



Final Report
Grant No. 12-25-B-1104
Specialty Crops Block Grant Program
Wisconsin Department of Agriculture,
Trade and Consumer Protection
Report Due Date: November 29, 2013

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Secretary

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INTRODUCTION

The Wisconsin Department of Agriculture received \$1,056,177 from the Specialty Crop Block Grant Program, Grant No. 12-25-B-1104. The Department was able to fund 23 projects to promote and improve specialty crops industries in the state of Wisconsin or the Midwest and funding a SCBG Manager to administer and promote the Specialty Crop Block Grant program. WI DATCP is using 10% of the funds to cover administrative costs for the finance department to track and disperse the funding.

Enclosed are the reports submitted by all 24 grantees.

Grant Projects:

- FY10FB-001 Prevention of sugar end defect in WI potatoes
- FY10FB-002 Assessing soil fumigation and fumigation alternatives in WI potato production
- FY10FB-003 Optimizing resource use in potatoes with drip irrigation
- FY10FB-004 Pest management strategies to replace Mancozeb and Diazinon for ginseng
- FY10FB-005 Wisconsin cranberry product electronic marketplace
- FY10FB-006 Market expansion for Wisconsin grown grapes
- FY10FB-008 Integrated systems to improve mint persistence in Wisconsin
- FY10FB-009 GAP/GHP cost share
- FY10FB-010 Grower-driven sustainability standards for cranberry production
- FY10FB-011 Developing alternative potato sprout inhibiting strategies to CIPC
- FY10FB-012 Cold hardy wine grape production in regions of Wisconsin
- FY10FB-013 Improving nitrogen use efficiency in sweet corn production
- FY10FB-014 Workshops for underserved fresh market growers
- FY10FB-015 Evaluation of automated sprinkler irrigation systems in cranberry
- FY10FB-016 Evaluating soil moisture probes for water use efficiency in cranberry beds
- FY10FB-017 Table grape trials for fresh market production
- FY10FB-018 Control of powdery mildew and leaf spot disease using low-risk pesticides
- FY10FB-019 Development of mobile post-harvest processing for hazelnut production
- FY10FB-020 Driftwatch – Wisconsin
- FY10FB-021 SavorWisconsin.com
- FY10FB-022 Putatively invasive plant taxa survey of Wisconsin nursery growers
- FY10FB-023 Optimizing calcium rates for pickles
- FY10FB-024 Specialty Crop Grants Specialist
- FY10FB-025 Perennial fruiting systems for a sustainable future
- FY10FB-026 Growing Wisconsin's Maple Syrup Industry

1) Wisconsin Potato and Vegetable Growers Association

Project Title: Prevention of sugar end defect in WI potatoes (FY10FB-001)

Total Amount Received: \$80,000

Date of Award: October 25, 2010

Project Contact(s): Karen Walters, AJ Bussan

Report Date: February 6, 2012

I. Project Summary

The Wisconsin potato industry has had price incentives to improve fry color of processing potatoes since 2006, but prior to 2010 did not reject potato lots because of unacceptable fry color. The economic loss to potato growers with rejected potatoes due to unacceptable fry color is significant, as spot market prices for fresh potatoes are much less than contract prices for processing potatoes. Managing sugars and fried color are key issues for McCain Foods, the largest processor of Wisconsin potatoes. Improved fry color and quality will likely improve the demand for Wisconsin produced processing potatoes and contribute to the economic success of the Plover, WI processing facility and ultimately Wisconsin potato growers. A reliable supply of high quality processing potatoes is needed to ensure the long-term economic health of the processed potato industry in Wisconsin.

The goal of this project was to improve the raw product value and improve finished product quality of processed potatoes by minimizing the negative effects of sugar end defect. Improved finished product quality increases the marketability of processed products from Wisconsin. Improved fry color of processed products lowers acrylamide levels and enhances processed potato product safety.

This project was first year funding through the SCBGP specific to sugar end defect and does not enhance previous research funding from the program directly. It does build upon preliminary research funded in 2009 through project titled *Potato Systems for Improved Management Efficiency and Improved Raw Product Quality*.

II. Project Approach

1) Conduct on-farm trials that demonstrate optimal management of irrigation, vine desiccation, and harvest timing:

A demonstration experiment was conducted at Hancock WI using Russet Burbank as the standard variety and Bannock Russet as an improved variety with lower propensity for sugar-end

defect formation. Plots were irrigated as needed throughout the 2011 growing season except that one or two sequential irrigation events were omitted for some rows during the period of early tuber bulking. Water deficit during this time of tuber development is one way to trigger sugar end formation in Russet Burbank. Plants that had missed one or two irrigation events were nearly indistinguishable from plants that had received full irrigation. Tuber tissue at the tuber stem-end and tuber bud-end was collected at harvest and after three months of storage at 55°F and will be used to assay for sugars, acid invertase activity, and relative abundance of acid invertase mRNA. Fry evaluations conducted at the same times are used to assess the degree to which sugar-end defects developed prior to harvest and during storage.

Furthermore, we have collected data on producer farms detailing irrigation scheduling output demonstrated by the figure on the following page. This is used to educate WI producers on appropriate irrigation scheduling during February 2012 grower education conference. Further data collection is underway with cooperating growers.

2) Develop raw product evaluation techniques that can be used after harvest to predict the likelihood of sugar end development in processing potatoes:

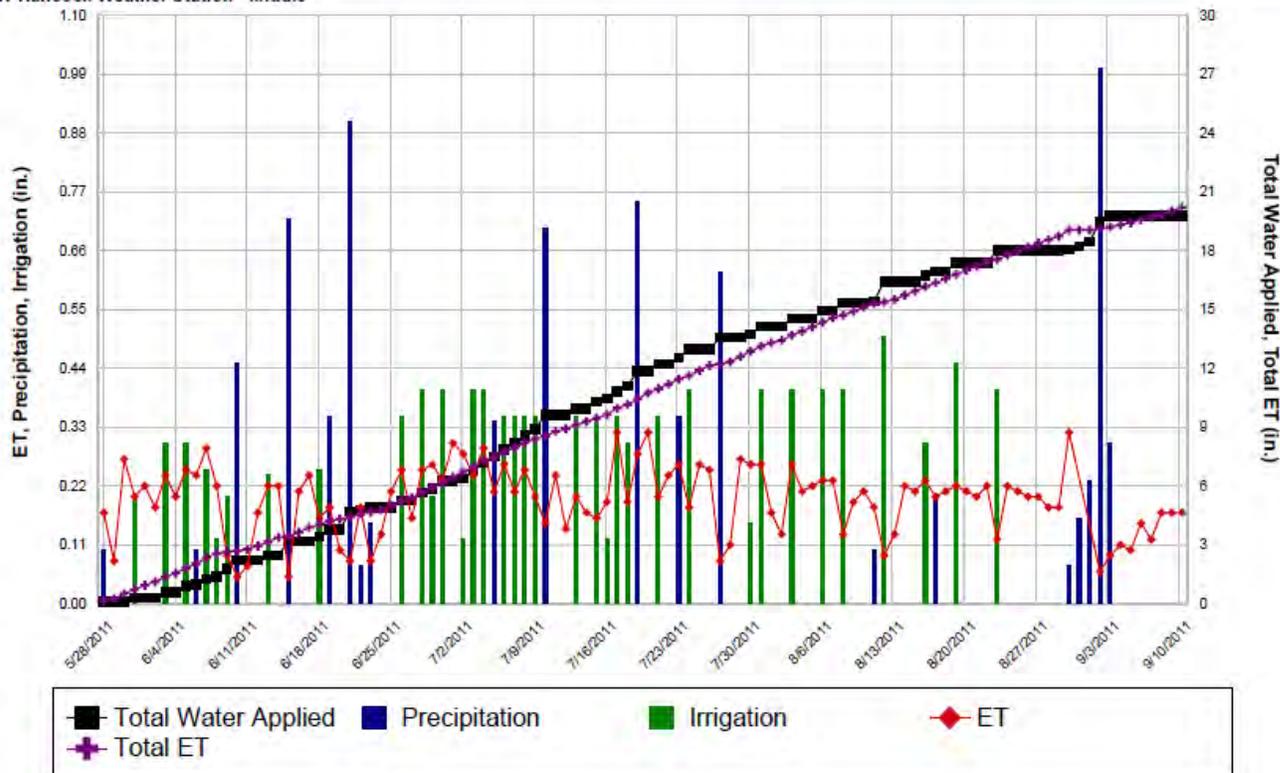
Methods to quantify acid invertase mRNA have been developed and validated through use with multiple fry and chip processing cultivars. All aspects of the procedure can be conducted with commercially available reagents.

3) Develop potato varieties with resistance to sugar end defect as well as cold-induced sweetening:

Lines of Russet Burbank that have had the acid invertase gene (*VInv*) silenced using RNA-interference have been assayed by quantitative PCR to establish the extent of *VInv* expression in leaf tissue. Of the 54 lines available, several have high amounts of suppression (>93%) and these lines are hypothesized to be much more resistant to sugar-end defect formation than Russet Burbank checks. Tubers have been harvested from some transformed plants, and additional plants are currently producing tubers. Tuber expression of *VInv* will be assayed after tubers have been placed into cold temperature storage to confirm effectiveness of the silencing approach. We plan to conduct small scale field trials in 2012 using a subset of these lines to demonstrate control of sugar-end defects. If successful, this demonstration will illustrate a clear path that can be followed to produce sugar-end defect resistant varieties using conventional breeding or biotechnology.

4) Screen available processing russet potato varieties for resistance to sugar end development:

We evaluated over 85 clones for general processing characteristics. Samples have been evaluated in storage of processing quality.



III. Goals and Outcomes Achieved

-Completed evaluation of irrigation practices by some processed potato growers. Waiting for broader irrigation information to help evaluate practices relative to soil moisture content

-Screened 85 breeding lines for yield, size, specific gravity, fry color, and sugar content under Wisconsin growing conditions. Lines are also being evaluated for acrylamide content.

-Developed several transformed lines of Russet Burbank with silenced Acid Invertase expression of over 93%. Field trials will be conducted to evaluate quality in WI.

Evaluating long term storage of Umatilla and Alpine in commercial scale storage trials in the SRF.

B. All goals were accomplished. We will continue grant in 2012. Furthermore, we received competitive funding in separate, but related project focused on mitigation of acrylamide in processing potatoes.

Goal: Improve raw product quality and decrease rejection rate of processed potatoes based on fry color.

Performance Measure: proportion of potatoes that are acceptable for processing.

Benchmark: 85% of potatoes grown for processing are acceptable and being processed.

Target: 100% of potatoes grown for processing are acceptable and processed

This year 100% of processed potatoes in Wisconsin have been accepted for processing. In fact, producers with issues related to quality in the past now have some of the best processing quality coming out of storage. In reality, Russet Burbank is highly susceptible to stress conditions that occur during the growing season. Russet Burbank growers have adopted practices related to irrigation management to reduce impacts of climate on sugar end and solid content of potatoes. However, extreme conditions were to reoccur could jeopardize this record going forward.

Goal: Varieties other than Russet Burbank are grown for processing.

Performance Measure: acres of potatoes planted for processing with varieties other than Russet Burbank

Benchmark: 15% of acres for processing are planted with Bannock Russet

Target: 50% of acres planted for processing are planted with varieties other than Russet Burbank or with genetically modified Russet Burbank within 5 years.

We are working with McCain foods in implementing production of varieties other than Russet Burbank. McCain has contracted production of 4 new varieties. These varieties were grown on nearly 2,000 acres of the 12,000 acres of processing potatoes grown. Expansion of new varieties is being planned including securing additional seed production to allow for more planted acres. These new varieties could increase total processing potato production in Wisconsin in the future.

IV. Beneficiaries

Beneficiaries include Wisconsin Potato Farms and their employees, allied industries and Wisconsin Potato Processors (primarily McCain Foods USA) and their employees.

This includes 100% of the processed potato growers in Wisconsin affecting roughly 12,000 acres. There are 42 processed potato farms in Wisconsin with 30% of crop processed into fries. Each farm employs 5 to 20 employees depending on farm size and time of year. Potato farms also support diverse and extensive associate industries including chemical suppliers, equipment dealers and manufacturers, irrigation companies, storage companies, technical advisors, potato seed growers and others. McCain Foods employs several hundred people at the potato processing plant in Plover. Increased quality of raw potatoes will improve plant efficiencies and economic returns insuring continuing positions or potentially leading to expanded processing volumes and more jobs. This will also potentially benefit Wisconsin Seed Growers as they move to sell the new varieties to processed potato growers.

Chip and processed growers will also benefit from successful USDA SCRI grant leveraged from this project.

V. Lessons Learned

Heat stress plays a substantial role in the development of sugar end defect in Russet Burbank. Heat also lowers solid content and specific gravity of potato also lowering processing quality.

To move forward and achieve substantial improvements in processing quality will require planting of transformed Russet Burbank that will still have unsatisfactory gravity, or identification of new varieties. Bannock is grown on nearly 1,000 acres. Umatilla production may increase to 25% of acres and possibly more if we can store long term.

Umatilla is susceptible to black spot bruise and subsequent infection by dry rot in storage. Umatilla must be harvested at pulp temperatures above 55 F to prevent bruising. Previous storage research in other regions has showed Umatilla can be stored at 45 F long-term and that is our current storage temperature set point.

VI. Additional Information

Photo of (left to right) standard russet Burbank and three silencing lines with 98, 96, and 96% silencing of vacuolar acid invertase in the leaf tissue.



VII. Contact Info

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2) Wisconsin Potato and Vegetable Growers Association

Project Title: Assessing soil fumigation and fumigation alternatives in WI potato production (FY10FB-002)

Total Amount Received: \$74,116

Date of Award: October 25, 2010

Project Contact(s): Karen Walters, Amanda Gevens

Report Date: July 23, 2012

I. Project Summary

In Wisconsin, potatoes are grown on approximately 63,000 acres and are the largest specialty crop industry in the state with an annual harvest of approximately 25 million cwt and a farm gate value of about \$246 million. One of the limiting factors in potato production is disease. Key soilborne pathogens include *Verticillium dahliae*, *Pratylenchus penetrans*, and *Streptomyces scabies*. While soil fumigation can be effective in limiting initial soil inoculum, it can be difficult to appropriately time and can be potentially harmful to workers and the environment. Further, the EPA is continually reviewing and revising use patterns and restrictions on soil fumigants including non-fumigated buffer zones, creating further challenges in implementation. As national leaders in integrating environmentally-responsible and sustainable production practices in potato, Wisconsin growers are interested in implementing alternatives to reduce, replace, or augment fumigation. However, for alternatives to be viable, they must be effective, have compatibility with current production practices, and be economical. We assessed the efficacy and feasibility of several fumigation, crop rotation, cover cropping, and cultural practices on soilborne disease control in this project. Treatment efficacy was determined by measuring pathogen density in soil, plant and tuber health, yield, soil nitrogen, and other soil factors. Our field trials were on cooperator farms, at the UW-ARS in Hancock, at the UW-Langlade County airport station, and we expanded the study into a multi-year project.

II. Project Approach

Our project, "Assessing the utility of soil fumigation and soil fumigation alternatives in Wisconsin potato production," was comprised of multiple field objectives both on UW research stations and on grower cooperator farms. All projects had critical involvement of Mr. Bryan Webster, UW-Plant Pathology Graduate Research Assistant, Dr. Stephen Jordan, UW-Plant Pathology Associate Researcher in Vegetable and Potato Pathology, and Mr. Kenneth C. Cleveland, UW-Plant Pathology Undergraduate Research Assistant.

In the fall of 2010, we established 3 trial sites for spring 2011 potato planting for the evaluation of fumigation on soilborne disease of potato. Establishment was necessary in the fall prior to production season of potato because fumigation requires a period of time for off-gassing prior to planting.

1) Metam sodium fumigation and alternative treatments (vine removal and cover crops) for *Verticillium* (PED) control of potato, 'Russet Norkotah,' at the Hancock Agricultural Research Station (HARS), Hancock, WI, Plot S25. This project was coordinated with UW-Plant Pathologists Drs. Doug Rouse (directed vine removal, manure treatments, and *Verticillium* soil assay) and Anne MacGuidwin (directed cover cropping treatments and conducted nematode assays).

A trial was established 22 May 2011 at the Hancock Agricultural Research Station, Hancock WI, to evaluate broadcast metam sodium (Vapam HL, AMVAC) soil fumigation, non-fumigant alternatives, vine removal, and cover crops for control of potato early dying, caused by the complex of the *Verticillium dahliae* fungus and *Pratylenchus penetrans* root lesion nematodes. Over several years, the yield enhancing and disease controlling effects of inputs across a typical potato rotation of potato-corn-soybean-potato will be assessed. As is commercially standard in northern conventional potato production, fumigation treatments of broadcast metam sodium (40 gal/acre) were applied in the fall of 2010. Fall fumigation is necessary due to inadequate early spring conditions for effective fumigation and limited time to allow for off-gassing prior to planting of a ≥ 120 day crop. Fungicide, fertility and insecticide programs were consistent with grower standards for the production region. The center two rows of each plot were harvested 22 Sep 2011. Tubers were graded into marketable (US#1), undersize, and cull categories on 29 Sep 2011. At date of vine kill, assigned 'vine removal' treatments were subjected to chopping and removal of vines. Disease pressure was moderate in this field. After harvest, the field was planted to cover crops for second phase of the experiment. Prior to first snowfall, cover crops were soil incorporated. Results, to date, reflect impact of soil fumigation and vine removal on yield (quality and quantity) and pathogen incidence in the soil (Table 1). Numerically, fall fumigation resulted in higher yielding plots. However, differences were not statistically significant. Vine removal enhanced yield for both fumigated and non-fumigated treatments, but was not statistically significant. Compared to the non-fumigated, non-vine removed control, the fumigated and vine removed treatment significantly increased total yield (Table 2). *Verticillium dahliae* is notoriously elusive in soil plating assays due to their slow growth and low numbers in soil (Figure 1). Our results indicate very low numbers of *V. dahliae* in the soil; no significant differences were resolved. Cover crop effects will not be recognized until evaluation of corn yield data in late summer 2012. The experimental field will rotate back to potato in 2014 after soybean in 2013.

** (No Specialty Crop Grant funds were used in the corn and soy assessments for this project.)

Table 1. Preliminary effects of fumigation, cover crop, and vine removal on potato, ‘Russet Burbank’, yield and soil pathogen status.

Treatment Number	Treatment	Marketable Yield	Total Yield (cwt/A)	Root Lesion Nematodes/ 100 cc soil	<i>Verticillium dahliae</i> colonies/g soil
1	Rye cover crop (<i>commercial standard practice without Vapam</i>)	109.1 b	472.5 ab*	110.5 bc	0
2	‘Caliente’ mustard cover crop	110.2 b	478.9 ab	66.5 abc	0
3	Tillage radish cover crop	115.1 ab	487.3 ab	78.0 abc	0
4	Vines removed; rye cover crop	119.1 ab	500.0 ab	140.0 c	0
5	Vines removed; ‘Caliente’ mustard cover crop	112.4 ab	462.4 b	23.3 ab	0
6	Vines removed; Tillage radish cover crop	125.0 ab	528.7 a	74.5 abc	0
7	Vapam; Rye cover crop (<i>commercial standard practice with Vapam</i>)	124.9 ab	523.2 ab	4.0 ab	0
8	Vapam; ‘Caliente’ mustard cover crop	116.9 ab	476.3 ab	20.3 ab	0
9	Vapam; Tillage radish cover crop	115.5 ab	496.4 ab	3.0 a	1
10	Vapam; Vines removed; Rye cover crop	116.5 ab	484.9 ab	3.3 ab	0
11	Vapam; Vines removed; ‘Caliente’ mustard cover crop	112.6 ab	489.5 ab	19.8 ab	1
12	Vapam; Vines removed; Tillage radish cover crop	129.2 a	535.3 a	1.5 a	0

*Column means with a letter in common or with no letter are not significantly different (Fisher’s LDS, $P=0.05$).

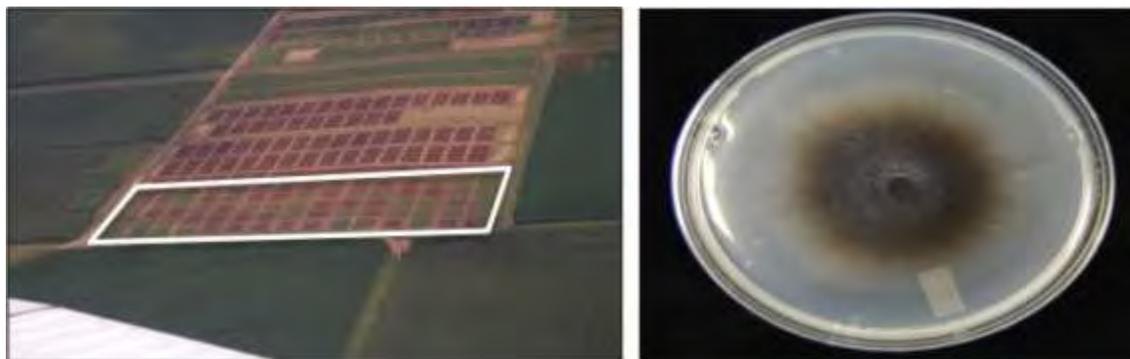


Figure 1. Aerial photo of potato fumigation alternatives trial at the UW-Hancock Agricultural Research Station (on left). Note vine removal treatments seen as bare ground in field marked in white. Picture is culture of *Verticillium dahliae* collected from soil in potato research field, 2011 (on right).

Table 2. Impact of metam sodium (Vapam HL 40 gal/acre) pre-season soil fumigation and pre-harvest vine removal on potato ('Russet Burbank') yield.

Treatment #	Treatment	Total yield (cwt/A)	% Marketable yield (cwt/A)
1	Control (No Vapam, No Vine Removal)	472.5 a*	86.9
2	Vine Removal	484.0 a	84.3
3	Vapam HL 40 gal/acre	502.6 ab	87.7
4	Vine Removal + Vapam HL 40 gal/acre	519.3 b	84.8

*Column means with a letter in common or with no letter are not significantly different (Fisher's LSD, $P=0.05$)

2) Chloropicrin fumigation evaluation for common scab control of potato, 'Pike,' on grower cooperator farm of John T. Schroeder of Antigo, WI. This project was coordinated with Dr. Chad Hutchinson of Tri-Est Ag Group, Inc. (chloropicrin manufacturers and applicators) and Mr. Alex Crockford of the UWEX Langlade County Research Station, Antigo, WI.

A trial was established at the grower cooperator seed potato farm of John T. Schroeder, Langlade County, WI, to evaluate fumigation efficacy for control of potato common scab. Approximately 2 oz seedpieces were cut mechanically on 5 May from 'Pike' tubers. Seedpieces were allowed to heal before planting. A randomized complete block design with four replications was used for the trial and treatment plots consisted of four 300-ft X 20.7-ft treated sections which aligned with approximately 8 potato rows. Fumigation treatments were applied on 30 September 2010 (Table 3). Tillage and planting of Pike seed was carried out as per grower standard practice. The soil type was Antigo silt loam and the field was maintained during the growing season according to standard grower practices. The center two rows of each plot were harvested 20 Sep 2011. Tubers were graded into US#1, undersize, and cull categories on 23 Sep 2011. After undersize tubers were graded out and tubers washed, but before scabbed tubers were removed, 20 tubers from each plot were chosen arbitrarily and assessed for scab incidence.

All of our treatments, with the exception of Trt 1, C-60 at 83 lb/A broadcast, yielded common scab incidence results that were not significantly different than the untreated control. The unexpected results indicated a failure of common scab control in this grower cooperator trial. It is hypothesized that the tillage practices that took place after application of the fumigant disturbed the treated soil zone, incorporating untreated, *S. scabies* infested soil into the potato hill. The US#1 yield of all treatments (mean of trts: 262.6 cwt/acre) was significantly greater than the untreated control (171.4 cwt/acre) (Table 4). This trial, on a grower cooperator farm, was intended to assess chloropicrin containing fumigants with and without a novel solvent. The solvent allows for a reduction in the amount of active ingredient utilized for equivalent disease control results. Results of this field trial indicated a negative interaction between fumigation treatment and tillage practices. This finding has driven a second year of research, located at the Langlade County Airport /UWEX research site to further investigate the interaction of tillage and chloropicrin fumigation. Results were extended to producers in Langlade County on October 13, 2011 at the Langlade County Airport/UWEX research farm. The progress of this objective is in line with expected timeline, as determined in original grant application.

Table 3. Fumigation treatments evaluated on grower cooperator farm in Antigo, WI, 2011.

Trt No.	Trade Name	Active Ingredient	Rate	Time of Fumigation
1	C-60 Pic	chloropicrin 60%	83 lb/A broadcast	30 Sep 2010
2	C-60 Pic	chloropicrin 60%	167 lb/A broadcast	30 Sep 2010
3	C-60 Pic	chloropicrin 60%	250 lb/A broadcast	30 Sep 2010
4	C-60 Pic	chloropicrin 60%	333 lb/A broadcast	30 Sep 2010
5	Pic Plus	chloropicrin 85% + proprietary solvent	117 lb/A broadcast	30 Sep 2010
6	Pic Plus	chloropicrin 85% + proprietary solvent	234 lb/A broadcast	30 Sep 2010
7	Pic Plus	chloropicrin 85% + proprietary solvent	351 lb/A broadcast	30 Sep 2010
8	Pic Plus	chloropicrin 85% + proprietary solvent	468 lb/A broadcast	30 Sep 2010
9	Untreated Control	NA	NA	NA

Table 4. Effect of treatments on yield, grade and incidence of common scab on tubers (treatment numbers as listed in Table 3).

Trt no.	Total cwt/A	US#1		Undersize ¹		Culls		Disease ² Incidence
		cwt/A	%	cwt/A	%	cwt/A	%	
1	308.0	250.4 bc ³	81.3%	34.1 a	11.1%	23.5 ab	7.6%	62.5% a
2	338.9	276.6 bc	81.6%	35.0 a	10.3%	27.3 ab	8.1%	72.5% ab
3	362.2	278.1 bc	76.8%	38.6 ab	10.6%	45.5 b	12.6%	81.3% ab
4	372.4	302.8 c	81.3%	34.1 a	9.2%	35.5 ab	9.5%	77.5% ab
5	296.8	232.0 b	78.2%	33.0 a	11.1%	31.8 ab	10.7%	83.8% ab
6	324.7	250.0 bc	77.0%	32.4 a	10.0%	42.3 ab	13.0%	77.5% ab
7	328.0	255.0 bc	77.7%	39.8 ab	12.1%	33.2 ab	10.1%	78.8% ab
8	305.8	248.1 bc	81.1%	33.9 a	11.1%	23.8 ab	7.8%	81.3% ab
9	240.1	171.4 a	71.4%	46.8 b	19.5%	21.9 a	9.1%	86.3% b

1. Undersize indicates potatoes <1 7/8" in diameter

2. The percentage (out of 20 tubers per treatment) with common scab symptoms

3. Analysis of variance was performed on each data set, and Fisher's protected least significant difference (LSD) was calculated (alpha=0.05).

3) Fumigation (metam sodium and chloropicrin) and in-furrow fungicide evaluation for common scab control of potato 'Yukon Gold,' at the UWEX Langlade County Airport research farm, Antigo WI. This project was coordinated with Mr. Alex Crockford of the UWEX Langlade County Research Station, Antigo, WI.

A trial was established 25 May at the Langlade County Research Area, Antigo, WI, to evaluate fungicide and fumigation efficacy for control of potato common scab. Approximately 2 oz seedpieces were cut mechanically on 15 May from US#1 Yukon Gold tubers. Seedpieces healed for 7 days before planting. A randomized complete block design with four replications was used for the trial and treatment plots consisted of four 40-ft-long rows spaced 36 in. apart with 12 in. spacing in the row. Fumigation treatments were applied in the fall of 2010. In-furrow chemical treatments were applied at planting. Furrows were mechanically covered using hilling disks. The soil type was Antigo silt loam and the field was maintained during the growing season

according to standard grower practices. To minimize soil compaction and damage to plants in rows used for foliar and yield evaluation, drive rows for pesticide application equipment were placed adjacent to plots. The foliar fungicide program included: Bravo Zn at 1.125 pt/acre on 5 Jul, Bravo Zn at 2.0 pt/acre on 12 & 26 Jul and 6 Sep, Quadris at 6 oz/acre + Bravo at 1.5 pt/acre on 19 Jul & 2 Aug, Bravo Zn at 2.0 pt/acre on 9 & 23 Aug, Tanos at 6 oz/acre + Bravo Zn at 1.5 pt/acre on 16 & 30 Aug, and Bravo Zn at 1.5 pt/acre on 9 & 13 Sep. Vines were chemically killed with Reglone 1.0 pt/acre on 2 and 9 Sep 2011. Fertility and insecticide programs were consistent with grower standards for the production region. The center two rows of each plot were harvested 17 Sep 2011. Tubers were graded into marketable (US#1), undersize, and cull categories on 23 Sep 2011. After undersize tubers were graded out and tubers washed, but before scabbed tubers are removed, 20 tubers from each plot were chosen arbitrarily and assessed for scab incidence and severity. Disease severity was rated on a scale of 0-3 with 0=no disease, 1=<10% surface area symptomatic, 2=10-25%, 3=>25%. An overall symptom severity was calculated for each plot by summing the severity rating of each tuber assessed for each plot. Precipitation for the site was 9.02 in from 25 May to 17 Sep 2011. Supplemental irrigation of 1 in was applied on 28 Jul.

Disease pressure was high in this field trial with 100% of tubers in the untreated control exhibiting common scab symptoms. Numerically, all treatments controlled common scab better than the untreated control, with treatments 2, 6, 7, and 9-14 having significantly less symptomatic tubers. Overall symptom severity ranged from 8.5 in treatment 10, to 39.3 in treatment 18. Treatments 2, 6, 7, 9, 10, 11, 12, and 14 had significantly less overall symptom severity than the untreated control. Marketable yield was greatest and significantly different from the untreated control in treatment 2, Vapam 40 gal/acre. But for treatment 15, there were no significant differences in cwt/acre of culls among treatments.

Table 5. Common scab incidence, severity, and resulting potato yield for 19 control programs evaluated on ‘Yukon Gold’ potato in Langlade County, WI, 2011.

Treatment and rate/A (application dates)	Symptomatic tubers ^z (%)	Overall symptom severity	Marketable yield (US#1) cwt/A	Culls cwt/A
1.Unfumigated control.....	100.0 f	37.3 efg	216.3 cdefg	43.3 ab
2.Vapam 40 gal (1).....	51.3 abcd	14.3 abc	284.6 h	24.0 ab
3.Blocker 10 pt (2).....	72.5 bcdef	24.0 abcdef	182.1 cdef	33.0 ab
4.Blocker 10 pt Mocap 15G 20 lb (2).....	68.8 abcdef	23.0 abcde	170.9 bcd	39.8 ab
5.Mocap 15G 20 lb (2).....	82.5 def	29.0 bcdef	171.1 bcd	47.6 ab
6.Blocker 10 pt NAA 0.33 oz (2).....	50.0 abcd	11.3 ab	232.5 defgh	19.2 a
7.TigerSul 1000 lb (2).....	56.3 abcde	16.8 abcd	211.9 cdefg	32.7 ab
8.Regalia 29 fl oz (2).....	76.3 cdef	25.0 abcdef	173.1 bcd	47.5 ab
9.Pic Plus 117 lb (1).....	51.3 abcd	12.8 abc	232.8 defgh	24.9 ab
10.Pic Plus 234 lb (1).....	37.5 a	8.5 a	228.6 defgh	25.8 ab
11.Pic Plus 351 lb (1).....	50.0 abcd	16.5 abcd	236.5 efg	43.3 ab
12.Pic-C60 167 lb (1).....	46.3 abc	11.5 ab	251.9 gh	26.1 ab
13.Pic-C60 250 lb (1).....	55.0 abcd	24.0 abcdef	244.1 fgh	31.9 ab
14.Pic-C60 333 lb (1).....	42.5 ab	9.5 a	257.4 gh	32.4 ab
15.Quadris 11.6 fl oz (2).....	98.8 f	47.5 g	96.8 a	89.3 c
16.Serenade Soil 64 floz (2)..	91.3 f	41.3 fg	161.2 bc	37.9 ab
17.Serenade Soil 128 floz (2)	88.8 ef	30.8 cdefg	164.3 bc	38.3 ab
18.Mocap 15G 20 lb NAA 0.33 oz (2).....	90.0 f	39.3 efg	114.0 ab	61.1 bc
19.AmegA 10 pt (2).....	82.5 def	33.8 defg	179.2 cde	42.6 ab

^zPercentage of assessed tubers symptomatic for common scab

^yColumn numbers followed by the same letter are not significantly different at P=0.05 as determined by Fisher’s Least Significant Difference test.

^xApplication date of treatments, 1=Fall fumigation 30 Sept 2010, 2=at planting 22 May 2011.

In the spring-summer of 2011, we established additional trial sites for the evaluation of soilborne disease control of potato.

1) In-furrow nematicide trial with Agri-Mek (abamectin) for control of root lesion nematodes (component of PED along with Verticillium) in grower cooperator field of Nick Somers of Plover River Farms, Stevens Point, WI on ‘Russet Norkotah. This project was coordinated with Dr. Russ Groves, UW-Entomology, and Dr. Jeffrey Krumm, Syngenta Crop Protection.

A grower cooperator research site was established in Stevens Point, WI to evaluate a non-fumigant alternative to control of diseases on ‘Russet Norkotah’ potatoes. The section of field under investigation did not receive metam sodium soil fumigation prior to planting. At-plant, the insecticide and nematicide, abamectin (Agri-Mek at 19.6 fl oz/acre), was applied over top of the seed piece prior to row cover. All production practices in the areas of pest and disease control, fertility, weed control, and irrigation were commercial standard for the farm. Soil was collected at emergence and at vine kill to determine populations of *Verticillium* spp. through established methods. There were no significant differences in yield or quality, or in the numbers of

Verticillium dahliae colony counts with application of abamectin when compared to the untreated, nonfumigated control (Table 3).

Table 6. Effects of in-furrow applied abamectin on pest, pathogen, and yield of potato ‘Russet Norkotah’ in Plover, Wisconsin, 2011.

Treatment	Root lesion or <i>Pratylenchus penetrans</i> , nematode counts (mean of 4 replications, 100 cc of soil)		<i>Verticillium dahliae</i> colony counts (mean of 4 replications, 100 cc of soil)		Mean total yield (100 ft of row harvested of each of 4 replications, no grade out)
	At emergence (6/9/2011)	At vine kill (8/5/2011)	At emergence (6/9/2011)	At vine kill (8/5/2011)	
Untreated control	100.5	26.25	0.0416	0	636.43 lb
Agri-Mek at 19.6 fl oz/acre rate, applied in-furrow, at planting	19.25	73.75	0.125	0	611.22 lb

2) In-furrow fungicide trial with in-furrow applications on ‘Russet Norkotah’ for control of *Rhizoctonia* at HARS, Hancock WI, Plot K19 West. This project was coordinated with Mr. Mick Holm of Dupont and Mr. Glenn Carlson, Field Trials Coordinator of the Hancock Agricultural Research Station, Hancock, WI.

Potatoes were planted 2 May to initiate a field trial at the Hancock Research Station in central WI to evaluate fungicide efficacy for control of potato black scurf. Approximately 2 oz seedpieces were cut mechanically on 27 Apr from US#1 ‘Russet Burbank’ tubers. Seedpieces were allowed to heal prior to planting. A randomized complete block design with four replications were used for the trial, and treatment plots consisted of four 24-ft-long rows spaced 36 in. apart with 15 in. spacing in the row. Drench treatments and seed treatments were applied at planting with 2 gallons of water with fungicide was applied per plot for in-furrow drench applications (Table 7). Standard farm practices were used during the growing season for weed and pest control, including foliar fungicides. Tubers were harvested on 14 September. Incidence of black scurf was determined from visual symptoms of 20 tubers after washing and grading. While disease severity was low for black scurf in this trial, incidence was moderate (Table 8). While numerically there were differences in yield and disease incidence among treatments, there were no statistical differences between treatments with respect to yield or disease at the 95% confidence level (Figure 2).

Table 7. Treatment and rates of fungicides evaluated as in-furrow, at-plant treatments to control *Rhizoctonia* on tubers at harvest of ‘Russet Norkotah’ in Hancock, 2011.

Trt #	Fungicide	Rate
1	Untreated Control (no fungicides)	NA
2	Tiger Sul (sulfur)	44 lb/A
3	MBI-10620	0.5 fl oz/1000 row ft
4	MBI-10620	1 fl oz/1000 row ft
5	MBI-10620	2 fl oz/1000 row ft
6	MBI-10620	0.8 oz/cwt
7	Vertisan EC (LEM17 EC)	0.7 fl oz/1000 row ft
8	Vertisan EC (LEM17 EC)	1.6 fl oz/1000 row ft
9	Picoxy SC	0.5 fl oz/1000 row ft
10	Picoxy SC	1.3 fl oz/1000 row ft
11	Q8y78 SC	1.6 fl oz/1000 row ft
12	Fontelis (LEM17 SC) seed trt + Vertisan EC (LEM 17 SC) in furrow)	0.3 fl oz/100 lb seed + 1.2 fl oz/1000 row ft
13	Fontelis (LEM17 SC)	0.6 fl oz/100 lb seed
14	Fontelis (LEM17 SC)	0.3 fl oz/100 lb seed
15	Quadris	0.6 fl oz/1000 row ft
16	Maxim MZ 6.2	8 oz/100 lb seed

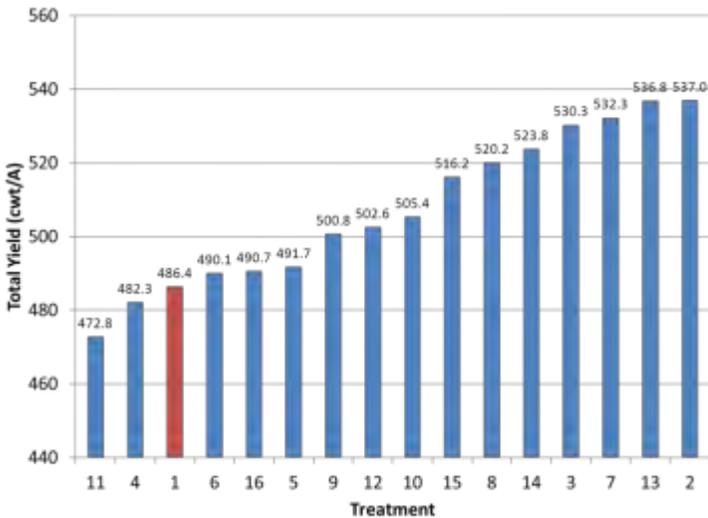


Figure 2. Total yield of tubers at harvest of ‘Russet Norkotah’ resulting from 16 treatment trial to evaluate control of *Rhizoctonia* in Hancock, WI, 2011.

Table 8. Yield, specific gravity, and Rhizoctonia incidence of tubers of ‘Russet Norkotah’ at harvest.

Trt No.	Total Yield	Culls		Bs		Total A		Specific Gravity	Rhizoctonia Incidence on Tubers (Black Scurf)
	cwt/A	weight	%	weight	%	weight	%		
1	486.4	19.5	4.1%	60.1	12.4%	406.8	83.5%	1.075	50.0%
2	537.0	25.4	4.8%	55.1	10.3%	456.5	84.9%	1.076	35.0%
3	530.3	23.6	4.4%	57.3	10.8%	449.5	84.7%	1.076	25.0%
4	482.3	26.7	5.6%	53.7	11.2%	401.8	83.2%	1.078	30.0%
5	491.7	16.6	3.3%	68.2	14.0%	407.0	82.6%	1.075	27.5%
6	490.1	17.2	3.6%	64.0	13.1%	408.8	83.4%	1.074	25.0%
7	532.3	19.7	3.7%	60.5	11.4%	452.1	84.9%	1.078	25.0%
8	520.2	22.2	4.3%	69.2	13.3%	428.8	82.5%	1.076	15.0%
9	500.8	16.8	3.3%	60.6	12.3%	423.5	84.3%	1.075	45.0%
10	505.4	16.9	3.3%	43.7	8.5%	444.8	88.2%	1.075	30.0%
11	472.8	20.9	4.3%	65.2	13.8%	386.8	81.8%	1.074	17.5%
12	502.6	23.8	4.7%	56.4	11.2%	422.4	84.1%	1.076	27.5%
13	536.8	16.4	3.0%	65.5	12.2%	455.0	84.8%	1.078	27.5%
14	523.8	30.3	5.8%	66.1	12.7%	427.4	81.6%	1.077	16.7%
15	516.2	23.9	4.6%	58.3	11.4%	434.0	84.0%	1.077	27.5%
16	490.7	22.4	4.7%	70.9	14.8%	397.4	80.5%	1.076	22.5%

In the fall of 2011, we established 2 trial sites for spring 2012 potato planting for the evaluation of fumigation and cover crops on soilborne disease control.

- 1) **Chloropicrin fumigation and tillage evaluation for Verticillium (PED) control of potato ‘Russet Norkotah,’ at the UWEX Langlade County Airport research farm, Antigo WI. This project was conducted with the collaboration of Mr. Alex Crockford of the UWEX Langlade County Research Station, Dr. A.J. Bussan, UW-Horticulture, and Dr. Chad Hutchinson of Tri-Est Ag Group, Inc. (chloropicrin manufacturers and applicators).**

Project is underway in Antigo. Beds were fumigated with chloropicrin (Pic Plus 140 lb a.i./acre) in fall of 2011 and ‘Russet Norkotah’ potatoes were planted in May 2012 after field received block treatment of tillage: moldboard plow, deep rip, chisel plow, and no till. No visual differences between tillage treatments are noted at this time.

- 2) **Cover crop rotational evaluation for Verticillium (PED) control in potato system at HARS, Hancock, WI, Plot S25. This project was coordinated with UW-Plant Pathologists Drs. Doug Rouse (directed vine removal, manure treatments, and Verticillium soil assay) and Anne MacGuidwin (directed cover cropping treatments and conducted nematode assays). This long term study is ongoing to evaluate rotational impacts of a 3-year rotation out of potato. The field will be back in potato in 2014, following a corn-bean-potato rotation.**

Trial is underway. Corn was planted in May 2012 and the crop is doing well under irrigation at the Hancock Agricultural Research Station. We anticipate planting of the bean rotation in 2013, followed by cover crop in fall of 2013 prior to 2014 potato year. These projects are mentioned even though they are currently underway because they are continued with funding from a 2011 Specialty Crop Block Grant.

** (No Specialty Crop Grant funds were used in the corn and soy assessments for this project.)

In the spring of 2012, we established 2 trial sites for the evaluation of fumigation and in-furrow fungicide treatments for the control of soilborne disease.

- 1) **In-furrow fungicide trial with in-furrow applications on 'Russet Norkotah' for control of Rhizoctonia at HARS, Hancock WI, Plot S4. This project was coordinated with several agrichemical representatives and Mr. Glenn Carlson, Field Trials Coordinator of the Hancock Agricultural Research Station, Hancock, WI.**

Trial is underway at the Hancock station. Good stand and healthy plants were observed in field visits last week (July 10, 2012).

- 2) **The role of fumigation (metam sodium and chloropicrin) and in-furrow fungicide evaluation for common scab control of potato 'Yukon Gold,' at the UWEX Langlade County Airport research farm, Antigo WI. This project was coordinated with Mr. Alex Crockford of the UWEX Langlade County Research Station, Antigo, WI.**

Trial is underway at the Langlade airport research station. Heavy rainfall on June 18-21, 2012 created some production challenges, including some lower stem rotting and progression of Verticillium due to damaged root tissue. No foliar disease has been noted. These projects are also mentioned in this final report even though they are currently underway because they are continued with funding from a 2011 Specialty Crop Block Grant.

Dissemination of results to growers has been very successful. Three presentations were given two to the Wisconsin Potato and Vegetable Growers and WI Seed Potato Improvement Associations, six articles were published in peer reviewed journals, trade magazines, extension newsletters, and educational meeting proceeding, and information was posted on two University of Wisconsin grower-focused websites. See *Section III. Goals and Outcomes* and *Section VI. Additional Information* for details on presentations and articles such as dates, attendance, and circulation.

III. Goals and Outcomes Achieved

Multiple field trials were established and conducted in order to achieve the performance goals and measurable outcomes for the project which included evaluation and comparison of fumigation, fungicide (biological and conventional), and cultural methods of soilborne disease control in potato systems of Wisconsin. Common scab, Potato early dying, and Rhizoctonia diseases were studied in this project because shifts in management programs of one soilborne disease have impact on the others. Results of this work address both short term information needs on comparative product and program performance, and long term information needs as we progress through our multi-year rotational experiment at the Hancock Agricultural Research Station. Outcomes of fumigation and rotation studies are long term and progress, to date, has been reported in previous section.

Information has been provided to producers in the state of Wisconsin through various outlets and venues including presentations at the 2011 and 2012 UWEX-WPVGA Grower Educational Meeting in Stevens Point, WI with 60 and 100 participants attending the presentations; the 2011 and 2012 Wisconsin Crop Management Conference in Madison, WI with 1598 and 1505 attending respectively, and the UW Vegetable Crop Updates newsletters in 2011 and 2012. Our UWEX Vegetable Crop Updates newsletter was directly emailed to over 1500 recipients at the Univ. of WI, WI Potato and Vegetable Growers Association, Midwest Food Processors Association, and Organic Valley. Email recipients typically forward on our newsletter to an extended direct email outreach of over 3000 recipients across the region and U.S. for a total of 4500 recipients/weekly newsletter. In addition, the newsletters have been viewed by anywhere from 18-350 people monthly since their posting on the UW Plant Pathology website.

B. Provide a comparison of actual accomplishments with the goals established for the reporting period.

We generated data indicating relative efficacy of management programs for common scab, PED, and Rhizoctonia. This information has been directly consumed by growers and has impacted selection of disease control products and approaches in Wisconsin. This result is consistent with our anticipated goal of shifting best management strategies with respect to fumigants and fumigant alternatives for soilborne disease control. As we are still working through our rotational and vine removal study, we do not yet have data to share with producers supporting transition to fumigation alternatives such as rotation, cover crops, or vine removal. We continue to strive for a 10% grower shift in management strategies to include fumigant alternatives with our further efforts.

The core purpose of this project addresses the economic, environmental, and social sustainability of the Wisconsin potato industry. Maintenance of at least 95% of current acreage and productivity was seen and indicates success.

IV. Beneficiaries

This project has directly benefited multiple sectors of the WI potato industry. Results of our efforts have generated enhanced disease management recommendations to increase pest management and raw product quality of WI potatoes and have improved our competitiveness in the marketplace and value of finished products by the processing, chipping, seed, and fresh

market sectors. WI potato growers are direct beneficiaries through improved pest management with decreased cost of pesticides, improved crop value through enhanced quality, and increased and stable market opportunities. Potato processors and chippers will benefit through increase recovery and finished product quality. Potato farms have multiple employees that support crop production and storage. Full time employees commonly receive fair wages and health benefits. In addition to growers, processors such as McCain, Frito Lay, Kettle Foods, Alsum Produce, Okray Family Farms, Russet Potato Exchange, Bushman's Inc. and others employ hundreds of Wisconsin residents.

Nearly all Wisconsin potato farms, processors, and allied industries have benefited. Several potato farms grow processing vegetables and other specialty crops essential for diversification of the Wisconsin agricultural industries. Over 2,000 Wisconsin residents from nearly 100 hundred businesses work within the potato industry.

Maintenance of the potato industry at its current acreage and production with a total value of more than \$250 million dollars impacts the farm gate value of Wisconsin agriculture. Improved competitiveness of potato processing industries through enhance end product quality provides employment opportunities for several hundred residents. Value of sustainably produced or locally produced potatoes is uncertain, but the Wisconsin potato industry is well positioned to capture the value with the Healthy Grown program and location with 250 mi radius of 25 million US citizens.

This project is essential for the financial stability and future growth of the Wisconsin potato industry. Farm gate value of potato is typically more than \$250 million with value added through processing of nearly \$1 billion.

V. Lessons Learned

We have experienced no delays in our programming. Due to uncertainty of multi-year funding for this work, we have had to limit one of our objectives, the potato vine removal study. Potato fields that were scheduled to be vine-removed in 2011 would not be in potatoes again until 2014, at the earliest. To accommodate this objective of the research we will assess *Verticillium* soil populations in 2012 of vine removal treatments that were included in the Hancock Agricultural Research Farm experiment. While we will have no potato crop evaluation of this removal in the next rotation, we will learn something of the impact of *Verticillium* population after vine removal effect. Fumigation and cover cropping research is multi-year in nature and may vary by production region, making research endeavors hard to fund over time and geography.

VI. Additional Information

Peer reviewed journals

Jordan, S.A., Webster, B.J., Crockford, A., **Gevens, A.J.** 2012. Evaluating fumigation and at-plant treatments for control of potato common scab in Wisconsin, 2011. Plant Disease Management Reports 6:V096. Online publication. doi: 10.1094/PDMR06.
<http://www.plantmanagementnetwork.org/pub/trial/pdmr/reports/2012/V096.pdf>

Educational meeting proceedings

Webster, B.J., Jordan S.A., **Gevens, A.J.** 2012. Potato fumigation alternatives. University of Wisconsin Extension-Wisconsin Potato & Vegetable Growers Association Grower Education Conference. Holiday Inn Hotel & Conference Center. Educational Conference Proceedings. (Online Proceedings).

Gevens, A.J., Webster, B.J., Jordan, S.A., Crockford, A. 2012 Evaluation of fumigation and in-furrow fungicides for control of potato common scab. University of Wisconsin Extension-Wisconsin Potato & Vegetable Growers Association Grower Education Conference. Holiday Inn Hotel & Conference Center. Educational Conference Proceedings. (Online Proceedings).

Trade magazines

Gevens, A.J., Webster, B.J., Jordan, S.A., Crockford, A. 2012. Common Scab 2011: Evaluating fumigation and at-plant treatments. Potato Grower Magazine. Volume 41 (4):28.

Oral presentations

Webster, B.J., Jordan S.A., **Gevens, A.J.** 2012. Potato fumigation alternatives. University of Wisconsin Extension-Wisconsin Potato & Vegetable Growers Association Grower Education Conference. Holiday Inn Hotel & Conference Center. Stevens Point, WI. January 31. 60 attendees.

Gevens, A.J., Webster, B.J., Jordan, S.A., Crockford, A. 2012 Evaluation of fumigation and in-furrow fungicides for control of potato common scab. University of Wisconsin Extension-Wisconsin Potato & Vegetable Growers Association Grower Education Conference. Stevens Point, WI. February 1. 100 attendees.

Gevens, A.J., Jordan, S., Webster, B., Crockford, A. 2012. Evaluating Fumigation and In-furrow Treatments for the Control of Potato Common Scab. Wisconsin Seed Potato Improvement Association, Inc. 52nd Annual Meeting. North Star Lanes, Antigo, WI. January 25 (3:00-3:15PM). 80 attendees.

Extension newsletters

Gevens, A. J. 2012. Vegetable Disease Updates. University of Wisconsin Extension. Wisconsin Crop Manager. March-Present. Contributor of 16 articles to date. Editor 2011-current. Online newsletter.

Gevens, A. J. 2011. Vegetable Disease Updates. University of Wisconsin Extension. Wisconsin Crop Manager. February-Present. 18 articles. Online newsletter.

Website resources offering relevant information

University of Wisconsin Potato and Vegetable Pathology Website
<http://www.plantpath.wisc.edu/wivegdis/>

University of Wisconsin Vegetable Production Team Website
<http://vegetables.wisc.edu/>

VII. Contact Info

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3) Wisconsin Potato and Vegetable Growers Association

Project Title: Optimizing resource use in potatoes with drip irrigation (FY10FB-003)

Total Amount Received: \$70,000

Date of Award: October 25, 2010

Project Contact(s): Karen Walters, AJ Bussan

Report Date: January 31, 2013

I. Project Summary

Wisconsin potato production requires intensive management of water, nutrients and pests to optimize yield and quality. Documented reductions in groundwater depth in Central Wisconsin have concerned the public as well as growers. The finding of pesticides and nitrates in the groundwater in Central Wisconsin also creates concern about the impact of farming systems on water quality. Long-term sustainability of the potato and vegetable industry in Central Wisconsin will require modified production systems to improve resource use efficiency and optimize production and preservation and enhancement of groundwater resources. The goal of this research is to develop potato production systems with drip irrigation and bed configuration to improve water and resource use efficiency. Specific objectives will 1) evaluate the yield and quality of potatoes in response to plant population in bed planted versus hilled potatoes, 2) evaluate the water and nutrient use efficiency of sprinkler versus drip irrigated potatoes, 3) evaluated the effects of deficit irrigation on yield and quality of fresh market and processed potatoes, and 4) evaluate the efficacy of insecticides delivered through drip irrigation systems compared to in-furrow applications at planting. These objectives were initiated in commercial scale, on-farm research trials near Coloma, WI, in 2010 and current results are reported here. Continuing research funded by a 2011 SCBG will validate results under lower precipitation conditions and implement nitrogen management trials as a component of the trial in combination with drip irrigation system. Furthermore, a survey will be conducted on irrigation management by growers and means for lower consumptive water use in potato will be explored.

II. Project Approach

PROJECT OBJECTIVES

The goal of this research is to develop potato production systems with drip irrigation and bed configuration to improve water and resource use efficiency. Specific objectives include:

- 1) Evaluate the yield and quality of potatoes in response to plant population in bed planted versus hilled potatoes.

- 2) Evaluate the water and nutrient use efficiency of sprinkler versus drip irrigated potatoes.
- 3) Evaluate the effects of deficit irrigation on yield and quality of fresh market and processed potatoes
- 4) Evaluate the efficacy of insecticides delivered through drip irrigation systems compared to in-furrow applications at planting.

Activities performed to date:

Objective 1. We conducted on-farm research evaluating the impacts of bedding versus hilling of potatoes under drip and sprinkler irrigation during 2010 at Coloma Farms. This included evaluation of yield, quality (grade, size, sugar end, storability, solids, etc...), water movement through the beds and hills, and soil temperature. We conducted this experiment under 3 different densities of potato at planting. We repeated this experiment at Coloma Farms in 2011 but only at one density and under sprinkler irrigation. These were commercial scale trials with research area of 14 and 7 acres across years. Volumetric soil moisture was collected every 15 minutes with TDR probes placed at 3 to 6 locations within the potato hills and beds. Thermocouples were placed adjaced to each thermocouple. Yields were taken by harvesting 10 foot of row and 5 foot length of the bed. We also measured yields with commercial scale harvester and weighed trucks. Potato quality assessments included tuber size distribution, specific gravity, internal defects, and sugar content of potatoes at harvest and from storage. We are currently evaluating the data but preliminary results suggest improved yields within the beds with little impact on size distribution. We have not evaluated the sugar data yet and are still conducting final analyses. We conducted this experiment under 3 different densities of potato at planting.

In 2011, drip irrigation trials were repeated at Isherwood Family Farms and bed forming experiments were conducted at Coloma Family Farms. Drip irrigation trials included data collection consistent with 2010 experiments except no storage sugars were evaluated.

In 2012, a small plot trial was conducted at Hancock Agricultural Research Station evaluating response of Russet Norkotah (fresh market potato) and Snowden (chipping potato) to multiple seeding rates in beds and hills. This trial was conducted to optimize density of the trials and more closely evaluate water in hills and beds.

Objective 2. We conducted commercial scale comparisons of sprinkler and drip irrigation at Coloma Farms in 2010 and Isherwood Family Farms in 2011. Data included soil moisture, soil temperature, yield, and quality.

Small plot trials were evaluated on Hancock Ag Research Station in 2012 evaluating drip versus sprinkler irrigation. Results are still being compiled for evaluation.

Objective 3. We set up drip irrigation systems to implement deficit irrigation in 2010 and 2011 trials. Deficit irrigation was not possible in 2010 due to frequent rains through July and August. In 2011, a third of the drip irrigation treatment received 15% less water than standard irrigation based on ET.

In 2012, drip irrigation received 75, 85, and 100% of ET. Irrigation management was maintained at this level throughout the year.

Objective 4. Insecticide trial was conducted on Coloma Farms during 2010. The southern half of the pivot received standard in furrow insecticide treatments with subsequent foliar treatments. Furthermore, the northern quarter of the pivot received treatment designed to incorporate the insecticide with irrigation according to label at the time of first generation beetle egg laying. Insecticide was injected through drip irrigation treatment at the same time. Injection through drip irrigation increased residual activity with one exception. In treatment with irrigation drip lines spaced every other row, insecticide efficacy was inadequate.

Many of the results to date are incomplete. This is first year of 2 year project and full results will be made available as the objectives are completed.

Outreach efforts have been substantial with this project. Bussan was interviewed by Wisconsin Public Radio before funding was awarded due to rapid implementation of project during summer of 2010. Field tours were held during summer of 2010, 2011, and 2012 to show growers and non-farmers efforts being deployed to improve the water resource management. Project outcomes were shared during the Wisconsin Potato Grower Education Conference in February 2012 and 2013. The Water Task Force is coordinating efforts across multiple aspects of water management including the demonstration projects using the bed potato planter. In addition, there is substantial interest in evaluating deep buried drip irrigation as a means for utilizing this water conserving strategy without the effort of laying and retrieving the drip line every year. Articles have not been completed yet due to incomplete research results. The p.d. is nervous about rapid escalation of technologies and deployment at commercial levels, but growers are encouraged by preliminary results.

Over 50 growers and community members have seen drip irrigation and bedding efforts in the field

Over 100 non growers toured plots at Hancock as part of water resource tour

Over 200 growers saw presentations at Wisconsin Potato Grower Education conference in 2012 and 2013.

III. Goals and Outcomes Achieved

Goal 1:	Improve water and resource use efficiency of potato production in Central Wisconsin.
Performance Measure:	Yield and potato value per inch of applied irrigation water and per kWatt of electricity for irrigation pumping.
Benchmark:	Yield and potato value per inch or kWatt in sprinkler irrigated and hilled potato.
Target:	Improve yield and potato value per inch or kWatt by 5 to 10% with drip irrigation and bed planting.
Data Source:	Yield and market value of potato and water and electrical usage from irrigation monitoring in field scale research at Coloma Farms.
Data Collection:	Yield and quality data will be collected from plots and in commercial harvest. Value will be quantified by marketing potatoes from different treatments. Water and electrical usage for pumping will be metered from commercial irrigation well.

Data usage:	Crop value will be used to determine profit over cost of bed planting, increased seed costs, and drip irrigation.
Accomplishments:	Yield of potatoes at Isherwoods with drip irrigation was identical with sprinkler irrigation. Furthermore, irrigation with 85% less water led to yields that were identical to irrigation at full ET. With drip irrigation at HARS in 2012, yields were reduced compared to sprinkler irrigation. We believe this was due to over irrigation in many plots leading to leaching of nutrients.
	At Coloma Farms in 2010, drip irrigation was treated with almost 50 lb/a less nitrogen which greatly reduced potential impacts on the environment and indirect energy consumption by 20 to 25%.
Goal 2:	Refine/replace insect management programs in Upper Midwest potato production with decreased reliance on foliar sprays.
Performance Measure:	Reduce use of broad spectrum insecticides (e.g. endosulfan, phosmet, synthetic pyrethroids) with and economic viability of reduced risk delivery systems.
Benchmark:	Economic value of broad spectrum insecticides that pose worker exposure, environmental and non-target risks
Target:	Increased profitability of lower risk systemic insecticides applied in furrow or through drip irrigation systems leads to reduced use of and other products.
Data Collection:	Yield and quality data from plots and commercial harvest and crop value assessed through commercial marketing. NASS data will assess endosulfan, phosmet, and synthetic pyrethroids use.
Data Usage:	Crop value will be used to determine increased profits of low risk pest management programs.
Accomplishments	Endosulfan, phosmet, and pyrethroid use has been greatly reduced over past several years. In part this is due to discovery of new low risk pesticides including the anthrylic diamides.
	Drip irrigation has been shown to reduce pesticide use by at least 50% in multiple crops including potato.

B. Provide a comparison of actual accomplishments with the goals established for the reporting period.

At this point no potato farms have adopted drip irrigation as a means for watering potatoes. Cost and labor requirements are prohibitive and a barrier to adoption. If water becomes restricted/limiting or has greatly increased value than drip will become a potential tool for improve irrigation.

Growing potatoes in bed has become of high interest to many growers. Growers are currently working to obtain and commercial scale bed planter. The planter may be used of 5 to 8

commercial potato farms. Several farms are discussing planting of 80 or more acres to beds during the summer of 2013. No commercial planting of beds was done prior to 2013.

This is a 2 year project with the 2nd year being funded by a 2011 SCBG so it will not be completed until after summer of 2013. Potential impacts from beds could be substantial in short term, but drip irrigation economics need to be improved before it will be practical. Research and demonstration will continue to provide critical data for growers to make informed decisions.

IV. Beneficiaries

Wisconsin potato growers: improved production efficiency should improve yield per acre and therefore production efficiency. Lower costs will improve profit margin. Early results suggests that 10 to 15% yield improvements are possible. Immediate impacts could be up to 5 growers in 2013. If demonstration trials are successful, this could quickly expand to many more of Wisconsin's 120+ potato farms as well as other Wisconsin and Midwest farmers who include potatoes as one of their many crops.

Wisconsin residents: improved yields will improve potato production efficiency reducing water and nutrient use in the crop with the largest resource demand. This will decrease acres of potatoes and potential decrease impacts on ground and surface waters. Over 100,000 people live in Central Wisconsin and all would benefit from improved water resource management. There are over 200,000 people that visit the region as tourist on an annual basis.

V. Lessons Learned

We have learned a great deal on the management of drip irrigation. Nearly a dozen presentation have been made on drip irrigation to hops, fresh market vegetable, and berry growers over the past 24 months. The impact has affected far more producers than just the vegetable growers.

We have also learned how to manage the bed planting and harvest operations. We have modified the bed planting process to decrease the greening of potatoes and increase recovery. We have also discovered that the bed planting alone could potentially reduce water use by 5 to 10% and the nitrogen fertilizer by 20 to 40% with little effect on yield. This is because water and therefore nutrients remain in the root zone better in bedded potatoes vs. hills.

VI. Additional Information

Publications are pending. Specifically bulletins on drip irrigation and bed planting in potatoes. Further research publications are still in progress.

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4) Ginseng Board of Wisconsin

Project Title: Pest management strategies to replace Mancozeb and Diazinon for ginseng (FY10FB-004)

Total Amount Received: \$68,230

Date of Award: October 25, 2010

Project Contact(s): Rachel Tate, Russell Groves

Report Date: January 31, 2012

I. Project Summary

The primary focus of the project was to reduce the overall amount of pesticides (fungicides/insecticides) applied to ginseng each year that are identified by FQPA as high risk. This goal was to be reached with two objectives: 1.) To implement reduced-risk, pest management programs that reduce the amount of pesticides applied to ginseng by 20% and 2.) To incorporate at least one newly-registered product into their pest management programs in the first year of the study. Several new fungicides effective against *Alternaria panax* have been registered in recent years, however the growers were not familiar with these new products and their effectiveness. Introducing growers to these new fungicides and disseminating important information (new pesticide registrations, disease/insect updates) to growers were specific needs in this industry.

Alternaria panax is the most common pathogen of ginseng throughout the world. It can attack shoots, leaves, and stems on plants of all ages. The leaf blight includes lesions with yellow-green haloes, dark brown margins and pale brown centers. Stems can also become blighted and collapse. The potential for repeated widespread epidemics is great because *A. panax* produces large numbers of conidia (spores) on the surface of diseased leaves and stems. When weather is favorable (humid and wet), blight symptoms and conidial production can occur every 5 to 7 days. Outbreaks of *A. panax* in one season increase the potential for epidemics in subsequent seasons, since the fungus overwinters in the infested plant debris. In the spring, overwintered conidia spread to newly emerging plants via rain splash and initiate the disease cycle for the new growing season. Conidia move via air currents, resulting in pathogen spread from diseased gardens to nearby healthy gardens. If *Alternaria* leaf and stem blight is not controlled, it can reach epidemic proportions within a month causing complete defoliation reduces root yield and quality. Defoliation of young plants increases their susceptibility to winter kill. The yield losses reported by Wisconsin growers when disease is uncontrolled range from 50 to 100%, with the majority of those surveyed reporting losses of 75 to 100%. In addition, *Alternaria* leaf and stem blight can damage or destroy the seed crop normally harvested from 3-year-old ginseng gardens. *B. cinerea* is common and thrives on dead or senescing plant tissue available in a ginseng garden.

Also called gray mold, this fungus is the same pathogen that causes crop loss on greenhouse bedding plants, cut flowers and many vegetables and fruits. *B. cinerea* is a pathogen of foliage, flowers and seeds, resulting in reduced seed yields.

Fungicides are relied on to manage disease and are applied every 5 to 7 days from early May through September. The Wisconsin ginseng industry is reliant on mancozeb, an EBDC fungicide the EPA classifies as a probable human (B2) carcinogen (high rate of thyroid cancer in rat studies). Wisconsin ginseng growers have received a Specific Exemption for this fungicide for the last 17 years. Fungicides classified as B2 carcinogens are high priorities to be reviewed by EPA under the Food Quality Protection Act (FQPA) (www.epa.gov/pesticides/reregistration/status.htm). Strobilurin fungicides, azoxystrobin (Quadris) and pyraclostrobin (Cabrio), are registered for controlling *A. panax* on ginseng. Besides exceptional efficacy against *Alternaria* spp., these strobilurins have very low mammalian toxicity and are environmentally friendly. However, the chemistry and mode of action of these fungicides make them very vulnerable to the development of resistance in target fungal populations; repeated applications with these materials alone are not advised. In recent years, working with IR-4, the industry has gained the registration of fluazinam (Omega) and pyraclostrobin/boscalid (Endura). Also in the IR-4 pipeline for submission to EPA for future registration is pyrimethanil (Scala).

Insect and arthropod pests, which impact ginseng, are often considered a significant issue during stand establishment or during the early portion of the growing season when the crop is emerging from over-wintering. A complex of Lepidopteran and Coleopteran pests are considered the key pest species that affect the crop during these vulnerable periods. Specifically, cutworms are the larval stages of several species of nocturnal moths that can be easily recognized by their habit of curling into a “C-shaped grub” when disturbed. Of particular interest, the variegated cutworm (*Peridroma saucia*) has been noted as a major pest of concern for ginseng growers, especially in the first year of production or stand establishment. Migrating larvae are known to feed in the evenings on stems of young plants, girdling and chewing the tops as they emerge. Some species have been documented to overwinter as eggs in the region, whereas some adults are migratory and migrate from southerly latitudes annually. As a result of their dispersal into the crop from outside the field, most damage in ginseng occurs on the outer edges of the garden and damage is described as a wilted, young 1- or 2-year old plant that has fallen over.

An additional set of problematic insects in the root-feeding guild include immature stages of beetle pests such as wireworms and white grubs and fly pests including seed corn maggot. Wireworms are yellowish-brown, shiny, slender, hard-bodied immature insects that can reach up to 1” in length and ultimately molt into adult beetles easily recognized as click beetles. White grubs are also immature life stages that eventually molt into the familiar May and June beetles present during mid-summer. Both insects have complex lifecycles that may last 2-4 years in the immature stages which can dramatically increase the risk of damage in a root crop like ginseng. Both wireworms and white grubs can bore into seeds and developing seedlings, causing direct quality losses or even complete destruction of the developing plant. The larvae of seed corn maggots develop in the soil and burrow within seeds or feed on the cotyledon emerging from seeds. In very heavy infestations, these insects will feed on established stands continuing to cause direct economic losses as well as infection courts for soil-borne diseases.

Similar to the currently available fungicide options, broad spectrum, soil-applied insecticides continue to be relied upon to obtain adequate control of this combination of damaging foliar and root-feeding insect pests. In particular, Diazinon Ag600WBC, an organophosphate insecticide currently labeled on ginseng, is consistently used as a broadcast application against these target pests. In past Re-registration Eligibility Decisions (RED) of diazinon, restrictions were placed on all indoor and outdoor residential uses (2004). Pending reviews for this active ingredient were recently opened in 2008 (http://www.epa.gov/oppsrrd1/registration_review) and the projected RED registration review timeline will be resolved by 2012-13 under section 4(g)(2)(A) of FIFRA. Concerns regarding the re-evaluation are based on recent monitoring surveys and ecological risk studies revealing the widespread presence of organophosphate residues in agricultural and urban dominated waterways. Under section 4 of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), US EPA continues to re-evaluate existing pesticides to ensure that they meet current scientific and regulatory standards. These compounds are broadly characterized as having a wide spectrum of activity often with acute oral neurotoxicity to mammals, notable chronic effects, and are classified as both mutagenic and carcinogenic. With the advent of novel, reduced risk, and less broad spectrum registrations for several foliage and root-feeding insects (e.g. neonicotinoids (several registrations), anthranillic diamides (Coragen), and synthetic pyrethroids (bifenthrin), the continued RED eligibility of this important class of insecticides could be in jeopardy.

As these new products are proven effective and become available to ginseng growers, they need to be adopted by the industry and integrated into more comprehensive pest management programs. Our proposed product will demonstrate to customers that newly-registered fungicides and insecticides can reduce infection and infestation while limiting the number of applications when compared with using older products such as mancozeb or diazinon. The proposed product will also introduce growers to the advantage of applying products only when needed (scouting, disease forecasting) compared with current calendar-based application standards (5 to 7-day intervals). This could reduce the overall cost to customers, limit non-target effects, and reduce worker exposure, while also limiting the total amount of high risk pesticides applied yearly.

II. Project Approach

To determine the effectiveness of newly or soon to be registered fungicides, seven experiments were placed at grower cooperators' ginseng gardens in Wisconsin from 2010-2011. These experiments compared several reduced-risk fungicides with the grower standard controls. Results showed that newly registered products Omega (fluazinam), Switch (fludioxonil + cyprodinil), Endura (boscalid), and Cabrio (pyraclostrobin) were as effective or more effective when compared to the older industry standards which are B2 carcinogens, such as Dithane (mancozeb) and Bravo (chlorothalonil). Two experiments were conducted to determine if the timing of applications could be based on scouting for initial disease infection. The importance of early season applications and shorter spray intervals for protection of the foliage and berries (seeds) was evident in 2011. When treatments were started after initial infections were observed, disease pressure reached devastating levels by the end of July. Given this data, it appears that a calendar-based spray interval of every 7 days is necessary to yield a harvestable seed crop. However, inclusion of the new, safer fungicides may reduce the amount of B2 carcinogenic fungicides applied each year. In 2012, a new fungicide, Fontelis (penthiopyrad), will be

available to growers for the control of several diseases, including *Alternaria* blight, on ginseng. In 2011, two trials were conducted to determine the effectiveness of this new fungicide. Although this new product may have a fit as a tool against certain root rot diseases, data from our trials concluded that this product will not be a useful tool against *Alternaria* blight.

Table 1. Efficacy of newly registered and experimental fungicides to control *Alternaria* blight on ginseng.

Treatment and rate/A, applied at 7-day intervals	Infected plants (no.)		
	30 Jul	11 Aug	25 Aug
Untreated uninoculated.....	57.8 b	101.8 c	110.0 de
Endura 70WG 6.8 oz.....	1.3 a	6.8 a	16.3 a
Bravo Weather Stik 6SC 2 pt.....	0.8 a	22.3 ab	41.5 a-c
Cabrio 20EG 12 oz.....	1.3 a	6.0 a	9.8 a
Omega 5SC 8 fl oz.....	1.5 a	16.5 ab	38.8 a-c
Switch 62.5WDG 14 oz.....	1.0 a	8.8 a	21.5 a
Scala 400SC 18 fl oz.....	0.8 a	8.0 a	13.3 a
Tilt EC 4 fl oz.....	2.0 a	34.5 ab	69.8 b-d
Fontelis SC 24 fl oz.....	18.3 a	59.8 bc	78.8 c-e
V-10135 4SC 16 fl oz.....	64.3 b	100.8 c	118.3 e
Elevate WDG 1.5 lb.....	23.8 a	25.8 ab	31.0 ab

Treatment and rate/A, applied at 7-day intervals	Disease severity**			Seed yield (oz)
	30 Jul	11 Aug	25 Aug	
Untreated uninoculated.....	4.0 b	7.0 b	9.3 c	0.11 cd
Endura 70WG 6.8 oz.....	1.8 a	2.0 a	2.3 a	0.88 ab
Bravo Weather Stik 6SC 2 pt.....	1.3 a	2.3 a	3.0 a	0.62 a-d
Cabrio 20EG 12 oz.....	1.5 a	1.8 a	2.0 a	0.79 a-c
Omega 5SC 8 fl oz.....	1.8 a	2.5 a	2.8 a	0.54 a-d
Switch 62.5WDG 14 oz.....	1.5 a	2.0 a	2.3 a	0.77 a-c
Scala 400SC 18 fl oz.....	1.5 a	2.0 a	2.3 a	0.92 ab
Tilt EC 4 fl oz.....	1.8 a	2.8 a	5.8 b	0.22 b-d
Fontelis SC 24 fl oz.....	2.3 a	3.8 a	5.5 b	0.48 a-d
V-10135 4SC 16 fl oz.....	4.3 b	7.5 b	9.8 c	0.03 d
Elevate WDG 1.5 lb.....	2.5 a	2.5 a	3.3 a	1.01 a

*Column means with a letter in common are not significantly different (Student-Newman-Keuls; $P=0.05$).

**Rated on a scale of 1-10, where 1=no disease, 2-9=various degrees of infection, 10=100% defoliation.

Table 2. Evaluation of several newly registered, experimental, and standard *Alternaria* control products.

Treatment and rate/A, applied at 7-day intervals	Infected plants (no.)			
	6/29	7/15	7/29	8/10
Untreated uninoculated.....	84.0 b*	142.3 b	168.0 e	168.0 f
Endura 70WG 6.8 oz.....	0.3 a	0.5 a	2.8 a	16.0 ab
Bravo Weather Stik 6SC 2 pt.....	0.0 a	1.0 a	41.8 bcd	82.3 d
Dithane 75DF 2 lb.....	0.5 a	4.5 a	15.3 bc	41.0 bc
Cabrio 20EG 12 oz.....	0.0 a	2.0 a	3.5 a	3.3 ab
Inspire 250EC 7 fl oz.....	0.5 a	2.0 a	4.0 a	23.5 ab
Inspire Super 336EW 14 fl oz.....	0.0 a	0.0 a	0.5 a	3.3 ab
A15909A 14 fl oz.....	1.3 a	1.3 a	4.0 a	26.3 ab
Quadris SC 15.4 fl oz.....	1.5 a	1.5 a	12.8 ab	67.5 cd
Quadris Top 325EC 10 fl oz.....	1.0 a	1.3 a	2.5 a	28.5 ab
Pristine 38WG 10.5 oz.....	0.8 a	1.3 a	1.3 a	2.0 a
Captan 80WDG 2.5 lb + Bravo Weather Stik 6SC 2 pt....	2.5 a	7.3 a	55.0 d	100.5 de
Kocide 3000 46DF 1.75 lb + Bravo Weather Stik 6SC 2	0.0 a	2.3 a	56.3 d	88.8 de

pt.....				
Dithane 75DF 2 lb + Bravo Weather Stik 6SC 2 pt.....	0.5 a	0.8 a	7.8 a	25.5 ab
Tanos 50DF 8 oz	2.3 a	7.0 a	46.5 cd	98.8 de
Kocide 3000 46DF 1.75 lb + Captan 80WDG 2.5 lb	1.3 a	13.3 a	64.8 d	121.5 e

Treatment and rate/A, applied at 7-day intervals	Disease severity**			
	6/29	7/15	7/29	8/10
Untreated uninoculated.....	4.8 b	7.0 c	9.5 f	10.0 f
Endura 70WG 6.8 oz	1.3 a	1.3 ab	1.8 ab	2.0 ab
Bravo Weather Stik 6SC 2 pt	1.0 a	1.5 ab	3.3 d	4.0 cd
Dithane 75DF 2 lb	1.3 a	2.3 b	2.3 bc	2.5 ab
Cabrio 20EG 12 oz.....	1.0 a	1.5 ab	1.5 ab	1.8 ab
Inspire 250EC 7 fl oz.....	1.3 a	1.5 ab	2.0 ab	2.5 ab
Inspire Super 336EW 14 fl oz	1.0 a	1.0 a	1.5 ab	1.8 ab
A15909A 14 fl oz	1.8 a	1.5 ab	2.0 ab	2.5 ab
Quadris SC 15.4 fl oz.....	1.5 a	1.8 ab	2.3 bc	3.0 bc
Quadris Top 325EC 10 fl oz.....	1.5 a	1.5 ab	1.8 ab	2.5 ab
Pristine 38WG 10.5 oz	1.5 a	1.5 ab	1.3 a	1.5 a
Captan 80WDG 2.5 lb + Bravo Weather Stik 6SC 2 pt	1.5 a	2.3 b	3.3 d	4.8 de
Kocide 3000 46DF 1.75 lb + Bravo Weather Stik 6SC 2 pt.....	a	ab	d	cd
Dithane 75DF 2 lb + Bravo Weather Stik 6SC 2 pt.....	1.0	1.5	3.3	4.0
Dithane 75DF 2 lb + Bravo Weather Stik 6SC 2 pt.....	1.3 a	1.5 ab	2.0 ab	2.5 ab
Tanos 50DF 8 oz	1.5 a	2.0 ab	3.0 cd	4.5 de
Kocide 3000 46DF 1.75 lb + Captan 80WDG 2.5 lb	1.5 a	1.8 ab	4.3 e	5.8 e

*Column means with a letter in common are not significantly different (Fisher's LSD; $P=0.05$).

**Rated on a scale of 1-10, where 1=no disease, 2-9=various degrees of infection, 10=100% defoliation.

Control of early season insect pests at the seedling development stage has largely been accomplished through the use of soil-applied diazinon, a broad spectrum organophosphate. The continued re-registration eligibility decision through EPA for use of this material remains uncertain, and new insecticide alternatives are needed to target problematic insect and arthropod pests that impact the developing crop. Integrated pest management programs in ginseng have the potential to include new reduced-risk compounds for control of insect pests, and the efficacy of these compounds in control of insect pests was examined. This project assisted in the implementation of a pest management strategic plan through meetings with Wisconsin and Michigan ginseng industry representatives and establishment of field trials measuring control of insect pests.

The product of the proposed project was the integration of newly-registered pesticides with disease forecasting and scouting to reduce the overall amount of pesticides applied to ginseng gardens yearly while limiting the risk of resistance issues of strobilurin fungicides. Specifically, this product is aimed at transitioning growers from weekly calendar-based sprays to applications timed to the amount of disease and insect pressure and/or favorable environmental conditions related to real-time events in the ginseng growing regions.

Treatments were arranged in a randomized, complete block design, and insecticide were treatments replicated 4 times for a total of 24 experimental plots. Experimental plots were single rows, each 40-ft long. Systemic insecticides were applied at-planting using a hand-held, CO₂ pressurized backpack sprayer with a single nozzle boom operating at 30 psi delivering 9.1 gpa through a single extended range flat-fan nozzles @ 3.5 mph applied as directed sprays in-furrow

or as a side-dress. Foliar insecticides were applied under different application conditions using a hand-held, CO₂ pressurized backpack sprayer with a 4 nozzle boom operating at 30 psi delivering 24.9 gpa through 4, 8004XR, extended range flat-fan nozzles @ 3.5 mph.

Three ginseng gardens in Marathon and Lincoln counties, WI were selected for field trials. Each site included untreated ginseng plots. All plots were scouted on 10-14 day intervals from May to September for signs and level of infection from *Alternaria panax* and *Botrytis cinerea*. The number of emerged plants was recorded at each of the gardens in the spring after fall-planting. Furthermore, we collected a square meter soil sample to examine the number of ginseng seeds and potential damage from soil-dwelling pests. Emergence rates for plants and seed damage within each garden are found in the table below.

Table 3. Effect of insecticide treatment on plant health at Ginseng field A

Treatment	Rate	# Emerged plants	# Damaged seeds per plot	# Healthy seeds per plot	Proportion damaged seeds
Belay 2.13 SC	12 fl oz/a	9.5	0.3	3.8cd	0.04
Brigade 2 EC	6.4 fl oz/a	9.8	0.5	4.3cd	0.07
^a Coragen 1.67 SC	1.67 fl oz/a	12.0	0.3	6.3a-d	0.06
Diazinon 4 EC	1 pt/a	10.8	0.3	10.3ab	0.01
^a DPX-HGW86 10 SE	13.5 fl oz/a	11.5	0	3.7cd	0
^a DPX-HGW86 10 SE	20 fl oz/a	14.3	0.3	6.0a-d	0.04
Ferterra 0.4 GR	1.15 lb/1000 ft ²	11.5	1.8	4.3cd	0.23
Lorsban 15 GR	10 lb/a	12.3	0.3	2.5d	0.04
Lorsban 15 GR	13.5 lb/a	12.0	0.5	11.0a	0.04
Platinum 75 SG	4.01 oz wt/a	10.8	0.8	5.3a-d	0.10
Regent 4 SC	3.2 fl oz/a	13.3	0.3	2.5d	0.08
Untreated control		12.8	0	8.5a-c	0
	P	0.99	0.12	0.04	0.23
	LSD	7.5	1.04	5.61	0.15

^a-MSO 100 EC added at 0.5% v/v

There was no significant difference in number of emerged plants or proportion damaged seeds. However, there was a significant difference in the number of healthy seeds per plot. It is important to note that the number of seeds collected varied across plots and was not standardized. Therefore, proportion damaged seeds is the most balanced measurement for seed damage. Ginseng plots treated with Lorsban applied at 13.5 lb/a or Diazinon had the greatest number of healthy seeds in soil samples. Plots treated with Regent or Lorsban applied at 10 lb/a had the lowest number of healthy seeds in soil samples. While not significant, plots treated with Ferterra had the highest proportion of damaged seeds.

Table 4. Effects of insecticide treatment on plant health at Ginseng field B

Treatment	Rate	# Emerged plants	# Damaged seeds per plot	# Healthy seeds per plot	Proportion damaged seeds
Belay 2.13 SC	12 fl oz/a	12.8	0	7.5	0
Brigade 2 EC	6.4 fl oz/a	14.0	0.8	9.5	0.09
^a Coragen 1.67 SC	1.67 fl oz/a	14.8	0.3	11.3	0.05
Diazinon 4 EC	1 pt/a	16.0	0	8.8	0
^a DPX-HGW86 10 SE	13.5 fl oz/a	10.0	0.5	10.8	0.03
^a DPX-HGW86 10 SE	20 fl oz/a	13.0	0.5	9.0	0.02
Ferterra 0.4 GR	1.15 lb/ 1000 ft ²	12.8	0.3	10.3	0.08
Lorsban 15 GR	10 lb/a	15.5	0.7	7.7	0.07
Lorsban 15 GR	13.5 lb/a	14.5	0.5	6.8	0.03
Platinum 75 SG	4.01 oz wt/a	16.8	0.8	13.0	0.04
Regent 4 SC	3.2 fl oz/a	13.5	0.3	9.8	0.02
Talstar 0.2 GR	3.5 lb / 1000 ft ²	12.5	0.3	11.3	0.02
Untreated control		14.5	0.3	7.3	0.02
	P	0.96	0.85	0.84	0.83
	LSD	8.2	0.96	6.9	0.11

^a-MSO 100 EC added at 0.5% v/v

There was no significant difference in proportion damaged seeds or number of emerged plants per treatment at this field.

Table 5. Effects of insecticide treatment on plant health at Ginseng field C

Treatment	Rate	Application method	# Emerged plants	# Damaged seeds per plot	# Healthy seeds per plot	Proportion damaged seeds
Belay 2.13 SC	12 fl oz/a	In furrow/ Broadcast	26.3	0.3	4.0	0.03
Cruiser 5 FS	1.28 fl oz/ cwt seed	Seed treatment	28.8	0.3	3.5	0.08
DPX-HGW86 20 SC	13.5 fl oz/a	In furrow/ Broadcast	18.3	0.3	2.8	0.05
DPX-HGW86 50 FS	1.28 fl oz/ cwt seed	Seed treatment	32.3	0.3	3.5	0.05
DPX-HGW86 50 FS	3.84 fl oz/ cwt seed	Seed treatment	20.0	0	3.8	0
Lorsban advanced 40.18 EC	2.25 fl oz/cwt seed	Seed treatment	24.5	0.3	7.3	0.04
Platinum 75	4.01 oz	In furrow/	21.0	0.7	2.7	0.18

SG Poncho 5 FS	wt/a 1.28 fl oz/ cwt seed	Broadcast Seed treatment	20.5	0	4.0	0
Regent 4 SC	3.2 fl oz/a	In furrow/ Broadcast	30.3	0.8	9.3	0.09
Untreated control			52.0	0	5.8	0
			P	0.07	0.23	0.19
			LSD	19.8	0.62	5.02
						0.34
						0.14

There was no significant difference in plant emergence according to treatment at any field. Interestingly, plant emergence was highest in untreated control plots in which average emergence was nearly double that of most other treatments. Proportion damaged seeds were highest in plots treated with Platinum, but this was not significantly different from other treatments.

Estimates of defoliation on leaves were gathered by trained individuals at 10-14 day intervals and scored as <1 %, 1-5%, 5-10%, or >10%. Differences in frequencies were analyzed by chi-square test. Defoliation was low in most fields but was above 10% at a few discrete periods in late August and September. Plots treated with Lorsban and Talstar had the lowest levels of defoliation. Defoliation in ginseng treated with the above compounds was <1% in 80% of plots. In one field, the highest frequency of plots with defoliation above 1% was found in untreated beds as well as beds treated with Coragen and Ferterra. Defoliation in all treatments was below 5% on average.

Populations of different insect pest species and beneficial insects (i.e. spiders) were surveyed weekly by counting all damaged plants and associated life stages. Insect populations were scouted on a 10-14 day basis to document and determine the critical periods of pest migration, pest identification, and periods of risk of both foliar and root feeding insects. Seed corn maggot populations were measured through placement of 10 yellow sticky cards per field, and all other ground dwelling insects (i.e. millipedes, spiders, ground beetles) were measured through 10 pitfall traps per field. Temporal patterns of wireworm occurrence were established through spring sampling whereby we buried 1 to 2 cups of a 1:1 mixture of corn and wheat to a depth of 4 to 6 inches. Soil was then mounded over the top in a dome shape, and a piece of black plastic was placed over the mound to promote warming of the soil. All sites were marked with surveyor's flag, and soil from the baited stations was collected after 1 week. Wireworm bait traps were used over a 3 week interval at each of the 3 ginseng fields. As noted previously, seed was again be harvested from each plot to determine treatment effects on yield and quality.

Table 6. Pest and beneficial insect populations. Values are average number per insect trap (N=10 per field) per field (N=3).

<u>Insect</u>	<u>Date of Collection</u>									
	<u>Jun 3</u>	<u>Jun 13</u>	<u>Jun 23</u>	<u>Jul 5</u>	<u>Jul 19</u>	<u>Aug 3</u>	<u>Aug 15</u>	<u>Aug 31</u>	<u>Sep 14</u>	<u>Sep 27</u>
SCM	9.2	7.3	8.2	8.4	5.0	6.8	5.6	5.7	2.2	2.9
Spiders	2.0	0.6	1.0	3.1	1.8	3.2	1.6	1.9	1.0	0.3
Ground beetles	2.0	0.4	0.1	0.5	1.1	1.3	1.2	0.7	0.2	0.1
Millipedes	12.6	0.5	7.8	3.5	1.7	1.0	0.9	0.4	4.8	13.1

SCM= Seed corn maggot

Average seed corn maggot abundance peaked in between Jun 3 and Jul 5. Millipede populations were highest at the first (Jun 3) and final (Sep 27) collection dates. Ground beetle populations were low over much of the research trial but peaked over the middle of the growing season. There were no noticeable trends in spider abundance over time. Wireworm populations were low in all fields, and this prevented a more thorough data analysis.

In August, ~70 growers attended the annual Ginseng Research Field Day. Growers were able to observe ginseng beds treated with newly registered and experimental fungicides such as Omega, Switch, Cabrio, Scala, and Fontelis and compare these with beds treated with older, familiar products, such as Dithane and Bravo. We also discussed the importance of apply fungicides early in the growing season. Growers were given packets containing information on these newly registered products along with information on current application methods (nozzles, spray volumes, etc.).

III. Goals and Outcomes Achieved

To achieve the project goals, the effectiveness of these new, safer products was tested against *Alternaria* blight. Efficacy experiments were placed at grower cooperators' fields in Marathon County, WI to determine which of these new products should be adopted into grower spray programs. The new effective fungicides were introduced to the growers at the August Research Field Day and at the winter meeting in March. Growers were able to observe charted data and pictures showing the relative effectiveness of these products.

Throughout the 2011 growing season, core growers were questioned regarding the current fungicide programs. The majority of acreage in the industry was covered with the in-person questioning of the core growers. Instead of using surveys for the remaining ~30% of the acreage, the largest pesticide distributor in the area was questioned on sales data of newly registered products such as Omega, Switch and Endura and also grower standard Dithane. Seven

core growers were questioned that account for ~70% of the total acreage in the state. Included in these seven growers were the three largest growers in the United States. All of the core growers questioned incorporated newly registered fungicides Switch and/or Omega during the 2011 growing season. The spray records 2010-2011 from five of the core growers (including the three largest growers) were available for us to see which products have been incorporated into their spray program.

After the 2011 growing season, sales data from the major chemical distributor in the area that serves ginseng growers was collected. Sales of all of the new products increased from 2009 to 2011. This information gives excellent insight on which products growers have implemented into their spray programs. It should be noted that disease pressure was severe in 2011 and it is doubtful that the amount of fungicide applications were reduced compared to previous years.

To disseminate information to growers in real time, two major achievements were accomplished in 2011. At the 2011 winter meeting, growers were given a tutorial on how to receive information via Dr. Mary Hausbeck's tweets. The email addresses of growers were also collected at the winter meeting and the field day. Throughout the growing season, Dr. Hausbeck tweeted information to growers regarding newly labeled products and the current disease pressure observed in the field. Response from growers to this method of contact has been very positive. Email contact is in its beginning stages of implementation. Two emails in 2011 were sent to growers regarding information on disease pressure we had observed and which tools were most effective in control. Between the emails and tweets, we estimate that over 50% of the industry is in some form of receivership of real-time information. Sending growers information on the newly registered products is an important activity in reaching the goal of incorporating new, reduced risk-fungicides into their spray program.

Through this project, we have documented bacterial infection rates in ginseng and the impact of insect pests on ginseng plants. Knowing the dates of peak seed corn maggot flight and other key pest populations will aid in evaluation of appropriate pest management practices relative to critical thresholds in insect populations. The management of these pests, traditionally fulfilled with broad-spectrum products, can include reduced risk products. The similar effectiveness of reduced risk compounds on suppressing defoliation is a positive sign, indicating the opportunity for replacement of diazinon. The data from this project can be used to generate recommendations for insect control in ginseng and as a baseline for further evaluation of insect pests, such as seed corn maggot, that have been visually identified as pests. Performance targets can be more accurately assessed, since the migration of pest species such as seed corn maggot have been documented in ginseng.

B. Testing the efficacy of these new fungicides in a commercial ginseng garden was achieved (Tables 1 and 2). Although other trials were completed, data from this particular trial shows the importance of applying these new, reduced-risk fungicides when disease pressure is severe and berry (seed) yield is desired. This trial was also highlighted at the annual Ginseng Field Research Day (Fig. 1) and winter meeting. Core growers were questioned regarding the incorporation of these new products. All of these growers used Cabrio, Endura, and Switch in 2011. About one-half of the core growers questioned applied Omega in 2011 (the high cost of Omega was cited by those who had not included the product into their spray program). Almost

all of the smaller growers interviewed had not applied Omega or Switch, cost and familiarity were the two major issues. The large turnout at the research meetings and Dr. Hausbeck's emails and tweets will help growers become familiarized with these new products.

Experimental procedures were completed in spring and summer of 2011 and were refined from preliminary work that began in fall 2010. A final goal of this experiment was to determine if the inclusion of reduced-risk compounds and creation of an integrated pest management program for ginseng would be viable. We were able to start this process by analyzing beneficial and pest populations of insects in ginseng fields as well as the occurrence of damaged plants. Spiders, seed corn maggots, ground beetles, millipedes, and wireworms were selected as the target insects. Cutworms and white grubs were not measured nor found in high abundance. The exception to this was in September when many adult cutworms were found on yellow sticky cards.

Scouting of ginseng fields provided the opportunity to examine pest pressure in fields and the relation of plant health to pest pressure. Although some growers noted potential damage from ground-dwelling insects such as cutworms, we found minimal evidence of significant insect damage. The heavy use of insecticides and fungicides in fields likely suppressed most pests from reaching economically damaging levels. Ginseng's high value limits the opportunity to create reference control fields and compare untreated fields or fields only receiving select compounds to conventional fields. Even though insect damage remained low, this, in itself can be a significant result in addition to several other advancements. 1) We have documented the peak populations periods of key insect pests and beneficial insects. 2) Seed damage was low in all treated beds, irrespective of compound applied. 3) Reduced risk compounds can provide similar control of target pests and similar emergence of ginseng plants relative to current compounds. Given the uncertainty of re-registration of B2 carcinogenic products, it is beneficial that reduced risk products performed similar to organophosphates.

IV. Beneficiaries

The major beneficiaries of this project were the ginseng growers. The project was supported by the Wisconsin Ginseng Board that represents the ginseng production industry in Wisconsin with a primary focus on growers in the central region of Wisconsin. More than 90% of the cultivated ginseng grown in the U.S. is grown in Wisconsin. Wisconsin's 65 growers cultivate 1,400 acres of ginseng, producing an average of 1,500 lbs/acre, which represents 10% of the world's supply of ginseng root. At \$20/lb, ginseng is a high value crop for Wisconsin, totaling approximately \$50 to \$75 million annually. Many growers applied the newly registered fungicides in 2011 when standard control methods failed to control *Alternaria* blight. Data showed that seed yield was reduced by ~10-30% when the newly registered fungicides were not applied (compared with only Bravo applications). Growers averaging 500 lbs of seed (\$50/lb) yield/acre could save \$2,500 to \$7,500 per acre if products such as Endura, Switch, etc., are applied. Across the whole industry, assuming 35% of overall acreage is of seed harvestable age, this equals a savings of \$1.3 to \$3.9 million to the industry.

Ginseng producers are required to use organophosphates on a calendar based interval and would benefit from forecasting models to reduce the risk of non-target effects and spray when pests

reach economic thresholds. Seed damage was found to be minimal after the application of reduced risk compounds, and growers could benefit from utilizing these compounds, which may ultimately replace products that will lose their registrations.

V. Lessons Learned

Although most growers (especially the larger growers) have implemented the newer, safer fungicides into their spray programs, it does not appear the total amount of fungicide applications decreased in 2011. This, in large part, is most likely due to the high disease pressure observed in 2011, resulting in growers spraying at shorter intervals for an extended period of time. Another problem encountered is that many of the smaller growers may have a problem with the higher cost of the new products. The cost of a Dithane application is ~\$18/acre, while applications of Switch and Omega are expensive, \$45 or \$65 per acre, respectively. Over time as smaller growers see the benefits of these new products, they will be more likely to incorporate them into their spray programs. The success of the annual Field Research Day was a positive result, with over 100 people (~70 growers) attending. For many growers, the Research Field Day was their introduction to products such as Switch and Omega. The annual Research Field Day along with the collection of email addresses and Dr. Hausbeck's tweets have produced an excellent network of communication with the growers.

Our understanding of the effectiveness of reduced risk compounds at controlling insect pests and at limiting defoliation has been expanded. Although chemical products may have been responsible for this knockdown, the absence of established wireworm populations and elevated seed corn maggot populations, even in control plots, suggests that fungal and bacterial pressure may be a more serious concern than insect pest pressure. Further research would be needed to determine the effects of individual pest species on ginseng emergence or defoliation. Higher insect pest populations would have provided more meaningful data that could have been analyzed and interpreted for trends. The results regarding insect populations are expected to benefit crop consultants and the research community by providing a baseline sample of population dynamics of the major insect pests in ginseng. The length of maturity from planting to harvest complicates the ability to predict pest damage, but this project provided an initial evaluation of the seasonal patterns of several insect pests and their control from varied compounds.

VI. Additional Information

Figure 1. Dr. Mary Hausbeck discussing disease control issues with ginseng growers at the 2011 Ginseng Research Field Day.



VIII. Contact Info Butch Weege
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5) Wisconsin Cranberry Discovery Center

Project Title: Wisconsin cranberry product electronic marketplace (FY10FB-005)

Total Amount Received: \$56,000

Date of Award: October 25, 2010

Project Contact(s): Barbara Hendricks

Report Date: January 18, 2012

I. Project Summary

Purpose

The project is increasing the competitiveness of cranberries in the current marketplace by making consumers nationally more aware of cranberry products available to them, their unique flavor, versatility and health benefits associated with the consumption of the cranberries in the different variety of cranberry products. The project is creating a new market outlet for Wisconsin made cranberry products, and educates the consumer on the many uses for the cranberry. The grant is being used to create, manage and promote a virtual marketplace for Wisconsin-made cranberry products.

What is the specific issue, problem or interest to be addressed?

A record cranberry crop nationally in 2008 and improved productivity by growers has resulted in an expanded supply of fruit. This increase in supply along with new production areas coming on line has created a large supply of fruit and downward pressure on grower prices. This creative and expanded marketing process will help increase consumption to reduce the oversupply.

In recent years a number of small Wisconsin companies have developed specialty cranberry products including cranberry sauces, salsas, baking mixes, mustards, grilling and barbeque sauces, chutneys, candies, oils and other innovative uses of cranberry products. These companies, although innovative in product development, often lack resources to market their products or have limited access to retail outlets except in specialty shops or boutiques. Consumers often look for cranberry products based on their health benefits and good taste. They find it difficult to locate and buy many of the more than 1,000 cranberry products now in the marketplace. Consumers have also shown a strong preference to buy locally produced products when possible.

This project offers additional market opportunities for the producers for their products, improve consumer access to them and to expand the market for cranberries and cranberry products in general.

Why is the project important and timely?

The project is important and timely for a number of reasons. First of all expanding markets for specialty crops and these products creates jobs in the processing of the products. Most, if not all, of these specialty product producers are small businesses and start-up firms. It is well understood that the strength of the economy lies in the development of small businesses such as these.

Secondly, in many cases these companies are innovative in product development but lack resources in marketing their product. Access to widespread retail outlets is not available to them. These processors tend to buy their raw product from local sources as well. The web provides an excellent alternative to reach a large and growing class of consumers. A well marketed, central site with a wide variety and diversity of products for purchase by consumers will aid in increasing their sales and overall sales of Wisconsin cranberries.

Thirdly, the expanding supply of fruit is placing pressure on grower prices. With this project we have created additional markets for value added products produced in Wisconsin which will generate additional demand for Wisconsin grown fruit. That increased demand and consumption will assist in moving fruit and improving grower returns.

Finally, the connection between the consumer and small specialty cranberry product producers will also enable the Discovery Center to connect consumers with the farmers who produce their food. Customers also have the opportunity to learn more about how cranberries are produced in Wisconsin, the multi-generational farm families that grow them and the importance of buying products produced in Wisconsin.

The Wisconsin Cranberry Discover Center was created with the use of a Specialty Crop Block Grant in 2002. The Discovery Center, located in an historic building in Warrens, Wisconsin consists of four components: A Taste Test Kitchen, an Exhibit Hall and Museum, the Wetherby Cranberry Library and a retail shop. Since its opening the Discovery Center hosts upwards of 50,000 visitors annually who come to learn about cranberry production in Wisconsin and experience one or more of the four components in the Center. The long term objectives for the Discovery Center are to serve as education and promotion platform for Wisconsin cranberries and to generate revenue in support of the education mission which includes promotion of Wisconsin cranberry products.

A portion of the 2002 grant funds were used to create the website www.discovercranberries.com. While a large part of the website is devoted to the education mission of the center it also includes an online store that featured some of the products currently available through the gift shop at the Discovery Center. The 2010 grant was used to create a new, online Wisconsin Cranberry Products Electronic Marketplace built upon the efforts made through the previous grant to the Discovery Center.

II. Project Approach

Activities	Tasks Performed	Partnership	Significant	Accomplishments
Selecting Website designer	Reviewed ideas proposals, dev. designs, goals & long term care.	Barb, Site Pro, Stream Creative Tom, Zeppos	Selecting the best fit for the new website design	Selected Stream Creative as our Web designer
Project Launch	Conf. Calls, site map domain name, research & design dev.	Barb, Stream Creative, Zeppos, Tom	Usability, general layout brand of site	Refined Homepage Launched project
Website data/X-cart	Framework of site, pictures, word press, data dev., integration	Barb, Emma, Stream Creative, Zeppos	Essential Building blocks to the website	Established future website content, design, & platform for new site.
Identifying Cranberry products & producers. Retrieving Information Website	Eliminating products, adding new. Scraping content & pictures to reuse on new site.	Stream Creative, Zeppos, Barb, Emma	To reuse significant elements from our old store, save grant dollars & valuable time	To make sure the products on the new site fit into the criteria of our new Web site.
Data entry & X-cart dev. Design Concept	Photos, data entry, adding new products, evaluation.	Stream Creative, Zeppos, Barb, Tom, Emma	To make sure we had the essential database elements for the website.	Development of new design, templates, and approval of new site. June 1, 2011 launched.
Social Advertising, Google Ad-words, Face book, Merchant circle, Dex knows, Yelp & Foursquare	Research to find what words drove the most traffic to the website.	Zeppos, Barb	To help increase the competitiveness of cranberries in the currant market place.	These tools will provide additional info. about cranberries, improve consumer access, help to educate and facilitate getting Wisconsin Cranberries into consumer's hands.

Stream Creative: Website Designer
 Site Pro: Website Designer
 Zeppos & Ass.: Public relations Contractor
 Barb Hendricks: Wisconsin Cranberry Discovery Center Director
 Tom Lochner: WSCGA Executive Director
 Emma Van Norman: Marketing development and Data entry

III. Goals and Outcomes Achieved

Goal 1: Appear on the first page and in the top ten of search results on top engines such as Google and Yahoo.

Benchmark: Currently, the Discovery Center site appears at No. 75 on a Google search for cranberry recipes and other cranberry searches. We would also contract to be a sponsored site on Google search.

Cranberries

- Yahoo: discovercranberries.com showed up 8th on the first page
- Google: discovercranberries.com showed up on the bottom of the 3rd page

Cranberry Gifts

- Yahoo: thecranberrystore.com showed up 8th on the first page
- Google: thecranberrystore.com showed up 10th on the 6th page

Cranberry Products

- Google: discovercranberries.com showed up 7th on the 2nd page
- Yahoo: discovercranberries.com showed up 10th on the 9th page

Cranberry Recipes

- Yahoo: discovercranberries.com showed up 4th on the 5th page
- Google: There was no response for “Cranberry Recipes” in the 39 pages of results.

The ranking should continue to increase as SEO efforts are implemented (i.e. search engines read the website; Google Adwords increase impressions, etc.). Based on the results to date, it seems as though Yahoo has done its read of the new site, but Google has not yet. That is not surprising, as it can take several months for search engines to re-review sites. We are very pleased with the Yahoo results to date.

Goal 2: Increase online sales of Wisconsin cranberry products on the www.discovercranberries.com website by 300% in year 1.

Benchmark: The sales for the most recent fiscal year on the current site are estimated to be \$4,000. The target for the next fiscal year is \$12,000.

July 1, 2011 to Nov. 29, 2011: the sales of 74 products generated \$3,272.03 which is nearly the same amount as the entire previous fiscal year.

When Google Adwords are implemented, there should be an increase in sales.

Goal 3: Increase the number of Wisconsin cranberry products on the www.discovercranberries.com website by 10% in the next 12 months.

Benchmark: The website online store currently features 200 Wisconsin cranberry products.

June 1, 2011 to Nov. 29 2011: we have added 11 products which is over half of our projected goal, with expansion plans in the works for several new products focusing on special needs of

the consumer. We are also working on several Wisconsin Cranberry products that will focus on the sugar restricted diet.

Goal 4: Increase overall visits to website by 20%.

Benchmark: Average of 1,500 visits per month.

July 1, 2011 to Nov. 29, 2011: Average of 661 visits per month.

While this is currently lower than the benchmark goal, we expect the number to increase when Google Adwords are finalized and implemented. When the Google Adwords were running, the average number of visits per month was higher at 757. Once they are again implemented, more people will be aware of the site and will be led to exactly what they are looking for, thus making each visit more relevant to the museum or product sales.

Goal: 5 Increase time per visit by 25%.

Benchmark: Current visitors average just less than 2 minutes on the site.

July 1, 2011 to Nov. 29, 2011: Visitors average 2 minutes, 44 seconds on the site.

This is a great result so far and shows that once people are on the site, it is engaging them to learn more about the Cranberry Discovery Center and the many cranberry products offered online through the store.

Goal 6: Increase number of pages visited by 1 per visit.

Benchmark: Current visitors average 5.26 page views per visit.

July 1, 2011 to Nov. 29, 2011: Visitors average 4.56 page views per visit.

As part of the site redesign, we made a very concerted effort to better organize the site so visitors could more easily find the information they wanted. With that in mind, our goal here is counter productive in light of that strategy. For example, previously visitors had a hard time finding what they were looking for and had to search through several pages. With the new redesign, the pages are much easier to find, thus allowing visitors to find exactly what they are looking for with fewer page views. With that in mind, the fewer page visits is not surprising as the site is much better organized with product categories and more.

IV. Beneficiaries

The project is showing potential for widespread impacts to a number of intended beneficiaries including the state's cranberry industry, 80 companies that produce Wisconsin cranberry products, the Cranberry Museum, Inc. a nonprofit 501c3 corporation that operates the Wisconsin Cranberry Discovery Center, and the cranberry consuming public.

This project increases sales and awareness of Wisconsin cranberry products which directly affects the profitability of all Wisconsin growers.

The Discovery Center retail store currently markets approximately 230 Wisconsin cranberry products for 80 different companies. The project has impacted them by creating a new market outlet and opportunity for them.

The Cranberry Museum, Inc. dba the Wisconsin Cranberry Discovery Center is benefiting as the proceeds from sales on the site are being used for additional education and promotion activities related to the website and the overall mission of the Discovery Center.

The consuming public is benefiting as they have an additional opportunity to purchase these specialty Wisconsin cranberry products which in many cases are not available to them in a convenient manner. They also are able to learn how to incorporate cranberries as part of a healthy diet.

V. Lessons Learned

<i>Positive Lessons</i>	<i>Negative Lessons</i>	
Diverse group of partners (timeline)	Timeline issues	(Plan for a 15% increase in timeline)
Research similar ideas	scrapping old information (Evaluate starting new)	
Outline expectations	Training	(Start early)

While developing the Wisconsin Cranberry Product Electronic Marketplace, we experienced problems with scrapping data from our old website to re-utilize on our new site. Our initial thought was to transfer factual information and photos, and eliminate the additional costs and time factor of recreating this information. The content, pictures, and data were not compatible with our new web design thus creating a huge squeeze on our time-line not to mention an additional financial burden. The best lesson taken away from this experience is to do your research prior to starting your project, ask questions and extend your time-line by 15%.

VI. Additional Information

www.discovercranberries.com

www.thecranberrystore.com



VII. Contact Info

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6) Wisconsin Grape Growers Association

Project Title: Market expansion for Wisconsin grown grapes (FY10FB-006)

Total Amount Received: \$54,420

Date of Award: October 25, 2010

Project Contact(s): Anna Maenner

Report Date: December 31, 2011

I. Project Summary

“Market Expansion for Wisconsin Grown Grapes” employed a Viticulture Consultant/Marketing Specialist who worked with Wisconsin grape growers and vintners to develop a system which to overcome the barriers to producing and marketing wines made with Wisconsin grape varieties. This position helped educate growers on good agricultural practices for grape production and on vintners’ expectations relative to quality, harvesting, storage and delivery. This position also educated vintners on Wisconsin grape varieties and the unique characteristics they offer to wine production. In addition, this project provided an incentive for vintners to use Wisconsin grown grapes in their wine production. Through this project, the Wisconsin Grape Growers Association (WGGGA) worked toward developing a Wisconsin Wine Accreditation Program whereby wines produced here would become accredited if they contained a minimum of 75% of Wisconsin-grown grapes. These accredited wines would then be promoted by the WGGGA on our website, with marketing materials at wineries, through media contacts, directly to consumers through social media and to other interested parties i.e. restaurants, grocers, etc. This project is important to expanding the market for Wisconsin-grown grapes.

Wisconsin’s grape and wine industries are exploding! Though some of the oldest vineyards and wineries in Wisconsin date back to the 1840’s, their history is riddled with disappointment and catastrophe as European grape cultivars were unable to withstand our cold winters. As our few pioneer vintners struggled to survive, they did so through painstaking efforts to help their grapevines stave off the damaging cold.

With the development and introduction of cold-hardy grape cultivars and the improved transportation system, the wine industry here began a slow but steady growth period beginning in the 1970’s. With limited supplies and varieties of Wisconsin-grown grapes, most wineries imported the majority of grapes they used in production from other grape-growing regions of the country.

As the nation’s interest in wine grew so did the interest in growing grapes in Wisconsin. Many viticulturists who began growing grapes in the late 1990’s and early years of this century did so

for the home production of wines. As wine has gained popularity throughout this decade the number of vineyards or those interested in starting a vineyard has grown to over 200 while the number of wineries here has reached almost 80.

Cold-hardy grape cultivars are new on the viticulture landscape with names that many of our nation's vintners and local consumers would not recognize i.e. St. Pepin, Frontenac, Marquette, LaCrescent, LaCrosse, Edelweiss and St. Croix. Along with their names, these cultivars are unknown as to the characteristics they lend to the wines produced from them. For these reasons, Wisconsin vintners continue to produce the majority of their wines from grapes imported from other grape-growing regions with names consumers recognize, read and hear about.

As interest in growing grapes has increased so has the viticulturist's desire to sell those grapes to local wineries. Whereas wineries, that have an established customer base whom are accustomed to certain types of wines and the grape varieties used to produce them, or new wineries that are trying to entice new customers who again are looking for what they know, may not be inclined to experiment with Wisconsin grape varieties. A winery, beginning the production of a new wine with a new cultivar, does take on an economic risk if the finished wine does not have desirable characteristics or is not marketable because it is unknown. This situation creates a barrier to the selling of Wisconsin grapes to Wisconsin wineries.

With the current interest in buying "local," there now exists a window of opportunity where the economic risk for trying Wisconsin grown grapes in wine production, is reduced. The consumer is now inclined to try products identified as local, thereby reducing the market risk side of the equation.

Also, many of the cold-hardy grape varieties have now been tried in limited wine production so their characteristics and qualities are becoming better understood. This reduces the "unknown" factor when using Wisconsin varieties in wine production.

In 2008, leaders stepped forward in the industry and the Wisconsin Grape Growers Association, Inc. (WGGA) was born. The WGGA is a non-profit agricultural organization (501)(c)(5) dedicated to uniting and educating growers, assisting with research and promoting and protecting the art, science and commerce of viticulture in Wisconsin. In our first year, membership in the organization reached 120.

The critical components now exist to move Wisconsin's grape and wine industries to the next level...an organization to provide leadership; cold-hardy grape varieties whose qualities are becoming better known and a local food movement that creates a demand for Wisconsin-grown products. This proposal pulls the pieces together to get more Wisconsin grapes made into truly Wisconsin wines.

The position funded by this grant will work with the WGGA members and the Wisconsin Wineries Association to provide a better quality fruit. We know what grape cultivars are being grown in Wisconsin but we don't know if they are the varieties or in the quantity to best meet the needs of the wine industry. Also, grapes must be harvested, handled and delivered within very specific parameters to meet the needs of the vintner. One objective of this proposal will be to

create the protocols whereby the grape grower and the vintner both know what is expected of each other and the transfer from grower to processor goes smoothly and as expected maintaining quality every step of the way.

A second objective for this project was to implement the Wisconsin Wine Accreditation Program. This program, managed by the WGGA, certifies wines that are produced from a minimum of 75% Wisconsin-grown grapes. Once wines are certified, WGGA will assist with promoting those wines through our website, with marketing materials given to wineries, through media contacts, directly to consumers through social media and to other interested parties i.e. restaurants, grocers. WGGA will use the marketing materials it's developing from the funding we received from the 2009 Specialty Crops Grant. These marketing pieces promote Wisconsin grape varieties, their qualities and characteristics.

Thirdly, this position approached vintners and promoted the use of Wisconsin grapes by providing information on grape qualities and characteristics and offering the opportunity for accreditation and the subsequent market promotion.

This position helped established the protocol, lines of communication and the accreditation program so the grower/vintner relationships should continue independently. The Wisconsin Wine Accreditation Program will be run by the WGGA.

Through this proposal, processes were developed and connections made to overcome some of the hurdles restricting the use of Wisconsin grown grapes in the state's wine industry and further moving true Wisconsin wines into the hands of our consumers.

This project built on the materials developed with a 2009 Wisconsin Specialty Block grant which developed, printed and distributed a wine wheel, Wisconsin grapes poster and brochure. These previously created materials were distributed to the wineries that were accredited for their use in promoting and educating about Wisconsin grape cultivars.

II. Project Approach

OVERVIEW AND HIGHLIGHTS:

Rebecca Rochester visited a majority of the wineries during the year to introduce herself and find out more about each winery. This helped to build relationships and improved the response rate on the Wisconsin Wineries Survey 2011. There are still a few wineries that she has not visited, but hopes to visit in 2012 (through other grant funding).

Grape growers in Wisconsin have indicated that educational opportunities are important. WGGA held two educational events this year—WGGA Spring Vineyard School and WGGA Summer Vineyard Walk. The Spring Vineyard School had over 125 grape growers in attendance. It sold out! The Summer Vineyard Walk had about 25 people in attendance. Timing and location played a role in why the attendance was lower than the Spring Vineyard School. We will be re-evaluating this event in 2012. Along with these two main educational opportunities, WGGA partnered with University of Wisconsin West Madison Agricultural Research Station and UW-Extension Agricultural Agents and other staff to hold events throughout the year. This year

Northeast Wisconsin Technical College (NWTC) joined the Viticulture and Enology Science and Technology Alliance (VESTA) program. They now offer an enology and viticulture associates degree and educational seminars throughout the year. Rebecca was invited to participate in the VESTA Curriculum Retreat as a Wisconsin state representative industry person which was held in Branson, MO earlier this year. VESTA will be rolling out a Wine Entrepreneurship degree in the future to go along with the enology and viticulture programs.

Over the course of the year, Rebecca worked on updating the WGGA website and started a monthly e-newsletter using Mail Chimp that is sent out to members and industry people (approximately 200 people receive the e-newsletter). Rebecca was also able to form relationships and work with the following media outlets: Daily Vista, Palate Press, Milwaukee Journal Sentinel, Vernon Broadcaster, Drink Local Wine Event, FRESH, Grape Sense Blog by Howard Hewitt, Wisconsin Foodie, Midwest Wine Press, Wine Business Monthly, The Country Today, Travel Wisconsin, Verona Press, Fox 11 Good Day Wisconsin, Chicago Sun-Times, Green Bay Press Gazette, Wisconsin Public Radio, Wines & Vines, and Mike White's E-Newsletter from Iowa State University.

WGGA exchanged links with the following organization websites: Indiana Wineries, Iowa Winegrowers Association, Winedustry.com, America's Wine Trails, Missouri Grape Growers Association, Minnesota Grape Growers Association.

WGGA Wisconsin Wine Accreditation Program details were finalized. Thirty-seven wineries qualified for the program. A webpage was developed which lists these wineries. Free marketing materials (50 wine wheels, 100 brochures and 5 posters) were sent to each of the wineries who qualified. This program will continue in 2012 with more exciting features.

The WGGA Board of Directors recommended and finalized nominations for an annual WGGA Industry Awards program to recognize people who have made a significant impact in the Wisconsin grape and wine industry. The first awards will be given at the 2012 Wisconsin Fresh Fruit & Vegetable Conference.

Rebecca built a database of over 300 Wisconsin grape growers and over 80 Wisconsin wineries that are either already bonded, operating or are in the process of getting bonded. Before this project started, it was estimated that there were just 200 grape growers and 50 wineries. Each quarter Rebecca checks the TTB website to see if there are any new approved federal licenses. If identified, she reaches out to them and introduces herself and inquires if they will be using Wisconsin grown grapes. She also introduces them to the Wisconsin Winery Association and discusses their cooperative options in the state. The same goes for new grape growers. She reaches out to them and sends them WGGA membership information. Sometimes new growers aren't even aware that there is a Wisconsin Grape Growers Association.

Rebecca's main priorities this year included publishing the Report of the Wisconsin Wineries Survey 2011 and the Report of the Wisconsin Grape Growers Survey 2011. The Wisconsin Wineries Survey 2011 was sent to 81 wineries, and there was an 86.42% response rate. It took a lot more work than she initially expected to have wineries answer a simple five question survey. Rebecca invested in substantial phone time which turned out to be a real benefit because she

learned more about them and their businesses. The final report was published in June. This report was sent to all grape growers in our database, members of the Wisconsin Winery Association, media, UW-Extension Agents and WGA Board Members.

The Wisconsin Grape Growers Survey was sent out to 301 individuals of whom 30 were not eligible to participate so the new survey population was set to 271. There was a 52.03% response rate. Some of the larger vineyards in the state chose not to participate. The Report of the Wisconsin Grape Growers Survey 2011 was published in December. This report was sent to all grape growers in our database, members of Wisconsin Winery Association, media, UW-Extension Agents and WGA Board Members.

Rebecca also spent a great amount of time working with individual growers and wineries. Over the course of the year, she helped develop systems to overcome the barriers to producing and marketing wines made with Wisconsin grapes. There is a shortage of Wisconsin grown grapes as wineries are definitely on board to produce Wisconsin grown grape wines. As more vineyards begin to bear grapes and new growers plant larger vineyards, it will be important for them to have a resource to keep the lines of communication open and provide education and resources as the industry develops and changes.

Rebecca's completed workplan and accomplishments:

JANUARY 2011

During the month of January, I traveled to Wisconsin Dells to attend the Wisconsin Fresh Fruit & Vegetable Conference from January 2-4, 2011. At the conference I attended different sessions on grape and winery topics, the WI Wine Pairing & Social Dinner, along with the annual meeting for the WGA. This was the perfect opportunity to jump start my position with the WGA because it allowed me to meet a large group of industry professionals, growers and winery owners at one time.

I spent the next couple weeks in Wisconsin doing online research of wineries. I put together a collective database of Wisconsin Winery Association (WWA) Members, Non-WWA Member wineries who are bonded in the state of Wisconsin and future wineries of Wisconsin. Altogether the list is composed of 78 Wisconsin winery contacts (44 WWA Members, 29 Non-WWA Members and 5 future wineries).

On January 11, 2011, I met with Tim Rehbein, UW-Agricultural Agent Viroqua County, in Viroqua to discuss strategies and surveys. I put together a Wisconsin Wineries Survey 2011 that was emailed to WWA Members via Jon Hamilton (WWA President), and I emailed the survey to Non-WWA Members. The survey consisted of five questions. It was sent out on January 20, 2011.

Other items I worked on during January include phone and email follow up to wineries who completed the survey, creating the WGA Spring Vineyard School flyer and press release, updating WGA website, updating WGA Facebook page, creating 2011 Grape Marketing Coordinator Work Plan, working on Wisconsin Wine Accreditation Program flyer, researching vineyard tools (crop estimation, field surveys, contracts), media contacts with

www.wineindustry.com, arranging speaker, Paul Gospodarzyk, for Spring Vineyard School, and reading about current trends in the Midwest Wine Industry.

FEBRUARY 2011

During the month of February, I concentrated on collecting data for the Wisconsin Wineries Survey 2011. Other items I worked on during February include researching wine competitions and submitting a proposal for a Wisconsin State Fair Professional Wine Competition to Brian Bolan. I also made a few updates to the WGGGA website and WGGGA Facebook page. I continued my research on vineyard tools (crop estimation, field surveys, contracts).

I researched and began developing a Wisconsin Grape Growers Survey 2011. I made media contacts with www.wineindustry.com, The Daily Vista, Wine Business and The Country Today. I also reached out to do a link exchange with other industry association websites: Minnesota Grape Growers Association, Indiana Wine Growers, Michigan Wineries, Missouri and Iowa Wine Growers Association. I attended the February WGGGA Board Meeting via Skype on February 28, 2011.

MARCH 2011

I spent most of March traveling around Wisconsin (March 15-April 4). During this time I attended the WGGGA Spring Vineyard School 2011 at Wollersheim Winery, visited vineyards and wineries throughout Wisconsin and I met with Tim Rehbein to discuss project details.

I visited the following wineries and vineyards (19 total):

1. Bauer-Kearns Winery
2. Captain's Walk Winery
3. Door Peninsula Winery
4. Harbor Ridge Winery
5. Kerrigan Brothers Winery
6. LedgeStone Vineyards
7. Orchard Country Winery
8. Parallel 44 Vineyard & Winery
9. Red Oak Vineyard
10. Simon Creek Vineyard & Winery
11. Sinnipee Valley Vineyard
12. Spurgeon Vineyards & Winery
13. Stone's Throw Winery
14. Trout Springs Winery
15. Von Stiehl Winery
16. Weggy Winery
17. Whispering Winds Winery LLC
18. Wollersheim Winery
19. Zydeco Cyder Company, INC (Shepard's Hard Cyder Winery)

During the month of March, I concentrated on collecting data for the Wisconsin Wineries Survey 2011. Other items I worked on during March include coordinating and finalizing details for the Wisconsin State Fair Professional Wine Competition. The competition is in June. WGGGA and WWA will be involved by sponsoring the Best of Wisconsin Wine and other ways still to be determined. I also continued to add content and links to the WGGGA website and added content and pictures to WGGGA Facebook page.

I finalized the WGGGA Wisconsin Grape Growers Survey 2011 in Google Docs and hard copy format. This survey was emailed out on 3/7/2011 to over 200+ and mailed out to an additional 50 on 3/8/11. I made media contacts with The Country Today who ran an article on the Spring Vineyard School. I also put together a bird netting handout for the Spring Vineyard School 2011.

APRIL 2011

I spent the first part of April at the Drink Local Wine Event in St. Louis, MO (April 1-April 3) to network and get ideas for future Wisconsin wine and grape industry events. I met grape and wine association people from Missouri, Texas and Oklahoma and mingled with media and winery owners and staff from Missouri. I made key contacts with Jeff Siegel and Dave McIntyre who run a Drink Local Wine Event. I also did a live radio interview with Olivia Wilder of Wilder Times about the Wisconsin grape and wine industry. This was a great event, and I hope that they consider holding it in Wisconsin in the near future.

During the month of April, I continued collecting data for the Wisconsin Wineries Survey 2011. Other items I worked on during April include coordinating and finalizing details for the Wisconsin State Fair Professional Wine Competition. The press release went out on April 28, 2011. I also continued to add content (WGGGA Current Members section and events) and links to the WGGGA website and added content and pictures to WGGGA Facebook page. WGGGA Facebook now has 77 fans. I have started to use the @Wigrapes Twitter account as well.

I continued to work on the Wisconsin Grape Growers Survey 2011. I made media contacts with Howard Hewitt at Grape Sense and Palate Press and Dawn Reiss at Chicago Tribune and TIME. I arranged an itinerary for Howard's trip to Wisconsin and he visited Wollersheim, Fisher King, LedgeStone and Parallel 44 on April 29-30, 2011.

I created the first edition of the WGGGA monthly e-newsletter. It was sent out on Thursday, April 28, 2011 to 170 subscribers. I have begun to work on registering for the Wisconsin Garden Expo for 2012. I have also continued to make contacts with growers and wineries via email and phone to answer various questions.

MAY 2011

The Wisconsin Wineries Survey 2011 officially closed in April. I completed the first draft of the report and will be finalizing it in June and releasing it to WWA and WGGGA Members. The data collected shows strong growth and diversity of wineries in the state. This will be a great way to gauge future growth and trends in Wisconsin. Other items I worked on during May include coordinating and finalizing details for the Wisconsin State Fair Professional Wine Competition. I also continued to add content (WGGGA Current Members section and events) and links to the

WGGA website and added content and pictures to WGGA Facebook page. WGGA Facebook now has 81 fans. I have started to use the @Wigrapes Twitter account as well. I continued to work on the Wisconsin Grape Growers Survey 2011. I sent the WGGA June e-newsletter out on 5/31/2011. I have also continued to make contacts with growers and wineries via email and phone to answer various questions.

I flew to Branson, MO for a few days to attend the Viticulture and Enology Science and Technology Alliance (VESTA) Curriculum Retreat as the Wisconsin representative. I networked with leaders from California, Oklahoma, Texas, Indiana, Michigan, Minnesota, Missouri, Wisconsin and Washington. The program offers a convenient way to take classes in Viticulture and Enology. It was a great way to educate others about the Wisconsin wine industry and to learn more about what is going on in the other states. Northeast Wisconsin Technical College will begin offering VESTA classes in Enology and Viticulture this fall.

JUNE 2011

During the month of June, I published the final Report of Wisconsin Wineries Survey 2011 and sent it out to WGGA Members, WGGA Board, Non-WGGA Members, WWA list and media. Other items I worked on during June include coordinating and finalizing details for the Wisconsin State Fair Professional Wine Competition. I also continued to add content (WGGA Current Members section and events) and links to the WGGA website and added content and pictures to WGGA Facebook page.

I continued to work on the Wisconsin Grape Growers Survey 2011. I created the WGGA monthly e-newsletter and sent it out. I also continued to make contacts with growers and wineries via email and phone to answer various questions. I began coordinating wineries and wines for the Wisconsin State Fair Foundation All-Star Blue Ribbon Tasting.

I spent June 15-27 traveling around Wisconsin visiting a few wineries. I spent most of June getting ready for the Wisconsin State Fair Professional Wine Competition. Action items included getting judge itineraries lined up, press releases out and operations organized. I was on-site at the Wisconsin State Fair from June 22-25 prepping and running the competition. There were over 100+ wine entries in the inaugural competition. WGGA and WWA sponsored the award for best Wisconsin wine. On June 27 I met with Tim Rehbein in Viroqua to discuss the grant and where things stood overall.

JULY 2011

During the month of July, I created the WGGA monthly e-newsletter and sent it out. I also continued to collect data and organize the Wisconsin Grape Growers Survey 2011. On July 29 I attended the Wisconsin Fresh Fruit & Vegetable Planning Meeting via Skype. I also created a YouTube Channel for WGGA and uploaded a video of the WGGA Spring Vineyard School.

Other items I worked on during July included phone and email contact with growers and wineries in Wisconsin, creating the WGGA Summer Vineyard Walk flyer, press release and emails, updating WGGA website, updating WGGA Facebook page, media contacts with Kyle Cherek with Wisconsin Foodie, Palate Press and Howard Hewitt's Grape Sense Blog. I continued with WGGA membership drive and emailed grape growers throughout the state.

AUGUST 2011

During the month of August, I traveled to Parallel 44 Vineyard & Winery to help put on the WGGA Summer Vineyard Walk. We had 25 people attend this event. The event included a vineyard tour and educational session, wine tasting with the winemaker and a dinner. On August 16 I attended the WGGA Board Meeting at the University of Wisconsin West Madison Agricultural Research Station. UW-West Madison Agricultural Research Station held a Table Grape Field Day on August 24 from 10:00 AM to 1:00 PM.

Other items I worked on during August included continuing to work on the Wisconsin Grape Growers Survey 2011. I created the WGGA monthly e-newsletter and sent it out. I have also continued to make contacts with growers and wineries via email and phone to answer various questions. August was the beginning of harvest season, so I was busy helping growers coordinate the sale of grapes to wineries. The WGGA Board of Directors developed a Wisconsin Wine Accreditation logo which will be used as a stamp/sticker on wines produced with 75% or more Wisconsin grown grapes with the help of the Pilch and Barnet marketing agency. I also did the monthly WGGA Membership maintenance: welcome emails to new members, add to Google groups, website, Mail Chimp and database. News articles and events were also posted to Facebook.

SEPTEMBER 2011

During the month of September, I continued to collect data and organize the Wisconsin Grape Growers Survey 2011, I registered WGGA for Wisconsin Garden Expo 2012, I worked on coordinating marketing materials for next year's events, I continued to reach out to wineries for wines for the Wisconsin Food & Wine Pairing Dinner, I continued to collect nominations for WGGA Industry Awards, I worked on items for Wisconsin State Fair Professional Wine Competition 2012, and I created the WGGA monthly e-newsletter and sent it out. I also did the monthly WGGA Membership maintenance: welcome emails to new members, add to Google groups, website, Mail Chimp and database. News articles and events were also posted to Facebook.

I also continued to make contacts with growers and wineries via email and phone to answer various questions. In September some of the first grapes were harvested, so I was busy helping growers coordinate the sale of grapes to wineries.

WGGA President, Ryan Prellwitz, was featured on Wisconsin Public Radio's Joy Cardin's show.

OCTOBER 2011

During the month of October, I closed the Wisconsin Grape Growers Survey 2011 and began working on the first draft of the Report of Wisconsin Grape Growers Survey 2011. Over 140 grape growers participated in the survey out of 271. I continued to reach out to wineries for wines for the Wisconsin Food & Wine Pairing Dinner, I continued to collect nominations for WGGA Industry Awards, I worked on items for the Wisconsin State Fair Professional Wine Competition 2012, and I created the WGGA monthly e-newsletter and sent it out. I also did the monthly WGGA Membership maintenance: welcome emails to new members, add to Google groups, website, Mail Chimp and database. News articles and events were also posted to

Facebook. I also began to work on putting together a report, Wisconsin Wineries Production Report, to see actual growth of wine production in Wisconsin from 2007-2010.

I also continued to make contacts with growers and wineries via email and phone to answer various questions. October was another busy month for wineries and growers because it was harvest time.

I made media contacts with Midwest Wine Press.

NOVEMBER 2011

During the month of November, I finished the first draft of the Report of Wisconsin Grape Growers Survey 2011 and sent it out to the WGGGA Board of Directors to proof and approve. I continued to reach out to wineries for wines for the Wisconsin Food & Wine Pairing Dinner, I continued to collect nominations for WGGGA Industry Awards, I worked on items for the Wisconsin State Fair Professional Wine Competition 2012, and I created the WGGGA monthly e-newsletter and sent it out. I also did the monthly WGGGA Membership maintenance: welcome emails to new members, add to Google groups, website, Mail Chimp and database. News articles and events were also posted to Facebook. I also continued to work on putting together a report, Wisconsin Wineries Production Report, to see actual growth of wine production in Wisconsin from 2007-2010.

I continued to make contacts with growers and wineries via email and phone to answer various questions. I began work on my presentations for the upcoming Wisconsin Fresh Fruit & Vegetable Conference 2012 in January. I worked on my quarterly update of Wisconsin wineries with federal and state permits found online at the TTB website. There were five new Wisconsin wineries approved for federal permits, and I made contact with each of them.

DECEMBER 2011

During the month of December, I finalized the Report of Wisconsin Grape Growers Survey 2011 and sent it out to WGGGA Members, Non-WGGGA Members, WGGGA Board, WWA and other media. I continued to reach out to wineries for wines for the Wisconsin Food & Wine Pairing Dinner, I finalized nominations for WGGGA Industry Awards, I worked on items for the Wisconsin State Fair Professional Wine Competition 2012, and I created the WGGGA monthly e-newsletter and sent it out. I also did the monthly WGGGA Membership maintenance: welcome emails to new members, add to Google groups, website, Mail Chimp and database. News articles and events were also posted to Facebook. I finalized the Wisconsin Wineries Production Report which shows actual growth of wine production in Wisconsin from 2007-2010.

I continued to make contacts with growers and wineries via email and phone to answer various questions. I continued working on my presentations for the upcoming Wisconsin Fresh Fruit & Vegetable Conference 2012 in January.

As part of our plan of work, we planned to quantify initial numbers and track results of wineries purchasing grapes in 2010 and 2011, tonnage and value of grapes purchased for both years, and bottles of accredited wines produced and retail value of those wines. I spent the first part of 2011 putting together a database of all the wineries in Wisconsin. Using the Wisconsin Wineries

Association website which listed 39 members along with TTB website and Google I discovered that there was over 70 wineries in Wisconsin. I reached out to each winery to figure out which of these wineries were producing wines with Wisconsin grown grapes and concentrated on them.

We did not realize how difficult it would be to quantify initial numbers and track results of wineries purchasing grapes in 2010 and 2011, tonnage and value of grapes purchased for both years, and bottles of accredited wines produced and retail value of those wines. The Wisconsin Wine Accreditation Program rolled out in fall 2011. This year I will have a better idea of the increase of accredited wines and retail value of those wines. It took a while to introduce myself to wineries and to build trust among the wineries.

I was able to identify wineries that produced a wine with Wisconsin grapes in 2011, but not 2010. Retail values were not part of the requirements for the accreditation program in 2011 but will work to integrate this into the 2012 program. I will also try to go back and get retail value of the accredited wines for 2011 now that I have better communication with the wineries.

Tonnage and value of grapes purchased is something growers do not want to share. They still find it to be confidential information. This is something we were unaware of when the grant was written. I have some information I collected from grape growers survey on tonnage they harvested in 2010, but does not indicate which winery they sold what variety to. We are hoping that the Economic Impact Study in 2012 will help us uncover some of these things.

The industry is young in Wisconsin and with time we should be able to uncover more information about grape pricing, wines produced and the retail values of each wine.

III. Goals and Outcomes Achieved

1. In 2011, we expect to sell 300 additional tons of Wisconsin grapes to Wisconsin wineries than were sold in 2010.

With a clearer picture of what qualities vintner's want from the grapes they purchase, a better product will be grown, harvested and delivered. Also, with increased awareness of Wisconsin grapes and their qualities and characteristics, more vintners will be interested in purchasing their grapes locally. Currently 2,000 tons of Wisconsin grapes are sold to wineries in the state. That tonnage will increase by 15% (300 tons) with a per ton value of \$1,000, for an economic impact of \$300,000.

The Specialist will collect information during his visits with wineries and growers to confirm the amount of grapes purchased and sold.

One of the questions on the Wisconsin Wineries Survey 2011 was, "Do you purchase Wisconsin grown grapes?" Out of 81 total wineries surveyed, 28 wineries (34.57%) indicated they currently did. Another question on the Wisconsin Wineries Survey 2011 was, "Are you interested in purchasing Wisconsin grown grapes?" 42 wineries (51.85%) indicated that they were. That was an increase of 14 wineries who are looking to use Wisconsin grown grapes this year at their winery. Wineries were also surveyed to see which varieties of grapes they were most interested in purchasing and this information was passed along to the growers so they could contact the

wineries who were looking for varieties they were growing. This information can also be used for future growers who are debating which varieties to plant.

Wisconsin had an epic harvest in 2011. In fact it is being called, "one of the best harvests in over 30 years." Yields were up and grapes were very clean and disease free. There is actually a shortage of Wisconsin grown grapes in Wisconsin. With 11 new wineries opening in 2011, the demand was far greater than the supply. One winery alone was looking for 300 ton of Wisconsin grown grapes. A lot of wineries are still importing grapes and/or juice from out-of-state. As vineyards begin to bear fruit and more grapes are planted, there should be a slight decrease in out-of-state grape purchases.

I created a database of wineries who were interested in purchasing Wisconsin grown grapes and the quantities each wanted. I then emailed this list out to all Wisconsin grape growers. It was up to them to contact the wineries to form relationships and sell them their grapes. I also had a few growers who needed to sell some grapes at the last minute due to a potential buyer backing out. I sent an email out to Wisconsin wineries who had expressed interest in the varieties, and together we were able to get the grapes sold.

Actual tonnage harvested by wineries in Wisconsin is hard to estimate. Survey results from the Report of Wisconsin Grape Growers Survey 2011 indicated that Wisconsin grape growers harvested a total of 690,799 pounds or 345 tons of grapes in 2010. Besides 299,163 pounds of unknown varieties harvested, the top five varieties of grapes harvested were Marechal Foch (61,519 pounds or 30.75 tons), Frontenac (59,786 pounds or 29.89 tons), Marquette (51,291 pounds or 25.64 tons), La Crescent (42,069 pounds or 21.03 tons) and Frontenac Gris (31,655 pounds or 15.82 tons).

Wisconsin grape growers estimated a total of 419,540 pounds or 210 tons of grapes to be harvested in 2011. The total is lower than 2010 because a lot of growers did not answer this question. Some reasons they may have not answered this question include grapes not bearing yet or they just do not have the education or tools to do an accurate estimate. Besides 5,900 pounds of unknown varieties harvested, the top five varieties of grapes estimated for 2011 were Marquette (92,280 pounds or 46.14 tons), Marechal Foch (79,845 pounds or 39.92 tons), Frontenac (63,220 pounds or 31.61 tons), La Crescent (36,250 pounds or 18.12 tons) and Frontenac Gris (27,906 pounds or 13.95 tons). Actual tons harvested in 2011 have not been reported. It is difficult to get growers to report pounds/tons harvested as it is not required by the state or federal government. Wineries are just required to report total gallons produced and tax paid wine.

I think it is fair to say that at least an additional 300 tons of Wisconsin grapes were sold to Wisconsin wineries due to more vineyards bearing fruit, an excellent harvest with a higher yield crop and an increased interest in both wineries producing local wines and consumers purchasing local wines.

2. *We expect the sales of accredited Wisconsin wines to increase by 15% over the previous year's sales for the same product.*

In 2011, we will identify Wisconsin wines that qualify for WGGGA accreditation. For a wine to be accredited, 75% of the grapes used in that wine's production must have come from Wisconsin-grown grapes. Once accredited, this position will work through public relations channels to promote these wines to the Wisconsin consumer. We expect to increase the sales of accredited wines in 2011 by 15% over the sales for that same product in 2010. Our anticipated increase in

grape sales converts to an additional 175,000 bottles of wine produced with a retail value of \$12/bottle or \$2.1 million in increased sales.

This will be evaluated by collecting information from the winery on the 12 months of sales prior to accreditation with the 12 months of sales after accreditation.

I identified 37 wineries in Wisconsin who currently had one or more wines produced with 75% or more Wisconsin grown grapes (see chart below). These wineries qualified for the WGGA Accreditation Program 2011. They were given marketing materials to hand out to consumers who visited their wineries. They received 50 wine wheels, 100 brochures and 5 posters to start. More materials were mailed out throughout the year. These materials were part of a grant the WGGA received in 2009. They are also listed on the WGGA website under Marketing/Wisconsin Wine Accreditation Program.

WGGA WISCONSIN WINE ACCREDITATION PROGRAM 2011

Number	Winery Name	County
1	Appletreow Winery	Racine
2	Bauer-Kearns Winery	Grant
3	Botham Vineyards & Winery	Iowa
4	Brigadoom Winery	Oneida
5	Burr Oak Winery	Juneau
6	Captain's Walk Winery	Brown
7	Cedar Creek Winery	Ozaukee
8	Clover Meadow Winery	Washburn
9	Cold Spring Vineyard	Washington
10	Danzinger Vineyards	Buffalo
11	Door Peninsula Winery	Door
12	Elmaro Vineyard (West Prairie Winery, LLC)	Trempealeau
13	Fermenting Cellars	Rock
14	Fisher King Winery	Dane
15	LedgeStone Vineyards	Brown
16	Maiden Rock Winery & Cidery	Pepin
17	Muller Wines (White Winter)	Bayfield
18	Musetta Winery (now called Villa Bellezza Winery)	Pepin
19	Northleaf Winery	Rock
20	Orchard Country Winery	Door
21	Parallel 44 Vineyard & Winery	Kewaunee
22	River Bend Vineyard & Winery	Chippewa
23	Sinnipee Valley Vineyard	Grant
24	Spurgeon Vineyards & Winery	Iowa
25	Staller Estate Winery	Walworth
26	Trout Springs Winery	Brown
27	Two Brothers Wines LLC	Waukesha
28	Valley Vineyard	Pierce
29	Van Price Innovations LLC (Lance's Winery)	Langlade
30	Vernon Vineyards	Vernon
31	Vetro Winery, LLC	Jefferson
32	Vino in the Valley	Pierce
33	Von Stiehl Winery	Kewaunee
34	Weggy Winery	Grant
35	Whispering Winds Winery LLC	Grant
36	Wollersheim Winery	Sauk
37	Woodland Trail Winery	Oconto

I also worked with the Wisconsin State Fair to help promote Wisconsin grown and produced wines. The inaugural Wisconsin State Fair Professional Wine Competition was held and over 100 Wisconsin grown and produced wines were submitted. A media event was held and 15-20 media attended and tasted through the final tasting. Along with the added media, Wisconsin State Fair Foundation held a consumer tasting event which featured wines from the competition. Over 250 people attended and tasted these award winning wines.

In data provided by the Wisconsin Department of Revenue, I was able to put together a Wine Production Report Growth by Year for Wisconsin wineries. You can see the growth from 2007 to 2008, 2008 to 2009 and 2009 to 2010. There was an increase of 207,387 bottles of wine produced in Wisconsin from 2009 to 2010. Data for 2011 will not be available until April 2012.

Wine Production Report Growth by Year

Year	Wine Under 14%	Growth Over LY	Wine Over 14%	Growth Over LY	Cider	Growth Over LY	Total Gallons	Total Liters	Cases	Total Growth Over LY
2010	647,828.59	5.38%	23,479.77	22.82%	4,863.71	17.97%	676,172.07	2,559,581.77	284,397.97	6.08%
2009	612,969.84	9.17%	18,120.80	0.74%	3,989.80	39.70%	635,080.44	2,404,040.98	267,115.66	9.40%
2008	556,765.33	-24.66%	17,986.99	-21.12%	2,405.95	100.00%	577,158.27	2,177,976.51	241,997.39	-24.42%
2007	694,079.26	N/A	21,785.49	N/A	0.00	N/A	715,864.75	2,709,834.39	301,092.71	N/A

3. We expect seven wineries to purchase Wisconsin grapes after this project that had not purchased local grapes previously.

In 2010, less than 25%, or approximately 12, of Wisconsin's wineries will purchase locally raised grapes. This project will increase the number of wineries purchasing grapes in 2011 by 7 or a total of 19 wineries.

This will be evaluated through visits with wineries and confirmation of sales from growers.

Eleven new wineries opened in Wisconsin in 2011. Among these wineries, Elmaro Vineyards, Harbor Ridge, Fisher King Winery, Lewis Station Winery, Villa Bellezza Winery, Sandstone Winery, and Chiselled Grape Winery all purchased Wisconsin grown grapes. So our goal of increasing the number of Wisconsin wineries purchasing Wisconsin grown grapes was actually increased by 8 instead 7 which was our goal.

IV. Beneficiaries

Provide a description of the groups and other operations that benefited from the completion of this project's accomplishments. Include quantitative data that concerns the beneficiaries affected by the project's accomplishments and/or the potential economic impact of the project.

All Wisconsin grape growers, all Wisconsin wineries, consumers, Wisconsin State Fair, UW-Agricultural Extension Agents, Wisconsin Winery Association, VESTA and media outlets. The potential economic impact is yet to be seen. The Wisconsin grape and wine industry has received a tremendous amount of earned media this year: Palate Press, Fox News, Wines & Vines, Iowa

State University Newsletter, Midwest Wine Press and other local Wisconsin newspapers and TV stations.

Findings from my work over the past year have indicated that the Wisconsin grape and wine industry is much larger than anyone realized. This means that the economic impact is far greater than originally forecasted: creation of jobs, increase in tourism with wine trails and events, etc.

Through this project, processes have been developed and connections have been made to overcome the hurdles that were restricting the use of Wisconsin grown grapes in the state's wine industry and further moving true Wisconsin grown and produced wines into the hands of our consumers. Wisconsin grape growers have benefited because it has become easier to sell their grapes to Wisconsin wineries. They now have the opportunity to choose a few different wineries to work with and find the best fit for them. In the future grape growers should benefit from an increase in grape prices due to establishing long-term relationships, supply and demand and an awareness of Wisconsin grown and produced wines by consumers.

V. Lessons Learned

Some problems and delays I experienced were the incomplete list of Wisconsin wineries and Wisconsin grape growers. So I had to do a lot of online research and reach out to a few different parties to pull one together. I was given a list of WWA Members (44 wineries) but that did not include all bonded Wisconsin wineries or wineries who were in the application process. I had to Google around on the internet to find website and contact information. Other delays included response rates on surveys and hearing back from wineries.

The biggest unexpected outcome is that the Wisconsin grape and wine industry is much larger than anyone anticipated. Not only are there over 70 wineries in Wisconsin, but there are over 300 grape growers. It was thought that there were around 50 wineries in Wisconsin and 200 or so grape growers. The Wisconsin Grape Growers Association (WGGA) has 137 members. My main database which includes the WGGA Members has grown to over 300 individuals this year. The Wisconsin Winery Association (WWA) has 45 members. A complete database of wineries has also been developed and forwarded to WWA and the executive director of WGGA and WWA.

Lessons I have learned over the course of the year are that not everyone is going to be cooperative or want to participate in research or the associations. It takes time to develop relationships and gain trust. Once I can show growers and wineries the benefit of working with me and the associations, I think more will begin to cooperate and some already have. Although there was a high response rate for both surveys, Wisconsin Wineries Survey 2011 - 86.42% and Wisconsin Grape Growers Survey 2011 - 52.03%, some of the larger vineyards in the state did not respond nor communicate with me at all during the year. As the industry continues to grow, the more experienced growers must step up and become leaders and mentors to industry newbies.

This year I was able to really dig in and begin to understand where the Wisconsin grape and wine industry really stands. It took a while to establish the ground work, but now it is essential to keep

this project going so the industry continues to move in the right direction. By educating the people who are closest to the industry like the Wisconsin Grape Growers Board, Wisconsin Winery Association Board, University of Wisconsin-Madison Research and University of Wisconsin-Madison Agricultural Agents, we can make sure the correct information is relayed out to Wisconsin grape growers, Wisconsin winery owners, media and consumers.

VI. Additional Information

I published two reports that detail the current state of the grape and wine industry in Wisconsin:

1. **Report of Wisconsin Wineries Survey 2011** <http://wigrapes.org/wp-content/uploads/2011/06/WI-Winery-Survey-2011-Report1.pdf>

2. **Report of Wisconsin Grape Growers Survey 2011** <http://wigrapes.org/wp-content/uploads/2011/12/Report-of-the-Wisconsin-Grape-Growers-Survey-2011.pdf>

Grapes Wanted by Wisconsin Wineries 2011 (attached)

Updates were made to the Wisconsin Grape Growers Association website at www.wigrapes.org. The following items were added:

1. Updated WGGGA Membership Benefits and Membership Forms
2. Current WGGGA Members page which lists members by county
3. Marketing tab with Picture Gallery, Wisconsin Wine Accreditation Program, Articles, Press Releases, Contact Us with information on how to contact me with marketing inquires

A Facebook page was developed and marketed. There are 116 fans up from around 10 when I first started. (<https://www.facebook.com/wigrapes>)

A Twitter account was also setup. It is not used as much right now, but is there in case there is need for the future. (@wigrapes)

I developed a monthly e-newsletter using Mail Chimp filled with current media and press, events, and other important information that was sent out to WGGGA Members, WGGGA Board of Directors and some industry people. Open rate is higher than industry average at 52% or greater.

VII. Contact Info

Anna Maenner
Executive Director
Wisconsin Grape Growers Association
2011 Canal Road
Waterloo, WI 53594
920-478-3852
acminc@frontier.net

8) Wisconsin Mint Board

Project Title: Integrated systems to improve mint persistence in Wisconsin (FY10FB-008)

Total Amount Received: \$52,785

Date of Award: October 25, 2010

Project Contact(s): Julie Braun, AJ Bussan

Report Date: January 31, 2013

I. Project Summary

Wisconsin Mint Board represents 15 to 20 mint growers across the state of Wisconsin. For most Wisconsin mint growers, mint is not the primary crop but provides alternative and diverse source of income for growers. Spearmint and peppermint were grown on over 4,800 acres during 2008 with oil yield of 208,000 lb worth approximately \$3.6 million - just half the crop harvested 10 years ago. Loss of mint production is due to price competition, dramatic increases in input costs, and reduced persistence of mint stands. Mint is a perennial crop that can survive more than 5 years, but stand survivability in Wisconsin has shortened over the past decade. Stand persistence reductions have been linked to the mint bud mite, Verticillium wilt, injury from herbicides, and selection of mint lines with reduced persistence. A means to reduce input costs would be to improve mint persistence and reduce high costs of field establishment. This project will focus on development of integrated management systems that improve the persistence of spearmint and peppermint in WI. Field research and demonstration projects will evaluate new germplasm and pest management systems for improved stand persistence in mint.

II. Project Approach

Objectives of the program were:

- 1) Evaluate Verticillium resistance of new peppermint and spearmint lines and demonstrate impact on persistence and productivity over time.
- 2) Demonstrate enhanced persistence of Sh spearmint line across multiple locations and soil types in Wisconsin.
- 3) Quantify interaction of mint bud mite best management systems and Verticillium resistant mints and Sh spearmint on persistence and productivity.
- 4) Evaluate interactions between weed best management strategies and Verticillium resistant mints and Sh spearmint on persistence and productivity.
- 5) Communicate integrate management systems that improve persistence and productivity to the Wisconsin mint industry.

Objective 1: The Only lines available are genetically modified. While robust resistance has been demonstrated, market acceptance is not likely in the near future. Therefore, we have knowledge on resistance of lines available, but will not be implementing until change in acceptability of the technology. We evaluated Verticillium wilt development in Black Mitchum peppermint in commercial fields. We are also tracking Verticillium development in different Scotch spearmint line selections. No Verticillium wilt was evident in selections planted at Arlington Ag Research Station. We have also not observed or measured any Verticillium wilt in plots established on producer fields. We will continue to monitor in current plots on producer fields. In trial at Arlington, mint was maintained for two years with no Verticillium development. In winter 2012, mint winter killed at Arlington. We will continue to work with the Wisconsin Mint Board as we move forward with more mint research funded by a 2011 SCBG.

Objective 2: At this point Sh spearmint lines have been established in research plots to address objective 2. Quantification of oil yield and quality were initiated during 2012. Sh lines yield over 100 lb oil/a compared to Scotch spearmint which only yield 60 to 80 lb. We also surveyed numerous Scotch spearmint fields in Central Wisconsin. Lack of persistence appears to be linked to poor regrowth of spearmint rhizomes prior to the harvest. This leads to poor or no regrowth and subsequent death of mint roots and crops the next spring. Furthermore, roots that do regrow have lesions and infections that also likely stress the crop.

Plots established at Arlington winter killed in winter of 2012. Propagation was completed in spring of 2010 and 2011 with Knight Hollow Nursery. Sh plugs were planted at Gumz Muck Farms both years, Soda Farms in spring 2011, and shipped to IN mint grower in spring 2011. We are tracking progress of this mint in these fields. Oil yields are reported above.

Objective 3 and 4: We have combined the activities associated with objectives 3 and 4. We are now surveying peppermint and spearmint growth and development in 4 fields across Wisconsin. We surveyed vegetative growth, overwintering crown decline over the course of spring growth, new stolon development, oil yield, and subsequent impacts of mowing time on stolons. As part of this effort we are also monitoring uptake and partitioning of nitrogen, phosphorous, and potassium. Please see attached report detailing outcomes of this research to date.

No commercial Verticillium resistant spearmint or peppermint lines are available to evaluate. Therefore we are evaluating the interactions of bud mite in Sh and Scotch spearmint and in Black Mitchum peppermint. Bud mite has not been present at threshold level to date so we will make treatments when this occurs under continuation of funding. In addition, we are monitoring commercial fields for bud mite and implementing appropriate management in cooperation with mint growers. Subsequently, we monitor stolon growth and development and subsequent effects on potential for over wintering as described above.

Objective 4. Sh and Scotch spearmint have been established on Gumz Muck Farms. Different weed management treatments have been implemented during summer of 2011 and 2012 in fields. Crop injury and weed control has been monitored. Now that mint is established, crop will be monitored for regrowth during spring and weed control treatments implemented again during summer of 2013. Results are incomplete as mint line selections were at different stages of development up until this point. This will be completed in spring 2014.

Please see attached pdf providing data on these activities.

Objective 5. Midwest mint meeting was held in February 2012 in Indiana and during February 2013 in Wisconsin Dells, WI. Recent presentations are attached. Instead of formal tours, individual growers were walked through current research at multiple times during the growing season. Finally, new management materials are being developed. Please see draft pdf of outcome of sustainability assessment effort.

The 2012 meeting was attended by 40 to 45 mint growers and buyers from MI, IN, and WI. The 2013 meeting was attended by 25 mint growers and buyers from MI, IN, and WI. The mint sustainability survey was distributed to 25 members of the Scientific Affairs Committee within the Mint Industry Research Council and 35 MI, IN, and WI mint growers.

III. Goals and Outcomes Achieved

- *GOAL: specialty crop research on conservation and environmental outcomes*

Outcome: increase persistence of peppermint and spearmint – Average stand age of Wisconsin mint fields will be determined at the beginning of the project. This will be repeated 5 years later to determine adoption of Sh spearmint, Verticillium resistant mint, and identified management systems.

This is a long-term outcome too far in the future to ascertain now. Currently, very little spearmint is being produced in Wisconsin. If acreage of spearmint increases it will reflect increased persistence.

Outcome: adoption of reduced risk pest management strategies will also be tracked. Labels for mint bud mite will be pursued for several products and use patterns in mint recorded relative to current use of Comite and Fujimite.

This is being pursued, but with limited success. In part, this is due to the label approval process. It is difficult to get chemicals labeled for use on specific crops with small numbers of growers. We will continue to pursue this goal with our 2011 SCBG funds that continue this project.

- *GOAL: new and improved peppermint and spearmint varieties* have been identified.

Outcome: spearmint acres planted to Sh spearmint and total mint acres planted to Verticillium resistant varieties after 5 years will indicate project success. No acres are currently planted to either.

Sh spearmint has been planted on 3 different farms in WI and a farm in IN. Another spearmint line has also been identified and grown by a mint farmer and we are documenting its persistence and productivity. We will continue to pursue this goal with our 2011 SCBG funds that continue this project.

- *GOAL pest and disease control*

Outcome: Shifts in best management strategies will be recorded specifically as it relates to insecticide and herbicide use and adoption of resistant varieties.

IPM survey is underway to document use of different pesticides across the state. We will continue to pursue this goal with our 2011 SCBG funds that continue this project.

- *GOAL: sustainability*

Outcome: The core purpose of this proposal addresses the economic, environmental, and social sustainability of the Wisconsin mint industry. Data from Wisconsin Ag Statistics Service on mint production will be quantified. Maintenance of current acreage and productivity will be seen as success.

We have conducted an assessment of the sustainability of mint production as discussed in the continuation proposal for this grant (using 2011 SCBG funds). A draft of the summary is attached. Please do not distribute as this still needs internal UW-Madison review and approval and also needs to be reviewed by the Wisconsin mint board. This was shared with mint buyers and end-users at the Mint Industry Research Council Meeting in Las Vegas on 1/23/2012. There was enthusiastic response by majority of meeting participants. We feel this should address market/value chain request for information on approach to mint production and management.

B. Provide a comparison of actual accomplishments with the goals established for the reporting period.

Data collection is underway.

There is close to 50 A of Sh spearmint and at least 160 acres of another alternative spearmint variety. The mint sustainability summary provides a good summary of current management. Specific information on alternative pest control measures should be finalized within 12 months.

IV. Beneficiaries

Mint growers – There are 10 active mint producers remaining in the state. Mint used to be a thriving industry in Wisconsin, particularly for farmers of other crops who added mint as an additional crop with significant value. If mint persistence can be improved, it can add value as a crop to hundreds of Wisconsin farms, drastically increasing their farm income.

Citizens – management continues to evolve and current sustainability assessment information suggests a majority of mint acres are being managed with UW extension recommended best management practices. These are developed with the intent of minimizing environmental impact which is beneficial to the state. In addition, the industry employs dozens of residents that receive competitive compensation and benefits packages. Increased production would increase jobs for Wisconsin workers in this industry. While we do not have complete numbers for a full-fledged economic assessment of the mint industry at this time, please see attached sustainability report for partial coverage of economic impact.

V. Lessons Learned

Mint produces next generation of stolons as early as May, within about 3 to 5 weeks of emergence of the crop. These stolons are the key for future crop stands.

Mowing reduces stolon health of spearmint and peppermint. Regrowth following mowing is an indicator of overall crop health.

Spearmint stolons generally degrade in health from mid summer through freezing. The cause of this decline is not currently defined, but we feel this holds the key for improving persistence.

VI. Additional Information

See attached documents entitled *final report Handout For11 29 ajb* and *final report Sustainable_Mint_DRAFT_01_18_2013*

VII. Contact Info

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9) WI DATCP Bureau of Trade Practices -- Fruit & Vegetable Inspection Unit

Project Title: GAP/GHP Cost Share Program (FY10FB-009)

Total Amount Received: \$50,000

Date of Award: October 25, 2010

Project Contacts: Jeremy McPherson

Report Date: January 30, 2012

I. Project Summary

The purpose of this project was to provide food safety assistance to Wisconsin-based specialty crop producers and processors, and to promote the Good Agricultural Practices / Good Handling Practices (GAP/GHP) certification program. The DATCP Bureau of Business Trade Practices – Fruit & Vegetable Inspection Unit is authorized by USDA to certify farms and facilities under the GAP/GHP program. A key part of the certification process is an on-site audit. This grant provided funds to make these audits (and therefore, certification) financially accessible to more producers and processors, thereby creating new market opportunities for Wisconsin producers. Many large chain stores require food safety certification at the farm level.

The GAP/GHP requirements are governed by USDA. USDA establishes the standards and trains the state inspectors who are certified to conduct the audits. USDA also mandates that the price of the audit is \$92.00 per hour plus an overhead fee of \$50.00. Under this grant agreement, the Fruit & Vegetable Inspection Unit's audit clients paid \$23.00 per hour (25%) and the grant covered the remaining \$69.00 per hour (75%).

In addition, this grant helped defray the cost of having Fruit & Vegetable Inspection unit auditors provide free workshops and training seminars for growers. These seminars were typically organized by trade organizations for their members or by processing facilities for their suppliers. They provided an opportunity for growers to learn about the GAP/GHP requirements before submitting to the audit and, therefore, more efficiently obtain certification.

Finally, this grant helped the Fruit & Vegetable Inspection Unit auditors maintain their credentials to do this work. USDA requires each auditor to take 24 hours per year of continuing education to maintain their certification. This grant covered 75% of the salary & fringe expenses for the time that the three auditors spent in their continuing education training.

The Fruit & Vegetable Inspection Unit received a similar grant last year. The work done under this project was largely a continuation of the previous project.

II. Project Approach

The Fruit & Vegetable Inspection Unit conducted 76 GAP/GHP audits. Many of these audits would not have been possible without this grant. Growers received most of the audits, but there were some conducted at packing & distribution facilities. The growers were from all over Wisconsin and the products included: apples, arugula, basil, beets, carrots, chives, cucumbers, eggplant, green beans, lettuce, mushrooms, onions, peppers, potatoes, scallions, swiss chard, tomatoes, and zucchini.

This grant also provided support to The Fruit & Vegetable Inspection Unit by sharing in the unit's costs for which it does not bill customers. Over the grant period, the unit's auditors appeared at seventeen workshops or seminars to talk about GAP/GHP standards and the certification process. These workshops were typically arranged by grower trade organizations or businesses that buy the growers' products. These workshops are an excellent opportunity for growers to learn what will be expected should they continue to seek GAP/GHP certification.

This grant also covered part of cost of having three Fruit & Vegetable Inspection Unit auditors maintain their credentials with USDA. USDA requires 24 hours per year of continuing education. This grant covered 75% of the employees' pay while they fulfilled this requirement, and 75% of the cost of obtaining the training.

III. Goals and Outcomes Achieved

The Fruit & Vegetable Inspection Unit performed 76 GAP/GHP Audits during this grant period (FY10 / Calendar Year 2011). This represents a 38% increase from the 55 audits that were performed during FY 09 / Calendar Year 2010; which was the first year of the SCBG for GAP/GHP. Previously in 2009, The Fruit & Vegetable Inspection Unit conducted 38 GAP/GHP audits.

The Fruit & Vegetable Inspection Unit presented training seminars or workshops seventeen times this year. This is an increase over the sixteen that were presented in 2010 and four that were presented in 2009.

B. Provide a comparison of actual accomplishments with the goals established for the reporting period.

Before this grant was available, the unit performed about 38 GAHP/GHP audits annually. The stated goal at the beginning of this grant period was to increase this number by 20 over a two year period. The Fruit & Vegetable Inspection Unit exceeded this goal. The number of audits performed increased by 17 the first year and 21 the second.

IV. Beneficiaries

The purpose of this project was to make third-party food safety audits (GAP/GHP) available to small and medium-size Wisconsin growers, many of whom would not otherwise have the resources to pay for the audits. Specialty crop buyers are increasingly requiring growers and packing facilities to obtain third-party audits. Growers who are unable to comply may lose market share and find themselves at a competitive disadvantage.

Roughly 145 grower and packing-house representatives attended the seventeen workshops. Some of these would have gone on to request an audit and obtain a certification during this year; others will become part of the program in the future (they might need time to adjust their operations to meet certification requirements). These workshops are a crucial first step to certification. Nearly all of the farms and facilities that we have certified participated in one of these free clinics before entering into the certification audit.

V. Lessons Learned

The grant awarded was for \$50,000. However, the actual costs reimbursed under the grant were only \$30,118. While GAP/GHP certification is growing, we did not need all the funds budgeted for cost sharing the audits. We will continue to market the program in hopes of reaching even more growers in the future.

VI. Additional Information

None

VII. Contact Info

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10) Board of Regents of the University of Wisconsin System

Project Title: Grower-driven sustainability standards for cranberry production (FY10FB-010)

Total Amount Received: \$49,200

Date of Award: October 25, 2010

Project Contact(s): Jed Colquhoun

Report Date: January 30, 2013

I. Project Summary

Sustainability has rapidly become a market differentiator throughout the retail supply chain, including food products. As a result, sustainability standards have been developed or are proposed for food production, focusing primarily on large-acreage grain crops such as corn or soybean. These standards are typically driven by marketing, and as such, don't involve significant producer input. This project was unique in that it was driven by growers, represented a collaboration of growers, processors and handlers, and was focused on the long-term feasibility, including producer economic sustainability. The end product includes a grower-driven sustainability program that is realistic for growers, yet fulfills retailer objectives for improved methods to quantify the impacts of the supply chain. The assessment tool was widely adopted by cranberry producers in Wisconsin and beyond.

II. Project Approach

This project began with an evaluation of existing sustainability metrics tools, such as the Field to Market and Stewardship Index for Specialty Crops approaches, to see if they might be applicable to cranberries. Early on, it became apparent that cranberries, as a specialty crop, would require a customized approach, and that the only way cranberry producers would become significantly engaged in the project would be to actively participate in the creation of the assessment tool. Thus, we held several producer input meetings with the grower associations, on marshes and at the annual producer meetings. This input was incorporated into a survey that was reviewed and approved by the producers and handlers, distributed to all Wisconsin growers, and results compiled, analyzed and communicated throughout the industry and beyond. See Section III. for more details on activities performed.

III. Goals and Outcomes Achieved

Activities included:

- 1) Evaluation of existing sustainability tools relative to cranberry production. As described above, none of the existing initiatives were appropriate for specialized cranberry production, thus we created our own assessment tool from the ground up.
- 2) Interactive input opportunities for cranberry producers, handlers and processors. Several meetings were held with Wisconsin Cranberry Board members and others to develop a producer-led sustainability tool. This tool was then vetted through the cranberry supply chain with the creation of a Cranberry Institute Sustainability Task Force (the national Institute membership includes all of the cranberry handlers and processors), where we met in-person and via several teleconferences.
- 3) The refined sustainability assessment tool was then sent to all producers, results returned, data entered and analyzed. The results have been presented in a variety of venues and using innovative publications, social media and web presence.

B. Provide a comparison of actual accomplishments with the goals established for the reporting period.

The project has far exceeded the proposed goals in several ways:

- 1) In Wisconsin, the sustainability assessment tool was successfully implemented with the results representing about 70% of the cranberry acreage. Additionally, the tool worked well enough that it was also adopted in Massachusetts, New Jersey and the Pacific Northwest, also with very high participation rates.
- 2) The tool was implemented with no cost to the grower, other than use of about 30 minutes of their time. This is far less than the 2% goal that was proposed and that achieved by other sustainability initiatives.

IV. Beneficiaries

The beneficiaries of this project were broad and throughout the cranberry supply chain from growers to handlers and processors. While the project was originally designed for Wisconsin's 369 cranberry producers, which represents about 60% of the U.S. cranberry industry, the sustainability survey was adopted and carried out by producer associations and cranberry handlers in the Pacific Northwest, New Jersey and Massachusetts. Cranberry handlers and processors have also adopted the sustainability assessment survey and use it in their broad communications.

V. Lessons Learned

The importance of the producer-led, research-driven focus of this project should not be underestimated. A large portion of the time dedicated to this project included many grower meetings, discussions and one-on-one conversations to build trust in the process and outcome, and the high return rate in the survey approach demonstrates the importance of this approach. Additionally, the project results demonstrate that a one-size-fits all approach to sustainability is not appropriate – producer-led solutions differ greatly among crops and regions, and thus existing sustainability tools will not work particularly for specialty crops such as cranberry.

VI. Additional Information

None

VII. Contact Info

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11) Wisconsin Potato and Vegetable Growers Association

Project Title: Developing alternative potato sprout inhibiting strategies to CIPC (FY10FB-011)

Total Amount Received: \$44,375

Date of Award: October 25, 2010

Project Contact(s): Karen Walters, AJ Bussan

Report Date: January 31, 2013

I. Project Summary

Wisconsin potato growers produce approximately 20 million hundredweight of potatoes annually worth \$200 million. Over 85% of potatoes are stored to allow for year long marketing. Nearly all of the stored potatoes are treated with CIPC to prevent sprouting. CIPC is a known mutagen with multiple perceived human health risks when residue limits are exceeded. CIPC use on potatoes has been banned in Europe and US retailers are asking packing sheds and processors to reduce or end use of CIPC. Yet, suitable alternative strategies for management of sprouts in stored potatoes have not been identified. Storing potatoes at 4 C (38 F) can reduce sprouting, but this is only effective for fresh market potatoes and until they are packaged and sold. The goal of this research is to identify alternative sprout management systems in fresh market, processed, and chipping potatoes. Specific objectives include 1) use of alternative products through ventilation systems for season long storage, 2) application of sprout inhibitors immediately before packaging, and 3) application of alternative sprout inhibiting products to potatoes in packing lines. Fresh potatoes need to be maintained free of sprouts for at least 6 weeks after packing to meet consumer quality expectations.

II. Project Approach

The goal of this research is to identify alternative sprout management strategies in fresh market, processed, and chipping potatoes. Fresh potatoes need to be maintained free of sprouts for at least 6 weeks after packing to meet quality requirements of retailers and produce managers and to avoid consumer complaints. Processing potatoes must be maintained sprout free to avoid accumulation of reducing sugars and development of dark colored French fries or potato chips. Specific objectives include:

- 1) Evaluated use of alternative products through ventilation systems for long-term storage.
- 2) Measure sprout suppression after application of alternative sprout inhibitors immediately before unloading potatoes for packaging.

- 3) Evaluate application of alternative sprout inhibiting products to potatoes in packing lines to prevent sprouting after washing and at retail centers and homes.

Activities completed

Objective 1. We have evaluated the efficacy of AMV 1018, SpudDefender, and 1,4-Sight for sprout suppression of long-term fresh market potatoes and AMV 1018 for sprout control in chip potatoes. AMV 1018 provided excellent control of sprouts long-term compared to CIPC. Only limit to use on a broad scale is pending label and cost. SpudDefender works in storage, but also has more sprouts and increased quality issues due to sprouting. SpudDefender applied to bulk pile resulted in rejection of potatoes at terminal markets in 2000, cwt trial. 1,4-Sight work provided adequate sprout control, but is costly for the number of applications. AMV 1018 also suppresses sprouts in chip potatoes, but this requires more treatments and was not as successful. Therefore, AMV1018 will need to be blended with other products.

Objective 2. Completed this research on AMV 1018, clove oil, 1,4 sight and SpudDefender. AMV 1018 provided sprout control for 8 weeks after removal from storage. SmartBlock (AMV 1018) - In 2010, 2,000 hundredweight of fresh potatoes in Bin 9 were treated with SmartBlock in December and then again in April. Bin 8 was treated with CIPC in November and with CIPC plus Biox (Clove oil) in April. Fresh potatoes were stored at 38. SmartBlock provided better sprout suppression in storage and after removal than CIPC plus Biox. A similar experiment was done with chip potatoes. Chip potatoes were stored at 48 to 50 F. The warmer storage temperatures required for management of chip potatoes led to less success with SmartBlock. Potatoes began to break dormancy and sprout more quickly following SmartBlock compared to CIPC treatments.

SpudDefender – SpudDefender provided good sprout suppression of potatoes stored in crates when compared to CIPC. SpudDefender treatments to bulk piled potatoes failed to control sprouts. Potatoes delivered to retailers were rejected due sprouts after treatment with SpudDefender. Rejections occurred even though potatoes in the pile had few to no sprouts visibly present. After removal from 38 F storage, sprouts grew quickly (within days) leading to unacceptable appearance at the retailer.

1,4-Sight – 1,4-Sight was used alone in fresh potatoes and compared to CIPC. 1,4-Sight was applied 4 times in November, late December, March, and May. CIPC was applied in November and again in combination with Biox in April. 1,4-sight provided suppression of sprouts in the pile and also in packages after processing at the packing shed. It is unclear whether this would be cost effective.

Objective 3. SpudDefender has great potential as an in-line application especially when used on potatoes treated with CIPC in storage. Sprout management is improved compared to CIPC applications on the packing line. SpudDefender should be evaluated widely for displacing CIPC use in packing facilities. SpudDefender was compared to CIPC with in-line applications to potatoes coming out of storage. Applications were made to potatoes on the grading line on two different occasions. After treatment, potatoes were packaged with commercial bagging equipment. Potato tubers were evaluated for sprout development under two different temperature regimes. First, they were stored in controlled atmosphere similar to common potato storages at

55 F. Second, they were stored in dark closet, consistent with how potatoes might be stored in a home.

SpudDefender applications in the line on potatoes treated with CIPC in storage had improved sprout control compared to CIPC following CIPC. This is because the SpudDefender actually burns off the sprouts, whereas CIPC keeps sprouts from growing rather than desiccating sprouts present. Potatoes treated with SpudDefender in storage and then treated with CIPC also gave satisfactory results, but not as well as SpudDefender in line after CIPC applications in storage. SpudDefender treatments to potatoes treated with SpudDefender in storage were not as successful at preventing sprouting.

See attached for fuller description of data. Data from 1,4 Sight and bulk storage applications of SpudDefender are still being analyzed.

Data has been presented at grower field days in the UW Hancock Ag Research Station Storage Facility and during the Wisconsin potato grower education conference.

III. Goals and Outcomes Achieved

Goal	Decreased number of CIPC applications in stored potatoes and reduce residues
Performance Measure	Number of applications per storage season to fresh market and processing potatoes.
Benchmark	Currently, over 90% of potatoes are treated with CIPC an average of twice per year.
Target	Initial target is to reduce CIPC applications during washing and grading by 30% as it poses greatest risk for residues on finished product. Future reductions in CIPC during storage will be targeted.
Data sources	Research will identify alternative practices that are as effective as CIPC. CIPC usage from five different commercial potato packing sheds will be gathered. Data will also be collected from 2 commercial applicators on use of CIPC alternatives.
Data collection	CIPC alternatives will be identified through research explained below. Adoption of alternative practices will be monitored by gathering data on CIPC usage in wash lines and storages from potato sheds and commercial applicators (3 of which have written letters of support) in cooperation with the WPVGA.

Accomplishments Alternative to CIPC has not been identified and reduction in its use has yet to occur. SmartBlock has been shown to be at least as effective as CIPC in suppressing sprouts on fresh potatoes. Economic return to the grower will depend on the cost of the product. Section 18, if approved, could help salvage 40,000,000 cwt of potatoes that have already sprouted in Wisconsin storages.

We also have learned that SmartBlock must be applied with CIPC for long term sprout suppression in chip or processed potatoes.

Finally, we do not recommend SpudDefender for use on potatoes going into or coming out of storage. At this point, it is not proven effective. Large food retailers were mandating use of SpudDefender instead of CIPC by all growers in Wisconsin. Our data showed that SpudDefender alone would not provide adequate sprout suppression. We had fresh potato shipments rejected from Wisconsin due to breaching of dormancy in potatoes and the grower was not compensated. Our research proved SpudDefender was not effective in that manner.

B. Provide a comparison of actual accomplishments with the goals established for the reporting period.

See above

IV. Beneficiaries

Potato packing sheds and potato growers benefit. SmartBlock Section 3 label was approved in February 2013. There are 10 to 15 potato farmers that have applied SmartBlock on approximately 300,000 cwt of potatoes so far this season. These potatoes had visible sprouts that would have been rejected for sale if not managed with SmartBlock.

Several retailers had indicated that they would no longer purchase fresh potatoes treated with CIPC. The research on SpudDefender demonstrated to the retailers that SpudDefender was not an effective alternative and that not allowing use of CIPC would result in lower quality fresh potatoes. These retailers have changed their stance based on these findings. This influenced sale of over 3 million cwt of potatoes in Wisconsin.

The value of the potatoes treated with SmartBlock over the past month is estimated at \$1.5 million in value to the growers with additional benefit of up to \$600,000 to the packing sheds. It is estimated that SmartBlock applications could be made to an additional 1 million cwt of potatoes currently being stored in Wisconsin.

If SpudDefender use had been required by retailers in place of CIPC as initially proposed, the lost quality of fresh potatoes in Wisconsin would have been worth up to \$10,000,000 to the growers and an additional \$2 million to the packing sheds.

V. Lessons Learned

Watch potatoes closest after harvest to manage sprouting. A bulletin is under development for variety specific management profiles.

Goals proposed were ambitious, however, outcomes of research has created a mechanism whereby CIPC use could be reduced as initially proposed. Part of the delay has been delay in label approval by EPA for SmartBlock and SpudDefender. SmartBlock recently received registration and will be used widely in Wisconsin. Price will determine how broadly SmartBlock will be used.

SpudDefender label is still pending in the United States. My recommendation to packing sheds is to replace in-line application of CIPC to potatoes with SpudDefender once the label is approved. Further demonstration of efficacy will be necessary in cooperation with packing sheds and retailers.

CIPC is critically important potato sprout management tool. It is the most economical treatment cost only 20% of currently alternatives including 1,4-Sight. Furthermore, it is backbone of storing high quality potatoes that meet customer (retailer) specifications.

VI. Additional Information

We have shared data with industry at 3 field days and the potato grower education conference in February 2011. Updates on the finale results will be shared at the winter grower education conference in February 2012. The field days were held at the Hancock Ag Research Station during the winter and summer of 2011. About 50 to 60 participants attended each field day. The Potato Grower Education Conference was held in Stevens Point, WI with over 75 participants in the room for the presentation. Growers are very much interested in the use of AMV 1018 (SmartBlock) as a sprout inhibition tool. They are awaiting federal label and would like to see how it could be integrated into long-term sprout suppression in storage. The interest in SpudDefender (hydrogen peroxide) is less keen. The growers are concerned about the volume of material in application and the liquid vapor application as compared to injection of gas (as with CIPC or AMV 1018). SpudDefender has great potential in potato packing sheds and farmers are very much interested in this application.

SmartBlock Section 18 was requested from EPA in November 2011. The data from this trial was crucial in developing the request. Potential impact could be 10,000,000 cwt worth \$60 to 100 million.

VII. Contact Info

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12) Wisconsin Grape Growers Association

Project Title: Cold hardy wine grape production in regions of Wisconsin (FY10FB-012)

Total Amount Received: \$38,494

Date of Award: October 25, 2010

Project Contact(s): Anna Maenner

Report Date: November 13, 2013

I. Project Summary

In 2002 there were 279 acres in grape production in Wisconsin, today the acreage is closer to 700 and the number of wineries has expanded to over 50. Wisconsin also has two designated American Viticultural Areas and established wine trails. There are several factors that have contributed to the expansion of this industry including increased agro-tourism and availability of grape varieties bred for cold climates. European grapes (*Vitis vinifera*) are not cold hardy enough to for the Midwest and the American grapes (*V. lubrusca*, *V. riparia*, *V. muscadina*) have lacked desired qualities for wine production. Early French-American hybrids such as Marchael Foch have been the foundation for the WI wine grape industry for many years however the selection of varieties has been limited. New cold hardy varieties have led to renewed enthusiasm however; there are many aspects of production that are not well understood. Understanding grape quality and the factors that contribute to achieving high quality is essential in order for the WI wines to be competitive. The objective of this research is to develop regional cultivar recommendations based on grape quality in addition to cold hardiness and to educate growers on how to measure grape quality in the vineyard.

II. Project Approach

The goal of this project was to evaluate the quality of cold hardy wine grapes in Wisconsin. Fruit from two different research vineyards was used, one at West Madison Agricultural Research Station (MARS) and the other at Peninsular Agricultural Research Stations (PARS). Vineyards were managed as a commercial vineyard would be managed. During the course of the season, the data was posted on the www.fruit.wisc.edu website so growers could access the information and use it when making decisions about harvest timing. In addition to the fruit quality data, pruning weights, phenological data and yield data was also collected for each variety and each of the two stations. Samples were collected from each experimental unit weekly from the time of veraison to harvest. Half of the samples collected were used to evaluate pH, Brix and TA and the other half of the fruit was frozen and stored for further biochemical analysis to quantify organic acids, sugars and volatile compounds.

During the season, a field day was held to allow growers to come to the site and discuss quality analysis and demonstrate the use of the equipment. Growers expressed appreciation for this opportunity to come and evaluate the different varieties side by side. Judy Reith-Rozelle and Dick Weidman managed the plantings and took care of all aspects of pest management during the season. County extension agents assisted with sharing the information to growers by posting the information on websites and making on-farm visits to growers during the growing season. Beth Workmaster has overseen the collection of all fruit quality data and biochemical analysis of the frozen fruit.

The results of the study have shown that there are significant differences in quality parameters between the varieties evaluated and suggest that continuing with further evaluation is critical for the development of a comprehensive understanding of the aspects of fruit development and quality of these new varieties. One of the significant findings is that there appears to be an inconsistent relationship between brix and pH. This is important as growers often harvest based on brix due to the ease with which this information can be collected. It was determined that additional information is necessary in order to establish robust correlations between Brix and pH with consideration of the weather conditions. Due to the significant impact of environment on the quality of fruit, this project must be repeated to determine if the trends observed are consistent across seasons.

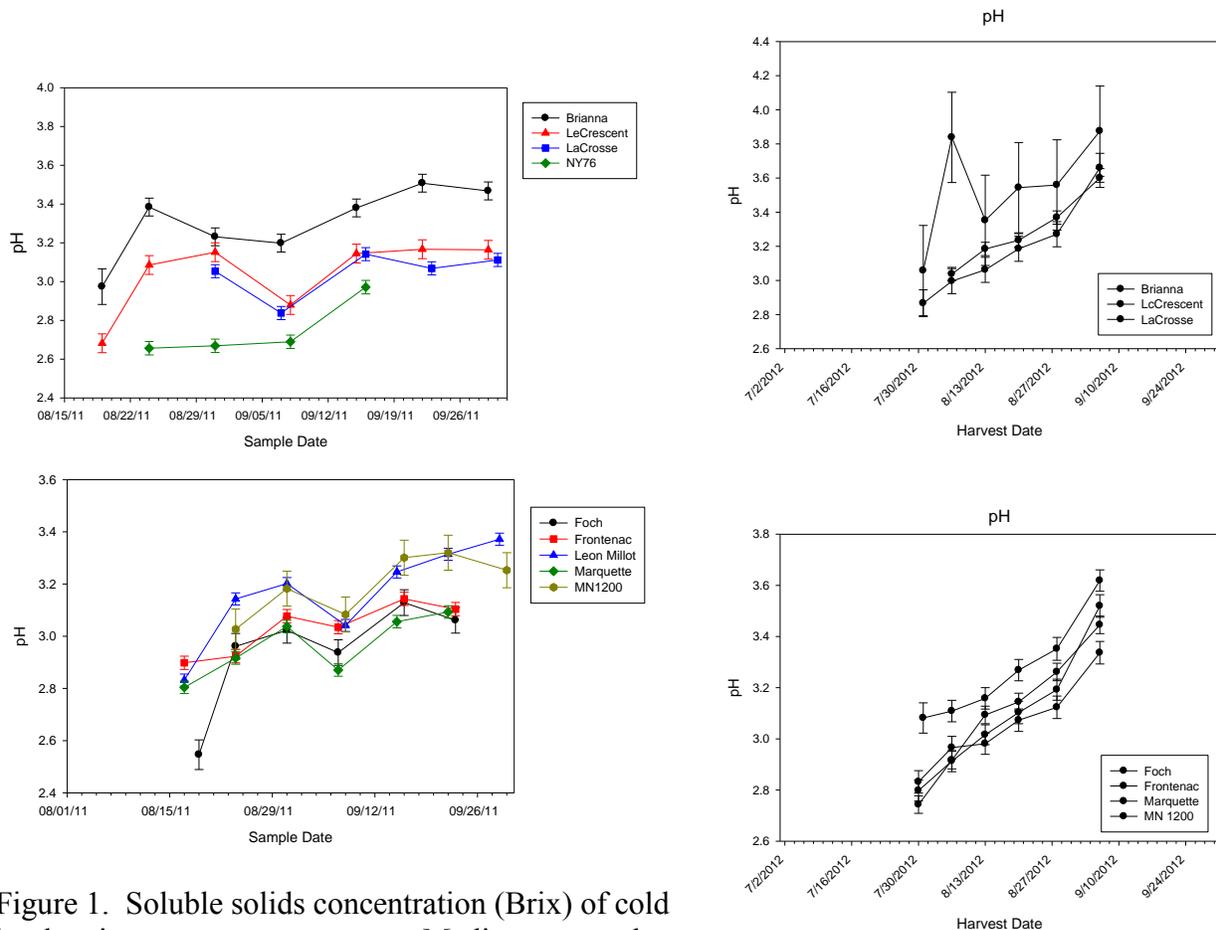


Figure 1. Soluble solids concentration (Brix) of cold hardy wine grapes grown at west Madison research station.

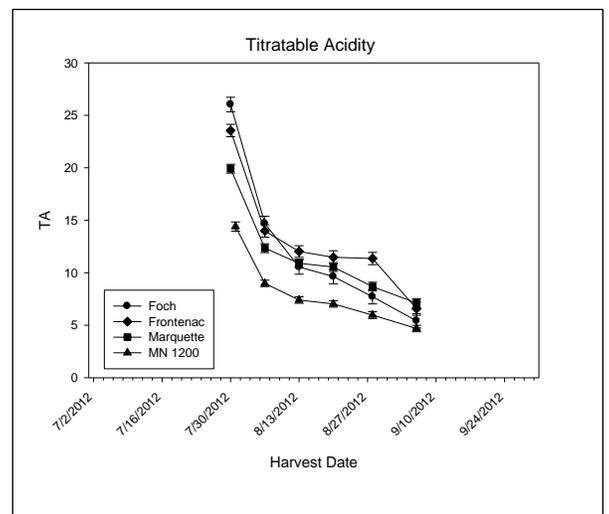
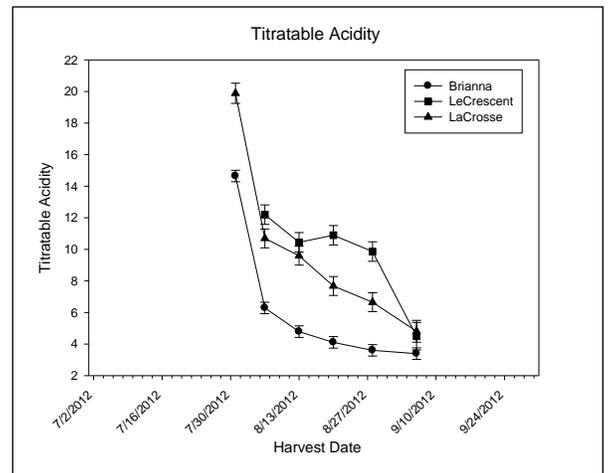
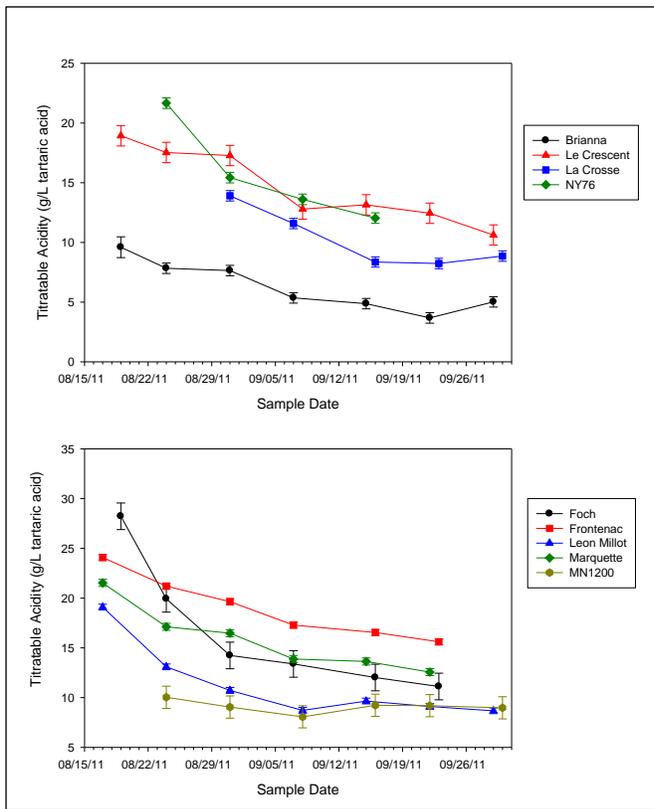


Figure 2. pH of grapes grown at West Madison Research Station. Grapes samples collected weekly during the growing season.

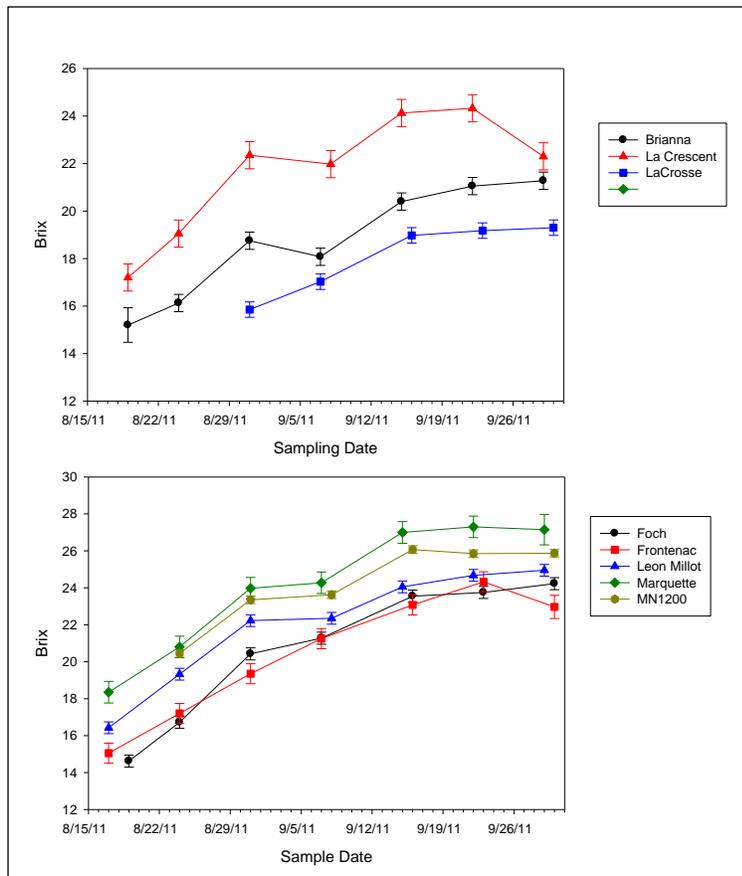


Figure 3. Titratable acidity of wine grapes grown at the West Madison Research Station.

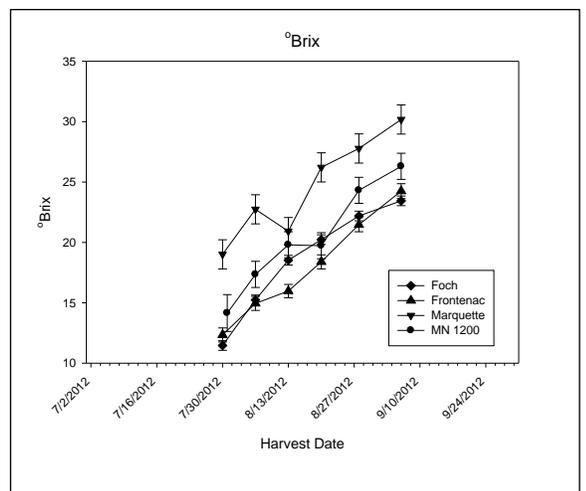
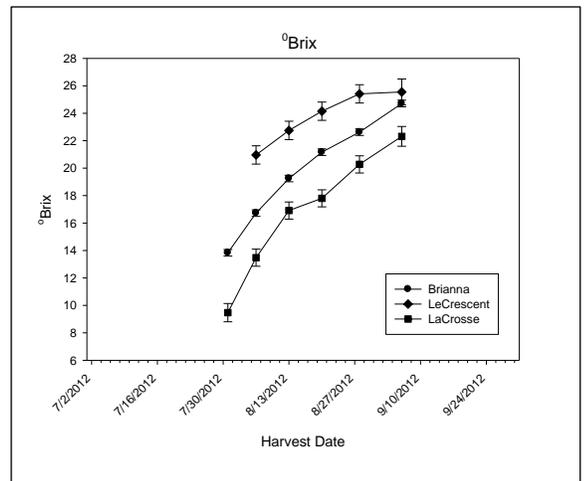


Table 1. Dates of Veraison and Harvest for cold hardy wine grapes grown at West Madison Research Station		
Variety	Veraison	Harvest
Leon Millot	8/7/2011	9/28/2011
Foch	8/12/2011	9/28/2011
LaCrescent	8/15/2011	9/22/2011
Brianna	8/16/2011	9/15/2011
NY 76	8/14/2011	9/2/2011
Vignoles	8/15/2011	9/23/2011
LaCrosse	8/24/2011	9/27/2011
Marquette	7/27/2011	9/15/2011
Frontenac	8/5/2011	9/27/2011

III. Goals and Outcomes Achieved

Activity	Participant	Timeline
Develop lab protocols and set up quality analysis equipment	Volenberg, Reith-Rozelle, Weidman, Harbut, Workmaster	Jan-Mar 2011
Quality workshop at Spring Vineyard School	Volenberg	April 2011
Harvest fruit, collect yield data, analyze fresh fruit	Volenberg, Reith-Rozelle	June-Sep 2011
Field days at WM	All	Aug
Evaluate field day	All	Sep 2011
Present results to growers at Spring vineyards school	Volenberg, Harbut	Jan 2012
Harvest Fruit, collect yield and quality data	All	June-Sept 2012
Field Day	All	Aug, 2012

B. Provide a comparison of actual accomplishments with the goals established for the reporting period.

Goal – Identify varieties that produced high quality grapes in two different regions of WI. Currently, there is no information about the quality of cold hardy grapes grown in WI. Information for cultivar selection is based on cold hardiness alone.

This project has allowed us to begin to develop a data base on the cold hardy wine grapes that are established at the UW research trials and to provide some research-based information about the chemistry in the fruit. Many growers have had to use their own experience, which is often minimal, to determine optimal harvest date for varieties; as a result, there is high variability in quality. This research-based information will allow for growers to have reference values and ripening profiles that can be used as bench marks to make more informed decisions resulting in consistent, higher quality fruit. Fruit quality is highly influenced by environment, so it will be necessary to continue to monitor fruit quality over multiple seasons. The data collected in 2012 demonstrated similar trends with certain cultivars however, the two seasons experienced quite different conditions. This study has provided valuable information to growers about the expected range of fruit characteristics during the ripening process and has aided growers in determining the varieties that they select for new plantings. This data set characterizes the first comparison between so many varieties in the same climate and provides growers with a comprehensive picture of how the grape chemistry changes over the season. This data provides the foundation for further work on understanding how fruit chemistry changes throughout the season and further establishing optimal harvest dates based on weather data and variety.

Goal – Train WI grape growers to conduct quality evaluations on their own vineyard.

Training sessions provided 20 growers the opportunity to see the equipment and learn the principles behind the use of these tools to establish quality parameters. The results of the study were valuable to help demonstrate the importance of timing in fruit quality assessment. Many of the growers do not come from an agricultural background and are not familiar with the principles

of fruit development or the use of monitoring techniques to assess quality. This project has provided the opportunity to introduce many of the grape growers to the principles of fruit quality in order to enhance the quality of WI grapes.

Goal #3 – Establish relationship between vine and soil nutrient status and fruit quality.

The nutrient analysis of soil samples from each site and petioles from each site were conducted and evaluated. There was high variability across samples and no consistent correlations between the soil and tissue analysis. Upon discussion with colleagues in the Midwest that were conducting similar work, it has been decided that the scale of testing must be done on a larger scale in order to account for variability and determine if there are any correlations. This work on nutrient analysis will be done at the regional level in a separate research effort in order to encompass the sample numbers required to test this relationship.

Publications:

- **Peer reviewed extension fact sheet on how to measure grape quality**

The PI for the is project left her position at UW and publications have been delayed. It is planned that this publication will still be completed in the winter 2013.

- **Peer reviewed extension publication on wine grape cultivar selection for regions of Wisconsin**

Upon consultation with other researchers in the Midwest that are collaborating on a larger project, it was decided that 2 years is not sufficient data to publish conclusive information about the appropriateness of cultivars for different regions. It is expected that the data collected for a complementary project (funded by USDA-SCRI) currently underway will provide additional data for to add to this work.

- **Peer reviewed scientific publication in the journal HortScience on the correlation between plant nutritional status, yield and quality of grapes grown in different climatic regions.**

The paper was modified to focus more on fruit quality and will utilized the fruit harvested in 2011 and 2012. Beth Workmaster is continuing to complete the analysis on the frozen fruit. The final samples are being run on the GC-MS and paper will be submitted in 2014 to HortScience.

Extension Activities:

- **Present results on nutrition, yield and grape quality at the Wisconsin Fresh Fruits and Vegetable Conference and the Minnesota Cold Climate Grape Conference (2011).**

Results were not shared at the conference due to availability of presenters. The information was, however shared with growers regularly through the WGGGA listserv and through the IPM report newsletter. The information was also shared during a beginner grape school which occurred prior to WI Fresh Fruit and Vegetable Conference and was attended by 63 growers. The results from the 2011 and 2012 were shared and discussed in the 2013 WI Fresh Fruit and Vegetable Conference.

- **Distribute all results using the weekly Grape IPM Scouting Report that is distributed, via the internet to all WGGGA members.**

Reports were sent out weekly and information also posted on www.fruit.wisc.edu website and through the WI Grape Growers Association website.

IV. Beneficiaries

The primary beneficiaries of this project are the approximately 400 grape growers of Wisconsin and the 90+ wineries in Wisconsin that rely on Wisconsin-grown cold climate grapes. Currently, demand for Wisconsin-grown cold climate grapes greatly exceeds available supply. These groups have been extremely supportive and appreciative of this work.

V. Lessons Learned

As there had not been previous work on the nutrient analysis of these cold hardy grapes, we did not anticipate such high variability across samples and therefore underestimated the number of samples that would be required. This project has led us to engage in many discussions with colleagues in the Midwest regarding the need for a coordinated effort on understanding nutrient dynamics in the cold hardy grapes. Although the data did not allow us to achieve our stated goal, it has provided valuable information and experience in relation to how best approach the study of nutrient status of vines and the role it plays in fruit quality.

VI. Additional Information

None

VII. Contact Info

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13) Midwest Food Processors Association

Project Title: Improving nitrogen use efficiency in sweet corn production (FY10FB-013)

Total Amount Received: \$36,539

Date of Award: October 25, 2010

Project Contacts: Nick George, Matt Ruark

Report Date: February 6, 2012

I. Project Summary

The overall goal of this research was to develop improved nitrogen (N) recommendations for sweet corn grown in Wisconsin. Specific objectives include: (i) determine the effects of hybrid, planting density, N rate and their interactions on sweet corn yield, (ii) evaluate nitrogen use efficiency (NUE) components across improved management practices, and (iii) evaluate nitrate concentrations in groundwater below conventional and optimized sweet corn management practices.

In 2008, Wisconsin ranked second in production of processing sweet corn, harvesting over 87,000 acres, or 24% of the total US acreage (USDA 2008). Sweet corn production also has a major economic impact to Wisconsin as the harvested sweet corn acreage had a farm gate value of over \$80,000,000. Modern sweet corn production requires substantial nitrogen fertilizer inputs. University of Wisconsin-Extension guidelines suggest that fertilizer be applied at a rate of 150 lb ac⁻¹ on sandy soils, preferably over several split applications (Laboski et al., 2006). However, based on personal conversations, few, if any, growers follow the UW guidelines. The value of the sweet corn crop is high, and even compared to today's relatively high N fertilizer prices, growers are not willing to be "short" on nitrogen. Over-applications of 25 to 50 lbs are not uncommon. But we have very little current information regarding the advantages and disadvantages of over-apply N on sweet corn. A re-evaluation of the N rate fertilizer recommendation was conducted in 2009. On-farm results suggest that there was not a significant increase in yield when sweet corn was fertilized with 155 lbs of N compared to 205 lbs of N, but average yields were much greater (0.7 to 1.4 tons ac⁻¹) at three of four sites (Table 1). This preliminary data highlights why growers are likely to over-apply fertilizer: there is always a chance that an extra 25 to 50 lbs of N can lead to a yield increase of 0.5 tons or more.

Elevated nitrate concentrations in groundwater continue to be a major environmental problem in central Wisconsin (Fig. 1). Sweet corn production is a dominant land-use practice in the Central Sands and over application of N is a likely contributor to the increase in nitrate concentrations in

groundwater. Therefore, investigating options to increase the nitrogen use efficiency (NUE) of sweet corn continues to be a high priority.

II. Project Approach

Four research experiments were planned for the 2011 growing season and conducted at the Hancock Agricultural Research Station. The first experiment evaluated two sweet corn hybrids across seven N rates (0, 50, 100, 150, 150, 200, and 250 lb ac⁻¹). One N rate (50 lb ac⁻¹) was applied once at V5. Two N rates (100 and 150 lb ac⁻¹) were applied over two applications (V5 and V8) and three N rates (150, 200, and 250 lb ac⁻¹) were applied over three applications (V5, V8, VT). Yield was collected by hand and whole plots samples were collected for NUE analysis, which included:

Agronomic efficiency (AE) = $(Y_N - Y_0) / N$ applied

Uptake efficiency (UE) = $(AGB_N - AGB_0) / N$ applied

Removal efficiency (RE) = $(Ear_N - Ear_0) / N$ applied

Where Y_N , AGB_N and Ear_N is the yield, total N content of the above ground biomass, and total N content of the ear, respectively, for a N fertilizer treatment. Y_0 , AGB_0 and Ear_0 is the yield, total N content of the above ground biomass, and total N content of the ear for the treatment not receiving N fertilizer.

The second study compared two sweet corn hybrids at two rates of N (130 lb ac⁻¹ and 200 lb ac⁻¹) at four seeding densities (18000, 24000, 30000, and 36000 seeds ac⁻¹). Yield was collected by hand and whole plant samples were collected for NUE. The third planned study was going to focus evaluating the N response of nine different hybrids. Unfortunately, the late planting date did not result in any yield from this study. It will be repeated in 2012. In addition to yield, kernel recovery was evaluated on the first and second studies and allows for yield reporting in cases per acre (i.e. canned product).

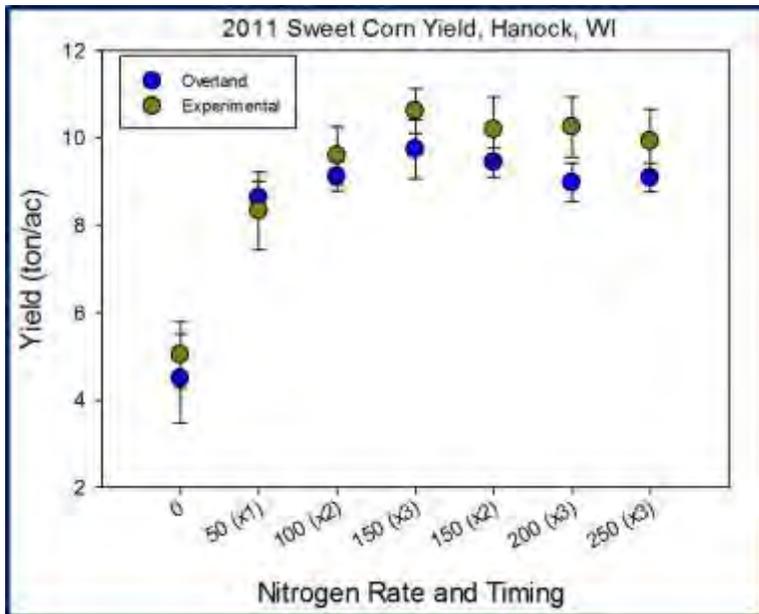
The fourth study evaluates four N management practices: 200 lb ac⁻¹ (224 kg ha⁻¹) of N (high input), 150 lb ac⁻¹ (168 kg ha⁻¹) of N (standard input), 150 lb ac⁻¹ (168 kg ha⁻¹) of N as polymer coated urea (controlled input), and no N applied (no input) and their impact on groundwater N concentrations (nitrate, ammonium, and organic N). The high input treatment included N application as a standard grower application rate of 200 lb ac⁻¹, applied as urea and ammonium sulfate in three applications (preplant, 4 weeks after planting, 6 weeks after planting). The standard input will be the recommended rate of N (150 lb ac⁻¹) applied as urea and ammonium sulfate in three applications. The controlled input treatment included the recommended rate of N (150 lb ac⁻¹) as ESN® applied entirely at planting. The no input treatment will have no fertilizer N additions and be used as a control.

The plot sizes were 48 x 50 ft, an adequate size where adjacent plots will not influence the water quality dynamics at the groundwater interface. In each plot three groundwater monitoring wells were installed, which were PVC pipes (3.2 cm in diameter) with well screens with 0.5 mm slot width. The wells were installed in 2010 and potatoes were grown. However, the water table rose during the 2010 growing season, so longer well screens were attached to each PVC pipe and wells were reinstalled. Wells were sampled weekly and analyzed for nitrate, ammonium, and total N, with organic N be determined as the difference between total N and the sum of nitrate-N

and ammonium-N. In order to develop a partial nitrogen budget and to determine nitrogen use efficiency components both above ground biomass and ears will be analyzed for total N.

III. Goals and Outcomes Achieved

Results from the 2011 growing season indicate that the Experimental variety (22-85) out-yielded the Overland variety across most N rates. Also, for both varieties, yields were maximized with 150 lb ac⁻¹ of N when applied over three applications. The 22-85 variety also out-yielded the



Overland variety when determined as cases per acre. However, the optimum N rate to maximize cases per acre was only 100 lb ac⁻¹.

This data is in agreement with previous results that show new varieties will out-yield older varieties. It also implies that newer varieties will have greater NUE compared to older varieties, since they maximize yield at the same N rate.

Results from the seeding density study indicate that different varieties responded differently to seeding density. Overland

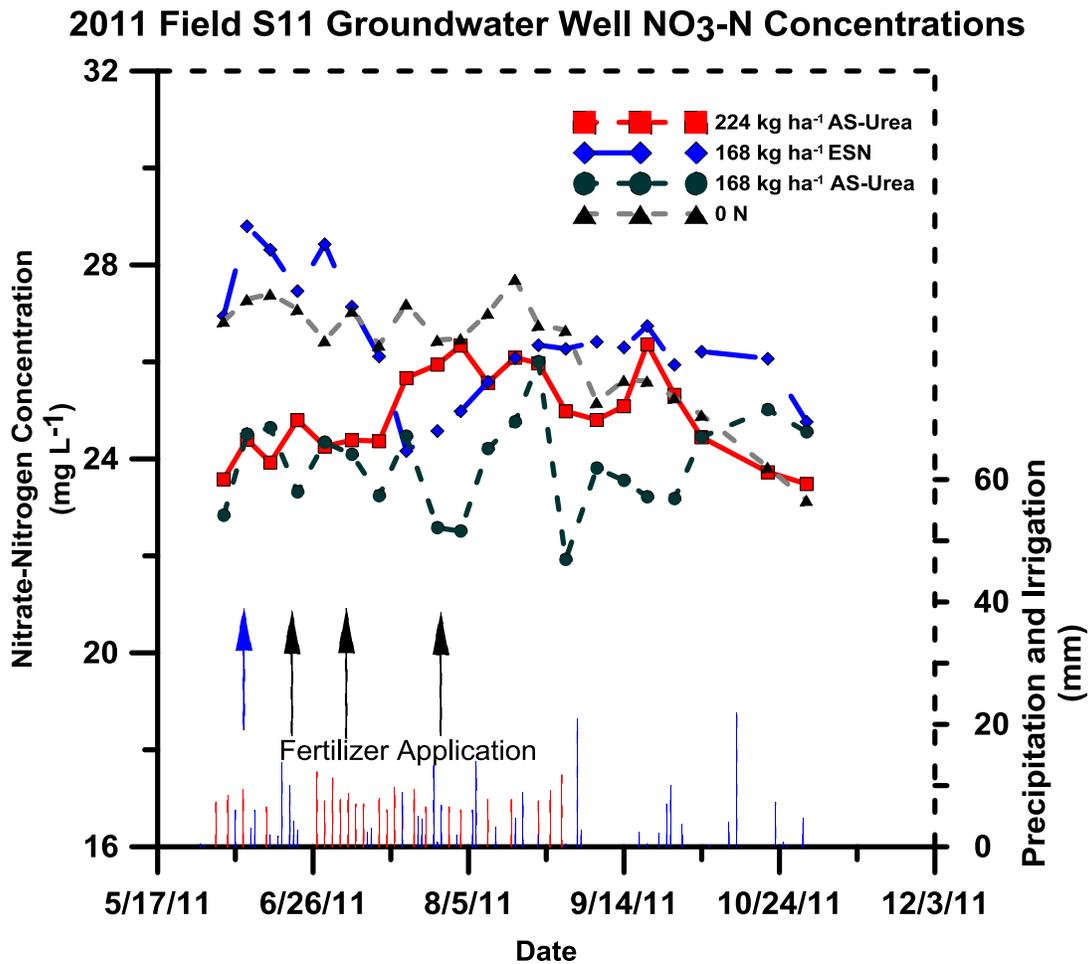
maximized yield at 24,000 seeds per acre when fertilized with 200 lb ac⁻¹ of N, but maximized yield at 36,000 seeds per acre when only fertilized with 130 lb ac⁻¹ of N. A similar, but less pronounced trend was observed with the 22-85 variety.

Groundwater nitrate concentrations did not appear to be affected by N management practices in 2011. This is in contrast to 2010 where ESN significantly reduced groundwater concentrations over one year. There are three possible explanations for this difference. The first is that there was not an intense rainfall event during the 2011 growing season that would have flushed nitrate out of the soil profile. The second is that background concentrations were sufficiently high to mask any effect. In fact the high rate of N resulted in similar concentrations of nitrate as the no input treatment. The third is that ESN resulted in lower yield (16.3 Mg ha⁻¹ or 7.2 tons ac⁻¹) compared to the high input (20.0 Mg ha⁻¹ or 8.9 tons ac⁻¹) or standard input (18.9 Mg ha⁻¹ or 8.4 tons ac⁻¹). Less N would have been taken up in the ESN treatment plots, meaning more N would be available to be leached. ESN has performed well on field corn in this region. It is unclear why ESN performed so poorly in 2011. Ammonium and organic N concentrations were all well below 1 ppm in concentration. These are not major sources of groundwater N.

Whole plant samples are currently being processed and analyzed for total N to calculate NUE.

In all, this data contributes to the long-term evaluation of controlled-release fertilizers. It just so happened that during the 2011 growing season, weather conditions did not cause excessive loss

of nitrate. This data evaluated conditions where controlled-release fertilizer would not be beneficial, but did show that optimum N rates are lower than what is typically applied.



B. The only goal that was not completed was collection of deep soil cores after harvest. There is a gravelly sand layer that prohibits deep coring without specialized equipment. Post-harvest sampling was limited to surface soil only. Total N analysis is a time consuming process and we expect to have completed the analysis by April 2012.

IV. Beneficiaries

The beneficiaries of this research are the sweet corn growers of Wisconsin and the people of Wisconsin that rely on groundwater as their drinking water resource. As we work with growers in the future to lower N inputs, or utilize controlled-release technologies, it is data like this that will be used.

According to the National Agricultural Statistic Service, Wisconsin harvested 74,500 acres of sweet corn in 2011 with an average yield of 8 tons of fresh ears per acre. This amounts to 595,780 tons of fresh ears produced in Wisconsin. With an average value of \$110 per ton, this amounts of \$63,362,000 in economic production.

The sweet corn growers of Wisconsin benefit in three main ways. First they have current data from which to base their nitrogen recommendations off of. This data is extremely valuable, because little if any data has previously existed for growers in Wisconsin. Second, growers benefit by learning about which nitrogen products are available to them and how they perform on fields like theirs. Lastly, they learn about what nitrogen budgets are in sweet corn fields. Growers can then decide if improvement in nitrogen use efficiency can be made. Overall this data will lead to a reduction in N inputs on sweet corn fields, thus improving economic efficiency of sweet corn production.

V. Lessons Learned

We have learned that N application recommendations to sweet corn need to also focus on the timing of application. Secondly, we learned that groundwater monitoring wells, have limited use when evaluated for only one year when determining effects on water quality. We will continue this project for one additional year with a 2011 SCBG to evaluate the effects of controlled-release N on water quality.

VI. Additional Information

Data collected as part of this study is made available through materials presented on our Soils Extension webpage: <http://www.soils.wisc.edu/extension/vegprod.php>. An additional report is attached for more detail on the research than was included in this report.

VII. Contact Info

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14) WI DATCP – Bureau of Farm and Rural Services

Project Title: Workshops for underserved fresh market growers (FY10FB-014)

Total Amount Received: \$39, 917.56

Date of Award: October 25, 2010

Project Contact(s): Kathy Schmitt

Report Date: June 6, 2013

I. Project Summary

With the increasing interest in local foods and continued growth in farmers markets, underserved farmers have been an untapped and relatively undeveloped group of growers to help meet demand. Their increasing professional development continues to help them deliver a higher quality product, meet customer demand, and improve their markets. These underserved farmers have not typically participate in educational workshops from mainstream sources. From previous workshop evaluations, surveys, and individual conversations with these farmers, we learned a great deal about the educational needs of these farmers. They wanted:

- to improve their farming practices
- programming that is culturally relevant and in their native language
- to learn proper methods of using pesticides and herbicides
- to integrate more organic practices into their farming methods
- to increase their production
- to improve their sales
- hands-on and farmer-to-farmer learning
- information on safe food handling

So this project focused on developing and delivering workshops to address pest and disease control and safe food handling procedures specifically for these underserved growers. They told us that their customers were asking them about their food safety and chemical practices and they wanted to be able to serve their customers better in this regard. Improving producer knowledge and skills in these areas would enhance their markets as they could tell customers about their good food safety practices and pest and disease management.

This project was built on a previous Specialty Crop Block Grant, *Sustainable Farming Practices for Underserved Fresh Market Growers*, which offered workshops related to sustainable farming practices. Topics included improved production and soil fertility methods, financial and production record keeping, pricing and marketing techniques, and organic production and organic certification process. Relationships developed with the first grant helped with building

trust and improving the participant turnout at workshops. Safe food handling and pest control were topics requested by participants in future workshops.

II. Project Approach

Since the largest number of minority fresh market produce farmers in Wisconsin are Hmong, we hired two, part-time, Hmong speaking staff to work on the program. A variety of outreach approaches were used to reach the target population, including workshop announcements and educational spots on Hmong radio, a newspaper article, letters of invitation, and personal phone calls. In addition, staff partnered with local Hmong organizations to host workshop space and promote the event to its membership and Hmong staff at the Farley Center also promoted the events. It takes repeated attempts and word of mouth endorsements to bring Hmong farmers to workshops. Workshops were either presented in Hmong or interpreted in Hmong. Only Hmong fresh market specialty crop producers participated in this program.

We had several presenters for the workshops. An organic educator from the Midwest Organic and Sustainable Education Service (MOSES) two workshops on organic methods of pest control and the organic certification process. MOSES also provided 6 Hmong fresh market produce growers with scholarships to attend their annual conference. A DATCP staff person accompanied them to help with interpretation and assimilation into this large conference setting. It was the biggest contingency of Hmong growers to attend the conference.

We partnered with UW-Extension for presentations as well. The Oshkosh County Agriculture Extension Agent spoke to groups about improving soil quality and pest management and an extension specialist presented information about tool safety and work efficiency tips, with an emphasis on body mechanics and low cost ergonomically designed tools.

The Ginseng Growers of Wisconsin Board reached out for help with building a relationship with its Hmong growers as they represent about 1/3 of the ginseng grown in the state. The board wished to recruit a Hmong ginseng grower to fill a board position. DATCP staff sought out a community leader to fill that role. In addition, staff interpreted at the ginseng growers field day, providing access to the information presented by a University of Michigan expert.

Michelle Schermann from the University of Minnesota trained Hmong growers at 3 workshops on safe food handling processes for fresh market produce farms. The relationship developed with Ms. Schermann led to one of our staff taking the Cornell University Good Agricultural Practices (GAP) training and, with additional mentoring by Ms. Schermann, is now able to lead workshops on safe food handling and advise growers on GAP himself. This is building the State's capacity to provide training in food safety to minority growers. Staff also offered a hands-on workshop on how to construct a mobile hand washing station. This was done to show growers how a simple hand washing station can be constructed out of scrap materials and used in the field for washing hands.

DATCP project staff presented information on income and expense record keeping to Hmong fresh market growers. They used information and materials piloted through a USDA Risk Management Education grant that were very visual and broke the process down into small steps.

Staff also organized and assisted in an on-site hoop house build that walked growers through the steps of building a season-extending hoop house. Participants were able to get hands on experience by helping with the build. The hoop house build was done in collaboration with the Farley Center and a Hmong grower than had been awarded an EQUIP grant.

We attempted a regional conference that targeted Hmong fresh market growers. Conference topics included integrated pest management taught by UW-Extension and information about selling produce at the wholesale and retail level. The latter presentation was done by a local foods wholesale buyer. An unexpected outcome of the conference was that the wholesale buyer made connections with several Hmong growers to source product from for the next growing season.

Workshops frequently included staff from local Farm Service Agency and/or Natural Resource Conservation Service offices. The project invited government resources to help bridge the gap between the minority producers and federal programs. Agency representatives talked about farm loan programs, EQUIP, and other relevant government programs.

We asked participants to compare their knowledge of the subject matter before and after participating in the workshop, using a Likert Scale. The Hmong people had difficulty understanding this method of evaluation, so we changed it to asking participants to note how much they felt they learned from participating in the workshop using a Likert Scale.

Skill areas surveyed in the evaluations at the various workshops and conference included:

- How to approach buyers for retail, wholesale markets
- How to prepare and package produce for retail, wholesale markets
- Where to get supplies like boxes and packaging
- Methods of insect control
- Weed control
- Understanding different soil textures and structure
- Knowing how to improve your garden soil
- Knowing how to reduce weeds in your garden
- Knowing how to choose the right tools & safer ways for gardening
- Providing good health & hygiene facility
- Understanding how germs contaminate
- Providing drinking water properly
- Washing hands properly technique
- Knowing how to manage pests, plant diseases and weeds without using chemicals
- Understanding soil amendments/fertilizers
- Understanding crop rotations
- Getting useful tips from the organic farm visit

Participants in the second year were asked to list the knowledge/skills they learned at the workshop that they will put into practice. Responses were:

Safe Food Handling Workshops

- A. Will go to the Farm Service Agency for questions and farm loans
- B. Will to protect my fresh produce from contamination of germs
- C. Will use the washing hands properly technique
- D. Will build my own portable hand-washing station
- E. Others: Building hoop house & rent portable restroom

Pest Control Workshops

- A. Will manage pests, plant diseases and weeds without using chemicals in the farm
- B. Will apply soil amendments/fertilizers knowledge to my farm operation
- C. Will use crop rotations as part of my planting plan
- D. Will use what I learned from the farm visit to improve my farm operation

III. Goals and Outcomes Achieved

12 workshops were organized and delivered in geographic locations that included Hmong communities:

3 Safe Food Handling workshops = 41 total participants

2 Growing Organics workshops – 28 total participants

1 workshop each:

Income and Expense Record Keeping = 14 participants

Improving Soil Quality and Tool Safety = 6 participants

Pest Management = 11 participants

Hoop House Build = 10 participants

Hand Washing Station Construction = 6 participants

Conference (wholesale/retail marketing, pest management) = 14 participants

Ginseng Field Day = 5 participants

Total fresh market produce grower minority participants= 135

Workshop evaluations indicated that respondents increased their knowledge about the workshop level well enough to put it into practice. Evaluations gathered information about what participants would want to learn in future workshops. Suggestions included:

- Irrigation methods
- Soil fertility
- FSA and other financial programs
- Pesticide and fertilizer regulations
- Weed management
- Marketing

B. Our goal was to reach 180 minority fresh market growers through 12 educational workshops. We did hold 12 workshops, but reached 135 minority fresh market growers –Workshops were evaluated. Overall, participants felt they had learned enough to feel confident about using the information provided at the workshop.

The project planned to follow up with 20% of workshop attendees to offer additional support and referrals for technical assistance. These participants were surveyed to see how well they implemented the knowledge they gained by attending workshops. It was projected that 20 participants (55% of participants receiving follow up services) would implement one or more new skills learned from the workshops within one year of attending a workshop. Due to losing a staff person, we were not able to execute the follow up survey until late in 2013. Results are shown below.

FY10 – SCBG Post Program Evaluation

Grantee: DATCP

Project Title: Workshops for Underserved Fresh Market Growers

Total Amount Received: \$39,917.56

Date of Award: 10/20/2010

Project Contact(s): Kathy Schmitt

Report Date: 1/31/2014

In the past you attended a workshop or had one-one talks with an outreach specialist about different ways to help your fresh market garden or farm be more successful. We hope you learned some new ideas from these contacts. We would like to find out what new “tools” you are using on your farm or market garden now that you weren’t using before going to a workshop or working with an outreach specialist.

Please mark the workshop you attended and the risk management tools you are using now that you weren’t using before.

☐ Food Safety Workshop

We had 41 Hmong growers who attended the Food Safety Workshops. Due to the busy schedules and changing contact phone numbers, we were able to reach and conduct 24 post evaluations. The numbers and percentages below are based on the 24 collected evaluations.

24 or (100%) Washing hands properly before handling fresh produce
20 or (83%) Teaching others how to wash hands properly
23 or (96%) Cleaning & Sanitizing the work station
24 or (100%) Cleaning & Sanitizing buckets, containers, small tools, etc...
15 or (63%) Training workers on the importance of good health & hygiene
11 or (46%) Testing water source used for irrigation
15 or (63%) Using chlorine or other sanitizers to wash and clean fresh produce
____ Others: _____

□ Financial Literacy & Marketing Workshop

We had 28 Hmong growers who attended the Financial Literacy and Marketing Workshops. Due to the busy schedules and changing contact phone numbers, we were able to reach and conduct 19 post evaluations. The numbers and percentages below are based on the 19 collected evaluations.

- 19 or (100%) Knowing how to keep receipts in proper place
- 14 or (74%) Using the basic calculator
- 18 or (95%) Understanding the importance of keeping good records
- 07 or (37%) Using the spreadsheet for recording sales at farmers markets
- 05 or (26%) Teaching others to use the spreadsheet for record keeping
- 18 or (95%) Using the pocket folder to keep receipts and other farm operation expenses
- 10 or (53%) Applying the skills learned to other farm activities
- 06 or (32%) Knowing where to get loans for farm businesses
- 08 or (42%) Keeping track of income
- 02 or (11%) Others: Applying Farm Service Agency Microloan for business expansion
Applying NRCS program for a high tunnel project

What could we do to help you learn or use more risk management tools?

- **I want to learn pest management and the types of fertilizers.**
- **I want to learn pest management and how to build a walk-in cooler.**
- **I want to know more about the safety of pesticide application.**
- **How to manage wildlife from ruining my crops and how to apply fertilizers on the farm.**
- **I want to learn how to apply fertilizer and chemical.**
- **I want to know more on pesticide application and how to mix those pesticides.**
- **How to protect myself from using pesticide and which one is safer to use.**
- **I will learn everything that you can offer.**
- **How to apply fertilizers and pesticide.**
- **How to control wildlife.**
- **I like to learn how to grow food and flowers.**
- **I like to grow big and sell to wholesales.**
- **I want to learn more on pesticide application and other methods of gardening.**
- **Learn how to grow good crops.**
- **Learn how to use fertilizer and insecticide.**
- **How to take good care of my crops and apply chemical if needed.**
- **I want to learn the best practice on farming.**
- **I want to learn farm chemical application.**
- **Learn more on fertilizers.**

What could we do to improve our service/program?

- **I don't know**
- **Teach farmers to become small business owners**

How could we improve our workshops?

- **Your workshop was great!**
- **Your workshops were great!**
- **Good!**
- **Your workshops were very useful.**
- **Your workshops were great.**

Other comments

- **I have an issue with my neighbor on chemical drift.**
- **I like everything to be clean.**
- **The freshness of my fresh produce is the key.**
- **I learned a lot from your workshops.**
- **There are still lots to learn. However, I start to see changes among Hmong farmers in the La Crosse areas after attending your workshops.**
- **The more you teach, the more we learn and will become good, knowledgeable farmers.**

IV. Beneficiaries

The approximately 325 known fresh market Hmong farmers sell primarily at farmers markets across the state. Hmong people are tightly knit groups and share information and impressions word –of- mouth in their clan units. As word spreads about how to practice safe food handling, more fresh market growers in this ethnic group will put these practices to use. Those that participated in workshops are also better able to answer questions from their customers about their growing methods and sanitation methods. Customers at farmers markets are the end beneficiary of the project’s accomplishments. As these underserved growers implement the food safety techniques they’ve learned, customers will feel more secure about the food they are buying.

Several Hmong community organizations collaborated with us on this project by hosting and helping to promote the workshops. This provided them with an opportunity to build value for their membership.

In addition, the State of Wisconsin now has a Hmong person trained in GAP procedures and safe food handling techniques for fresh market growers, thereby increasing reach beyond the end of this grant for teaching these methods to other fresh market growers.

V. Lessons Learned

There were some challenges executing our project. It was difficult to get a commitment from participants to come to a workshop. We tried advanced registration, but it did not increase participation. Community events sometimes conflicted with workshop dates, even with careful planning, unforeseen conflicts sometimes kept entire communities from attending the day of the event.

We had better success with attendance at workshops in the second year. We believe this was due to word of mouth endorsements from previous workshop participants. We missed our target on number of participants. Planning for 10-12 participants per workshop would have been closer to an achievable target at this stage.

Participants had difficulty understanding the concept of a Likert Scale and had trouble understanding the way we were asking change of knowledge evaluation questions. We also, we had trouble with one of the staff members changing the evaluation to questions that did not measure change in knowledge. Thus, his evaluations didn't yield any useful data. That was corrected as soon as we learned of the problem.

We modified the evaluation the second year to ask participants to indicate how much they learned from the workshop using the following categories:

- 1 = I didn't learn anything new
- 2 = I learned a couple of new things
- 3 = I learned enough to start using the information
- 4 = I learned enough to feel confident about using the information
- 5 = I could teach others about this subject

This method of evaluation seemed to be more understandable.

We were not able to implement the post workshop survey we had planned. This survey was meant to measure the implementation of new knowledge learned as a result of participating in the workshop. Unfortunately, we lost a staff person at the time the survey was to be conducted and needed to focus the remaining staff person on delivering the targeted number of workshops for this grant so there was no time for him to administer the evaluation. We plan to conduct the evaluation later this year. In the future, we will need to identify a back-up plan for our bilingual staff so that grant activities can continue despite the loss of staff. Identification of another organization willing to help in this situation would have been one solution.

Two unexpected outcomes from the project included the connection made between a speaker at the conference and 2 of the participants. The speaker operated a wholesale business where he brokered local products to stores and restaurants. As a result of speaking at the conference, he made a connection with 2 fresh market produce growers to provide him with product in the next growing season. The second outcome was that one of our Hmong staff began working on attaining some expertise in on-farm food safety for fresh market produce. He took the GAP training offered by Cornell and was coached by University of Minnesota expert, Michele Schermann on safe food handling presentation for this grower group. As a result, he has become the first (and only) Hmong on-farm food safety trainer in the state. This provides sustainability in continuing this training with Hmong and other minority fresh market growers.

VI. Additional Information

Due to the extended length of the project, our expenditures for salary exceeded our budget projection, however, our workshop expenses were less than anticipated.

VII. Contact Info

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15) Board of Regents of the University of Wisconsin System

Project Title: Evaluation of automated sprinkler irrigation systems in cranberry (FY10FB-015)

Total Amount Received: \$30,000

Date of Award: October 25, 2010

Project Contact(s): Rebecca Harbut

Report Date: February 15, 2013

I. Project Summary

Spring frost is a major concern for Wisconsin cranberry growers. Insufficient protection during frost can lead to reduced productivity or complete crop loss. Current standard practices utilize sprinklers which are turned on at the onset of frost and run continuously until temperatures are above a critical threshold. This method of crop protection is used in many fruit crops and provides adequate protection for the crop. However, running the irrigation for long periods of time is costly and applies excessive amounts of water to the crop. Cranberry growers rely heavily on water for many aspects of production and are constantly looking for new management practices and technologies that will increase water use efficiency. The use of automated cycled irrigation systems may allow growers to reduce the amount of time the irrigation systems are running during frost events resulting in cost savings and significant reduction in water use. This research conducted on-farm field trials to evaluate the impact of automated cycled irrigation systems on flower bud development and water use.

II. Project Approach

Project Partners:

Beth Workmaster – Beth has played a critical role in this project and has been responsible for the construction of the irrigation system and the data collection system. She has devoted extensive time working with the growers and the engineer to develop an understanding of how to effectively conduct this research on a commercial farm.

Joe Lord – is a cranberry grower and engineer who develops automated irrigation systems. He provided technical guidance and equipment for the irrigation system that was built.

Rebecca Harbut – As Primary Investigator of the project, Rebecca oversaw the project and established the treatment and data collection layout, analyzed data and was involved in grower meetings and discussions about the results.

Work Plan and Accomplishments:

Work Plan	Work Accomplished	Outcome
Set up weather monitoring program and link to irrigation cycling program	Beth Workmaster worked closely with growers and an engineer to develop the software and hardware needed for the study	Build complete irrigation system and data collection platform to apply treatments to segments of the bed. This system can be moved to different beds and modified to adapt to different commercial irrigation systems.
Set up field trials	Beth Workmaster worked to integrate the system built during the winter into the commercial cranberry marsh where the experiment was conducted. Worked with growers and engineers to address	
Collect Data during 4 frost events, maintain uprights in lab to determine frost damage	Data was collected during 2 frost events due to delay in having the system operational in the field.	Data was generated during 2 frost events, though frost events were very mild events. The data was informative, but did not provide sufficient data to establish recommended practices for irrigation cycling.
Weekly meetings with cooperating grower	Met regularly with grower and engineer that were collaborating on the project. These meetings were critical in developing the software and hardware that would be used in the experiment and helping to interpret the data collected during the trial.	The outcome of these meetings was the modification to the experiment to develop a functional system
Data analysis and writing	Data analyzed from the frost events that were recorded. The data was insufficient to provide firm recommendations, but there has been valuable discussion with growers that has come from the presentation of the data and discussion about the use of irrigation cycling.	This was the first year of the project and there was insufficient data achieved during the course of this experiment to determine specific recommendations. There were no written publications, but there were discussions during cranberry school about the project
Communication with growers	Shared research with growers at the 2011 and 2012 cranberry school during discussion period and during the summer field day.	There were approximately 450 growers reached during the cranberry school discussions. Approximately 200 growers attended the in-field demonstrations.

III. Goals and Outcomes Achieved

- Collaborated with an engineer to develop an irrigation system that could be used in a commercial cranberry farm to establish irrigation cycle.
- Installed the system in a commercial farm that allowed for 3 treatments: control (no protection), cycled and continuous (standard practice).
- Build a data collection system that allowed for temperature data to be collected at ambient, canopy and bud level in the field
- The system required some modification which resulted in missing data collection during two frost events. Data was collected for 2 subsequent frost events. Systems were turned on at the threshold temperature that the growers established and run throughout the night until temperatures returned to the upper threshold of 34F.
- During the course of the project and after the project we met with cooperators to discuss the challenges of the project and address how to modify it for subsequent research. The following were the primary comments received during those meetings and during the field day and cranberry school:
 - The primary concern was the logistics of cycling the pumps and the wear that might occur on starting and stopping the pumps on a frequent basis. This was not the case if the grower had an electric pump, but for the diesel pumps this was a concern. It was suggested that you could have a valve that would regulate the water flow without turning the pumps off, recognizing that it would result in water savings, but no fuel cost savings
 - There was concern about the sprinkler heads freezing while they were turned off which would prevent them from turning back on. This was never an issue during the runs that we had, however; under colder conditions, it could be a concern.
 - Beth Workmaster indicated that one of the major challenges from the research perspective was that there was a lot of equipment to set out and that the need to remove it from the field was prohibitive and resulted in missed opportunities. The set up should be in a bed where it can be set up once and left in place for the duration of the period of study. This would have allowed us to capture data during unexpected frost events.
 - Several growers commented that although they liked the idea of saving water and money, they would not risk the use of cycling irrigation as they considered it 'cheap insurance' to protect their crop during a frost night.
 - Growers indicated they could see trying it during a mild frost, but would be hesitant on a more extreme frost event.
 - The growers that used the system liked that they could monitor the canopy temperature in real time and make more informed decisions about when to turn off the irrigation at the end of a frost event.

B. Provide a comparison of actual accomplishments with the goals established for the reporting period.

Goal- Currently, there is no information in Wisconsin on the use of automated cycled irrigation systems. Several growers are interested in utilizing irrigation cycling during frost events to reduce production costs and water use; however, there is no research-based data available on the impact of cycling irrigation on survival of cranberry buds.

During the spring of 2011, the location that the experiment was established at experienced only 5 nights of frost protection. Minimal data was collected for the first four events due to programming challenges in the irrigation cycling program. Data was collected for the final frost event of the season and used for analysis. Unfortunately, these frost events were not very extreme so we were not able to determine the lower threshold for the cycling time cycle. However, the results did indicate that cycling irrigation during mild frost events did not result in a reduction in temperature and was maintained at a level similar to that of the continuous irrigation treatment despite a 50% reduction in water use (Fig1). The bud survival data also support the observation that cycled and continuous irrigation treatments had similar results during mild frost events without any impact on bud survival (Table 1). Although data collected during this season was not sufficient to establish firm recommendations on irrigation cycling during frost events, it has shown that there is potential to cycle the irrigation during mild frost events without negative results on bud survival. .

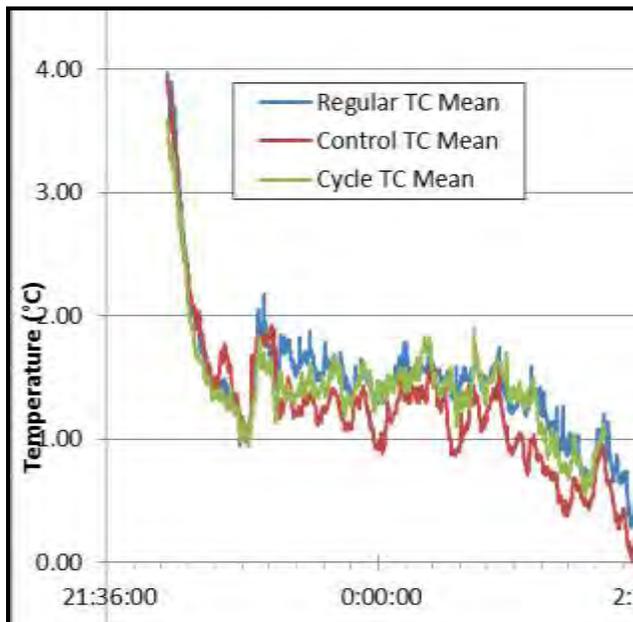


Figure 1. Mean temperature of three irrigation treatments; 1) Regular (continuous irrigation, blue) 2) Control (no irrigation, red) 3) cycled irrigation (green). Temperatures were recorded in a commercial cranberry bed during a mild frost event.

Table 1. Percent bud survival after frost protection treatments were applied.	
Treatment	% Bud Survival*
Control	82a
Continuous Irrigation	90b
Cycled Irrigation	89b
*Values with same letter are not significantly different according to Duncan Multiple Means comparison	

One of the goals of this project was to develop a greater understanding of the temperature at the bud which is encased in ice compared to the temperature of the canopy. In order to accomplish this, microthermistors (MT) were used to record the temperature of individual flower buds. The data collected suggested that the buds experienced temperatures that were 1-3⁰C colder compared to the canopy temperature; however, it is unclear if this was due to an offset in the raw data collected on the MTs installed on the buds or if it is a true temperature difference (Fig.2). This data does however suggest that the buds experience changes in temperature that are consistent with the readings that occur at the canopy level and can be an accurate indication of the temperatures experienced by the buds even when they are encased in ice.

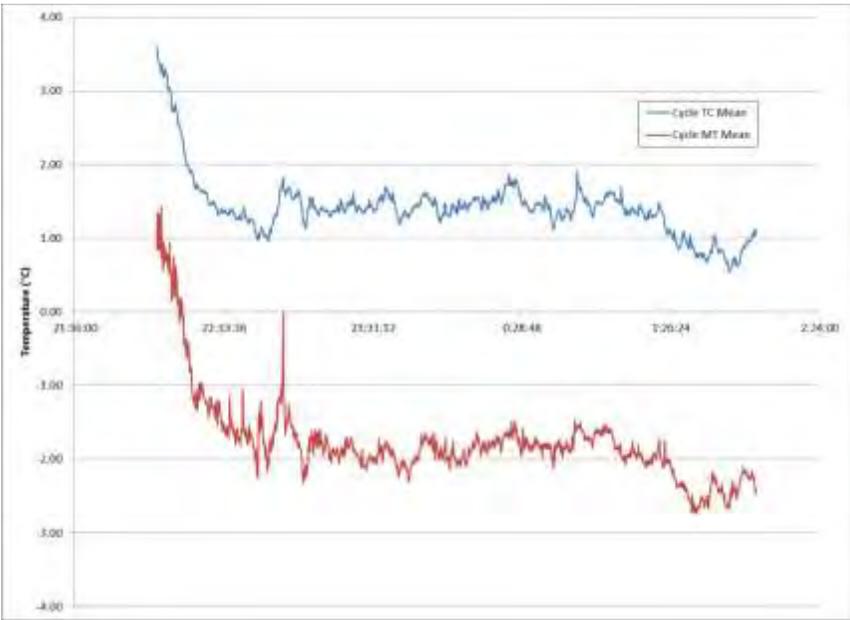


Figure 2. Recorded temperature means in the cycled irrigation treatment at canopy level (TC, blue) and bud level (MT, red).

Performance Measures –

1) Feedback from cooperating grower on use of system and potential concerns. This feedback will be documented throughout the project during weekly meetings

OUTCOME:

We worked very closely with growers during this study, both in the development of the irrigation cycling equipment and the implementation of the study which was carried out in a commercial field. We met regularly with the growers and they provided valuable feedback on the feasibility of the study and the utility of the system. As there were several technical challenges with this

project, the input from the growers and engineer were extremely valuable. The meetings allowed us to develop improved strategies for future work in frost protection. As this research was not funded for a second year renewal, we have shared data and lessons learned with growers so that they can conduct their own field experiments as well as colleagues at other research institutions and private companies to continue the work.

2) Completion of extension bulletin and peer reviewed publication

OUTCOME:

As there was insufficient data collected during the study, we did not publish an extension bulletin. We are recommending additional funds be sought to continue this research as results suggest automated sprinkler use has good potential to reduce water used on cranberry beds during frost events.

3) Workshops at the Cranberry School will be attended by approx. 350 growers.

OUTCOME:

As there results were not sufficient to give firm recommendations to the growers, we decided to share the results during the discussion period which occurs at the end of the first day of sessions. This time is available for growers to ask questions and we were able to share our experience and our grower cooperator was also able to participate in the discussion. There were approximately 250 and 200 growers that participated in the discussion at cranberry school in 2011 and 2012, respectively. We also had a discussion about the study during the Summer field day in conjunction with sharing results about the cranberry soil moisture probe study results as they were both connected to water management. The field day was attended by approximately 350 growers and about 200 growers attended the in-field discussion.

4) The success of this program will be tracked by the number of growers that indicate interest in installing automated cycled irrigation system. Information will be gathered during cranberry school workshop.

There was no formal survey conducted as the formal workshop was not held. However, there were several growers that approached the research team (approx. 15) after the discussion to gather more information and two growers that inquired with our collaborator about having a similar system installed on their farm.

IV. Beneficiaries

Cranberry growers are the primary beneficiaries of this work. There are approximately 250 cranberry growers in the state of WI and approximately 18,000 acres in production. During frost events, irrigation systems are often run continuously for many hours during a frost event accounting for millions of gallons of water as well as fuel consumed to run the irrigation pumps during the course of a season. The secondary beneficiaries are the citizens and others in the cranberry growing region that rely on the fresh water supply in the area. Although we were unable to establish recommended practices, there was substantial information that was gained by the research team and the project cooperators regarding the process of developing a commercial system that would allow for the ease of this type of research to be implemented by growers in the field. There were several challenges that were unexpected, but have been documented to enable

industry stakeholders interested in pursuing this type of system to address and anticipate the potential challenges.

V. Lessons Learned

This project faced several challenges both technical and environmental:

Environmental: The location that was chosen to conduct the research did not have as many frost events in 2011 compared to a typical year. In addition, the system takes a substantial amount of time to set up and therefore some frost events were missed as they were not forecast in advance. As a result, there were very few frost events that were able to collect the data. The system was reevaluated to determine if the data collection and irrigation system can be set up in advance and remain in place for an extended period of time, initially the grower was hesitant to leave the large number of sensors and wires in the field for an extended period of time as he was concerned it would interfere with daily operations on the marsh. This is a function of conducting field research that there is little that a research team can do to mitigate, however, removing the limitations that restrict the length of time the irrigation and data collection systems can be set up and left in the field would allow for a quicker response time to changing conditions. This is a function of conducting field research that there is little that a research team can do to mitigate, however, removing the limitations that restrict the length of time the irrigation and data collection systems can be set up and left in the field would allow for a quicker response time to changing conditions.

Technical: The development of a small-scale cycling irrigation system was a challenge that resulted in a time delay in getting the set up established. As mentioned above, the length of time required to set up the system and the length of time the system can remain in the field was a significant limitation to the project. Modifying the set up to allow for a quicker set up time and working with growers to address management issues that would allow the equipment to be left in the field for a longer period of time would allow us to react more quickly to changing conditions and would allow us to capture more frost events and collect the needed data.

Although there was significant work done in the lab prior to the growing season, there were unexpected challenges that occurred when adapting the system to fit with the growers existing irrigation system. This process of working with the growers to develop an operational system that also allowed for the collection of data was a valuable exercise as we were able to develop a better understanding of the potential limitations that growers would have in implementing this strategy on a full commercial scale. For example, as we needed to isolate a section of the bed, in order to establish treatment, we had several discussions about how a grower could manage the marsh in zones that experience different temperature dynamics. Through this process we have determined that the system must operate in companion with the existing irrigation system and therefore the recommendations must have an allowance to account for differences that may occur across the marsh.

VI. Additional Information

None

VII. Contact Info

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16) Board of Regents of the University of Wisconsin System

Project Title: Evaluating soil moisture probes for water use efficiency in cranberry beds (FY10FB-016)

Total Amount Received: \$28,537

Date of Award: October 25, 2010

Project Contact(s): Rebecca Harbut

Report Date: February 15, 2013

I. Project Summary

Cranberry production requires large amounts of water for frost protection, harvest, winter protection and irrigation. A potential avenue to increase water use efficiency is the use of soil moisture probes and evapotranspiration data to schedule irrigation. New technologies may provide growers with affordable monitoring systems that would allow irrigation to be scheduled based on precise soil moisture data. An alternative method to schedule irrigation that does not require purchasing equipment and has been used in several crop systems is use an online crop evapotranspiration (ET) rate calculator to allow growers to track crop ET rates and use this to schedule irrigation. These tools could reduce water use and reduce potential nutrient leaching due to over irrigating. This project would build on the results of a previously funded SCBG (FY2010) to determine optimal placement and recommendations for growers on how to use soil moisture probes. The recommendations developed in the previous study will be validated during a second growing season and at sites located across the state. In addition, this project will evaluate the feasibility of an online tool for growers to schedule irrigation based on evapotranspiration rates of the crop. This would provide growers without soil moisture monitoring equipment information to assist in irrigation scheduling.

II. Project Approach

Activities:

Activity		Timeline
Collect soil samples for research sites	Workmaster/Vandleest	May 2011
Conduct soil analysis	Conducted in-house	June-Aug 2011
Ordered soil probes and data loggers	Harbut	April 2011
Developed criteria for critical soil water potential for each research site based on work conducted at Laval University and soil analysis	Harbut & Workmaster, Caron, grower	April

Install soil probes, rain gauges and data loggers in 2 research beds, install rain gauges in adjacent grower managed beds	Workmaster	May 2011
Collect data on soil moisture, precipitation and irrigation throughout season	Workmaster, growers	April-Oct 2011
Measure stomatal conductance of cranberries in treatment beds and adjacent grower-managed beds	Workmaster, Harbut	May-Aug 2011
Data Analysis and writing	Harbut	Oct-Dec 2011
Share results at a field day at the research site	Harbut	Sept. 2011

This was the first year we have conducted this type of research. There was significant time and resource that were invested by the research team and the grower. The experiment has relied heavily on cooperation with the grower, Carl Salzwedle who has been responsible for overseeing the application of the irrigation treatments. Clay Vanderleest was the student hired to work on the project and assist Beth Workmaster with field data collection and lab analysis.

The results of this project have shown substantial savings in water use with no apparent detriment to plant health. The results of this research clearly demonstrate that there is high potential to reduce the amount of water that is used in cranberry production in Wisconsin. The treatment which received reduced water resulted in over 50% reduction in water use while maintaining production levels.

Experimental set-up. The experiment was set up in a commercial growers field, which involved establishing two separate irrigation systems to allow for the establishment of two different soil moisture treatments. Equipment was installed to monitor the water table depth, soil moisture (tensiometers and TDR probes), soil electrical conductivity, soil oxygen content. TDR probes were calibrated to the soil in the experimental bed.

Treatment application and data collections during 2011 growing season. Although there was some delay, the treatments were applied and data was collected during the course of the growing season. Uniformity of the irrigation treatments were measured using tensiometers and maps generated using the krigging technique (Fig.1). The research team worked with the grower to ensure that the irrigation was turned on at the appropriate times. During the course of the season, data was collected including; soil moisture (Fig.2 and Fig.3), water application (Fig. 2) soil O₂ content (Fig. 4), plant physiology (Table 1) yield and fruit quality (Table 1). There were two different types of soil moisture probes that were included in this study; the first was a tensiometer which measures the tension of the water in the soil matrix and the second is a time domain resistance (TDR) probe which is used to measure volumetric content.

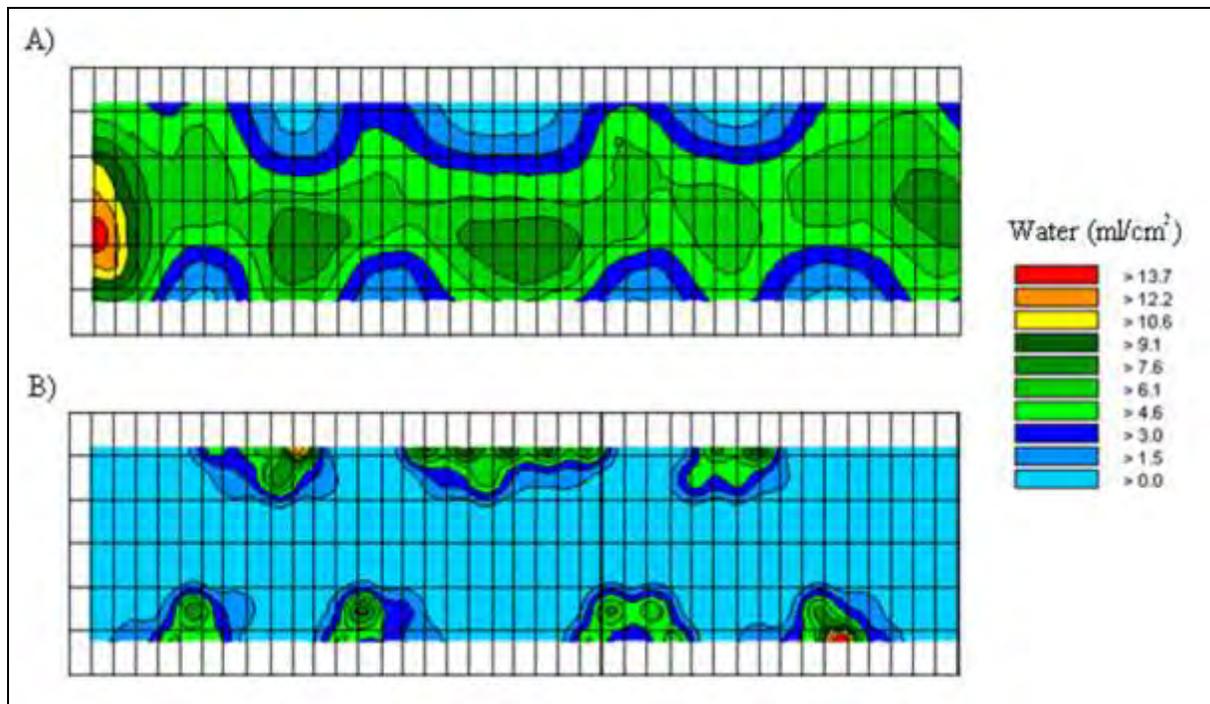


Figure 1. Irrigation uniformity for wet treatment (A) and dry treatment (B) across the experimental bed.

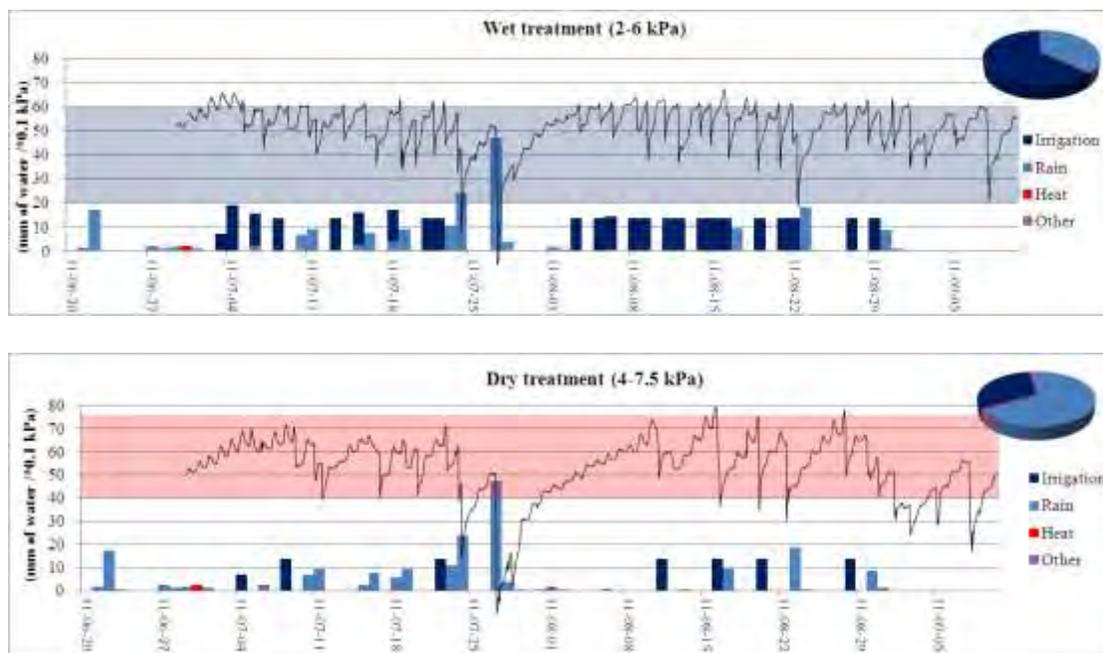


Figure 2. Seasonal soil moisture tension, and precipitation events during the course of the season in the wet treatment and dry treatment.

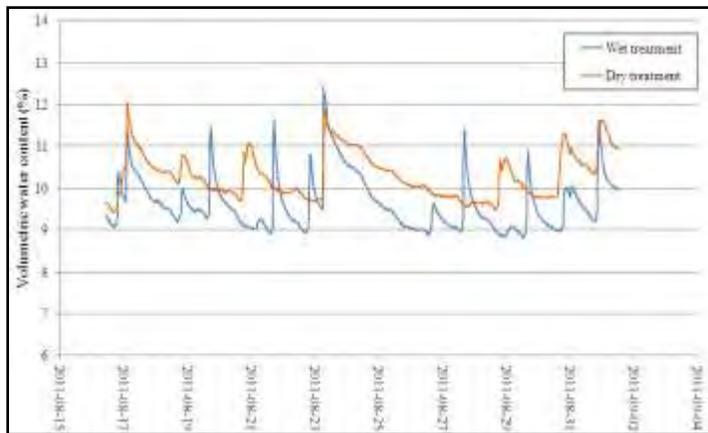


Figure 3. The volumetric water content in dry treatment (red) and wet treatment (blue)

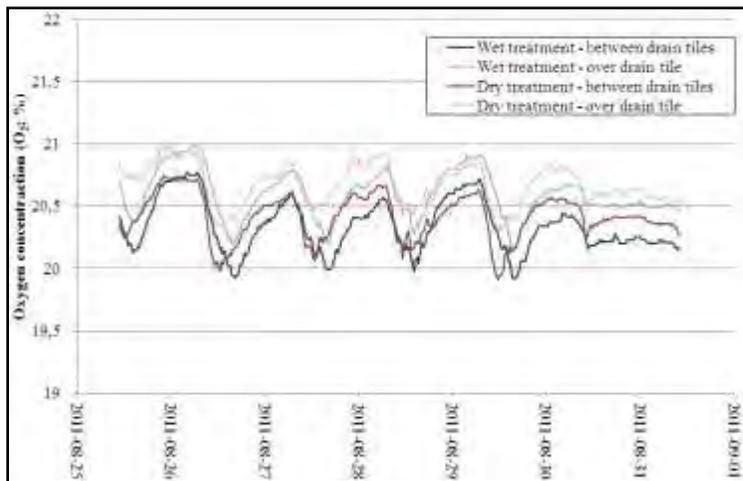


Figure 4. soil oxygen concentration during one week of season

Table 1. Impact of treatment on physiological characteristics of cranberry plants.

Treatment	Fv/Fm	Amax	Cond
Dry	0.675	8.7	0.147
Wet	0.693	9.6	0.179
SE	0.007	0.3	0.0072
P-value	0.07	0.034	0.002

Table 2. Impact of irrigation treatments on yield and fruit quality.

Treatment	Yield (lb/A)	Marketable Berry #/sqft	Marketable \bar{F} Wt (g)	Unmarketable Berry #/sqft
Wet	33,751	231	1.5	17.2
Dry	34,382	240	1.5	21.7

The use of soil moisture probes allows for the management of soil moisture more precisely and allowing the reduction of water use. This study is used to determine the utility of the different types of probes and the impact of the different moisture regimes on plant health and physiology. This was the first year of a two year study, (the second year is funded with a 2011 SCBG) but this data suggests that the use of soil moisture probes may allow for significant reductions in water use without negative impacts on plant health and yield. It is necessary to evaluate the impact over two years as the cranberry is a perennial plant and there may be impacts that are not evident until the second year that treatments are applied. The experiment will be repeated in 2012 in order to confirm the results.

III. Goals and Outcomes Achieved

The activities carried out during the grant period have been heavily focused on the establishment of the field trial; installing the irrigation system and monitoring equipment, establishing treatment parameters, training grower cooperators in applying the treatments throughout the growing season. The results of the season have provided valuable data to growers in allowing them to make an informed decision about the value of investing in a soil moisture monitoring system to use as a tool in making irrigation management decisions. The results of these studies were shared with growers at two field days during the 2011 season and were presented as preliminary results that were used to stimulate discussion about the principles behind soil moisture management and the costs and benefits of the technology.

Activity		Timeline
Collect soil samples for research sites	Workmaster	Sept 2010
Conduct soil analysis	Workmaster/VanderLeest	Dec 2010
Order soil probes and data loggers	Harbut	Jan 2011
Develop criteria for critical soil water potential for each research site based on soil sample data	VanderLeest	Jan-Feb 2011
Install soil probes, rain gauges and data loggers in research beds, install rain gauges in adjacent grower managed beds	Workmaster	April 2011
Collect data on soil moisture, precipitation and irrigation throughout season	Workmaster, Vabderleest, growers	April-Oct 2011
Measure stomatal conductance of cranberries in treatment beds and adjacent grower-managed beds	Workmaster, Harbut	May-Oct 2011
Data Analysis and writing	Harbut	Oct-Dec 2011
Final Report	Harbut	Dec 2011
Share results with growers at Cranberry Summer Field Day	Harbut	Jan 2012

B. Provide a comparison of actual accomplishments with the goals established for the reporting period

Goal – Establish research-based recommendations for use of soil moisture probes in cranberry production to encourage adoption of this technology by growers.

Target – Information generated during this study will be published in an extension bulletin and will be presented to growers at the 2012 Cranberry School in order to encourage growers to adopt the irrigation BMPs established through this research

Performance Measure – During Cranberry School (Jan 2012), this information will be presented to approximately 350 growers in addition to extension publications that will be distributed to 350 growers. Number of times the extension bulletin is accessed by growers will be tracked online. After the seminar at the Cranberry School, surveys will be conducted to determine the number of growers planning on purchasing soil probes to use for irrigation scheduling. Follow-up on adoption of this technology will be conducted during Cranberry School the following year (2013). It is anticipated that up to 40 growers will implement the use of this technology on their farms.

The establishment of recommendations will require an additional year of data (funded by a 2011 SCBG); however the results that have been collected indicate that the study will result in recommendations that would allow for a significant reduction in water use for irrigation during the growing season. Although it was decided to delay the publication of extension bulletins until we have additional data, the results collected this year have facilitated discussions with growers during field days and workshops and have stimulated a significant amount of discussion among growers about the use of soil moisture probes. During the field day in September 2011 after participating in the demonstration of the project, 80% of growers indicated that they were considering investing in a soil moisture monitoring system.

It was decided that this work would be shared with growers during the summer field day in August, 2011 as it would allow for an in-field demonstration of the soil moisture probes as well as a demonstration of how to test the uniformity of your irrigation systems. The field day was attended by 300 growers and there were approximately 200 that attended the in-field demonstration and discussion about the project. The presentation and demonstration was very well received and we received many positive comments from growers that they appreciated the information about the different types of probes and how they work as they were starting to consider adopting the technology.

We are still in the process of surveying growers to determine the rate of adoption of the use of soil moisture monitoring technologies. Based on informal survey's and discussions with growers, we anticipate that the number of growers that will adopt the use of soil moisture probes may exceed the goal of 40 growers.

IV. Beneficiaries

The primary beneficiaries of this project are the 250 cranberry growers of WI. However as the potential outcome of this work is significant reductions in water use during the cranberry production season, the 700,000+ people who live in the communities that rely on water sources and live around these regions would ultimately also benefit.

V. Lessons Learned

There were some delays in getting the field trial set up as we waited on the irrigation equipment to be installed. We also encountered some difficulties with proper installation of the probes at the start of the project. The installation method was refined and by working with the grower, an

installation jig was constructed to ensure all probes were installed at the same angle and depth. All of the equipment has been refined and installation procedures finalized so that the trial will be set up at the start of the 2012 season which will allow data collection for a longer period of time.

This project had significant findings but to make recommendations to growers, the data must be validated with additional years of data collection. The project was funded again with 2011 SCBG funding so the project will continue to collect sufficient data to develop recommendations once the 2011 grant project is completed.

VI. Additional Information

Publications:

- **Peer reviewed extension publication on use of soil moisture probes for irrigation scheduling**
This publication is currently being prepared

- **Peer reviewed publication in HortTechnology on the uniformity of soil moisture across beds and the use of probes to schedule irrigation.**
A peer reviewed publication will be published in 2013 as it was decided a second year of data would be required to pass the review process. A publication is in progress with the 2011 and 2012 field data and will be submitted to HortScience.

Presentations:

- **Results of the study will be presented to cranberry growers at the 2012 Cranberry School (Jan 2013)**
As previously mentioned, this work was presented at the summer field day instead of cranberry school in order to allow for a hand-on field demonstration of the equipment and a demo on how to test the uniformity of your irrigation system. There were approx. 200 growers that attended the in-field demonstration and multiple comments were received indicating growers were appreciative of the session.

VII. Contact Info

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17) Wisconsin Grape Growers Association

Project Title: Table grape trials for fresh market production (FY10FB-017)

Total Amount Received: \$21,745

Date of Award: October 25, 2010

Project Contact(s): Anna Maenner

Report Date: January 31, 2012

I. Project Summary

Our main goal was to continue the trial of at least 12 seedless table grape cultivars to determine the fruit quality, quantity and harvest period for all varieties planted in 2007 and to rate overwintering ability for the winter of 2011 - 2010. We also developed a program to look at harvest length of the grape clusters. We wanted to determine how long grapes could be left on the vine and still be of marketable quality.

Our targeted goal of developing a list of cultivars that will grow well in Wisconsin was achieved. The data collected during the growing season of 2011 provided enough data to develop a recommended list of seedless table grapes to grow in Wisconsin. The data shows winter hardiness, spring frost damage to buds, veraison dates and ripening calendar, brix levels, and disease and insect resistance or tolerance.

Our data will be released so that Wisconsin grape growers, Community Supported Agriculture (CSA), and small farm market growers will have additional fruit to complement their sales of Wisconsin grown fresh fruit. Seedless table grapes are a high value crop. Per acre income can be more than many other fruit crops in Wisconsin and more than general agricultural row crops. Once established, grapes are a long-lived crop, and can live for more than 25 years in some cases. Seedless table grape production has been limited by the few cultivars available for growers to plant.

Determining if any additional cultivars were hardy in the state would increase what fresh market, roadside stands, and CSA growers have as "locally grown" fruit to add to their market baskets. Also, determining a grape ripening sequence that could add weeks to the fresh production of grapes would expand the sales for these growers.

A secondary goal was to secure three new cultivars to add to the trial. We found four that were of significant value for production in Wisconsin. Three varieties were known in the industry in the United States: Thomcord, Jupiter, and Suffolk Red. An additional cultivar was found that had not been grown in the US on any large scale for many years. This variety was of significant

interest to our Wisconsin trials, due to the origin of the selection. An old Elmer Swenson variety – ES6-4-47 (Labeled as Ontario Blue in Canada) was found and added to the trials. This variety is grown in Canada and sold in Canada’s Farmer’s Markets as “Ontario Blue”. (Ontario Blue was being sold in markets when we were traveling there in late September of 2011. The grape was large, very solid and had a very complex taste. A half a kilogram of fruit was selling for \$4.99 – Canadian dollars.)

Outreach activities were held across the state and at the station. Information on the grapes has been posted on blogs and web pages. The Wisconsin Grape Grower’s Association (WGGA) has been posting information on the trials, on their blog and discussion related to the trials are held on the open forum of the WGGA Google site.

B. The primary purpose of the proposal was to continue and expand on a field trial of new seedless table grape cultivars in Southwest Wisconsin’s - Zone 4/5 for fresh market production. The grapes trial was implemented in 2007. The vines were spaced at 7’ x 10’ apart. Fifteen cultivars were selected for inclusion in the trial. Three of the cultivars were removed in 2010, due to lack of winter hardiness or late ripening problems. The 2011 evaluation now includes 12 cultivars that were part of a 2007 planting. Three new cultivars were planted in the May of 2011 to replace three varieties that were removed in 2010. A fourth cultivar was planted in June of 2011 that was located later in the summer.

II. Project Approach

The weather was very variable throughout the whole summer during the growing season of 2011. Early in the spring we did have very cold temperatures, which delayed bud break. Eight of the varieties did not break bud until on or after May 10. Bud swell had begun in early May and then slowed due to cold temperatures. On May 3rd temperatures dropped to 30.9 degrees Fahrenheit. The late bud break resulted in very little frost damage to any of the varieties. Only one variety experienced any damage due to the cold temperatures on May 3rd.

During the pollination period the cold and windy conditions, then very hot and windy weather resulted in leaf burn on many of the varieties. On May 9 and 10, temperatures topped out over 87°F and temperatures hotter than normal continued for several more days. At the same time, winds hit over 30 miles an hour for two days. One of the varieties had just begun to release pollen during this period and fruit filling on clusters was impacted.

The cold weather and late bud break delayed development of all varieties for as much as three weeks. Four to six inches of growth was not evident on the grapes until in late May. This is a benchmark used for first spray. The first spray was not completed until the last week in May. Consequently, fruit ripening was delayed by about two weeks for each variety.

However, as the summer progressed the weather was very conducive to grape growing for much of the season. Fewer disease outbreaks occurred and fewer fungicide sprays were needed. Low humidity, lack of rain, and wind kept the disease outbreaks to a minimum.

Developing Winter Hardiness

A large part of the work involved developing systems to increase the winter hardiness of all vines grown. The winter hardiness of grape vines can be managed to some extent by the growing conditions in the first four years and the continual management during production years.

Increasing the winter survival rate of cultivars is one management tool that our trials have found to be possible by the following growing methods.

Soil test should be conducted to correct any deficiencies before planting the vines. Prepare planting bed and plant vines at the correct depth.

The trellis system should be established soon after planting, so strong shoot and root development begins the first year. The installation of a system that supports the straight trunk development is one feature of the trellising. Straight trunks are stronger than those that are twisted or curved. The first year of growth all possible vine development is encouraged and vines secured to an upright bar established for trunk development. Developing double trunks has worked well in our system. One trunk on a plant can be lost due to winter injury or other problems, and the one remaining trunk will produce fruit. A replacement trunk can be trained from the remaining trunk very easily and less time is lost in production numbers.

Trellising the first year will decrease disease outbreaks. Additionally, as stated above, trellising will establish strong, straight trunks at the very outset.

The second year the two strongest vines should be chosen for the double trunk system for each vine. Cordons should be developed, and fruiting spur positioning managed. All flower clusters should be removed.

The third year cordons should be developed more fully and uprights or vines and fruiting spur placement managed. A few flower clusters may be left on the vines to determine veraison onset and time of final fruit ripening.

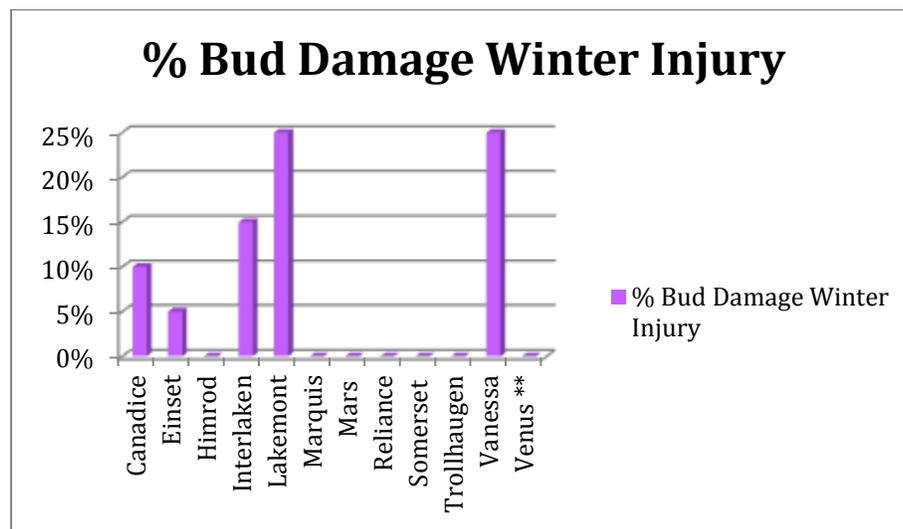
The fourth year trellising, trunk and fruit spur development should be in place and the first full crop harvested. Fruit load will still need to be managed to prevent over cropping and over stressing the vines before dormancy occurs.

Winter Injury and Frost Damage

Winter injury data was determined by selecting a few buds on each variety for dissection to check on the health of the primary and secondary buds, vascular health was also checked. These checks were completed in early April of 2011 at the time of pruning. Visual data was taken at bud break, and damaged buds counted on each variety. The low winter temperature recorded at the station was -14.4 °F near the station headquarters, and -18.5 °F in a field about 500 feet from the grape plots. Prior years we have lows of -18.4 °F and -24.1°F.

Vanessa and Canadice have had limited winter injury 2011 – from 5% to 10%. Lakemont and Interlaken 10% to 25% winter injury was recorded. Einset had under 5% bud damage from winter injury. The injury level for Einset is one that is sustainable in a larger population of vines. Chart # 1 - Bud Damage Winter Injury indicates levels of winter bud damage for 2011. The data for eight, of the 12 cultivars, that remained in the trial in 2011 indicates that they will perform well in Wisconsin. Those grape varieties include: Einset, Himrod, Marquis, Mars, Reliance, Somerset Seedless, Trollhaugen, and Venus. The remaining five selections, Einset, Canadice, Interlaken, Lakemont, and Himrod overwintered with limited winter damage and produced a marketable crop in 2011. Production was still quite reasonable, due to strong fruit cluster formation on remaining vines (Appendix - Winter Injury - Table # 1).

Chart # 1 – Bud Damage Winter Injury – 2011



Pruning of fruit spurs on Canadice, Einset, Lakemont, Interlaken, and Vanessa was more conservative to compensate for the winter damage on each cultivar. Longer cordons, with additional buds, were left to increase bud capacity. Fruit cluster thinning was more aggressive to decrease the stress on the plants from heavy fruit load and to increase vine winter hardiness. Each of the varieties was thinned to two clusters for each fruiting spur. Other varieties were thinned to three or four clusters per fruiting spur.

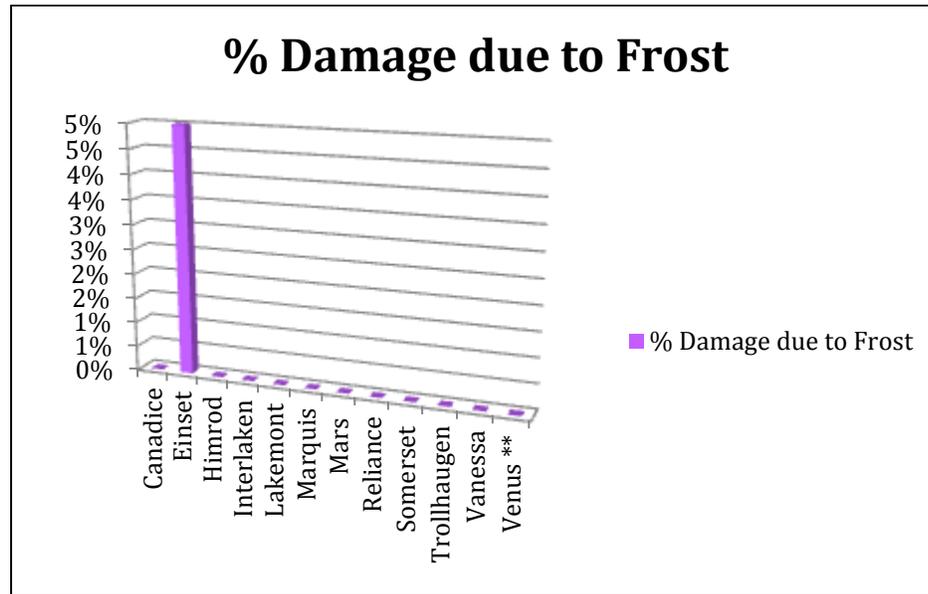
We will be monitoring the vines to see if fruit cluster thinning will decrease winter injury on the five varieties listed above. In 2012 we will again monitor for winter hardiness and plan fruit cluster thinning accordingly.

Frost Damage to Buds

Bud Break did not occur until early May (Appendix - Winter Damage/ Frost Damage/Bud Break - 2011 - Table # 1). The late bud-break helped to prevent frost damage. Weather records showed a low of 30.9°F on May 3. Frost was apparent on areas near and around the grape plot. Einset was the only variety with any bud damage due to the frost. Bud swell had begun on Einset on April 30. Bud damage was only 5%. Chart # 2 – Damage Due to Frost - shows level of damage to Einset and other varieties.

Early bud break is problematic and frost protection may be needed for those varieties that break bud early or when unseasonable warm spring temperatures occur. The high value of the crop would warrant frost protection.

Chart # 2 – Damage to Buds Due to Frost – 2011



Fruit Production

The vines on all varieties grew extremely well. All vines were summer pruned twice during the growing season to maintain an open canopy and limit upward growth of the vines.

Pollination was completed by early June and fruit set developed quickly. Himrod was the only variety that was impacted by the early hot, dry, very windy weather. The pollen was damaged and berry set was decreased by about 20% on each cluster.

Fruit set was above average on all but two of the cultivars, Himrod and Vanessa. We are still trying to determine the cause of the low fruit set on Vanessa. The vines were less vigorous than last year and fruit production lower.

The average per vine production for the 12 cultivars this year was 20.58 lbs. (Appendix – Seedless Table Grape Yields lbs. - Table # 4).

- Canadice had limited winter injury. Average fruit production per vine was 17.87 lbs. Fruit clusters were thinned to two clusters per fruiting spur.
- Einset had limited frost damage. Average fruit production per vine was 13.12 lbs. Fruit cluster weight and lbs. per acre were in-line with expected weights from research and cultivar data.

- Himrod had no winter injury or frost damage. Average fruit per vine was 14 lbs. Fruit cluster weight was lower than expected, but total production was in line with expected production.
- Lakemont and Interlaken produced an average of 13.0 to 14.0 lbs. per vine. Lower harvest totals are due to more aggressive fruit cluster thinning. Each variety had winter damage on one of the three vines.
- Marquis averaged over 19.0 lbs. per vine. Fruit clusters had some pollen damage due to high temperatures during pollen shed.
- Mars produced tremendous amounts of fruit, and cluster thinning will be more vigorous next year. The average per vine was over 38 lbs.
- Reliance and Somerset Seedless averaged over 25.0 lbs. per vine. Reliance had uneven ripening and we will be dropping fruit clusters at beginning of veraison.
- Trollhaugen, had beautiful fruit that average over 20.0 lbs. per vine. The cluster sizes were smaller than in the past and recorded in other research projects. We will be looking at dropping some fruit clusters or removing more flower clusters early in the spring.
- Vanessa has performed well the past three years. This year two of the vines had winter injury. With the double trunks, we still were able to maintain one cordon/one trunk of each vine and harvest 45.93 lbs. total or an average of 16.77 lbs. per vine.
- We will still be monitoring Vanessa for winter hardiness and production quality in the future. Fruit thinning will be implemented on this selection in the future, also and would be a recommended practice to maintain vigor and quality of the vines.
- Venus, which has performed very well in the past, has been compromised by Crown Gall infection. Average weight was only 1.67 lbs. per vine. This has been one of our favorites for flavor, berry, cluster size, and winter hardiness. We will install a new planting in 2012.

Cluster Weight

Weight, of the clusters, was close to or exceeded the cluster size set by the research for each cultivar. Chart # 5 & 6 – Expected Fruit Cluster Weights, below show fruit size each variety may obtain during a good growing season.

A few varieties were smaller in size. More aggressive fruit cluster thinning will increase the sizes next year. Charts # 3 & 4, Fruit Weight Grams for Clusters record actual size of fruit harvested in 2011 at the West Madison Ag. Research Station:

Chart # 3 - Fruit Weight Grams/Cluster – 2011 – West Madison Ag Research Station

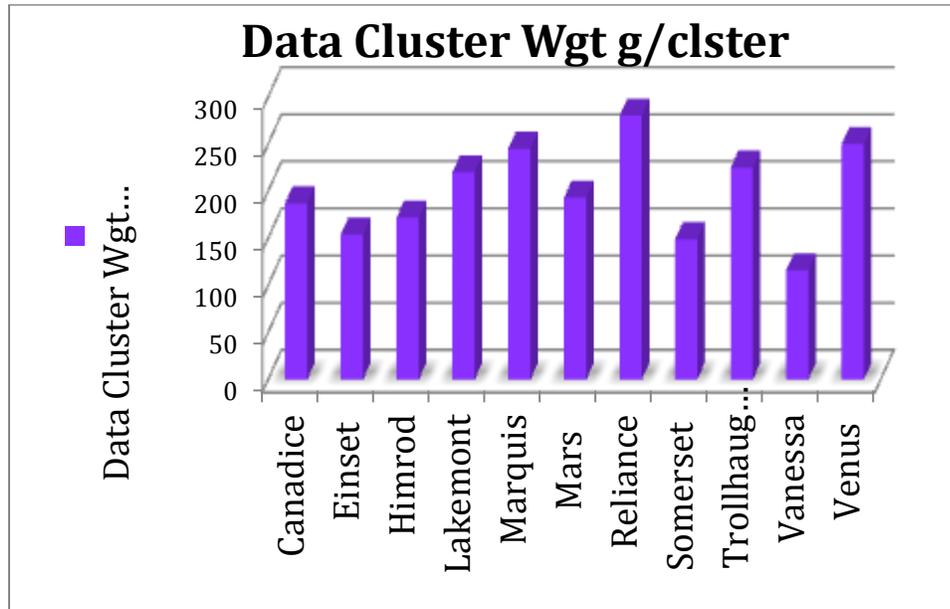


Chart # 4 – Fruit Weight Grams/Cluster – 2011 – West Madison Ag. Research Station

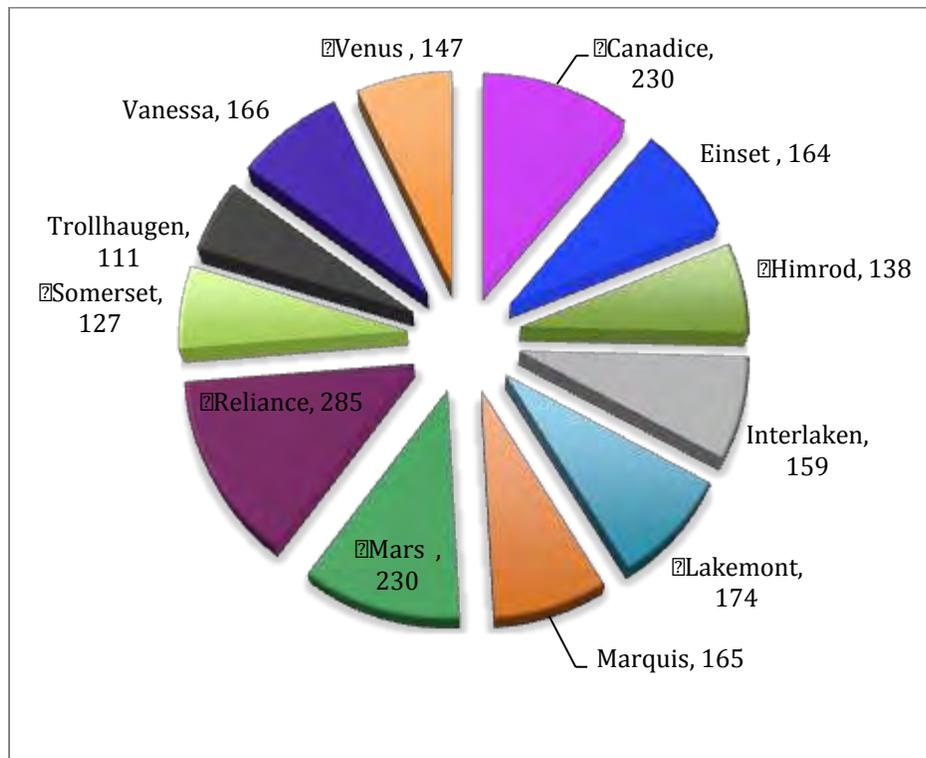


Chart # 5 – Expected Cluster Weights for Cultivars – Data Gathered from Research Sites

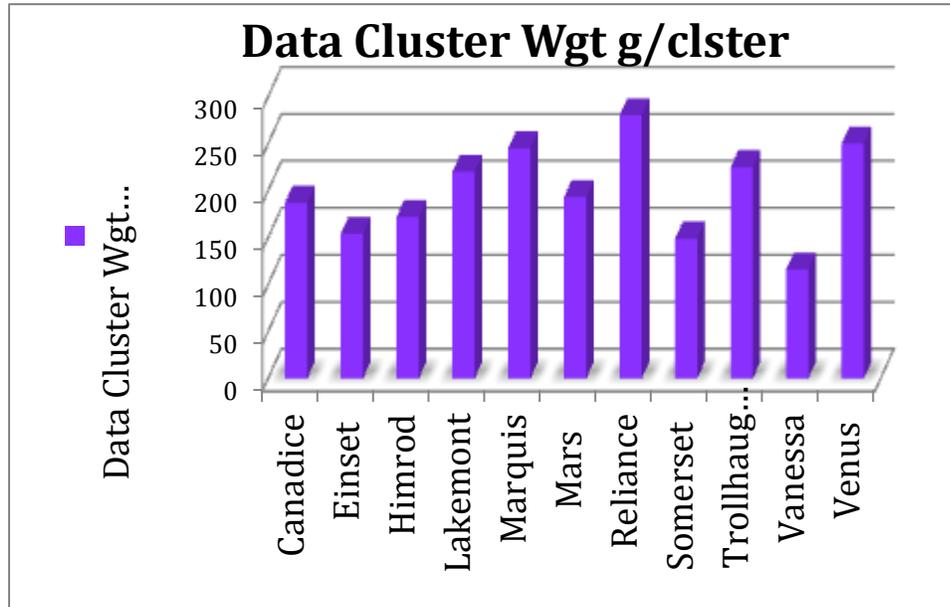
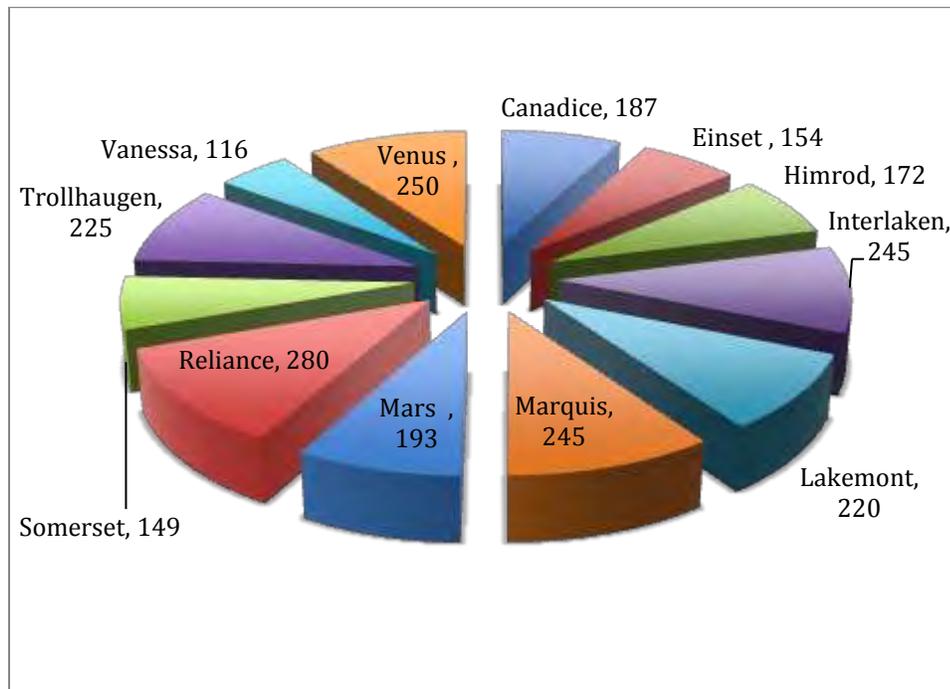


Chart # 6 – Expected Weights for Cultivars – Data Gathered from Research Sites



Length of Harvest Data

We set out to determine the length of harvest in 2011. Our goal was to find the extended harvest window for all of our winter hardy cultivars. Verasion was recorded on August 12 for nine varieties. Ten to 15% of the fruit on each cultivar was harvested every two to three days from August 25 – September 19, for a total of nine harvests. Chart # 7 - Harvest Period for All Varieties/Percent Verasion.

Somerset Seedless, Himrod, Candice, and Vanessa Brix readings on August 25 had already reached the range of harvestability. It is possible they could have been harvested the week of August 18 (Appendix -Yield Data – Table # 3).

Somerset Seedless and Trollhaugen were harvested nine times over the ripening period. The final harvest, on 9/19, the quality had decreased below marketable quality. Sugars levels had begun to fall, individual berries were becoming shrunken and insects were beginning to damage many of the berries.

The majority of the fruit on all vines was harvested on September 19 due to a hard frost advisory. However, the temperatures only dropped to about 34°F. Several small clusters were left on the vines of Interlaken, Lakemont, Mars, Reliance, and Canadice. A cluster was harvested each week. Reliance, the fruit held well until October 1. On October 10, 2011, Lakemont, Interlaken, Mars and Canadice still had fruit that held on the vine, appearance was good, and tasted sweet.

A late harvest might be possible with increased numbers of vines or acreage of table grapes. In 2012, we will be rating harvest period for all selections. Chart # 8 – Extended Harvest Data for selected Cultivars.

Chart # 7 - Harvest Period for All Varieties/Percent Verasion

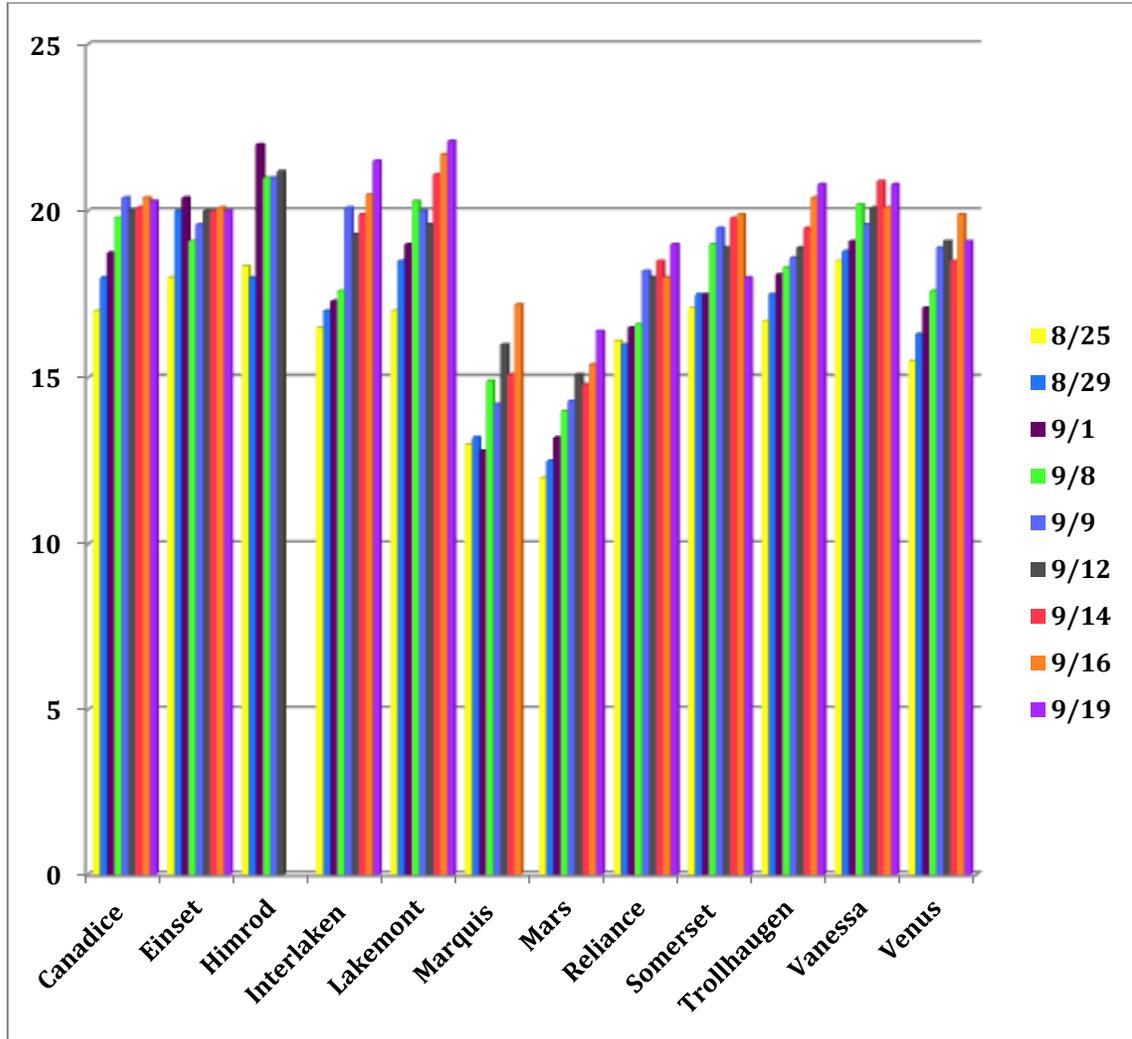
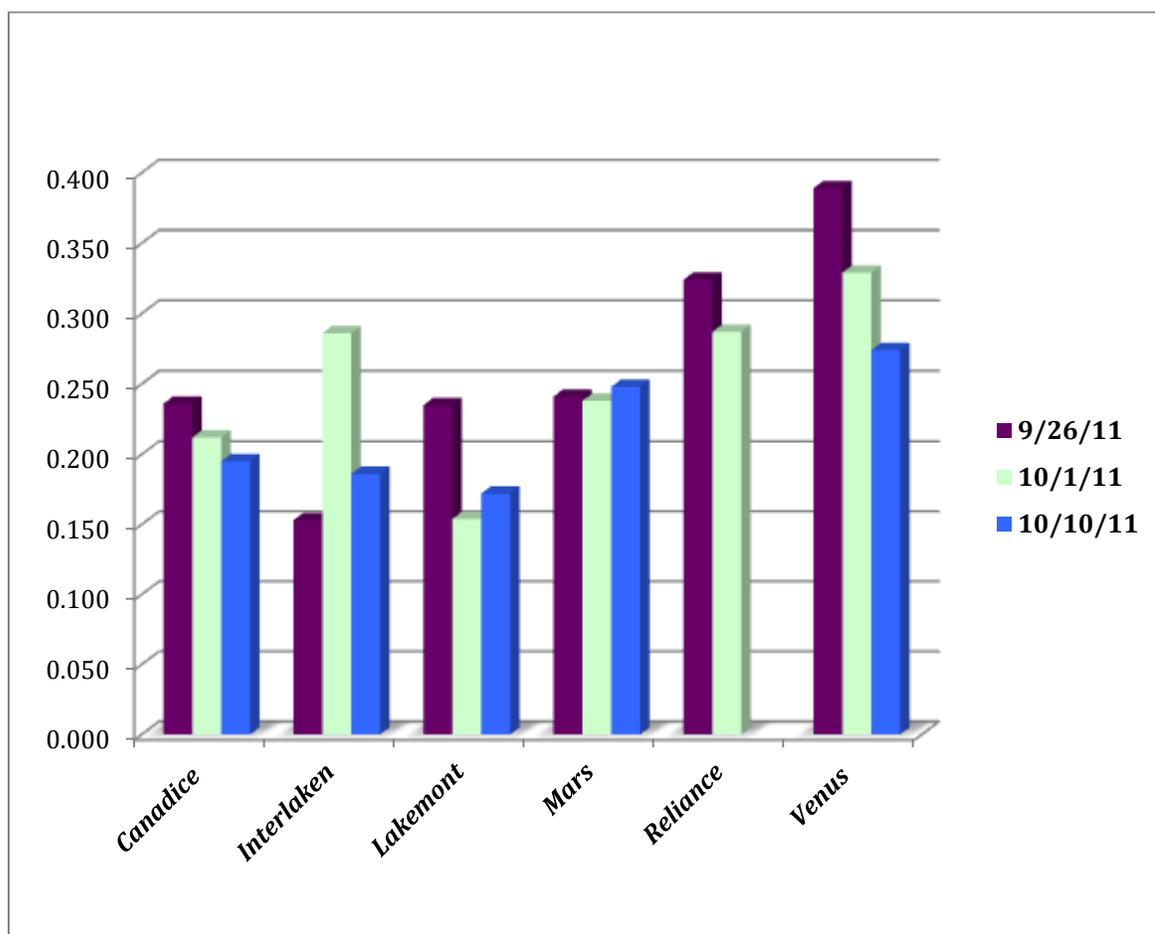


Chart # 8 - 2011 - Extended Harvest - One Cluster lbs./Cluster

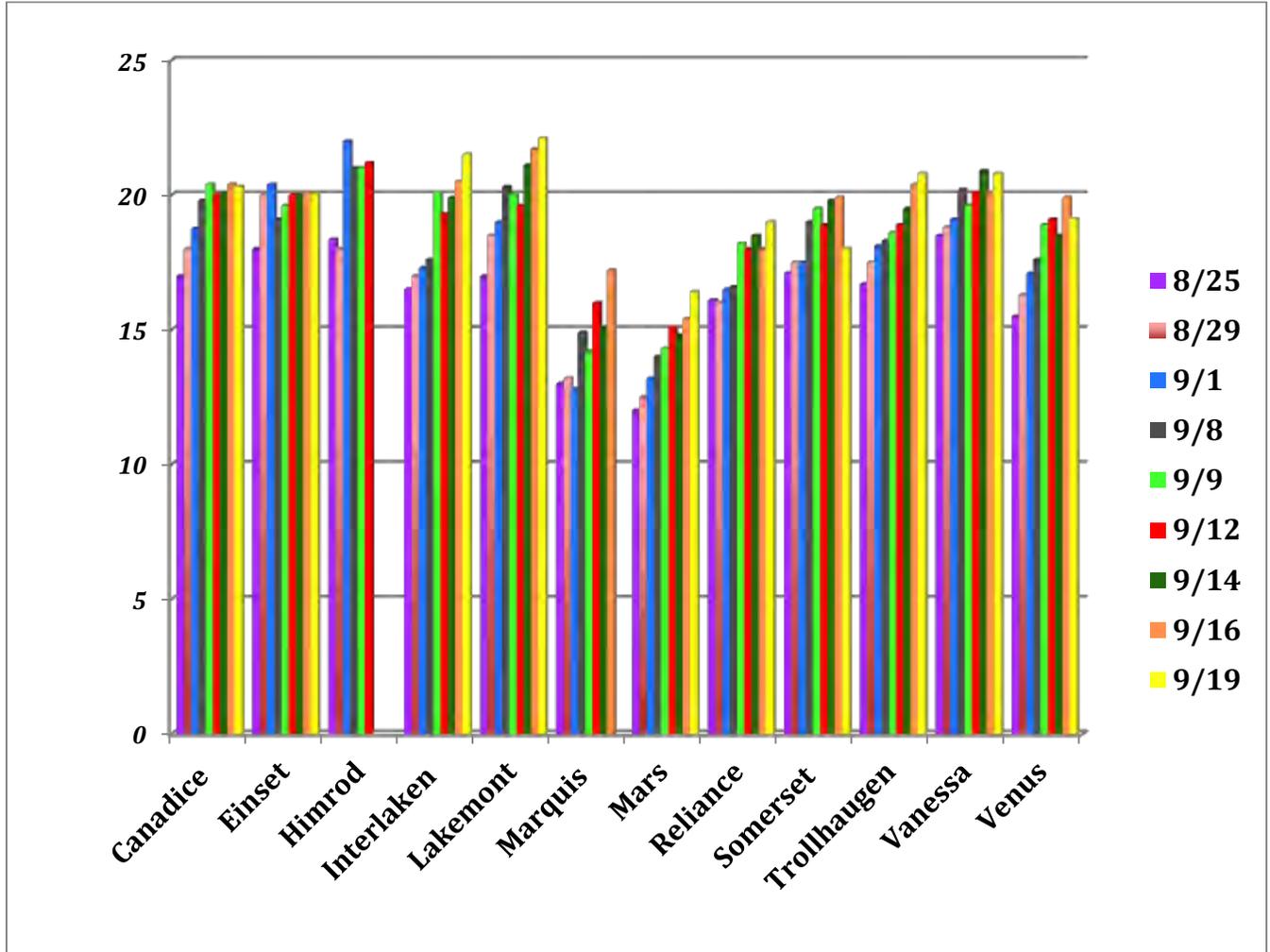


Brix Readings

Brix readings were taken on all cultivars at each harvest. The charts below and the brix table show how brix developed over the harvest period (Attached - Brix Readings – Table # 4).

Brix developed more slowly and some levels did not reach the levels recorded in 2010. Cold weather at the end of the growing season limited the brix development in some varieties. Chart # 9- Brix Readings, indicates the levels attained by varieties. Marquis and Mars were two varieties that did not reach optimal levels. Additionally, some varieties did produce an overabundance of fruit and fruit thinning should have been more aggressive.

Chart # 9 – Brix Readings – 2011



Cultivar Disease and Insect Responses

The vineyard was monitored for disease presences twice weekly throughout the summer to document levels of diseases present in plots. This summer the weather conditions resulted in very minor disease problems. Powdery mildew infection was not recorded on 10 of the grapes and this is a phenomenon that has not occurred in the growing past. In early June and July an outbreak of Downy Mildew was recorded on several selections. Mars is one variety that is more susceptible to Downy Mildew than all of the others. We had fewer problems with most of the other 11 varieties. Downy Mildew disease was controlled easily by careful monitoring (IPM) and a spray program.

Japanese Beetles are still a major problem for using all organic pesticides for grape production. Two flights, or outbreaks, of the beetle occurred the summer of 2011. The first was in mid-July and then a second toward the end of July. The numbers reached economic thresholds quickly during each flight and required sprays to control each flight. The relatively dry weather helped to decrease the length of the invasion.

A major selection preference for individual cultivars of grapes by the beetles is very evident. Those selections with *Vitus labrusca* genetics or the old concord type leaves are less favored than those of *Vitus vinifera*. *Vitus vinifera* leaves are smoother, with fewer hairs than the *Vitus labrusca* selections.

Marquis, Mars, Reliance, Trollhaugen, and Venus were more resistant to beetle feeding. Somerset Seedless, Canadice, Interlaken, Lakemont, Einset, Himrod, and Vanessa were more susceptible to the feeding of the beetles.

III. Goals and Outcomes Achieved

Our goal was to develop a list of cultivars that had survived the winter of 2010 – 2011. These selections had been planted in 2007, and survived the winters of 2007 through 2011.

- ❖ Beginning in late winter we began monitored each cultivar:
 - Checked all vines and buds for winter hardiness,
 - Monitored buds for date of spring bud break,
 - Monitored flower clusters for pollination and fruit set,
 - Checked at least three times a week for disease infections in all vines,
 - Monitored for insect problems,
 - Developed an IPM program for spraying and monitoring
 - Monitored fruit on a daily basis beginning in mid-August for veraison,
 - Harvested fruit and developed an extended harvest program,
 - Weighed random selections of cluster to develop data base for cluster size,
 - Weighed total harvest to gain knowledge on total grams or lbs. per vine and develop a per acre production total,
 - Monitored vines for dormancy in late fall.

- ❖ Secured four new cultivars that will be evaluated for winter hardiness.
 - These selections will be evaluated for four years before a definitive decision can be made on their value to the grape industry in Wisconsin.

- ❖ Information was disseminated at field days and in following publications and or electronic media for growers to access: website, blogs, newsletters and pamphlets.
 - Hosted Field days, evening walks, and placed information on a blog, Wisconsin Grape Growers Association web site, and on extension news outlets, and in newspapers.

B. Our major goal was to continue to move forward the research on identifying seedless table grape cultivars for suitability as commercial varieties in Wisconsin. We noted that by 2012 we would provide a recommended list of cultivars that are winter hardy, relatively disease resistant and produce well in Wisconsin's climate. We will be releasing this information to the public at the Wisconsin Fruit and Vegetable Growers conference and placing the information on the Wisconsin Grape Growers web site, and releasing information through University of Wisconsin - Extension, and the West Madison Ag. Research Stations new blog.

Our goal was to develop a list of cultivars and begin studying new selections that are coming on the market. We planted 4 new cultivars or varieties in June of 2011: Thomcord, Jupiter, Ontario Blue (an old Elmer Swenson variety – ES6-4-47), and Suffolk Red. (Ontario Blue is grown in Canada and can be found for sale at many farm markets. I found this variety for sale at several markets this fall when I was in Canada. It grows well, taste really sweet, and is a beautiful blue color. The growers I spoke with said that this seedless table grape is hardy in many areas of New Brunswick and Nova Scotia.)

Records of the numbers of individual growers, consumers and educators that attend field days, evening walks, presentations on research data, and the internet was retained. We did reach hundreds of people with our outreach efforts. The excitement regarding winter hardy seedless table grapes is growing very rapidly. We do have many experienced growers, and perspective growers stopping in to visit the grape trials every week.

Our long-term goal is to Increase numbers of growers planting seedless table grapes by 30% through outreach educational programs. Since we are just releasing the recommendations of species to be planted we do not yet have any data on how many growers will be planting the new varieties of seedless table grape. We do know that there is increased interest in table grapes. We gave out 250 varietal reports at the recent Garden Expo when in past, very few individuals at this event asked about table grapes. We do not know how this will transfer into planted acres but the interest alone is a huge increase since we did this project so the grape growers and gardening public are aware of the study and are very interested in the new varieties. We plan to include questions regarding planted acres of seedless table grapes in future surveys done by the WI Grape Growers Association which will allow us to better quantify the effects this project has had on the WI grape industry. We are confident that the excitement and interest this project has generated will transfer into future acreage.

IV. Beneficiaries

In January of 2011 information was presented to the grape growers and wine producers at the Wisconsin Fruit and Vegetable Conference. A PowerPoint was presented on the table grape program updating the information garnered during the 2010 season. Over 70 people attended the presentation.

West Madison was the host site for two field days. One was for the general public and part of Urban Horticulture Field Day and held on August 21, 2011. The attendance for that field day totaled over 890 people and we did provide tours and information for those attendees,

West Madison Ag. Research Station hosted a Commercial Grape Growers field day on August 24, 2011. We had over 43 individual growers, and 7 educators. Information was presented on the history of the grape project, overall success, trellising, and pruning. Demonstration of the sequence of pruning and trellising for first year, second year old, and three-year plantings was part of the program. Future plans for the program were presented also.

The seedless table grapes were just ripening and all attendees were given the opportunity to taste the harvest from 10 of the varieties. Participant's comments were very favorable and many were very surprised at the quality of the fruit produced and quantity of grapes on the vines.

In mid-summer a fruit walk was held at West Madison Research Station, which was lead by Dr. Rebecca Harbut, for the general public. We had over 38 people attend the walk and several were interested in beginning grape production for commercial harvest.

The trials at the station have become a draw for experienced grape growers as well as prospective growers. During the months of August, September, and October over 21 different individuals dropped in to request information, ask for tours, and discuss growing methods for table grapes. E-mails are exchanged often with individuals seeking help with growing grapes - numbers have not been maintained for the e-mail exchanges.

Electronic Media Dissemination of Information

Information was disseminated at field days and in following publications and or electronic media for growers to access: website, blogs, newsletters, Extension news releases, and with the Wisconsin Grape Growers Association web sites.

We will be developing a "fact sheet" that will be published through Extension. We hope to have this ready by early spring of 2012.

Information on the over wintering success of the grapes was posted on the West Madison Ag Research Station Trial and Demonstration Garden blog site and announced all walk, field days and information on that site. Blog address: <http://universitydisplaygardens.com>

The blog had over 110 visits in one day when we released information on the table grapes in August. The following day over 100 visited the site.

Ms. Reith-Rozelle will be presenting a PPT during the January 2012, Wisconsin Fresh Fruit and Vegetable Grower's Conference. She will be presenting all the data collected during the 2011 growing season and releasing the list of recommended varieties.

The vineyard has been drawing more people to the station than ever expected. Established grape growers and new growers have stopped at the station for advice in choosing sites, choosing varieties, and management practices, and then tour the collection.

V. Lessons Learned

Conclusions:

Five years of study and data collection have shown that seedless table grapes can be grown in Wisconsin. The key factors used in developing our conclusions are:

- a. vine hardiness
- b. fruit characteristics
- c. season of ripening
- d. tolerance of disease and insects.

Tolerance to low winter temperatures and to spring frost, is a measure of vine hardiness. Fruit characteristics are a measure of the eating quality. The selection must be equal to or superior to other winter hardy grapes on the market.

Season of ripening is an important factor. Cultivars should have fruit that ripens during the short growing season in Wisconsin. Included in season of ripening is also the ability of the vines to harden off before the first killing frost. Late ripening varieties have less chance to reach total dormancy than ones that may ripen in late summer. Tolerance to diseases and insects is a major factor in considering planting in Wisconsin. Most selections should at least exhibit limited tolerance to disease and insects.

Data and Observations

The data and observations in the field have shown that seven of the cultivars will grow in Wisconsin and produce fruit that is superior to, or equal to others seedless grapes on the market. Einset, Himrod, Marquis, Mars, Reliance, Somerset Seedless, and Trollhaugen, and will produce a marketable harvest with vine management and good growing practices. In 2011, these cultivars produced on average 6.25 to 12.5 tons per acre. Mars produced the 12.5 tons and the low brix levels show that this variety should have more fruit dropped and brix levels should increase.

Canadice, Interlaken, Lakemont, Vanessa, and Marquis can be grown in Wisconsin with extreme care in managing their fruit load and developing winter hardiness of the vines. Canadice is more winter hardy than Lakemont and Interlaken. We feel that Canadice will overwinter and produce a marketable crop with careful management of a strong root system and managed fruit load (Appendix, Table B – Seedless Table Grape Ratings 2011). This same management plan will hold true for Einset. Careful management of the fruit load, thinning of fruit clusters, and vine

The Southern part of the state, and those areas that may have microclimates of moderation from surrounding landforms, could grow the five listed above. With careful management these cultivars could prove to be a great benefit to growers. These five cultivars produced on average from 6.5 to 4.5 tons per acre.

The first brix recorded below was for the final harvest at the highest brix reading. Harvest of some grapes began at lower brix readings, second brix level below. Taste of individual grapes was the best indicator of “ripe” for harvest.

Description and Overview of 12 Cultivars

- **Canadice**
 - Fruit rose, red of mid-size, sweet, complex, spicy taste, 20 brix when ripe, brix at first harvest 18.75;
 - Mid-season harvest;
 - Clusters 0.475 lbs.;
 - Vines are of medium vigor;
 - Good resistance to downy mildew and powdery mildew,
 - High/Medium winter hardiness.

- **Einset**
 - Fruit light, rose of med-size, very spicy, fruity, clear, clean taste, 20 to 21 brix when ripe, brix at first harvest 20;
 - Early harvest;
 - Clusters 0.338 lbs.;
 - Vines vigorous;
 - High/Good resistance to downy mildew and powdery mildew,
 - High/Medium winter hardiness.
- **Himrod**
 - Fruit clear green/white, without blush, sweet, clear taste of “green grape”, 21 to 22 brix final harvest, brix at first harvest 22;
 - Early harvest;
 - Clusters 0.285 lbs.;
 - Vines vigorous
 - Good resistance to downy mildew, susceptible to powdery mildew, sprays control outbreaks easily;
 - High winter hardiness.
- **Interlaken**
 - Fruit white deep, green, very sweet when ripe, at 20 to 22 brix, with undertones of fruit, spice and a little ginger, brix at first harvest 22;
 - Mid-season harvest;
 - Clusters 0.325 lbs.;
 - Vines medium vigor;
 - Good downy mildew resistance, very low susceptibility to powdery mildew, sprays control outbreaks easily;
 - Medium winter hardiness.
- **Lakemont**
 - Fruit green/white with no blush, very sweet when fully ripe at 21 brix, brix at first harvest 20.3;
 - Mid-season harvest;
 - Clusters 0.359 lbs.;
 - Vines medium vigor;
 - Good downy mildew resistance, very low susceptibility to powder mildew, sprays control any outbreaks;
 - Medium winter hardiness
- **Marquis**
 - Fruit deep green, with light, sweet taste, and spicy undertones, fully ripe at 16 to 17 brix, brix at first harvest 15.1;
 - Late season harvest;
 - Clusters 0.340 lbs.;
 - Vines Medium vigor;
 - Medium susceptibility to downy and powdery mildew, controlled with sprays;
 - High winter hardiness.

- **Mars**
 - Fruit deep purple, a bit astringent, clear fruity taste; ripe at 15 to 17 brix, brix at first harvest 16.4;
 - Mid/late season harvest;
 - Cluster 0.475 lbs.;
 - Vines very vigorous;
 - Susceptible to downy mildew and powdery mildew, sprays control outbreaks;
 - High wintery hardiness
- **Reliance**
 - Fruit soft rose with blush of green, very beautiful, complex flavors, ripe at 18 to 19 brix, brix at first harvest 18.5;
 - Mid/late season harvest;
 - Clusters 0.588 lbs.;
 - Vines very vigorous
 - Good resistance to downy and powdery mildew, easily controlled with sprays;
 - High winter hardiness.
- **Somerset Seedless**
 - Fruit rose colored, very complex flavor and quite sweet, ripe at 19.5 to 20.0 brix, brix at first harvest 17.1;
 - Early season harvest, first to ripen;
 - Clusters 0.262 lbs.;
 - Vines very vigorous – needs to be on high cordon;
 - Good resistance to downy and powdery mildew, any outbreaks controlled by sprays
 - High winter hardiness.
- **Trollhaugen**
 - Deep purple, spicy, complex taste and very crisp, ripe at 19 to 21 brix, brix at first harvest 17.5;
 - Early season harvest, right after Somerset;
 - Clusters .229 lb.;
 - Vines medium vigor;
 - Susceptible to downy and powdery mildew, controlled with sprays;
 - High winter hardiness.
- **Vanessa**
 - Deep rose, red, with very spicy, complex, sweet taste, ripe at 19 to 20 brix, brix at first harvest 18.5;
 - Early season harvest, right after Somerset;
 - Clusters 0.342 lbs.;
 - Vines medium vigor;
 - Susceptibility to downy mildew low, powdery mildew medium, sprays control outbreaks;
 - High/Medium winter hardiness.

- **Venus**
 - Deep, red, purple fruit, very large berries, very complex fruity taste, ripe at 18.5 to 19.5 brix, 18.9;
 - Mid/late season harvest;
 - Clusters 0.303 lbs.;
 - Vines very vigorous;
 - Susceptible downy mildew, resistant to powdery mildew, sprays control;
 - Medium winter hardiness. (Winter hardiness compromised by Crown Gall in plots.)

VI. Additional Information

None

VII. Contact Info

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18) Commercial Flower Growers of Wisconsin

Project Title: Control of powdery mildew and leaf spot disease using low-risk pesticides (FY10FB-018)

Total Amount Received: \$21,068

Date of Award: October 25, 2010

Project Contact(s): John Esser

Report Date: February 1, 2012

I. Project Summary

The purpose of this research was to evaluate the effectiveness of certified organic, bio fungicides on powdery mildew and leaf spot on three high value cut-flower crops, Echinacea, Rudbeckia, and Sunflower. Two low-risk certified organic, bio fungicides, Regalia and Cease, were compared to a conventional chemically based fungicide, Heritage, along with a control which had no fungicides applied throughout the trial. Throughout the study, only the three cultivars of Sunflower developed powdery mildew, and leaf spot was not evident. The Echinacea and Rudbeckia did not develop powdery mildew and only Echinacea developed symptoms of Septoria leaf spot. The disease presence was not detected through testing at the University of Wisconsin, Plant Pathology Lab. The data taken was the average percent of powdery mildew covering the leaves and the average percent of powdery mildew present only on the leaves of the cut-flower stems. After analyzing the final data for powdery mildew infection on the sunflowers, it is determined that of the two certified organic fungicides, Regalia performed better than Cease.

The study design included three fungicides: one conventional and two certified organic. Cease and Regalia were the two certified organic, bio fungicides chosen, and Heritage was the non-certified organic or synthetic fungicide. The two certified organic, bio fungicides were chosen to compare their different modes of action. Cease contains a bacterial strain which produces active compounds that disrupt cell membranes, inhibiting the germination and growth of a pathogen on a leaf surface. Regalia 'turns on' the defense systems of plants, which produce cell strengtheners, antioxidants, phenolics, and pathogenesis-related proteins which inhibit plant pathogens internally. Heritage is a commonly used conventional fungicide in the industry that is a broad spectrum, preventive fungicide with systemic and curative properties. It was selected after talking with the grower at W. & E. Radtke Inc., Germantown, Wisconsin, who uses this on his crops. In addition to the three treatments, a control plot, with no treatment, was established. No fungicides were applied to this plot throughout the study.

These three fungicides were tested on two cultivars of *Echinacea*, *Echinacea purpurea* and *Echinacea* 'Rubinstern', two cultivars of *Rudbeckia*, *Rudbeckia fulgida* 'Goldstrum' and

Rudbeckia fulgida ‘Summer Blaze’ and three cultivars of sunflower (*Helianthus annuus*), ‘Valentine’, ‘Ikarus’ and ‘Sonja’. All three fungicides treatments and the control had independent rows that were separated by a 5-foot section, covered with mulch and a 20-foot border surrounding the entire plot. The rows of the two organic fungicides and the control had two repetitions of each cultivar of the sunflowers, Rudbeckia and Echinacea, with each repetition consisting of five plants. It is to be taken into consideration that the conventional fungicide was not included in the original grant. It was added later in order to create a full spectrum study and compare, not only how certified organic fungicides perform against no fungicide application, but also how they perform compared to what cut flower producers are currently using. Since this plot was added later, it only had one repetition containing five plants of each cultivar for the Echinacea, Rudbeckia and Sunflowers.

The weather conditions at the West Madison Agricultural Research Station were recorded using Davis Vantage Pro Weather Station. Reviewing the monthly climatological summaries, the data showed a drop in average temperature from both June and July to August from 75 +°F to 70.4°F. High temperatures of over 90°F were recorded for four days in June, and seven in July. There was a decrease in rainfall from 4.42 inches in July to 1.93 inches in August. No rain fell for seven days before the first appearance of powdery mildew in August.

Wind speeds increased in late August, reaching speeds of 22mph. The average relative humidity from August 13th to August 31st was 71.37%. Thus, the weather conditions: rainfall, temperature and relative humidity, were not conducive for growth of powdery mildew until the last two weeks in August.

According to the University of California, powdery mildew is “white, powdery mycelia and spore growth” that develops on the surface of leaves, shoots, flowers and fruits. Wind is the primary source of spores spreading to new hosts. Germination occurs in the absence of water and is inhibited when there is a prolonged presence of water. Cloudy or shady conditions with temperatures between 60-80°F is ideal while extreme sunlight and heat with leaf temperatures above 95°F can kill the fungus.

The Colorado State University Extension lists several methods of cultural control. These cultural controls include several options. Using varieties that have resistance to powdery mildew is the first choice a grower can use as part of an integrated pest management program. In the absence of resistant varieties a grower should limit nitrogen applications. Limiting nitrogen fertilizer in the late summer will decrease the chance of new plant growth that is more susceptible to infection. Reducing relative humidity by avoiding overhead watering, removing infected plant parts and plants that are overcrowded to increase air circulation and clean up and remove all the infected plant debris in the fall are all practices that can improve control of powdery mildew.

According to Purdue University Extension, Septoria leaf spot symptoms are small dark brown lesions that are one-eighth to one-fourth inches in diameter. Spores overwinter in infected plant material and are spread by splashing water from rainfall or irrigation. Lower leaves are infected first and will continue to infect upper leaves throughout the season. Unlike powdery mildew, leaf spot spores require moisture to germinate. For this reason it is best to avoid overhead irrigation. It is also best to not overcrowd plants to increase air circulation and hasten drying.

II. Project Approach

All three fungicides were applied, at the manufactures recommended rate, every two weeks. These rates are: 0.96 ounces/1 gallon of Regalia, 1.92 ounces/1 gallon of Cease, and 0.015 ounces/1 gallon of Heritage. The dates of application were June 30th, July 13th, July 29th, August 10th, August 25th, and September 8th. The plants were monitored and data was recorded three days per week starting after the first spray application. Data was taken of the average percent of powdery mildew covering the leaves. The scale that was used to determine the percent coverage of infection came from the Ministry of Agriculture, Food and Rural Affairs in Ontario, Canada (Appendix A). For the first half of the study the plants were deadheaded in order to encourage continual production of new flowers. On September 1st, only 'Valentine' and 'Ikarus' had powdery mildew on upper leaves. 'Sonja' only had powdery mildew on its lower leaves and so did not have cut-flower data taken. 'Valentine' and 'Ikarus' were cut at the normal length of a cut flower – 24” to 36” - and examined for the presence of powdery mildew in order to determine if the cuts were affected and/or had diminished value due to signs of powdery mildew.

III. Goals and Outcomes Achieved

Throughout the study, only the three cultivars of sunflowers developed powdery mildew, whereas both cultivars of Echinacea and Rudbeckia did not. As a result, all the data and analysis have resulted from the sunflowers. On the sunflower 'Valentine', Figure 1 shows the best control was the conventional fungicide, Heritage. 'Valentine' did not develop powdery mildew in the Heritage plot until September 16th with 25% leaf coverage. Regalia had a generally consistent percent coverage over the time period ranging from 26% on August 22nd to 36% on September 16th. The fungicide with less effectiveness for powdery mildew was Cease, having spiked on August 29th with 35% coverage and increasing to 46% on September 16th. The control steadily increased peaking at 68% leaf coverage of powdery mildew.

Figure 1.

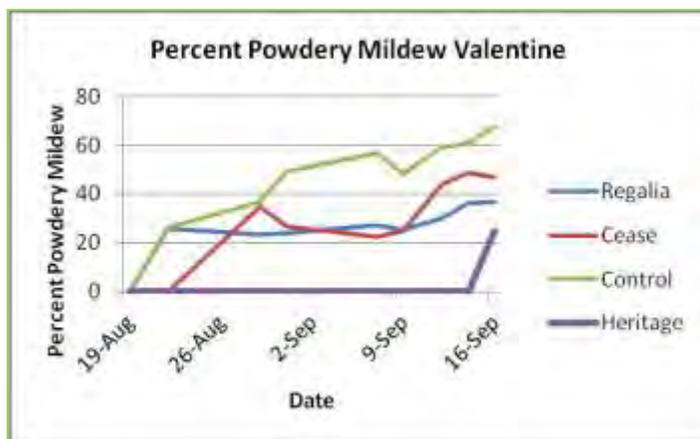


Figure 2.

The graph in Figure 2 shows the data from the sunflower ‘Ikarus’. This shows the same trend as Valentine (Figure 1) in that the most effective to the least effective is Heritage to the control respectively. Heritage showed no signs of powdery mildew until September 14th with 5% leaf coverage. Regalia once again had a generally steady trend over time, ranging from 5 to 23%. Cease had a steady increase over time peaking at 64% coverage on September 16th. The control also had a steady increase peaking at 82% coverage on September 16th.

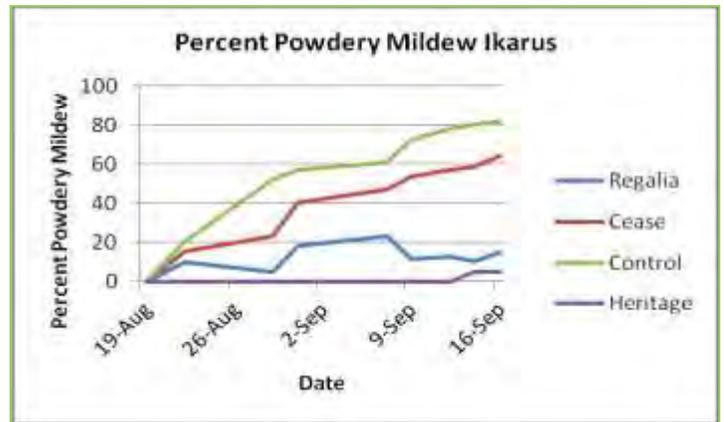


Figure 3.

The graph in Figure 3 is the data for the sunflower ‘Sonja’. Heritage performed the same as it did with ‘Valentine’ and ‘Ikarus’ except on ‘Sonja’ it never developed powdery mildew. Regalia showed better control with ‘Sonja’ than it did with ‘Valentine’ and ‘Ikarus’, also having not developed any signs of powdery mildew. In this trial, Cease developed more powdery mildew than the control. The control and Cease had 51% and 65% leaf coverage respectively.

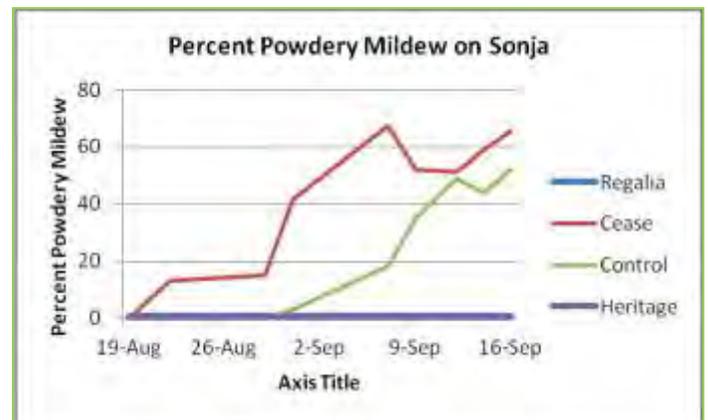
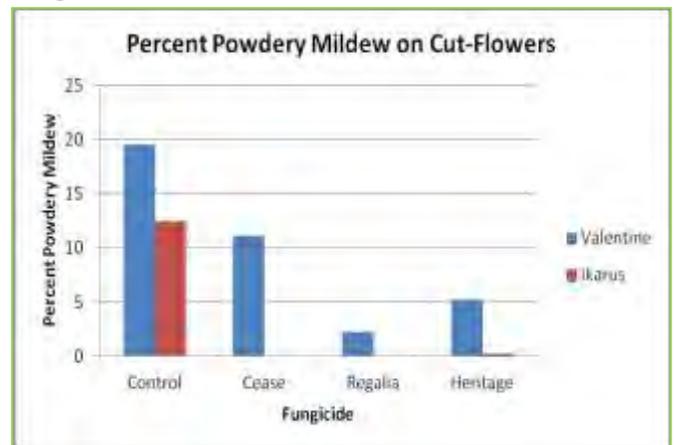


Figure 4.

Figure 4 shows the data collected of the percentage of powdery mildew present on the cut flowers of ‘Valentine’ and ‘Ikarus’. Of the three fungicides, Cease provided the least control for infection rates of powdery mildew with an average of 11% on the leaves of ‘Valentine’. The conventional fungicide, Heritage, developed the second most powdery mildew with an average of 5.25% leaf coverage on ‘Valentine’ and 0.2% on ‘Ikarus’. Regalia performed the best with developing 2.25% powdery mildew on the leaves of ‘Valentine’. Overall, all three fungicides performed better than the control which developed 19.5% and 12.5% on ‘Valentine’ and ‘Ikarus’ respectively.



B. The overall results show the conventional fungicide, Heritage, is the most effective against the germination and growth of powdery mildew in all three cultivars of sunflowers. Of the two organic fungicides, Regalia was more successful than Cease. It is unknown why the cultivars of

Rudbeckia and Echinacea did not develop powdery mildew. However, we brought samples of Rudbeckia and Echinacea leaves to the Plant Disease Diagnostics Clinic at the University of Wisconsin-Madison and Rudbeckia was found to have anthracnose and the Echinacea had symptoms of Septoria leaf spot but sporulation was not able to be found.

IV. Beneficiaries

One peer reviewed extension fact sheet on bio-fungicides for selected plant species will be sent to 91 extension agents, who will then disseminate the information to their constituents, an estimated 8,000 or more individuals and 500 to 600 Master Gardeners, and placed on the Hort Team Web Site and the Master Gardener's web site. Information was also provided to individual growers, consumers and educators that attend field days, evening walks, garden walk-in visitors, and presentations on research data.

We will disseminate information at the Commercial Flower Growers field day to 60 to 65 growers, students, and over 20 people from the Green Industry. We will also send the report to 750 individuals through the Wisconsin Commercial Flower Growers' newsletter, and the Wisconsin Green Industry publication Green Side Up, and to approximately 250 National Cut Flower Association Members, as well as place the report on the West Madison website and blog.

Records were maintained of growers/visitors and stakeholders visiting the West Madison Ag Research Station, Trial and Demonstration Garden web site and attendance at conferences where information could be presented. The blog was viewed about 7,100 times in 2011 with the busiest day occurring on August 17th with 164 views.

We will be keeping in contact with cut-flower growers in order to track their increase in sales after this information has been available to them.

A Special thanks to W. & E. Radtke Inc., Germantown, Wisconsin for generously donating the Echinacea and Rudbeckia plants and to the Fred C. Gloeckner Company, Harrison, New York for donating the Sunflower seeds.

V. Lessons Learned

There are a several factors that may have influenced the outcome of the results. Each repetition containing five plants was arranged with four plants making a square and one in the center. It was noticed that the center plant, as well as the leaves facing the center had significantly more powdery mildew growth than the leaves on the outer perimeter. As the sunflowers grew to their mature height, leaf overlapping occurred, and the lower leaf was observed to have much more powdery mildew than the top leaf which may be due to the sunflowers becoming overcrowded. When overcrowding occurs, there is less air flow and the relative humidity between the plants is higher, making the environment more conducive for powdery mildew development.

Overcrowding also makes it difficult to get complete coverage of the fungicides when spraying the leaves and makes it difficult to observe all the leaves, thus creating a greater possibility for error when recording data. In order to eliminate these factors, next year the sunflowers will be planted in a linear row. This will make spraying and data taking easier and more thorough as

well as implement cultural controls in order to make the environment less conducive to the development of powdery mildew.

As can be seen in the graphs of Figures 1, 2 and 3, the data shows a general increasing percentage of powdery mildew but also have days and/or a week where the percentage decreased. This may be due to the leaves senescing and falling off either from general die back or from symptoms of powdery mildew. They could have also been blown off from wind. If these leaves had powdery mildew and were included in the data the previous week(s), the average would then decrease with fewer leaves to take data from. This could also be due to human error in observation and data taking by not seeing leaves that were previously seen and recorded or assessing a different percent coverage.

When powdery mildew does affect the leaves, stems and/or flowers and buds, the quality and therefore the value diminishes. Since the lower leaves and stems of the plants are not being cut and sold, these parts do not affect the quality of the cut-flowers. For that reason, on September 1st the cut flower data (Figure 4) was taken in order to see which fungicide performed the best on the cut-flowers. This was the only data taken where the organic fungicide, Regalia, performed better than the conventional fungicide in both 'Valentine' and 'Ikarus' sunflowers. It is to be noted in Figures 1, 2, and 3 it showed no results of powdery mildew for the conventional fungicide, Heritage on September 1st. This must have occurred from miscalculating the percent coverage of powdery mildew on the whole plant. After harvesting the three stems with an average leaf coverage of 20% they were no longer available for observation and so the percent leaf coverage of the whole plant returned to zero. Next year the flowers will be cut more often. This will allow for more cuts harvested before powdery mildew reaches them, and will also be more in line with the methods of cut-flower growers.

Another consideration to take into account is the average percent of powdery mildew that covered the leaves compared to the average percent that covered the whole plant. For instance, one leaf of one plant could have had 50% of its surface covered in powdery mildew where another plant could have had 10-15 leaves with an average of 50% coverage. , Since taking the average percent of leaf coverage can have discrepancies in the data, next year data will be taken by looking at percent leaf coverage as well as the percent of powdery mildew that covers the whole plant.

In conclusion, the conventional fungicide, Heritage, performed better than the organic fungicides Regalia and Cease when looking at the average leaf coverage of powdery mildew. When compared to the control, Regalia was comparable to the conventional fungicide Heritage, in having significantly less powdery mildew. In contrast, Cease developed an equivocal amount of powdery mildew compared to the control. The cut-flower data for Heritage and Regalia also performed similarly in having minimal coverage on the leaves of the cut-flowers. Again, Cease and the control were comparable in controlling powdery mildew. The data demonstrates that the certified organic fungicide, Regalia, provides similar control of powdery mildew, as that of the conventional fungicide, Heritage. The certified organic fungicide Cease did not control powdery mildew well enough on the sunflowers when compared to the other options to produce a high quality marketable product.

VI. Additional Information

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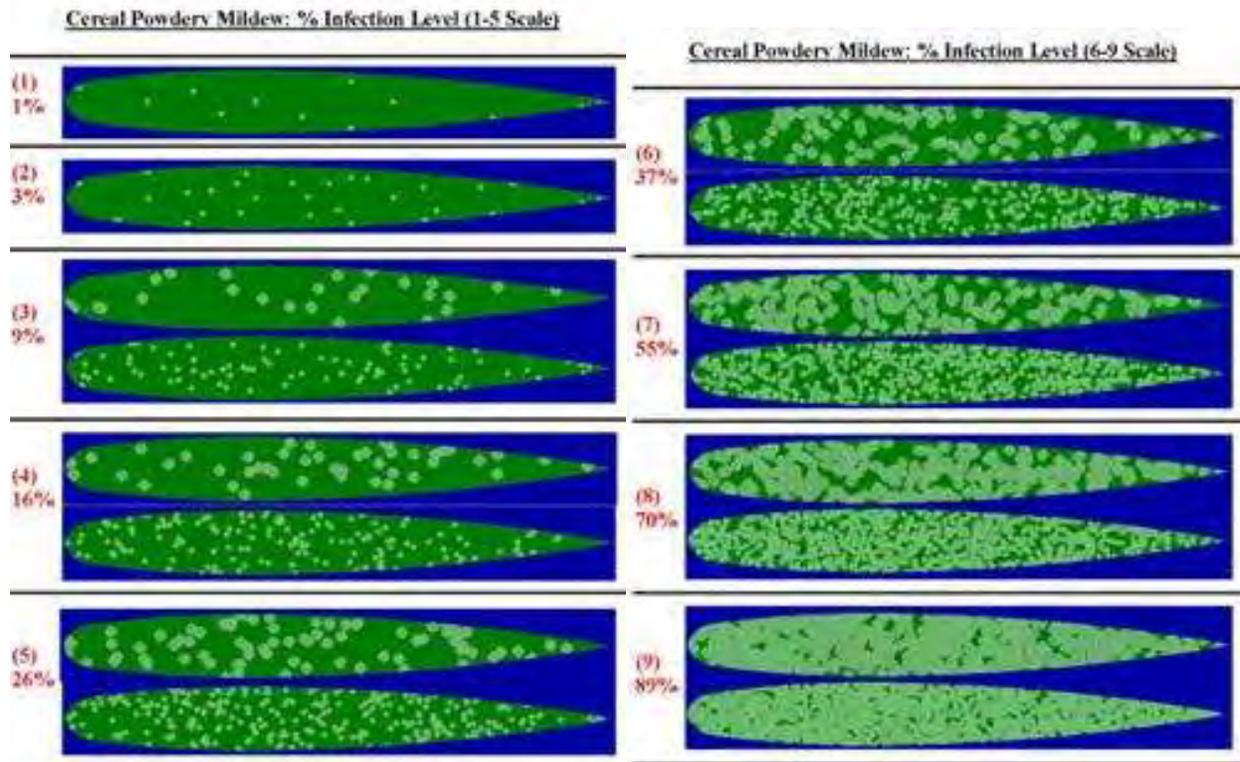
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Appendix A:



VII. Contact Info

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19) Board of Regents, University of Wisconsin System, UW-Extension

Project Title: Development of mobile post-harvest processing for hazelnut production (FY10FB-019)

Total Amount Received: \$20,000

Date of Award: October 25, 2010

Project Contacts: Jason Fischbach

Report Date: January 18, 2012

I. Project Summary

Wisconsin grown hazelnuts are from hybrid bush-type plants from crosses between the European hazelnut and the native American hazelnut. Due to genetic variability within plantings there is considerable range in hazelnut size and shell thickness. Current hazelnut post-harvest processing equipment on the market today is designed for European hazelnuts, which poses several problems for WI growers. For one, the equipment is not equipped to handle the variable nut size shell properties of the hybrids and, two, the off-the-shelf equipment is designed for a larger scale of production and is, therefore, cost-prohibitive for the more modest scale of current Midwestern hazelnut production.

The 2008 Wisconsin Hazelnut Growers Survey completed in September 2008 identified 66 WI hazelnut growers with just over 16,000 hazelnut plants. Ongoing survey work has identified another 17 growers in WI with another 9480 plants. The just completed 2010 hazelnut grower's survey identified 127 growers with 66,252 plants in WI, MN, and IA. With no affordable hazelnut processing technology, nuts from these plants are either being sold as in-shell nuts or not processed at all, resulting in significant lost revenue.

In response to requests from WI hazelnut growers for assistance, the University of Wisconsin Hazelnut Research Team in collaboration with the University of Minnesota, Rural Advantage, and Minnesota Hazelnut Foundation organized the 1st Annual Upper Midwest Hazelnut Growers Conference held March 12-13, 2010 in Lacrosse, WI. The first day of the conference focused on the processing bottleneck and included facilitated discussion sessions with growers on the processing issue.

According to growers, suitable small-scale prototype equipment has been developed by Midwestern growers for husking, sorting, and cracking Midwestern hazelnuts. However, each piece of equipment needs additional improvements and, purchased together, are unlikely to be

cost-effective for the majority of hazelnut growers. Despite some success with husking, cracking, and sorting, Midwestern growers have not yet been able to develop small-scale equipment for sorting shells from kernels.

The purpose of this project was to:

- 1. Quantify existing hazelnut production in WI and neighboring states with 1, 3, 5, and 10 year hazelnut production projections.**
- 2. Identify and price existing off-the-shelf and prototype hazelnut processing equipment and determine the suitability for processing Midwestern hazelnuts.**
- 3. Develop a least-cost plan for construction of a mobile, trailer-mounted, post-harvest processing unit capable of husking, cracking, and sorting Midwestern hazelnuts at not less than 1000 lbs/hour.**

B. The Upper Midwest Hazelnut Development Initiative was established in 2007 with the purpose of commercializing a hazelnut industry in the Upper Midwest. The Wisconsin Research Team received funding in 2009 through the SCBGP to develop a plant evaluation and breeding program specific to American hazelnuts (*Corylus americana*) and inter-specific crosses with European hazelnut (*Corylus avellana*). The purpose of that program is to develop improved hazelnut genotypes. This project is intended to meet the needs of growers with production from the hazelnuts already in the ground and producing. Together the projects help to advance the fledgling hazelnut industry in Wisconsin.

II. Project Approach

2010 Hazelnut Grower Survey

Survey work conducted by the Wisconsin Hazelnut Research Team in 2008 identified 66 hazelnut growers with 17,339 living hazelnut plants on roughly 24 acres across the state of Wisconsin (Fischbach, 2009). As the first survey of its kind and no grower organization in place in WI, the survey almost certainly underestimated both the number of growers and number of plants in Wisconsin.

The 2010 Hazelnut Growers' Survey was conducted in an effort to broaden the scope of the 2008 Wisconsin survey to include growers in Iowa and Minnesota. The purpose was to identify the number of growers and living plants, as well as existing and projected nut production. Such information is important toward developing an appropriately scaled hazelnut processing infrastructure.

The 2010 Hazelnut Growers' Survey was developed by the Hazelnut Processing Steering Committee as part of the Upper Midwest Hazelnut Development Initiative. The two page survey was sent by mail to 290 individuals in WI, MN, and Iowa who had previously indicated that they were hazelnut growers or had an interest in growing hazelnuts. These names were taken from mailing lists maintained by UW-Extension, Rural Advantage, the Minnesota Hazelnut Foundation, Dr. Lois Braun, and Forest Agriculture Enterprises. Individuals were asked to return the survey within 3 weeks. In addition, growers were given instructions on how to

complete the survey electronically using the online survey tool, Zoomerang. The survey was also distributed at the 2010 and 2011 Hazelnut Growers' Conferences held in Lacrosse, WI and St. Paul, MN, respectively.

In total there were 65 responses to the 2010 survey, including 28 responses using the online survey option. Only 4 respondents reported having no living hazelnuts. There were also 31 surveys returned as undeliverable for which a new address was not found. As with the 2008 survey, the relatively low response rate of 25% (65/259) was a problem that must be improved upon in future years.

To better quantify the number of growers and number of plants in the Upper Midwest, the data from the 2010 hazelnut growers' survey results were combined with the results from the 2008 survey, internal survey data collected by the Minnesota Hazelnut Foundation in 2009, and grower data collected by Dr. Lois Braun at the University of Minnesota as part of her on-farm hybrid yield evaluation project. Each of these additional data sets includes growers and estimates of number of living plants maintained by each grower. Growers that responded to these other surveys but did not respond to the 2010 survey were compiled with the 2010 survey results to better estimate the number of growers and number of living plants in the Upper Midwest. Jason Fischbach of UW-Extension published: **"Hazelnut Production in the Upper Midwest: Results of the 2010 Regional Hazelnut Growers Survey"**. The report is available for download at: www.midwesthazelnuts.org.

Upper Midwest Hazelnut Producers Processing Guide

In cooperation with the Hazelnut Processing Steering Committee, Jason Fischbach conducted a research project to identify existing and potential processing equipment for the Upper Midwest hazelnut producers. The focus of the research was on appropriately-scaled equipment. The results of the research along with a description of what is involved in hazelnut processing are presented in: **"Processing American and Hybrid Hazelnuts: A Guide for Hazelnut Growers in the Upper Midwest"**. The report is available for viewing and download at: www.midwesthazelnuts.org. As is discussed in the guide, the available equipment at the start of 2011 was minimal with just a handful of early prototype machines. By the end of 2011, there are now four husking options, two cracker options, and some early work on the sorting technology.

Mobile Post-Harvest Processing Unit (MPU)

The original intent of the project was to develop a least-cost engineering plan for a mobile processing unit and look for other funding to actually develop the equipment and build the MPU. To that end the Hazelnut Processing Steering Committee was convened toward implementation of the project. To engineer and build an MPU we needed the essential components (husker, cracker, sorter) and the engineering to make them all work together. After a number of meetings with the Hazelnut Processing Steering Committee it became apparent that as of March 2011 we didn't have any of those components commercially available which meant we had to design or improve each component first. There was larger scale equipment developed for other nut crops, but the purchase price was way beyond what the Committee felt feasible for the scale of production in the Upper Midwest.

The need to develop each component first, created two challenges: 1) There was no way we could pay for the engineering for three main components and an MPU design with only \$20,000, 2) In order to use the grant funding to improve/engineer candidate equipment that would be available in the public domain, such as the Crack M All, the owner would have had to give up ownership rights to that equipment. Understandably, no one was willing to do that.

Also clear from the discussions of the Hazelnut Processing Steering Committee was the immediate need for a low-cost, but effective husker that would separate the husk from the in-shell nut. Such a process could be done in a distributed fashion and would not trigger the food safety regulations involved in processing and handling nut kernels. In addition, there was a husker developed by the Southwest Badger RC&D council that was in the public domain. Thus, the decision was made to scale-back the development objectives and focus on development of a mobile husker that would be available in the public domain.

In April 2011, a request for bids was sent to Jake Myre and John Bashaw, each of which had experience working with hybrid hazelnut processing. The request for bids asked for development of a husking machine with the following specifications:

- Requiring only a single loading of in-husk hazelnuts into the machine. That is, the machine can have automatic recirculation, but not manual recirculation.
- Sized to fit in the bed of a standard ½ ton pick-up truck or be mounted on wheels (or trailer) and capable of being towed on highways.
- Capable of being built with “off-the-shelf” parts or equipment.
- Capable of being built for less than \$10,000 including parts and labor valued at \$35/hr.
- Powered by something other than a power take off unit from a tractor.
- The goal of the redesigned until shall be to meet the additional performance specifications listed below.
 - o Capable of processing a minimum of 500 lbs of dried in-husk hazelnuts per hour.
 - o Capable of removing the husks from the nut such that the finished product shall be in-shell nuts with less than 1% husk or other foreign material as measured by weight.
 - o No more than 2% of the nuts shall be cracked or have scratches or other damage apparent on the surface of the nut.
 - o Capable of producing through screening two size classes of waste husk material: “medium” and “fine”

John Bashaw (Pendragon Fabrications) was the winning bidder and was successful in designing and building the X2000 Hazelnut Husker. The prototype was built and introduced at the Wisconsin Hazelnut Field Day in October 2011. Based on the first testing, modifications were made to the air separation and shaker box. The final drawings and parts list are available at www.midwesthazelnuts.org. The husker was designed and built in three Phases:

- Phase 1: Review existing husking technologies and prepare a feasibility analysis of whether a machine with the desired specifications and construction cost could be built.
- Phase 2: Design the husker and provide technical drawings, parts lists, and cost-estimates for the husker.

- Phase 3: Build and test a prototype of the husker.

Phase 1 was completed for \$2600 and Phase 2 was completed for \$6900. The grant capped expenses for Phase 3 at \$10,000. The final cost for Phase 3 will be around \$15,000. The husker will be able to be built around \$10,000, however, due to the extra engineering costs of building and revising a prototype the cost for the prototype is more expensive. With no additional funding available, Mark Shepard of Forest Agriculture Enterprises offered to pay the additional expenses in exchange for co-ownership of the husker. The details of the co-ownership arrangement of the prototype machine are still being negotiated, but at a minimum, the husker will be available for growers to use in the coming years.

III. Goals and Outcomes Achieved

Objective 1 of this project was met with completion of the 2010 Hazelnut Growers Survey. With collaborative support from researchers in Minnesota and Iowa we were able to identify 127 growers in the three States. Using the survey results we were able to project hazelnut yields as reported in the survey report.

Objective 2 of this project was met with complete of the hazelnut processing guide. The guide provides information to existing and prospective growers about what equipment is currently available.

Resources and available technology limited our ability to fully implement Objective 3 of this project. We were unable to develop plans for a fully integrated mobile hazelnut processing line. However, given the state of the industry we determined the greatest need was a mobile husker available to growers. The husker will allow growers to develop processing “nodes” and use the technology in a trailer.

B. Provide a comparison of actual accomplishment to the goals established for the reporting period.

See Section IIIa above.

IV. Beneficiaries

This project directly benefits the 127 growers identified in the hazelnut survey. The processing and yield projection information can be used by the growers as they build their own hazelnut enterprises. With an estimated yield of 4.2 tons of kernel in 2010 and a projected yield of 6.6 tons of kernel in 2015, there is significant economic potential of processing and selling the hazelnuts. Assuming a raw kernel price of \$8/lb, the aggregate yield for the Upper Midwest has a retail value of approximately \$67,000. The survey results used to calculate these numbers almost certainly under-estimates current production. Regardless, the hazelnuts have zero retail value in the absence of suitable processing technology and this project has helped develop that technology and capacity. More importantly, this project helps growers invest in new plantings as it provides assurance that processing technology exists to help bring the product to market.

V. Lessons Learned

Development of processing technology will be an expensive process going forward. Professional engineering services are expensive and any creation of new technologies requires multiple iterations in the proof-of-concept to prototype process. That said, the cracking and husking challenges have now been met. The next step is development of low-cost sorting technology. With that in place a fully-integrated processing line can be designed and built.

Moving forward, it will be important to facilitate communication between groups of growers working independently to develop processing enterprises. Such sharing of information will help each group be more efficient and successful as they build processing capacity.

The hazelnut growers survey revealed that the existing industry in the Upper Midwest is still fairly limited and consists of a limited number of serious growers with large plantings and a large number of growers “trying” hazelnuts as a supplemental or hobby enterprise. Development of clonal cultivars paired with appropriately-scaled processing technology will be key to allowing the smaller growers to expand and the number of serious growers to increase.

VI. Additional Information

The Upper Midwest Hazelnut Development Initiative (UMHDI) is a collaboration of Universities, NGOs, and growers in the Upper Midwest working to commercialize the emerging hazelnut industry. The information clearinghouse for the UMHDI is the www.midwesthazelnuts.org. The UMHDI is well-positioned to support the fledgling industry, but will require additional resources in the coming years to fully realize the potential of a hazelnut industry in our region.

VII. Contact Info

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20) Wisconsin Grape Growers Association, Wisconsin Organic Advisory Council and Wisconsin Honey Producers

Project Title: Driftwatch – Wisconsin (FY10FB-020)

Total Amount Received: \$20,000

Date of Award: October 25, 2010

Project Contacts: Anna Maenner

Report Date: February 3, 2012

I. Project Summary

Need: The Driftwatch.org Pesticide Sensitive Crop Registry was developed to provide information to pesticide applicators about the location of pesticide sensitive specialty crops and at-risk habitat to help reduce the potential negative impacts of pesticide spray or overspray. The registry assists producers in mapping their fields and identifying their crop type on the publicly accessible website www.driftwarch.org and makes this information available through user friendly Google maps imagery.

The Driftwarch.org Pesticide Sensitive Crop Registry project development is being funded by an Environmental Protection Agency (EPA) Region 5 Supplemental Universal Project Grant of \$127,000. The goal of the project is to expand the geographic area covered by driftwatch.org to all states within US Environmental Protection Agency Region 5 – Wisconsin, Minnesota, Illinois, Michigan, Ohio and Indiana. The project created a unified web site to bring together the pesticide sensitive area data streams from each of the individual state’s producers into a single map display to enable users to search and zoom in to see the sensitive areas mapped over the aerial images anywhere within the six state region.

The EPA funded registry project established a cluster of nodes in a computer network that housed the software and data needed for the multistate Driftwatch.org website. Each state provided its own data steward who was in charge of granting access and maintaining the content of that state’s database.

Purpose: The purpose of this SCBG project component was to fund Wisconsin’s state-specific participation in the six state project. The \$20,000 grant covered the costs of the data steward to manage Wisconsin’s data and paid Wisconsin’s share of the website hosting and maintenance costs.

II. Project Approach

Outreach and Information: The following outreach activities were undertaken to engage producers and pesticide applicators in this voluntary project:

Applicators:

- DATCP's Division of Ag Resource Management (ARM) did outreach to pesticide applicators at 14 commercial pesticide applicator training sessions during the grant period. About 840 applicators attended the 14 training sessions. The training sessions are put on by the UW Pesticide Application Training Program for commercial pesticide applicators and they included information about Driftwatch as part of those training programs.
- ARM sent a letter to all registered pesticide applicators telling them about the Driftwatch site and how to access and utilize it.
- An ARM staff member attended the Wisconsin Crop Production Association and the Wisconsin Potato and Vegetable Growers Association annual meetings. A Driftwatch presentation was made to the participants and a booth was staffed to provide additional information to individuals. About 200 applicators were at the presentations and 10-20 commercial application businesses attended the WPVGA (WPVGA conference is primarily growers, but the applicators who attend are some of the key ones we wanted to reach).

Producers:

- DATCP sent emails to a variety of groups that have pesticide sensitive crops, including grape growers, organic farmers and bee keepers. Although the exact number of emails is unknown, at least eight statewide grower associations were targeted with multiple emails asking them to share with other locally interested parties.
- Informational booths were set up at the 2010 Wisconsin Fruit and Vegetable Growers Association meeting and the Midwest Organic Farming Conference to provide outreach about the purpose of and participation in this voluntary program.

Data steward: The role of the data steward was to intake the information provided by participants to the website. The process required that participants register in order to access the on-line mapping tools. Therefore, the registration information was coupled with the mapped field, allowing the data steward to evaluate each field map in combination with the registration information. The steward reviewed the information to evaluate its validity and accuracy. If there was a question about data validity, the steward checked with the grower or applicator for verification. The data steward edited the fields and entered them into the map. He also responded to questions about the program and provided instructions to the growers on editing their information.

Favorable/Unfavorable developments:

Initially there were problems with the software which delayed implementation by a month or more. This coincided with the initial period when the program was being promoted. Therefore the software problems may have discouraged follow through by some producers at the point of their initial interest.

III. Goals and Outcomes Achieved

Goal: The goal for the entire five-state project was to have 1300 producers register on the site by 12/31/11.

The goal of this grant was to have 200 agriculture applicators register on the site by 12/31/11.

Wisconsin Outcomes by Commodity as of 12/30/2011:

Commodity	Number of Producers Registered	Number of Acres Registered
Beehives	3	--
Certified Organic	17	2,032
Fruits	2	17
Grapes	40	865
Tomatoes	2	5
Organic Crops (not certified)	1	28
Vegetables	1	397
Other	1	35
Organically Raised	1	154
Berries	1	4
Applicators	11	--
Total	80	

Other outcomes:

Number of Fields – 113

Email notifications sent – 2,350

Public website visits - 2,175

Page views (hits) – 7,290

B. There were a number of issues with the structure of the project overall and with Wisconsin's implementation which impacted the level of accomplishments. See comments under "lessons learned." Only 40% of the desired registrants was achieved.

IV. Beneficiaries

80 Growers with pesticide sensitive fields benefitted by providing information about their location that applicators could easily access. Applicators benefited by an easy-to-access source of information on drift sensitive areas. This reduced the likelihood that they would have complaints or other issues and enabled them to plan their applications with this issue in mind. This project is still in the early stages and we anticipate that thousands of WI producers of sensitive crops will eventually benefit from this project. For example, although only 17 organic farmers registered on the site in the first year, Wisconsin has about 1300 organic farmers in the state. 40 of the almost 500 grape growers registered on the site. So there is tremendous potential for this project to have significant economic benefit to the state, although we do not have the means to quantify that economic benefit at this time.

V. Lessons Learned

- Outreach and publicity is critical to getting grower and applicator involvement. Information on the project needed to get to the applicator groups more effectively.
- Some participants were deterred because software problems coincided with the time period when most of the project outreach was underway. If the system didn't work when initially accessed, it is likely that potential participants did not return later to the site.
- The data steward role requires limited time and it should be possible to have someone add that task on to an existing set of responsibilities.
- Email as a method of distributing the information to the producers and applicators did not generate sufficient participation. The distribution lists used may not have captured this group adequately. In addition a mailing should have been done because email does not reach all the producers, especially Wisconsin's organic producers.
- More connections with local industry groups that have contact with both the producers and the applicators may have been useful. For example, demonstrating the project and showing its value at a wider array of industry trade shows may have produced more participation.
- Grower groups could have taken a larger role in publicizing the project and encouraging their producers to sign up. Organic growers were supportive of the project but did not take a major role in encouraging sign-up or in sharing the importance of the database. Wisconsin has almost 1400 certified organic producers yet only 17 registered on the site. However, many are suspicious of "the government" so their participation would likely have been increased with more push from the statewide organic organization and even certifying agencies.
- Since participation is strictly voluntary, it may be difficult to generate the needed motivation for farmers to enroll their fields. Until their crop is threatened some farmers will not see the importance of participation.
- While we were disappointed in the number of registered participants, this project is still in its infancy. This grant helped us determine what steps need to be taken in order to get growers and applicators to participate in the program. It is believed that this project is worthwhile and with additional outreach and assistance from grower groups and applicator organizations, Driftwatch will be a success.

VI. Additional Information

www.driftwatch.org

VIII. Contact Info

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21) WI DATCP – Division of Agricultural Development

Project Title: SavorWisconsin.com (FY10FB-021)

Total Amount Received: \$19,999.96

Date of Award: October 25, 2010

Project Contacts: Lois Federman

Report Date: June 19, 2013

I. Project Summary

The SavorWisconsin.com project was designed to drive greater traffic to the site to help increase awareness of and sales for the Wisconsin Specialty Crop producers listed on the site. The project built on the effectiveness of SavorWisconsin.com to increase producer listings and consumer traffic. By developing a comprehensive marketing plan utilizing both online and offline tactics, this project increased both consumer awareness of Wisconsin's specialty crops and the number of producers listed on the site.

Thanks to the support of the Specialty Crop Block Grant, the SavorWisconsin.com website has been in existence supporting Wisconsin's specialty crop producers for nearly a decade. The previous Specialty Crop Block Grant funding of SavorWisconsin.com focused on providing a web presence for producers who didn't have time, technology, or funds to have their own sites. While the site was marketed to consumers, emphasis was placed on recruiting new producers and creating the most up to date web technology and site infrastructure to promote local specialty crop farms to consumers. This Specialty Crop grant focused on marketing the site to consumers, allowing the team to extend outreach to through new trade shows and events; generate offline advertising through radio and print mediums; and implement changes to make the site secure and functional. Some emphasis was placed on beginning social media campaigns and more focused marketing of specific specialty crops.

II. Project Approach

The FY10 SCBG funds were utilized to achieve the goals outlined in the grant application. These funds were critical for expanding the site's reach and relevance to specialty crop producers.

Increased Site Traffic

During the grant period, site traffic received the highest annual page view rate since the site's inception. In 2010, the site received almost 1.4 million page views, surpassing the 1.3 million

SCGB target. This strong increase can be attributed in part to the social media tactics implemented throughout the grant period. Users can now easily click on a “share this” button, which allows them to share a link to that SavorWisconsin.com page on social networking sites such as Facebook. Since launching this feature, visitors have been sharing links an average of 100 links per month, exactly reaching the SCGB goal.

Site traffic was further impacted by offline marketing tactics including trade show attendance and distributing SavorWisconsin.com print materials at consumer focused agricultural events such as the Wisconsin State Fair.

The 2013 grant extension allowed DATCP to implement greater offline integrated marketing activities. In December, the SavorWisconsin.com team conducted a three tiered promotional push supporting Wisconsin’s Christmas tree and nursery industries. The following promotional tactics resulted in increased searches for “Christmas trees” on the site:

- 1) A statewide WI public radio promotion. This included 26 mentions primarily during key drive times from 12/5-12/22. Copy stated *“Supporters of Wisconsin Public Radio include - - Savor Wisconsin dot com. An online online directory of Wisconsin agricultural and food products. Featuring over 100 Christmas trees and holiday greenery listings. On the web at Savor Wisconsin dot com.”*
- 2) DATCP Launched press release, first week of December. The press release asked people to visit SavorWisconsin.com to find holiday greenery and Wisconsin grown Christmas trees.
- 3) Christmas tree feature, changed first week of December. The home page of SavorWisconsin.com was changed to include information about Wisconsin Christmas trees including a special link to search for trees.

Given the impact of the Christmas tree promotions, the team has extended this promotional strategy into 2013. New site feature stories and statewide press releases were launched in February and March to promote Wisconsin Potatoes and fruits and vegetables grown for community supported agriculture programs.

Goal 2: Increase the number of specialty crop producer listings.

The number of specialty crop producers listed on the site totals just over 1,800, showing continued increases over the prior year. These increases can be attributed to outreach with Specialty Crop groups and attendance at trade shows and other agricultural events. SavorWisconsin.com promotional materials were distributed at over 10 such events, reaching over 160,000 attendees.

Given that 2013 represents 10 years of online existence for the SavorWisconsin.com website, the team is evaluating its overall effectiveness. In early 2013, the team launched a brief survey to specialty crop producers listed on the site. The goal of the survey is to better understand the specialty crop producers using the site and identify the best ways for improving the site. Results will inform our next steps for 2013 activities and beyond.

While SavorWisconsin.com did include 10% to 20% non-specialty crop producers listed on the site over the course of this grant, funds were used solely to enhance sales of specialty crops. To

ensure this, 50% of the expenses of this project were funded through other sources, enough for the non-specialty crop portion of each expense to more than adequately be funded by non-specialty crop money.

III. Goals and Outcomes Achieved

Goals/Benchmarks

1. Increase site traffic: increase page views by 10% to 1.3 million per year
2. Increase number of specialty crop listings to 1,705 in 2012
3. Provide monthly features
4. Achieve 100 social sharing links per month

In 2010, the site received almost 1.4 million page views, surpassing the 1.3 million SCGB target. This strong increase can be attributed in part to the social media tactics implemented throughout the grant period. Users can click on a button, allowing them to share a link from SavorWisconsin.com to social networking sites such as Facebook. Since launching this feature, visitors have been sharing links an average of 100 links per month, exactly reaching the SCGB goal.

Traffic was further increased by launching both online and offline integrated marketing activities. In December, 2012, the SavorWisconsin.com team conducted a three-tiered promotional push supporting key specialty crop industries. By utilizing radio promotions, press releases and online feature stories greater traffic was generated for key industries.

Specialty crop producer listings on the site increased to just over 1,800, showing continued increases over the prior year. The increases are due to targeted outreach activities such as attendance at trade shows and other agricultural events. The SavorWisconsin.com website, while focused on specialty crop producers does contain listings from non-specialty crop producers. At the beginning of this project, 80% of the site's producer listings were specialty crop producers. This increased to 90% during 2012. To ensure Specialty Crop Block Grant funds were only spent on specialty crops, 50% of project costs were paid for through other funding sources.

B.

Item	Goal	Actual
Increase Traffic	1.3 million	1.4 million
Producer Listings	1,700	1,851
Monthly Features	1 per month	2013 Calendar; 3 Implemented to date*
Social Sharing Links	100 per month	On average 100/month

**The goal of generating 1 feature per month during the grant period was delayed until 2013 due to staff transitions and workload capacity constraints. This issue shall be rectified in 2013 with the. A calendar of proposed 2013 feature stories has been created, the team Public Information Officer has dedicated time and talent to author these stories and the sister press release each*

month. Do to the success of the first features, we hope to focus much of the 2011 SavorWisconsin.com project on these stories.

IV. Beneficiaries

The SavorWisconsin.com website has broad impact and supports producers in all WI Specialty Crop industries including 1800 producers listed on the site. Through features and offline promotional activities, emphasis has been placed on the following industries: Christmas trees, nursery growers, fresh market vegetables, cranberry, berry & fruit growers, and potatoes.

V. Lessons Learned

Offline (traditional) marketing tactics can effect what people search for on the SavorWisconsin.com website. The December 2012 radio promotion and press release generated greater searches for Christmas trees on the site. However, it is unclear whether these activities greatly impacted site traffic. Research on the site analytics showed the power of blogs. One of the greatest referring sites was a food blogger. Future tactics may include finding partners in food bloggers.

Also critical to the success of the site is having dedicated staff. Due to transitions within the department and a loss of the SavorWisconsin.com project manager, some of the proposed activities for the site were delayed. Having a consistent presence is critical for evaluating the site's performance, continuing promotional activities, and managing site updates.

VI. Additional Information

SavorWisconsin.com feature page: http://www.savorwisconsin.com/product_feature/default.aspx

Example of Specialty Crop article due to Press Release:

<http://walworthcountytoday.com/news/2012/dec/05/statewide-website-helps-track-down-christmas-trees/>

VII. Contact Info

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22) Wisconsin Nursery Association, Inc.

Project Title: Putatively invasive plant taxa survey of Wisconsin nursery growers (FY10FB-022)

Total Amount Received: \$14,700

Date of Award: October 25, 2010

Project Contacts: Brian Swingle

Report Date: December 20, 2011

I. Project Summary

Goal #1 – Provide critical information to the Species Assessment Groups (SAGs) about the amount of economic value contributed to the industry and state economy by 63 species currently on a watch list. It is critical for parties responsible for determining policy to know what impact their actions will have on the sector of the industry which is being impacted. Their actions can be just as devastating to the economic health of the individual growers and the industry as the biological impacts of the organisms themselves to cultivated and natural ecosystems. The SAGs have stalled in moving forward because of a lack of economic impact data. Enabling the SAGs to move forward in determining the appropriate status of species on the previously compiled watch list will remove the uncertainty growers have faced in determining their crop offerings. The survey information will be available for the upcoming round of SAG meetings (Fall 2011 and Winter 2012). The publishing of the findings will help growers plan their 2012 liner and other plant orders which are commonly placed beginning in late autumn. Additional comments from the respondents on their observations of the behavior of the species of interest broken down by geographic region within the state will assist the SAGs in determining if it may be appropriate to have different rules for the various regions. For example, in the north where fewer plants grow, some taxa that may not be invasive under those conditions could be excluded from restrictions placed in areas more hospitable to general plant growth,

II. Project Approach

Surveys were compiled by Dr. Wiegrefe, reviewed by representatives of the SAGs, and mailed to 720 nurseries on record as growers with the Wisconsin Department of Agriculture, Trade and Consumer Protection (WI-DATCP). A conference call was coordinated by Brian Swingle, WNA Executive Director, to enable the SAG members and active members of the Wisconsin Nursery Association (WNA) to advise and respond to questions by the Project Coordinator, Susan Wiegrefe. The printing and posting were coordinated by Brian Swingle using files compiled and submitted by Susan Wiegrefe. The surveys were posted in early February with a March 7th return deadline. This was a busy time for some nurseries and others had reduced staffing during

the period both resulting in difficulties in follow-up efforts. Survey results were compiled by Wiegrefe and preliminary data were available in June and the final survey summary was completed in September.

The survey results compiled by Dr. Wiegrefe are contained in the attached reports/spreadsheets. This is the data reported to the WDNR Species Assessment Groups and utilized in the assessment of possible invasive species in meetings on February 13 and 14, 2012.

The preliminary data that was available in June is attached as a pdf titled SCBG.pdf, and Word doc. titled Report-Overall Survey Response. This information was asked for by WNA of Dr. Wiegrefe to provide an update of the progress to date to the WDNR and the Species Assessment Groups in an initial meeting to decide what plants would be assessed in 2012.

The reports attached were shared with the WDNR Invasive species program staff, the NR 40 administrative code revision Species Assessment Groups, the WI Governor's Council on Invasive species, and incorporated by the WDNR staff in the plant profiles of each plant being assessed for NR40, that was provided to the Species Assessment Groups.

III. Goals and Outcomes Achieved

The surveys were mailed to 720 nurseries on record with the WI-DATCP. Issues with mailing addresses such as out of business, no valid address, no mail receptacle at address, etc. reduced the pool to 654. In order to increase the response rate from the original 214 returned surveys, telephone and/or email follow-up contact was made with 20 of the largest nurseries not responding. Late submissions, some from follow-up contacts, brought the return rate to 36% (235surveys).

The survey provides estimates of both annual sales and the value of crops in production for 63 taxa. The survey also collected data from the growers on taxa that they had observed to be less invasive than the straight species. This may help prevent rulings that paint with too broad a brush and exclude acceptable taxa belonging to a generally invasive species. The responses were carefully segregated by their geographic region to enable evaluation of differential invasiveness.

B. Our goal had been to obtain at least 50% response. In reviewing the returned surveys it was determined that although we received only 36%, a disproportionate number of larger nurseries had responded and the majority of the economic impact had been measured. Many of the nurseries not responding were part-time operations with no outside employees.

One disappointment was the number of nurseries choosing not to disclose their Gross Annual Sales. Since this is used in the calculations of total dollar impact, the data is not as complete as we had desired.

IV. Beneficiaries

The SAGs are better informed as a result of the survey and are able to move forward in their decision making process. They also have data, which will be made public (with protection of individual financial data) with which to support their decisions if/when challenged by growers. Decisions regarding some taxa will be made much easier since it is apparent some taxa contribute very little to the economic health of the industry.

Once the SAGs complete their next cycle of evaluations, the growers will be better informed as they plan their future crops and marketing. Previously some nurseries lost sales as they anticipated restrictions, while others capitalized on the void the first group left.

V. Lessons Learned

- The original time frame was adjusted at a couple of junctures – one major one out of realization of the actual dates when the SAGs would need the information and other times due to illness and other unavoidable time conflicts. We may have had better response rate if we had adhered to our original plan to distribute the surveys prior to Christmas 2010.
- At the onset of the project it was not planned to be able to divide up the responses by geographic area. Having the ability to analyze the response by region will enable a more nuanced policy if desired or practical.
- Some respondents may not have understood the categories of invasiveness we chose to include as multiple choice options. The inclusion of free-form comments may have enabled us to compensate for this potentially confusing/erroneous data.
- It remains to be seen what weighting the economic data will receive relative to the biological invasiveness assessments in the species assessment process.
- Because of the electronic nature of the data files compiled and submitted, many additional sorting and searching options will be possible that were not part of the original deliverables planned.

VI. Additional Information

The findings will be published to members of WNA, DATCP and WDNR once it is determined what information is most useful and confidentiality is ensured.

VII. Contact Info

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23) Midwest Pickle Association

Project Title: Optimizing calcium rates for pickles (FY10FB-023)

Total Amount Received: \$7,720

Date of Award: October 25, 2010

Project Contacts: Janine Christensen

Report Date: January 30, 2012

I. Project Summary

Pickling cucumbers have been grown in Wisconsin for decades. Starting out with small individually planted and hand-picked plots throughout the state to the current thousands of acres machine harvested on farms located primarily in the central sands. Although we have had pickles in Wisconsin for so long there has been very little studied on the effects and efficient use of nutrients that are essential to the plant. The UW extension service gives out general recommendations for the macronutrients of Nitrogen, Phosphorus and Potassium but does not have recommendations for the secondary macronutrients and micronutrients. The focus of this study is to look at one of the most important secondary macronutrients which is calcium and define a recommended amount that should be applied as well as correct timing of application on less than 2 percent organic soils.

II. Project Approach

The trial was planted on July 8 by Dan Trzebiatowski. Each entry was 5 rows wide on 30" rows and 50' long. There were 10' aisle ways in between the four blocks of entries. The first application of calcium was applied on July 8. The randomized complete block trial was set up so that a 10% calcium product was applied at 3 different timings at 4 different rates. The first, early application was applied the day of planting. The rates were 15, 30, 45, and 60 pounds of active ingredient per acre. A split application at those total rates was also applied on the day of planting. Then the second application was made on August 3 which consisted of the other half of the split application rate and the set of full rates. All applications were done by Hanson and Assoc. Hanson and Assoc also took chlorophyll readings on the leaves on July 28 as well as took leaf samples to get analyzed at the UW Plant Analysis Lab. A soil sample was taken at the start of the trial to give us the base line on calcium in the soil.

The trial was harvested on August 23 by Dan Trzebiatowski. The 3 middle rows of each entry were harvested by a Pik Rite harvester and loaded into plastic tote bins. The next day each entry was graded at Yeska Bros. grading shed and the total pounds of each sized pickle was weighed. A sample of 3 3A sized pickles was taken from each entry to have a calcium analysis done. A separate sample of 5 3A pickles was taken and put into a brine tank.

On October 24 the pickles that were put in the brine tank were taken out and a Magnus Taylor Pressure Tester was used to take readings on the firmness of the brined product. These readings did not show a significant difference between the different Ca amounts and timings used.

Statistical analyses of the data collected was performed at two levels of probability that the responses observed was reproducible rather than random. These probabilities were $p = 0.05$ and $p = 0.10$. The $p = 0.05$ is the standard for scientific purposes. The $p = 0.10$ is the standard accepted by DATCP for proof of product efficacy.

The data collected totaled 143 observations of factors such as total cucumber yield per plot, weights of cucumber grades, and plant chlorophyll indices. At $p = 0.10$, there were 19 significant responses to the calcium applications. This equates to a 13.3% response rate. This is a very high response rate in view of the fact that the soil at the test site contained 100 ppm more than what is considered adequate by the UW (Table 8.4, UWEX Pub. A2809).

The significant responses observed were not consistent for any given calcium treatment, but indications were that pre-emergence application was as or more effective than the split or mid-season applications. The data further indicated that on this soil responses were largely confined to calcium application rates or 30 lb/a or less. This would likely not be true for soils with calcium levels at or below the UWEX adequacy level of 401 to 600 ppm.

While by no means conclusive, the results of this field trial suggest that further investigation of the efficacy of calcium applications on cucumbers grown on sandy soils is warranted. But it is vital that any future trials be conducted on a soil or soils with less than adequate levels of exchangeable Ca. There does not appear to be any merit in applying the Ca in these trials at any time other than pre-emergence while the range in rates of application used in the current trial should be continued.

III. Goals and Outcomes Achieved

The significant responses observed were not consistent for any given calcium treatment, but indications were that pre-emergence application was as or more effective than the split or mid-season applications. The data further indicated that on this soil responses were largely confined to calcium application rates or 30 lb/a or less. This would likely not be true for soils with calcium levels at or below the UWEX adequacy level of 401 to 600 ppm.

B. It was established that if using a straight Ca product that a rate of 15 or 30 pounds of active ingredient at planting will benefit them the most on soils that have a adequate level of Ca already in the soil. This will help us to establish how to do the second year of testing.

The initial findings of the study were distributed to all the attendees of the pickling cucumber session at the Great Lakes Fruit and Vegetable Expo in Grand Rapids, MI as well as all members of the Midwest Pickle Association. All Wisconsin pickle growers did receive the initial results as well as a good percentage of MI growers. We received grant money to do a second year of

study so we hope to have better defined recommendations after this second year to publish with the Pickle Packers International and Vegetable Grower News.

We had also hoped that the results would show a consistent, better quality product that could bring a higher price. At this point we have not proved that. Year two will help us establish if Ca will provide a consistently better product.

IV. Beneficiaries

A presentation of initial results was given to the attendees of the Great Lakes Fruit and Vegetable Expo in Grand Rapids, MI which was also the Midwest Pickle Association annual meeting location. The initial results will help all cucumber growers start to understand that using straight Ca product will benefit them greatest by applying it at the planting stage verses later in season on soils that have adequate Ca already in the soil. Pickling cucumbers are an important crop to the state of Wisconsin as well as the Midwest. In 2011 Wisconsin harvested 5600 acres of pickling cucumbers producing 1,227,520 bushels for a value of \$7,151,000. In Michigan they harvested 31,600 acres of pickling cucumbers producing 7,078,400 bushels for a value of \$45,125,000. We are excited to continue this project through a 2011 SCBG where 2 years of results should yield more meaningful results to this economically important industry.

V. Lessons Learned

Soil sample results need to be done ahead of determining which field is used for the trial next year so the Ca levels in the field chosen are low helping the Ca treatments have a higher impact on the results. We feel that is why the results were not strong this year.

Another thought is that in the year to come we will trial multiple Ca sources that are paired with Nitrogen (N) since we think the N will help the uptake of the calcium so the plant uses the Ca faster. Our problem will be to analysis the results with two different components that could both contribute to the positive results.

VI. Additional Information





VII. Contact Info

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24) WI DATCP – Division of Agricultural Development

Project Title: Specialty Crop Grants Specialist

Total Amount Received: \$53,500

Date of Award: October 25, 2010

Project Contacts: Jen Pino-Gallagher

Report Date: January 31, 2013

I. Project Summary

The purpose of this project was to facilitate the efficient distribution of funds and the timely review and oversight of the projects funded under the SCBG. This program provided important funding to improve the profitability of Wisconsin's specialty crop industry. The Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP) provides the staffing resources that facilitate the distribution of these funds to this state. Department staff provide outreach on the program, review submitted proposals, prepare the application for USDA, develop contracts and administer the grants. In addition DATCP staff provide oversight of the program and reports to USDA.

When the SCBG program first provided funding to Wisconsin in 2007, paperwork and reporting were handled by state-funded staff. However, during the 2007-2008 years, the workload associated with the grant review, tracking and reporting significantly increased. Each industry grant lasted two-to-three years, and as each additional grant cycle was added, the number of grants to be tracked increased. More importantly, the 2008 Farm Bill established a significantly larger SCBG appropriation for 2009 through 2012 that allotted several times what the funds had been in past years. This increased the average number of awards from 7-9 annually to about 20 annual awards. The program quickly became something no longer manageable with current DATCP staffing. It was clear that in order to accept the SCBG funds that greatly benefit Wisconsin's specialty crop industries, a dedicated staff member was needed to administer the program. Since the 10% allowed by the USDA for overhead is not allocated to the managing division, we needed a grant to pay for the SCBG Manager position.

The 2009 Specialty Crop Block Grant originally funded this position from January, 2010 through mid-August 2011. It was extremely successful, increasing awareness of the program, increasing quality of applications, and increasing compliance/quality of reports and program evaluations by individual grant recipients. Without funding from the SCBG program for a grant administrator, this program could not be managed and WIDATCP would have to forfeit our state's share of the funds.

II. Project Approach

Plan of Work activities: Evaluate systems for tracking reimbursements, gathering report information and project evaluations: We explored the possibility of purchasing grant management software. We researched a few options but just did not have the funds in the budget for any official purchased software. The current system of Excel spreadsheets and Outlook task features seems to be working just fine. The most desired piece of grant management would actually be an on-line grant application form that could keep applicants from adding extra pages, using different tables/charts, and changing the grant application format currently used. We are working with our IT staff to and hope to be able to implement an on-line application form for our 2014 competitive process. Hopefully as more companies offer products, grant management software will become cheaper and we will be able to afford a more efficient system. Until then we'll stick to Excel and Outlook.

Conduct competitive grant process including evaluation and changes for next grant cycle and Conduct 3 - 4 SCBG proposal development workshops: We completed the 2012 competitive process and contracted 18 sub-recipients for the 2012 SCBG program. We executed 4 general grant writing workshops in October and November 2011 to promote the SCBG program as one of several state and federal grant programs being offered along with general grant writing tips to agricultural entities. A grant writing workshop was held specifically for Specialty Crop Block Grant Proposals with the hopes of strengthening proposals from smaller grower groups who could not afford to pay a grant writer to assist them with their applications. The 2012 RFP was released at the end of 2011 with a proposal due date of 4/2/12. Outreach to underserved groups was conducted through email and direct contact with agencies. SCBG priorities were created by soliciting Wisconsin grower groups and other entities who had an interest in specialty crop industries. It was our intention to move the priorities closer to direct alignment with the current USDA SCBG priorities and our state's specialty crop interests supported this move. We recruited the 2012 SCBG competitive process review panel which consisted of 5 long-term members of specialty crop industries who were not directly tied to 2012 proposals. We had hoped to keep one or two of the 2011 reviewers and add three to four new reviewers, but since we did not budget to pay the reviewers, one year was all they could give of their time voluntarily. We were pleased with this year's panel and will try to implement a small stipend with the 2014 review process. The new priorities helped to increase the types of applicants with some new private and non-profit entities applying for projects related to strengthening local food systems and farm to school projects. The vast majority of our projects did remain research-based but it was nice to have a few more projects in other categories other states have had for a few years. We felt the quality of proposals was greater than the two previous years and we only had one applicant submit an ineligible project, a huge improvement since the first competitive process in 2009! We feel the number of projects awarded is manageable and represents the broad array of specialty crops grown in Wisconsin. Our largest specialty crop producer groups still receive the largest percentage of the awards but we have made strides to help our state's fledgling crops and smaller producer groups advance as well.

Promote SCBG program at industry field days, conferences, and through individual contact: The SCBG Manager attended three conferences, the WI Fresh Fruit and Vegetable Conference, the WI Farm to School Summit, and the Midwest Local Foods Summit, all in January 2012. At

the Fresh Fruit and Vegetable conference, updates or final reports for 16 different specialty crop block grant projects were presented to growers. This included:

- 09-001 Potato Pathogens
- 09-003 Aster Yellows
- 09-004 Potato Systems
- 09-005 Apple Grower's Farm Fresh
- 09-016 Buy Local, Buy Safely
- 10-001 Potato Sugar End Defect
- 10-002 Potato Fumigants
- 10-003 Potato Drip Irrigation
- 10-006 Grape Market Expansion
- 10-009 GAP/GHP Cost Share
- 10-010 Cranberry Sustainability
- 10-012 Cold Hardy Grapes
- 10-013 Nitrogen use in Sweet Corn
- 10-017 Seedless Table Grapes
- 10-020 Driftwatch
- 11-012 UWRF Fruit Breeding

Most of the reports included handouts, booklets, or web addresses where growers could find recommendations for utilizing the project results. The potato and vegetable projects and grape-related projects seemed to have the most interest. The audience members had many questions and related anecdotes of their own experiences, and asked advice on their own situations. The apple and grape grower's associations seemed to have the most active members who were truly driving the work of their associations and seemed the most vocal in driving their associations' grant applications. The berry growers were the smallest group in attendance and have diverse needs due to diverse crops within the grower association.

Attendance at the other two events was to promote the Specialty Crop Block Grant program to groups who did not previously fit into the grant priorities. These groups have no prior history with this program since our state has mostly focused on research projects and did not include projects promoting local food systems or nutrition education. Contacts made during these two events helped to yield two successfully funded projects, both with increasing local foods priorities and one with an additional farm to school priority (2012FB 12-02 Wisconsin Harvest Medley and 12-004 Expanding the Market for CSA Shares in Southern Wisconsin).

Attendance at field days included:

- WI Cranberry Growers Association Field Day
- WI Potato and Vegetable Growers Field Day
- University of WI – Hancock Research Field Day
- WI Ginseng Growers Field
- Wisconsin Hazelnut Field Day
- Fresh Market Vegetable Growers Field Day
- WI Green Industry Field Day

The WI Cranberry Growers seem to have the strongest connection to their members and members seem the most appreciative of the work the association does. Much of the cranberry research projects are done on cooperator fields rather than institutional property and the growers seem very invested in the projects. Although I do not know how many attended the event I would guess over 100. It had the highest attendance of any field day. The WI Potato and Vegetable Growers also have a strong association and growers are still very interested in results of projects. Their field days probably had 75 or more people per event. This was my third year of attending the ginseng field day. Wisconsin has a very large population of Hmong ginseng growers. It was nice to see more Hmong growers at this year's event. DATCP's Hmong interpreter attended and Hmong growers asked questions. The ginseng growers seem to be making more strides to apply the results of the research too. The new social media outlets they are employing to help growers implement new practices seem to be working. This year's field day had even higher attendance than last year. I would guess around 50 growers were there. The Hazelnut field day was the most impressive. For such a fledgling organization they had good attendance with maybe 50 to 70 people. It was extremely well organized and presented on a level where everyone seemed to feel comfortable asking questions and relating their own personal experience. They demonstrated the new machine their 2010 SCBG funded as well as a few other new machines used for husking, cracking or shelling. Participants were extremely interested and eager to move their organization as well as their industry forward.

A trip to state fair to meet with another 6 grower groups helped increase our rapport with members of these groups to help each group find ways to articulate their needs in SCBG projects. This is a great place to meet with grower groups because many of the organizations who apply for the grants have a booth at the fair. It allows us to hit the most people in one location at one time and is especially beneficial because it allows us to interact with our smaller grower and producer organizations, many of whom are struggling in their attempts to receive SC grants. Some of the most beneficial outcomes were from talking with members of the WI Honey Producers Association who had a 2010 grant and will probably reapply in 2013. This meeting with the Maple Syrup Producers led to them hiring a grant writer for the 2012 round of Specialty Crop Grants. Conversations with the Executive Directors of the Apple Growers and Christmas Tree Producers helped to touch base and see how current projects were progressing. It was also nice to meet other members of their organizations and see how they work together and relate to the Executive Directors. Touching base with the Cranberry Producers and Grape Growers expanded my connections to new board members and helped build our relationship and gain other perspectives on the SCBG program. This and the Fresh Fruit and Vegetable Conference are probably the two most valuable functions attended this during this grant period.

We are anticipating an even better application process in 2013 with an increased number of appropriate applications. This will unfortunately also increase the number of rejected proposals as Wisconsin continues to fall in the specialty crop cash receipt standing among other states but we will continue to work with groups to help them improve the specialty crop industries in the state.

Evaluate effective outreach activities and recommend changes to make more effective: Because our new 2012 funding priorities included funding projects to expand local markets and to educate the public on health and nutrition aspects of consuming more specialty crops, we were able to open our outreach efforts to many more groups across the state. Some examples include:

- Meeting with the Wisconsin Farm to School Advisory Council and Farm to School Strategic Planning Committee to help brainstorm ideas of projects which would make strong proposals
- Attending the WI Farm to School Summit and Midwest Local Foods Summit
- Promoting the program at the Buy Local Roadshow workshops and webinars hosted by WDATCP staff

We have also worked to promote the grants to underserved populations of growers. We worked with other government staff to promote the project to Native American tribal governments in the state and have worked directly with grant writers from the Oneida Nation but these groups are frustrated with the classifications of “specialty crops” and have had difficulty finding a fundable project to meet their own priorities. We have had the most success with programs run by our own department that are specifically targeting underserved growers but we would prefer to collaborate with other agencies to fund projects rather than fund our own department’s projects. We are having better luck making direct contact with organizations who serve these groups which leads to better applications more likely to be funded.

We have also put efforts into meeting directly with Grower Association Boards for some of our state’s smaller grower groups to help them determine project ideas more likely to be funded and to review their applications to help them strengthen their proposals. We offer these services to anyone eligible to apply for a SCBG but we have focused on promoting these services to groups who have been less successful in receiving funding and to groups focusing on our lesser-funded priorities.

III. Goals and Outcomes Achieved

Goal 1: A primary goal for this position will be to maintain a comprehensive database to use for tracking the SCBG awards, reports, reimbursements and evaluations. Tracking this information in one electronic and physical location, having one person responsible for the collection and recording of the Specialty Crop Block Grant requirements will continue to enable DATCP to better monitor, evaluate, and streamline the program.

Outcome Measure: Streamlining the tracking process will be measured through time sheet activity records, amount of time spent on non-tracking related SCBG activities such as number of engagements attended, and an increase in number of applications submitted for each year’s competitive grant process.

Benchmark: *Currently 56 grants are being managed by the SCBG Manager taking up 85% of her time.*

Target: *By July, 2012, grant evaluation and tracking will comprise only 70% of the SCBG Manager's time.*

While this target achievement is an estimated number, I am confident in saying that time spent on administrative duties was reduced to only 65% of time spent on the SCBG program. Contacts made with other state grant administrators on program improvements their states are implementing, increased time spent on site visits, conferences and other outreach activities including creating materials for grant workshops, recruiting application reviewers, meeting with perspective applicants and networking with other DATCP staff, government agency staff and organization staff and volunteers who can promote the SCBG program to their clients has increased by 20%.

Goal 2: Increase awareness of the specialty crop block grant program. This will be accomplished through grant writing workshops, promotion of SCBG program at specialty crop industry field days and events, and through other industry communications and personal interactions.

Outcome Measure: Success will be measured by increased offerings in SCBG promotional activities and increased attendance at these programs.

Benchmark: in 2010/early 2011 SCBG Manager attended 3 conferences, 2 field days and put on 2 SCBG application writing workshops.

Target: by July 31, 2012, the SCBG Manager will have increased these contacts to 10 per year.

From August 1, 2011 through July 31, 2013, the SCBG Manager attended 3 conferences, 7 field days, and Wisconsin State Fair. Five grant writing workshops were held to promote the SCBG program including one workshop specifically devoted to help applicants with writing their SCBG applications. Meetings were held with the three WI growers associations to help them make decisions on projects for applications. Many more contacts were made to provide promotional materials on the grant program to be disseminated at other food safety, farm to school, and buy local initiative events. We exceeded this goal by three meetings and are pleased with the results of our outreach efforts.

IV. Beneficiaries

This project has benefited all Wisconsin specialty crop producers. Without this project, the WDATCP would not be able to effectively manage this grant program and might choose not to accept the funds which benefit so many specialty crop producers and processors in our state. Even if we did accept the funds, no outreach efforts would be conducted so only those who were previously aware of the grants would benefit. In particular, Wisconsin's smaller grower associations, underserved producers and processors, and organizations interested in nutrition education and buy local initiatives have benefitted from outreach efforts to expand the grant

priorities. This has helped diversify Wisconsin's Specialty Crop Block Grant recipients and is helping to strengthen some of our smaller specialty crop industries, adding value to farms' products. The program has also helped sub-recipients disseminate their project results so more producers and processors can take advantage of practices and procedures recommended from project results. Wisconsin's citizens have also benefited from this project because many of the sub-recipients have developed practices, procedures, and industry innovations that protect environmental resources, educate the public on healthy eating, or increase the safety of the food citizens eat. Without this Grants Manager project, most of the great things the Specialty Crop Block Grant program does, would not take place in the state of Wisconsin. We are extremely appreciative of the opportunity for us manage this program in a way that directly benefits our farmers and our citizens.

V. Lessons Learned

When the 2010 grants were set up, it was determined that for ease of management, the grants would only be given for a 1 year period. This proved difficult for the recipients, particularly for the research grants which made up 66% of the 2010 funding. For the 2012 grant cycle we reinstated the three-year grant cycle so applicants could take up to three years to complete their projects. This actually increased our efficiency in managing our projects because it kept recipients from reapply for the same project over again, confusing them on reports, timelines, and other administrative factors that took up the Grant Manager's valuable time.

While we have strengthened our relationships with longer-term repeat recipients, we still continue to struggle with some grantees to receive their reports on time or with enough information. It seems the obvious answer to this problem is to terminate their grants or disallow for future grants but their inability to write reports for our grant seems inversely proportioned to their ability to carry out fantastic projects with great outreach for project results with their grower groups. As we move forward with our 2011 grant for this project, we will continue to explore new tactics for getting what we need from recipients without jeopardizing their ability to implement some of the most effective uses of SCBG funds.

VI. Additional Information

None

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25) University of Wisconsin – Madison, Center for Integrated Agricultural Systems

Project Title: Perennial Fruiting Systems for a Sustainable Future

Total Amount Received: \$10,000

Date of Award: July 9, 2012

Project Contacts: Michelle Miller, UW-CIAS
Dale Secher, fruit grower/breeder

Report Date: September 30, 2013

I. Project Summary

The purpose of the project was to create a website (uncommonfruit.cias.wisc.edu) to share information regarding perennial fruiting systems, and specifically the results of Dale D. Secher's long-term, on-farm research on uncommon fruit varieties. The issue addressed was the need for an ecologically-based, diversified food supply system that reduces waste and consumption of non-renewable resources while benefitting farmers and the community. This is an important and timely issue; monocultural practices and the annual disturbance of soil structure and microbial activity is decreasing soil fertility and microbial balance. Agricultural diversification promotes resilience and sustainability, and helps farmers contend with economic and climactic variability.

II. Project Approach

The primary activity performed during the grant period was dissemination of information in a user-friendly, comprehensive manner through an easily accessible website. Core information is from on-farm research conducted by Dale Secher, and reflects ten years of experience observing over 54 perennial fruiting plants for possible inclusion into an ecologically based system. Design, editing and construction of the website were facilitated by co-coordinator Cris Carusi at CIAS.

The website features posts describing 54 species or sub-species and 140 cultivars observed in the Carandale test plots. Each post includes photos from Carandale's research plots showing nearly all of the fruit cultivars during different stages of production. The website is organized by fruit type (Prunus, Ribes and other uncommon fruits) and is fully searchable.

The most significant result of this work is a performance-based tool that can be used as a basis for custom designing an integrated cropping system for site-specific conditions.

III. Goals and Outcomes Achieved

We completed the following activities to achieve our goals and outcomes:

- **Determine site hosting, technical needs, usability considerations, design and maintenance plan.** This work was completed in the fall of 2012, with ongoing adjustments to our plan throughout the site's development. We opted to host the site at the University of Wisconsin Madison and develop the site using the Wordpress publishing platform. We kept site design as simple as possible in order for farmers and other users to quickly access the information they need. We developed the site content and structure with the intention of keeping site maintenance as simple as possible.
- **Compile project data by crop and provide photos of each crop.** This work was completed by Dale and Cindy Secher during the winter and spring of 2012-13.
- **Data editing.** This work was completed by CIAS and the Sechers during the spring of 2013.
- **Design and build site.** This work was completed by CIAS during the spring and summer of 2013.
- **Evaluation.** CIAS began collecting site data through Google Analytics on August 27, and will continue to collect and monitor this data for the foreseeable future.

B. Project Goal: Growers, grower associations and institutions across the U.S., and beyond, will be able to make informed decisions about specialty fruit crop production using the information available on this site.

Actual accomplishments: The Uncommon Fruit website is a tool that will help our target audience – growers – make informed decisions about specialty fruit crop production. The tool is particularly useful (and unique) in that it helps growers think about how uncommon, perennial fruit crops might fit into a sustainable system. The site provides in-depth documentation of Dale Secher's observations of production and harvest requirements, as well as the sustainability potential of each crop, which empowers growers to select crops that will fit their farms and markets while benefitting the environment.

We set out to reach a minimum of 2,000 growers through the website. The site has seen 1,341 visits, 1,149 unique visitors and 4,575 page views from the United States and 60 other countries since we began collecting data on August 27. While we have no way of knowing how many of those visitors are growers, we feel that we are well on our way to surpassing our outreach goal.

After the project was over, we surveyed the Aronia Network to determine if their use of the Uncommon Fruit website had increased their knowledge of fruit production. More than 50% of the respondents said that their knowledge of fruit production increased after visiting this site. Here are some specific comments received from survey respondents:

- This is a really excellent website with great information for growers of all scales about the pros and cons of (and tips for) growing and marketing each of a whole bushel-full of uncommon fruit. Thank you very much for sharing your knowledge and experience!

- I was impressed by the large variety in the fruit plantings. The commentary on plant growth and vigor and the economic potential of each fruit was very informative. The website is a good reference source to prospective growers and old fruit hands alike.
- As an extension educator, I have shared this website with no less than 20 small acreage fruit growers that I have worked with over the years. As a result of your work we have added two Viking aronia plants into our Teaching and Display Garden at the Spooner Ag Research Station. We also have future plans to renovate some of our demonstration plantings and will be looking very closely at some of the uncommon fruits listed on the website.
- I will send the website link out to my fruit growers email lists which includes about 20 names, and to my Master Gardener email list which includes about 180 names.

IV. Beneficiaries

This project has multiple beneficiaries. As described above, growers (our primary audience) will be able to make better-informed decisions about sustainable specialty fruit production systems. Grower associations and institutions across the U.S. and beyond will have a more comprehensive and comparable source of information about specialty fruit crops. New links with grower and other food-related associations are already being established. Information compiled about health and culinary benefits will benefit consumers and build product demand. The environmental benefits discussed will empower environmentalists and create demand for a more sustainable approach to food production. This will encourage local/regional marketing systems that create new jobs and economic opportunities. Homeowners will benefit by being able to make better decisions about planting edible landscapes.

V. Lessons Learned

One challenge we faced in this project was to create a site that would be useful and informative to farmers across the U.S. and beyond, even though it features observations from a single farm. Every attempt was made to communicate the site-specific information observed at the test site in a way that would be applicable on a regional basis. Many variables including soils, slope, orientation, drainage, sunlight exposure as well as temperature and precipitation patterns had to be considered when making interpretations and recommendations. This required both research and a thorough understanding of the biological, physiological and climatological factors that influence insect activity, disease issues and dormancy. This was very challenging and, even with 45 years of fruit-growing experience, it was more difficult and time consuming than anticipated.

Another challenge we faced was communicating the results of site-specific, on-farm research alongside more general data, particularly the nutritional and health benefits of the fruit crops. We carefully edited the site to ensure that any claims not related to the research and observations at Carandale Farm were backed up by peer-reviewed research or credible data sources, such as the USDA. Because the website is being hosted by UW-Madison, we had to be extremely careful to not making any unsubstantiated claims on the site. As a result, we feel the site is a solid source of information for growers and others interested in uncommon fruit crops.

VI. Additional Information

The information in the website can be used by growers as a tool for decision-making, but it is not a substitute for on-site trials. The nutritional and ecological information is well documented, but there are too many on-site variables to reliably extrapolate adaptability, yields and ultimate economic sustainability. Many of the uncommon fruit crops tested and discussed will require consumer education at the local and regional level.

Dale Secher has been interviewed and provided information about the Uncommon Fruit website to numerous groups and media outlets. So far, this information has been featured in the *Oregon Observer* (8/11/13: “Farm’s 10-year experiment featured on new website.”), and in an article and follow-up photos in the *Agri-View* farm publication (8/14/13 and 8/21/13).

VII. Contact Info

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26) Wisconsin Maple Syrup Producers Association

Project Title: Growing Wisconsin's Maple Syrup Industry

Total Amount Received: \$17,435.66

Date of Award: June 1, 2013

Project Contact: Al Herrmann

Report Date: November 26, 2013

I. Project Summary

The purpose of this project was to begin to increase maple syrup production in Wisconsin through increased education to new and current maple syrup producers. Wisconsin produced 155,000 gallons of maple syrup in 2011 and is the fourth largest maple syrup producing state in the United States. Yet, there continue to be vast stands of maple trees that are untapped within the state. Combined with new production techniques, Wisconsin has the ability to increase its production greatly. States like New York and Vermont that have aggressively promoted maple production have had very promising results.

Current producers need education in best industry practices to increase the present level of production. New and perspective producers need information on how to begin a maple syrup business. In Wisconsin, the Wisconsin Maple Syrup Producers Association (WMSPA) is the entity best positioned to provide this education.

In order to position itself to increase maple syrup production in Wisconsin, the Wisconsin Maple Syrup Producers Association needed to update and upgrade its technology usage including:

- computerizing membership lists, meeting notes, and records
- creating an electronic registration system for future Maple Institutes
- updating its website and newsletter to communicate industry enhancements and technology to members.

Without electronic files and membership in place, moving forward in implementing cutting edge educational efforts through our annual Maple Institute, newsletters and website would be extremely difficult.

II. Project Approach

Grant funds were used to upgrade the Wisconsin Maple Syrup Producers Association technology and communication ability with the maple industry in the Midwest in order to better implement its Maple Education Institute and bring cutting edge tools, techniques, and technology to current and future producers. We hired an intern who created an electronic membership database, electronic registration system for the Maple Institute, and is working on a system for archiving electronic minutes at board meetings. We were able to print two brochures, one promoting our upcoming annual Maple Winter Institute in which we try to educate maple producer on how to make a better quality product and also how to market it for greater profit. The second pamphlet promotes the Wisconsin maple syrup industry by listing WMSPA member locations and contact information along with a state map showing their location. 10,400 of the Winter Institute brochure were printed. All but about 300 have been distributed. They were distributed at the Wisconsin State Fair and were also distributed to almost all of the Maple Syrup equipment and container dealers in the state. Approximately 9,000 of the 25,000 Wisconsin Map brochures printed have been distributed so far. They were also distributed at the State Fair and other events such as the Edgar Steam Show, the Marshfield Fall Maple Fest and the Wisconsin Maple Fall Tour. An electronic version of the brochures is also on our web site and has been available as a pdf download from early August on.

We also upgraded the WMSPA website and created a promotional plan including brochure distribution, web promotions, and a newsletter. We are still considering how to add and fund social media in our promotion plan. One of the most beneficial upgrades to the site is that we are now able to poll viewers of our site to get feedback. We are now able to track who visits our web site and what they look at when there. This will allow us to continue to make improvements based on viewer feedback. At the end of our project we surveyed current members to see if they felt the new site was already increasing their knowledge as maple syrup producers. 72 people responded to the survey and 87% felt their current visits to the site were beneficial in increasing their knowledge about Wisconsin's maple syrup industry and knowledge as producers. We will continue to utilize the site to pass on pertinent information about maple syrup production in Wisconsin, and to assess production in the state, grower knowledge, and grower use of the site as a source for cutting edge production knowledge. This project has put the Wisconsin Maple Syrup Producers Association in a position to lead our state's producers in educational efforts as a catalyst to greatly increasing syrup production.

III. Goals and Outcomes Achieved

The ultimate goal of this project was to increase maple syrup production in Wisconsin through increasing the knowledge base of the state's producers and assisting those interested in producing in getting started. While we are confident that this will truly be the outcome of this project in the future, this goal could not be achieved in a three month project. So project staff measured an increase in the knowledge base of the state's producers instead. This is also a difficult thing to measure because the project took three months to update the website where the first step in increasing state producer knowledge would take place. To assess producer increase in knowledge after viewing the WMSPA's website, a survey was sent to WMSPA members and a "pop-up" quiz was set up for website visitors regarding content they viewed. 72 people responded to the survey and 87% felt their current visits to the site were beneficial in increasing

their knowledge about Wisconsin's maple syrup industry and knowledge as producers. We had some difficulty with the "pop-up" survey because so many computers automatically block pop-ups now that it was hard to get the survey viewed, but we are confident that the survey results are just the beginning of increased knowledge for this project. Our target was 70% of respondents increasing their knowledge so we feel good about the results so far. We are excited about our upcoming Maple Winter Institute and the educational opportunities it will bring to maple syrup producers in Wisconsin and the Midwest. We are confident this project has helped us increase our ability to provide cutting edge technology and education to the upcoming Winter Institute and will ultimately deliver a significant increase in our state's maple syrup production.

IV. Beneficiaries

The executive board of the WMSPA now has tools to help them to do a better job of communicating with its members. The 305 current members of the WMSPA and the additional 1000 commercial producers, along with the additional 2500+ hobbyists who have the potential to become commercial producers will benefit from this project by greater access to the information they need to make better quality maple products, better price and market their products, or begin a maple syrup business. This project has increased the WMSPA's ability to reach out to all these entities to help them increase their syrup production in a manner that will positively impact the state of Wisconsin.

V. Lessons Learned

That coordinating a volunteer group to do a complex task in a short period of time is not an easy thing to accomplish. With us being spread out throughout the state and all having very busy schedules, sometimes the biggest problem is just to keep our projects going to be successful. By being more able to communicate with each other we should be better positioned to run a successful association. I think we have spent our funds wisely and the Wisconsin maple industry should see benefits for years to come.

VI. Additional Information

<http://www.wismaple.org>

<http://www.wismaple.org/2014%20winter%20institute%20pamphlet%20final.pdf>

VII. Contact Info: Al Herrmann
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TTB #	Winery Name	County	Telephone	Interested in Purchasing WI Grapes	Variety	Variety	Variety	Variety	Variety	Variety	Variety	Variety	Variety
WI-W-78	Appletreow Winery	Racine	(262) 878-5345	Yes	La Crescent	LaCrosse	St. Pepin						
WI-W-15055	Armstrong Apples	Fond du Lac	(920) 477-3007	Yes	Red								
WI-W-86	Brigadoom Winery	Oneida	(715) 564-2280	Yes	LaCrosse	Marquette	Sabrevois	Steuben	St. Pepin				
WI-W-84	Burr Oak Winery	Juneau	(608) 562-5271	Yes	Brianna	LaCrosse	Lorelei	Prairie Star	St. Pepin				
WI-W-15019	Captain's Walk Winery	Brown	(920) 431-9255	Yes	Marquette								
WI-W-58	Cedar Creek Winery	Ozaukee	(800) 827-8020	Yes	Marquette								
WI-W-87	Clover Meadow Winery	Washburn	(715) 468-4224	Yes	Certified Organic								
WI-W-15046	Cold Spring Vineyard	Washington	(262) 628-9836	Yes	Marechal Foch	St. Pepin							
WI-W-15045	Danzinger Vineyards	Buffalo	(608) 685-6000	Yes	Edelweiss	Sabrevois							
WI-W-15008	DNA Vintners	LaCrosse	(608) 498-0582	Yes									
WI-W-53	Door Peninsula Winery	Door	(800) 551-5049	Yes	LaCrosse	Seyval Blanc							
WI-W-15054	Elmaro Vineyard (West Prairie Winery, LLC)	Trempealeau	(608) 385-4726	Yes	Edelweiss	Frontenac							
WI-W-15057	Fermenting Cellars	Rock	(608) 295-8972	Yes	Frontenac	Marechal Foch	Leon Millot	St. Pepin					
WI-W-15067	Fisher King Winery	Dane	(608) 438-4026	Yes	Marquette	St. Croix	Leon Millot	Frontenac	Marechal Foch	Frontenac Gris	St. Pepin	La Crescent	LaCrosse
WI-W-15060	Infinity Beverages	Eau Claire	(920) 242-0093	Yes	Unknown								
WI-W-15014	Ledgestone Vineyards	Brown	(920) 532-4384	Yes	Frontenac	Frontenac Gris	La Crescent	Marquette	St. Pepin				
WI-W-15028	Maiden Rock Winery & Cidery	Pepin	(715) 448-3502	Yes	Sabrevois								
WI-W-15027	Maiden Wines	Pierce	(715) 448-4600	Yes	Frontenac	Frontenac Gris	Marquette						
WI-W-79	Mason Creek Winery	Waukesha		Yes	Marechal Foch	Seyval Blanc							
Custom Crush Client	Muller Wines	Bayfield	(312) 879-0104	Yes	Seyval Blanc								
2011	Villa Bellezza	Pepin	(715) 495-0217	Yes	Frontenac gris	Marquette	Frontenac blanc	Prairie Star	La Crescent				
WI-W-15031	Northleaf Winery	Rock	(608) 580-0575	Yes	Concord	Whites							
WI-W-76	Orchard Country Winery	Door	(866) 946-3263	Yes	La Crescent	Marquette	St. Pepin	Seyval Blanc	Marechal Foch	Frontenac			
WI-W-15016	Parallel 44 Vineyard & Winery	Kewaunee	(888) 932-0044	Yes	Frontenac	Frontenac Gris	LaCrescent						
WI-W-15032	River Bend Vineyard & Winery	Chippewa	(715) 720-9463	Yes	La Crescent	Frontenac	Frontenac Gris						
WI-W-15062	Sandstone Ridge Vineyard & Winery	Jackson	(715) 514-9652	Yes	Frontenac	La Crescent	Seyval Blanc	Marquette					
WI-W-15018	Sinnipee Valley Vineyard	Grant	(608) 568-3212	Yes	LaCrosse	St. Pepin							
WI-W-15043	Spurgeon Vineyards & Winery	Iowa	(608) 929-7692	Yes	La Crescent	Marechal Foch	Marquette	St. Croix					
WI-W-15044	Studio Winery	Walworth	(262) 312-4239	Yes	Marechal Foch	Marquette							
WI-W-83	Tenba Ridge Winery	Trempealeau	(608) 525-2413	Yes	Juice								
WI-W-15058	The Chiselled Grape Winery	Ozaukee	(414) 266-7050	Yes	Unknown								
WI-W-15049	The WineSitters	LaCrosse	(608) 526-6060	Yes	Juice								
WI-W-85	Trout Springs Winery	Brown	(866) OUR-WINE	Yes	Frontenac Gris								
WI-W-15041	Two Brothers Wines LLC	Waukesha	(262) 695-9463	Yes	Marechal Foch	Frontenac	Frontenac Gris	Leon Millot	Delaware	Marquette	Moore's Diamond	St. Pepin	Concord
WI-W-15026	Valley Vineyard	Pierce	(715) 262-4235	Yes	La Crescent								
WI-W-15059	Van Price Innovations LLC (Lance's Winery)	Langlade	(715) 627-0038	Yes	Unknown								
WI-W-15007	Vernon Vineyards	Vernon	(608) 634-6734	Yes	Unknown								
WI-W-15056	Vetro Winery, LLC	Jefferson	(262) 593-5123	Yes	Leon Millot	Marechal Foch	White grape						
WI-W-45	Von Stiehl Winery	Kewaunee	(800) 955-5208	Yes	Marechal Foch	Marquette							
WI-W-82	Weggy Winery	Grant	(608) 647-6600	Yes	La Crescent								
WI-W-15025	Whispering Winds Winery LLC	Grant	(608) 943-9941	Yes	Concord	Edelweiss	Traminette						
WI-W-34	Wollersheim Winery	Sauk	(608) 643-6515	Yes	La Crescent	LaCrosse	St. Pepin	Marquette					

REPORT OF THE WISCONSIN WINERIES SURVEY 2011
(Published June 2011)



Survey Director
Becky Rochester
Wisconsin Grape Marketing Coordinator

Contributors and Sponsors

Wisconsin Grape Growers Association
Wisconsin Winery Association
Tim Rehbein, Vernon County UW-Extension Agricultural Agent

REPORT OF THE WISCONSIN WINERIES SURVEY 2011

Introduction: In late January 2011, the Wisconsin Wineries Survey 2011 was developed by Becky Rochester, Grape Marketing Coordinator for the Wisconsin Grape Growers Association (WGGGA) with the support of the Wisconsin Winery Association (WWA) and Tim Rehbein, Vernon County UW-Extension Agricultural Agent. The Grape Marketing Coordinator position is currently funded by a USDA Specialty Crops Grant 2010. The information collected will be used as a baseline to measure growth of the Wisconsin grape and wine industry. To measure the current status of Wisconsin wineries growing grapes in Wisconsin and producing wines with 75% or more Wisconsin grown grapes, a survey was conducted to 81 winery owners and includes bonded wineries, custom crush clients and wineries currently going through the process to become a bonded winery this year. A list of current members was provided by the Wisconsin Winery Association and this list was combined with a list of non-member wineries which was compiled by Becky Rochester.

Objective: The surveys objectives are to assess the following: 1) the current number of wineries in Wisconsin who grow grapes in Wisconsin, 2) the current number of wineries who produce wine from 75% or more Wisconsin grown grapes, 3) the current number of wineries who purchase Wisconsin grown grapes, 4) the current number of wineries who are interested in purchasing Wisconsin grown grapes in 2011 and which varieties they are interested in purchasing, and 5) the current number of wineries who purchase grapes, juice and/or wine out-of-state and which states or countries they are currently purchase from.

Methodology: The survey¹ consisted of five questions and was also used to qualify wineries for the Wisconsin Grape Growers Survey 2011. Distribution of the survey was done electronically via email in a Microsoft Word and PDF document format. The reasoning for conducting this survey electronically was to reduce the costs associated with postage and copying and to speed up the data collection time.

The survey was first emailed on January 20, 2011 to all members of the Wisconsin Winery Association (WWA) by Jon Hamilton, President of WWA. Becky Rochester emailed it to the remaining wineries who were not members of the WWA the following day. Responses were collected over the next three months. Please see Table 1 for Survey Implementation Schedule:

Date	Activity
January 20-21, 2011	First emailing of survey
January 31, 2011	Second emailing of survey
February-April 2011	Telephone follow-up to non-respondents
May 11, 2011	Survey closed

Response Rate: Seventy wineries responded to the survey for an 86.42% response rate. Eleven wineries did not respond to the survey for a 13.58% non-response rate.

¹ Wisconsin Wineries Survey 2011 Appendix A.

Overview of Wisconsin Grape and Wine Industry: Over the past five years there has been tremendous growth in the Wisconsin wine industry. There are six up and coming wineries that have reported they are in the process of becoming a bonded winery and opening in the next year or so. There are over 73 wineries that are bonded and operating in Wisconsin. This number is far greater than the 40-50 Wisconsin wineries that were reported just a few years ago.

Wisconsin is divided into 5 distinct wine regions:

1. **Door County:** There's no place quite like Door County, which offers an intriguing mix of charming small towns, eclectic shops and eateries, and coastal views reminiscent of America's Atlantic Coast. You'll stumble upon fishing villages, small farms, numerous parks and nature areas that make the Door Peninsula a mesmerizing and rewarding place to explore.
2. **Glacial Hills Region:** Just minutes from the bustle of Milwaukee, wine enthusiasts will find respite in the wineries of the Glacial Hills region of Wisconsin. The defining geographic feature is the rolling landscape. Pristine remnants of forests, meadows and glacial formations are preserved by the Kettle Moraine State Forest, which offers trail systems for hiking, biking, bird watching or picnicking with your favorite bottle of wine.
3. **Driftless Region:** The Driftless Region is a land of surprises. The glaciers that shaped the majority of the state spared this region bordered by the Chippewa, Mississippi and Wisconsin Rivers. It is a landscape of high plateaus webbed with crystal clear rivers and cut by deep green valleys. Nearly every small stream that flows through the region is loaded with native brook trout and wild brown trout.
4. **Fox Valley:** From Lake Winnebago to Green Bay, Wisconsin's Fox Valley is quintessential Wisconsin, offering a mixture of neat dairy farms, sprawling waterscapes and hardworking communities. This complex and thriving region presents the visitor with a surprising mix of shopping, dining and attractions—and some of the most interesting wineries in the state.
5. **Northwoods Region:** The Northwoods of Wisconsin is famous for its beautiful lakes as well as its outstanding forest trails. You're never more than a mile or two from a designated hiking or biking trail. Northwoods lakes and flowages are famous for their great fishing and friendly resorts. Untamed rivers offer outstanding canoeing and kayaking.

Conclusions: Based on the results from the Wisconsin Wineries Survey 2011, there are 37 wineries (45.68%) that produce at least one wine with 75% or more Wisconsin grown grapes. These wineries are eligible for the Wisconsin Grape Growers Association Wine Accreditation Program which will roll out in fall 2011.

There are 45 wineries (55.56%) that currently purchase grapes, juice and/or wine from other states and other countries due to the cost, supply, varietal selections and simplicity in doing so. The top three states in which Wisconsin wineries purchase grapes, bulk wine and/or bulk juice are California (28.13%), New York (21.88%) and Washington (19.79%).

There are 28 Wisconsin wineries (34.57%) that currently purchase Wisconsin grown grapes. The good news is that there are 42 wineries (51.85%) interested in purchasing Wisconsin grown grapes this year. Wineries indicated that they were most interested in purchasing the following varieties: Marquette (12.17%), La Crescent (10.43%), Frontenac (8.70%), Marechal Foch (9.57%), St. Pepin (9.57%), Frontenac Gris (6.96%) and LaCrosse (6.09%).

There is still a lot of potential for Wisconsin wineries to increase production of Wisconsin grown grape wines. There are 31 wineries (38.27%) that responded to the survey that currently do not produce a wine with 75% or more Wisconsin grown grapes. A small portion of these wineries may purchase Wisconsin grown grapes in the future if there was the potential to buy bulk juice since they do not have the proper equipment to process grapes.

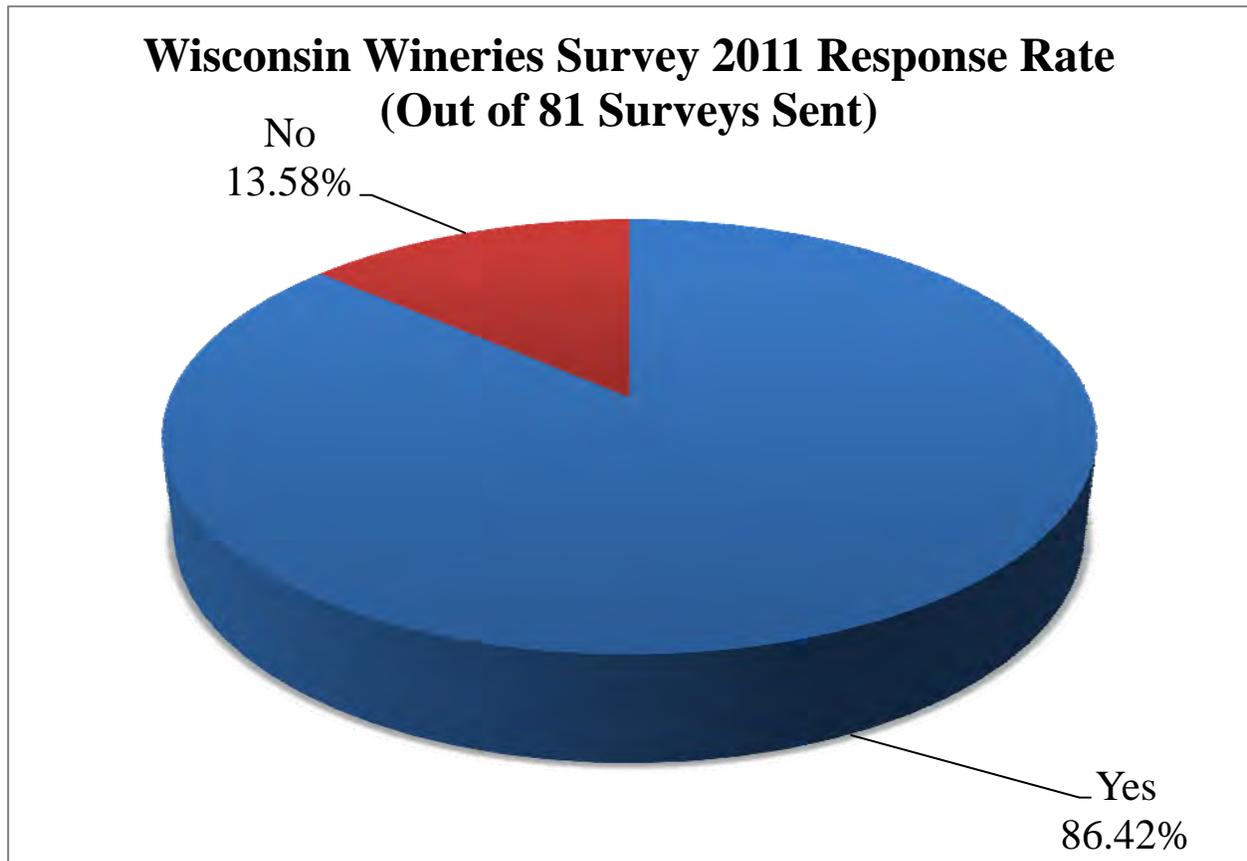
Only 28 wineries (34.57%) reported that they purchase Wisconsin grown grapes, while 40 wineries (49.38%) reported that they do not purchase Wisconsin grown grapes. A small percentage of the 40 wineries that do not purchase Wisconsin grown grapes, may not purchase them because they grow enough for themselves at this time. As their businesses continue to grow, the demand will grow and they may look to source fruit from other vineyards.

Overall, the market for Wisconsin grown grapes looks strong. With smart planning (site selection, grape varieties and proper communication between growers and wineries) Wisconsin grape growers should be on the road to a successful venture in agriculture.

RESPONSE RATE FOR WISCONSIN WINERIES SURVEY 2011

The Wisconsin Wineries Survey 2011 was sent to 81 Wisconsin wineries. The survey began at the end of January and data was collected until the beginning of May. The overall response rate for the survey was 86.42% (70/81 responses). Surveys were emailed directly to wineries and follow up phone calls were placed.

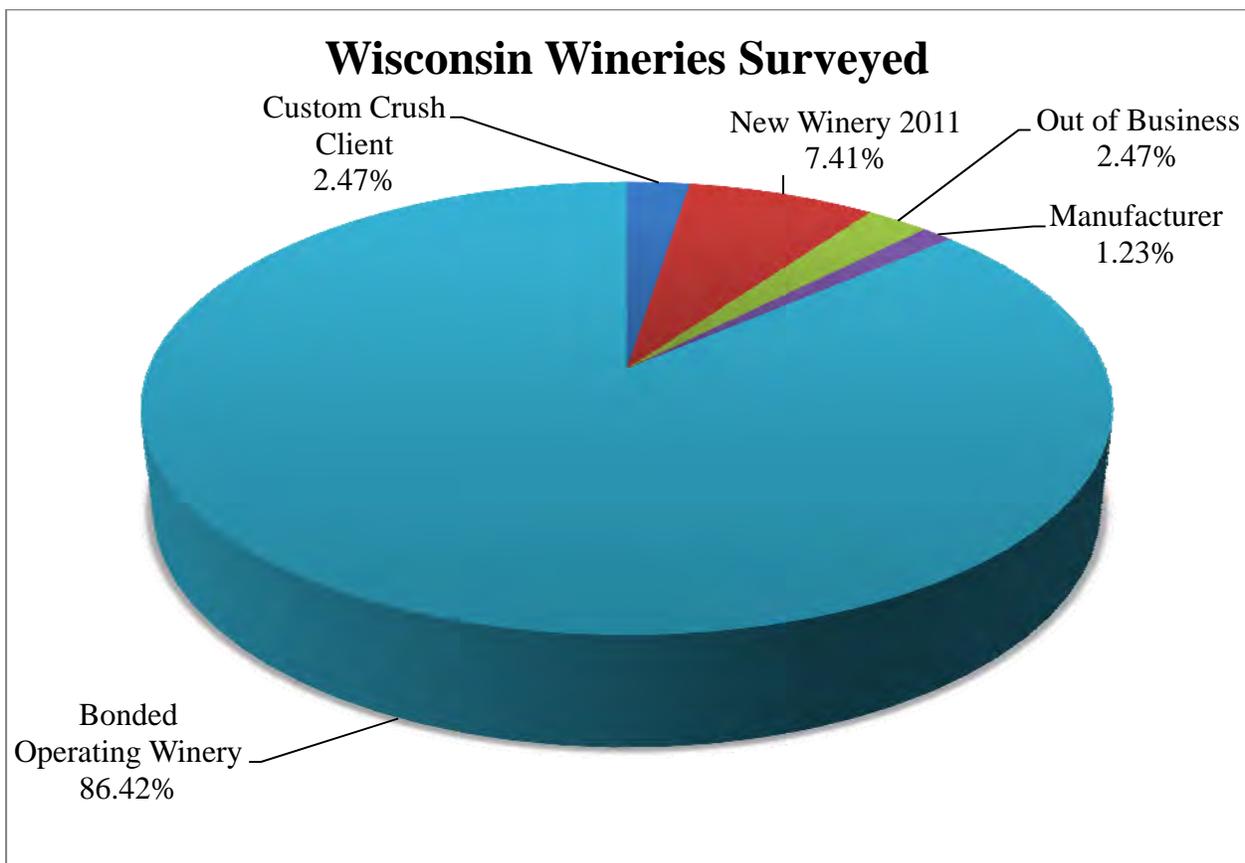
Response Rate		
Yes	86.42%	70
No	13.58%	11
Total	100.00%	81



WISCONSIN WINERIES SURVEYED

Out of the 81 Wisconsin wineries listed to participate in the Wisconsin Wineries Survey 2011, there were 2 custom crush clients², 6 new wineries opening in 2011, 2 bonded wineries that went out of business, 1 manufacturer not producing any wine and 70 bonded³ and operating wineries.

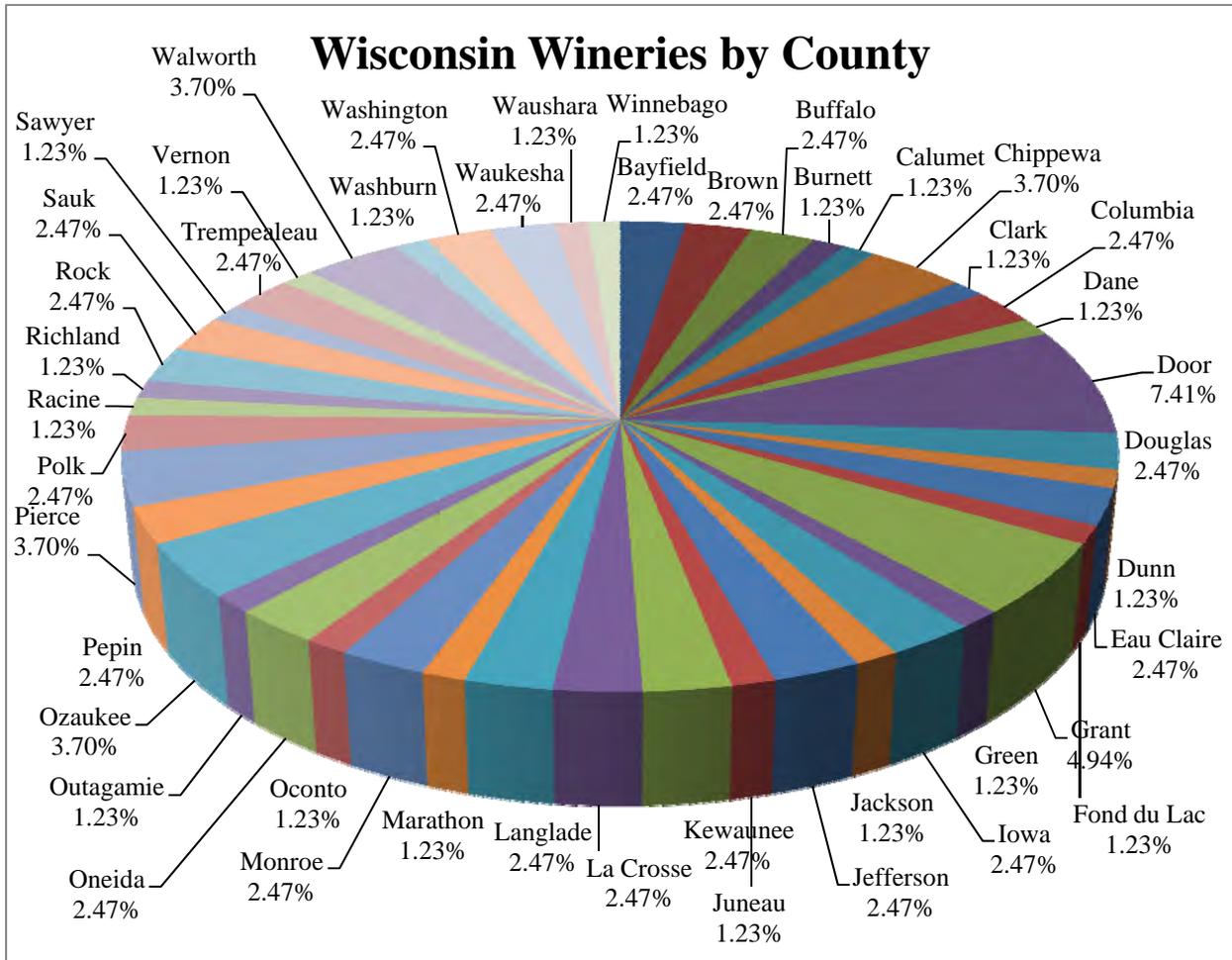
Wisconsin Wineries Surveyed	
Custom Crush Client	2
New Winery 2011	6
Out of Business	2
Manufacturer	1
Bonded Operating Winery	70
Total Surveyed	81



² **Custom Crush Clients:** Wineries are sometimes approached by a customer who would like to have wine produced. The customer often has access to grapes or other materials and would like to have them made into wine, but does not want to produce the wine. These customers are known as Custom Crush Clients. The *custom wine producer* must be fully qualified as a bonded winery. The winery is responsible for all production, records, reports, labeling, and taxes, even though it is producing the wine for a customer. The wine premises that bottles the wine obtains approval from TTB for the wine's label, and the wine premises that removes the wine from bond pays the Federal excise tax on the wine, regardless of who owns the wine. The producing winery incurs the expenses for winemaking equipment and winery premises.

³ **Bonded Winery:** When a company qualifies as a stand-alone winery, it is responsible for all production activities that take place on the bonded premises and the recordkeeping that documents those activities and filing reports about the activities to TTB. This may include obtaining label approval for the wine prior to bottling and paying excise tax on the wine. The proprietor incurs expenses for all necessary winemaking equipment and premises.

WISCONSIN WINERIES BY COUNTY⁴

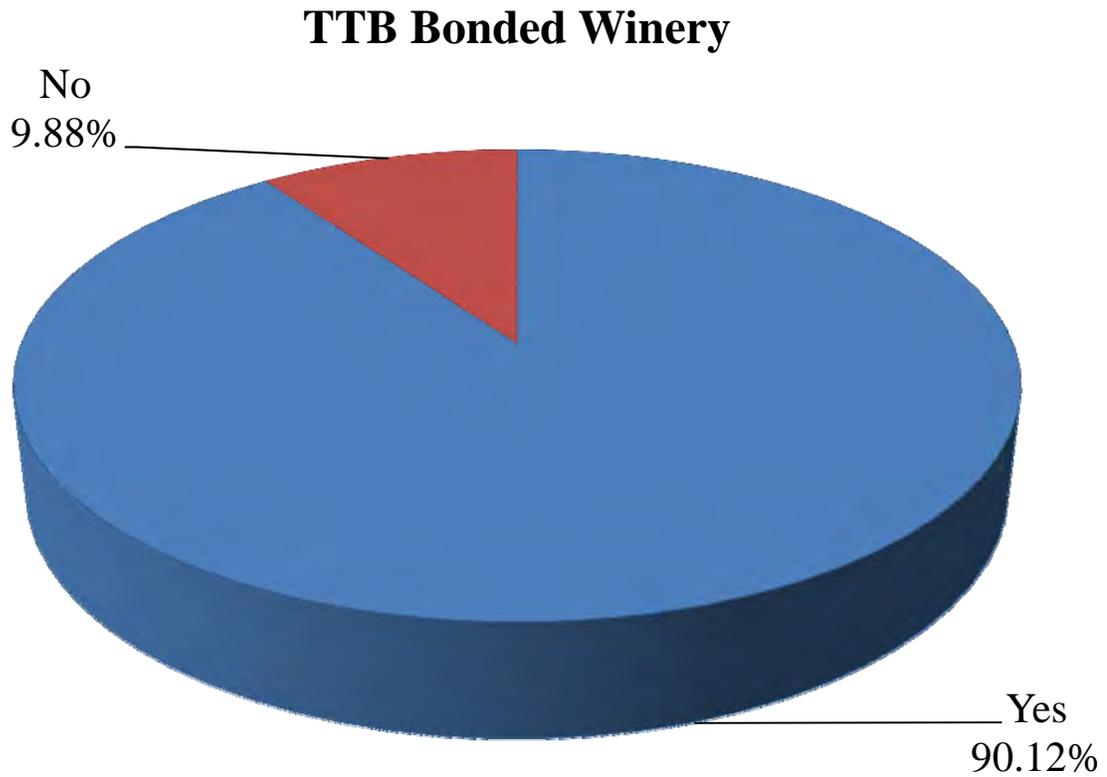


⁴ Refer to Appendix D for breakdown of Wisconsin Wineries by county.

TTB BONDED WINERY

Out of the 81 Wisconsin wineries surveyed, 73 are bonded wineries and 8 are either in the process of becoming bonded or are custom crush clients. Please see footnote on page 6 for more information regarding bonded wineries and custom crush clients.

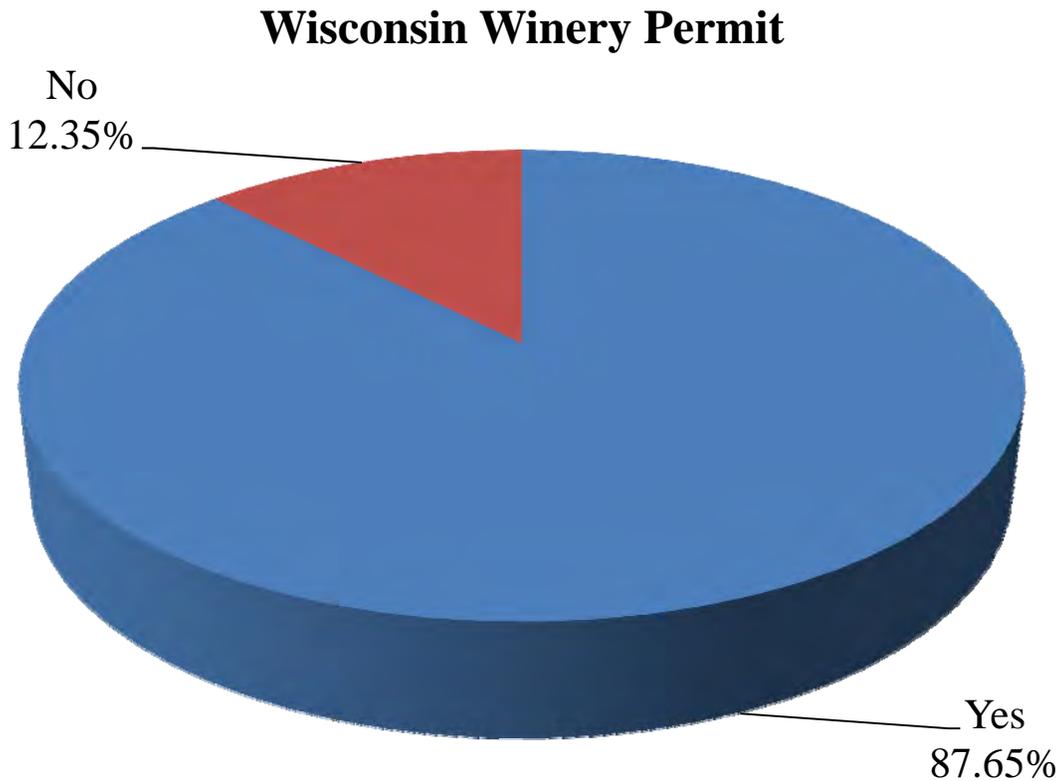
TTB Bonded Winery		
Yes	90.12%	73
No	9.88%	8
Total	100.00%	81



WISCONSIN WINERY PERMIT

Out of the 81 Wisconsin wineries surveyed, 71 have their Wisconsin Winery Permit⁵ (out of 73 bonded wineries) and 10 are either in the process of getting their permit or are custom crush clients. Please see footnote on page 6 for more information regarding bonded wineries and custom crush clients.

Wisconsin Winery Permit		
Yes	87.65%	71
No	12.35%	10
Total	100.00%	81



⁵ **Winery Permit: 125.53 Winery permit.** (1) The department shall issue only to a manufacturing winery in this state that holds a valid certificate issued under s. 73.03 (50) a winery permit authorizing the manufacture and bottling of wine on the premises covered by the permit for sale to wholesalers holding a permit under s. 125.54. A winery permit also authorizes the permittee to, on the winery premises and without obtaining a rectifier's permit, possess intoxicating liquor and mix or blend intoxicating liquor to produce wine sold to wholesalers holding a permit under s. 125.54. A winery holding a permit under this section may offer on the premises taste samples of wine manufactured on the premises to persons who have attained the legal drinking age. A permittee under this section may also have either one "Class A" license or one "Class B" license, but not both. The "Class A" license or "Class B" license may either be issued for the winery premises or for real estate owned or leased by the winery. If a "Class A" or "Class B" liquor license has also been issued to the winery, the winery may provide wine manufactured, mixed, or blended on the winery premises directly to the "Class A" or "Class B" premises and may offer the taste samples on the "Class A" or "Class B" premises.

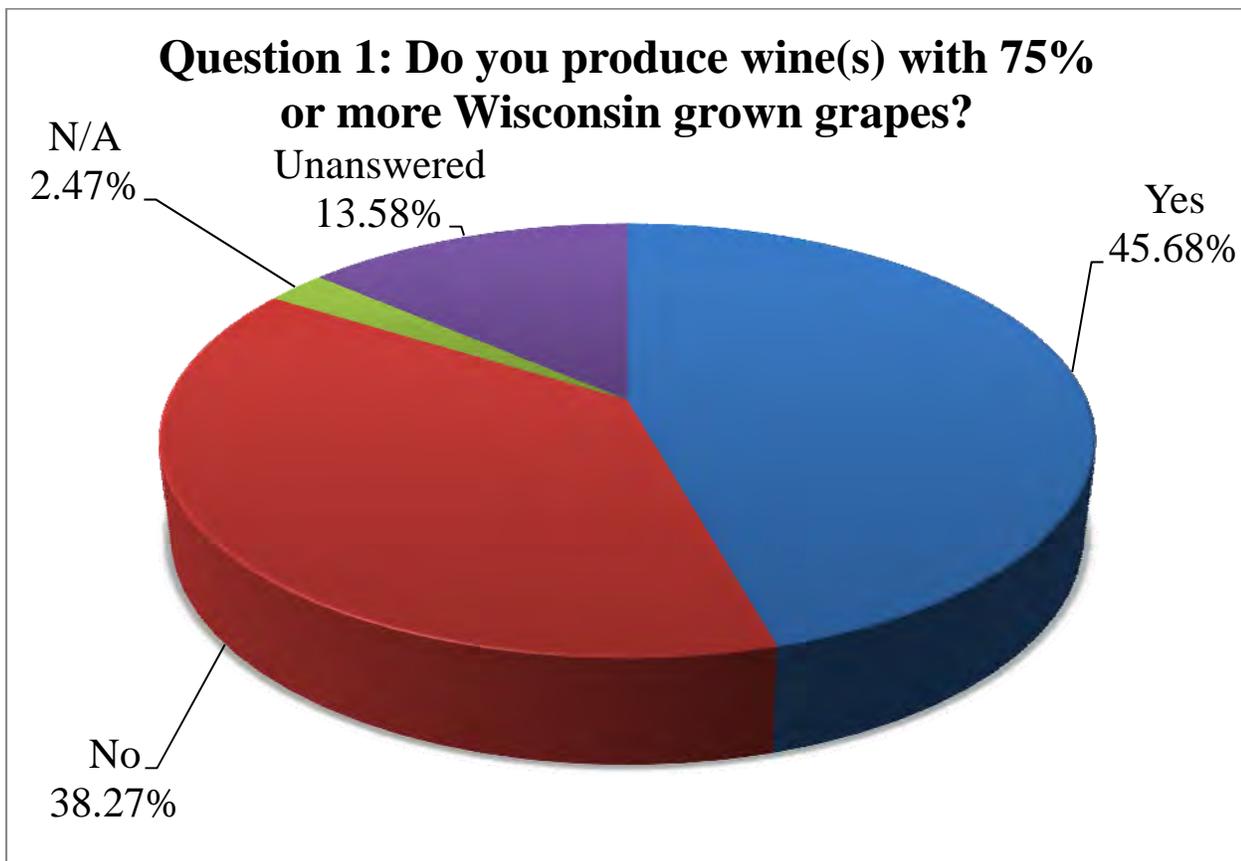
(2) Winery permits may be issued to any person except a foreign corporation, a foreign limited liability company or a person acting as an agent for or in the employ of another.

Source: Wisconsin Statutes Database Chapter 125 Alcohol Beverages <http://legis.wisconsin.gov/statutes/Stat0125.pdf>

QUESTION 1: DO YOU PRODUCE WINE(S) WITH WISCONSIN GROWN GRAPES?

Based on the results from the Wisconsin Wineries Survey 2011, there are 37 wineries (45.68%) that produce at least one wine with 75% or more Wisconsin grown grapes. These wineries are eligible for the Wisconsin Grape Growers Association Wine Accreditation Program which will roll out in fall 2011.

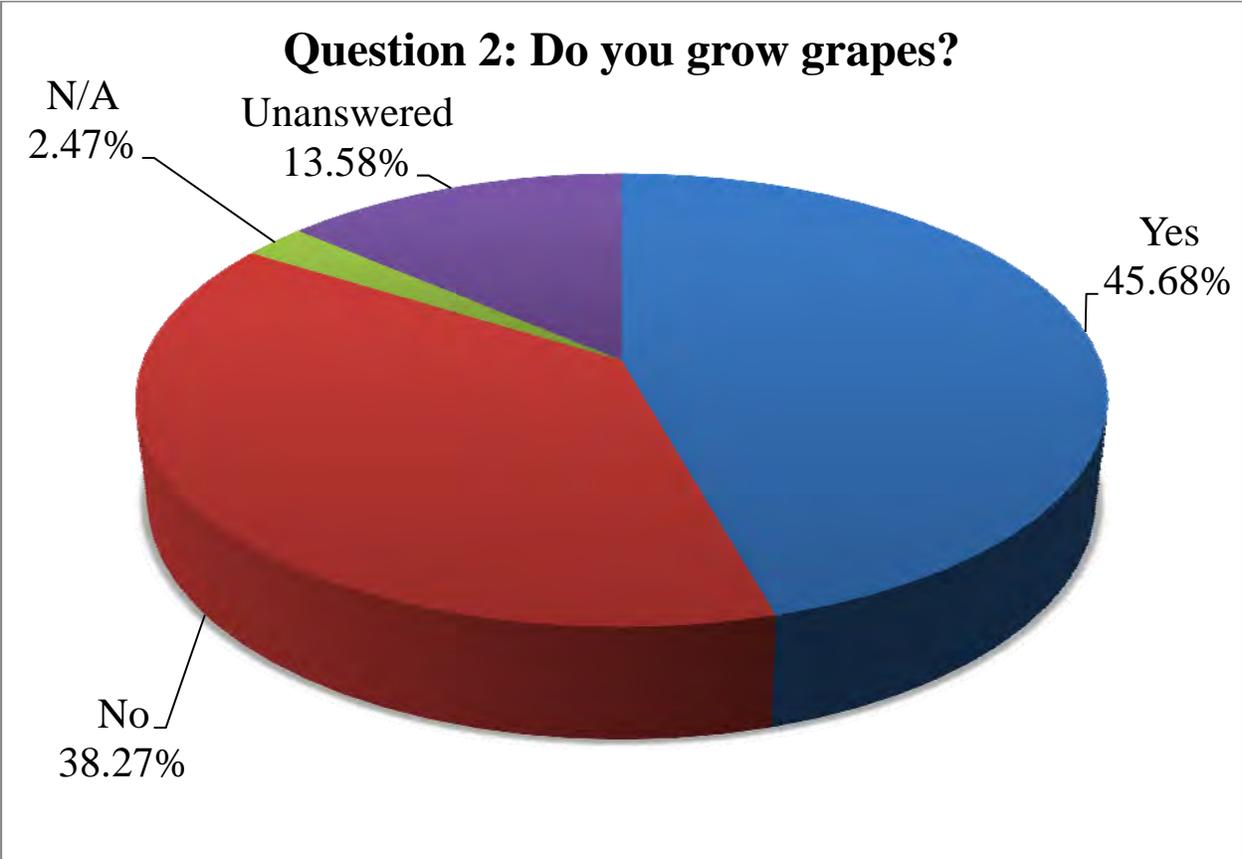
Question 1: Do you produce wine(s) with 75% or more Wisconsin grown grapes?		
Yes	45.68%	37
No	38.27%	31
N/A	2.47%	2
Unanswered	13.58%	11
Total	100.00%	81



QUESTION 2: DO YOU GROW GRAPES?

Based on the results from the Wisconsin Wineries Survey 2011, there are 37 wineries (45.68%) that grow grapes in Wisconsin. Most of these wineries, but not all of these wineries, produce wines made with 75% or more Wisconsin grown grapes. The varieties grown and acreage varies among the wineries and the locations.

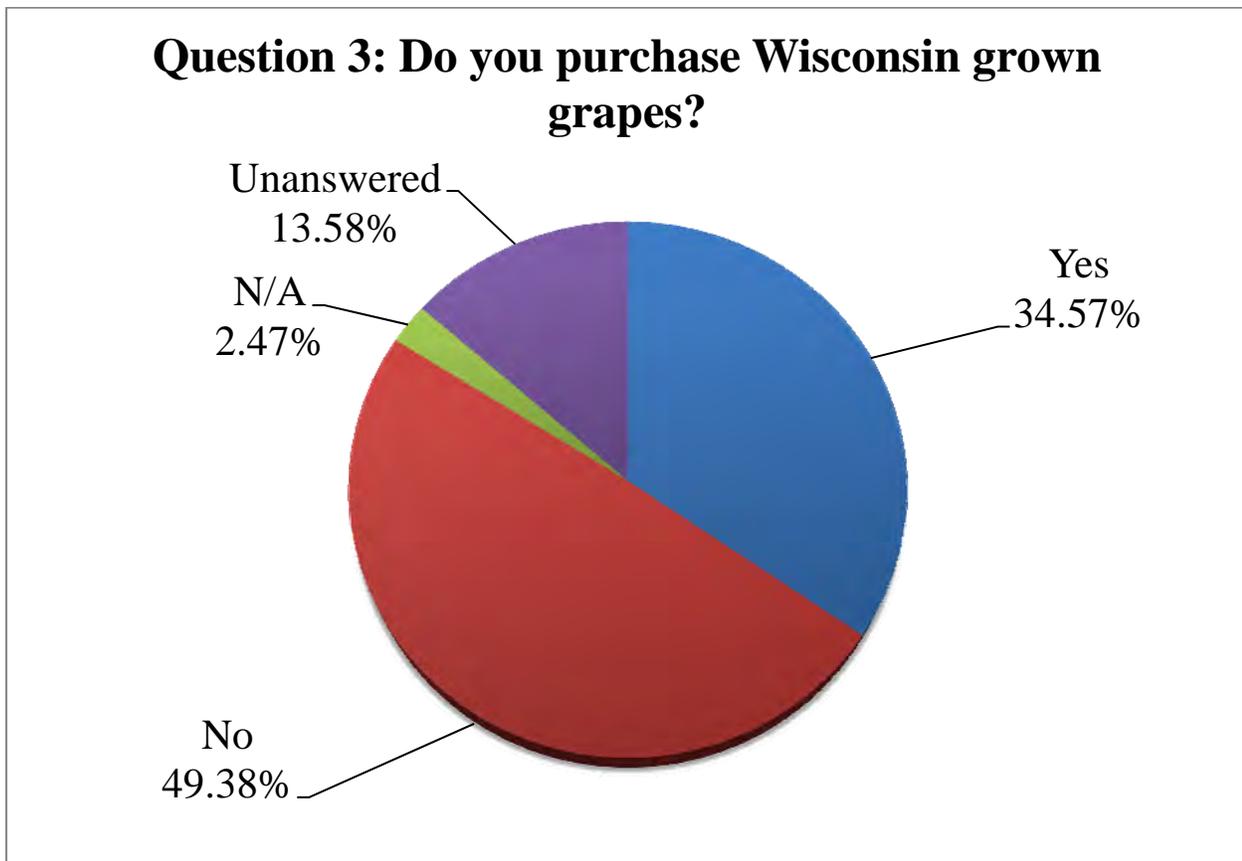
Question 2: Do you grow grapes?		
Yes	45.68%	37
No	38.27%	31
N/A	2.47%	2
Unanswered	13.58%	11
Total	100.00%	81



QUESTION 3: DO YOU PURCHASE WISCONSIN GROWN GRAPES?

There are 28 Wisconsin wineries (34.57%) that currently purchase Wisconsin grown grapes. This number will increase once the new wineries open this year and begin to purchase grapes. Some wineries may not purchase grapes because they grow them for themselves and the quantities meet their demands.

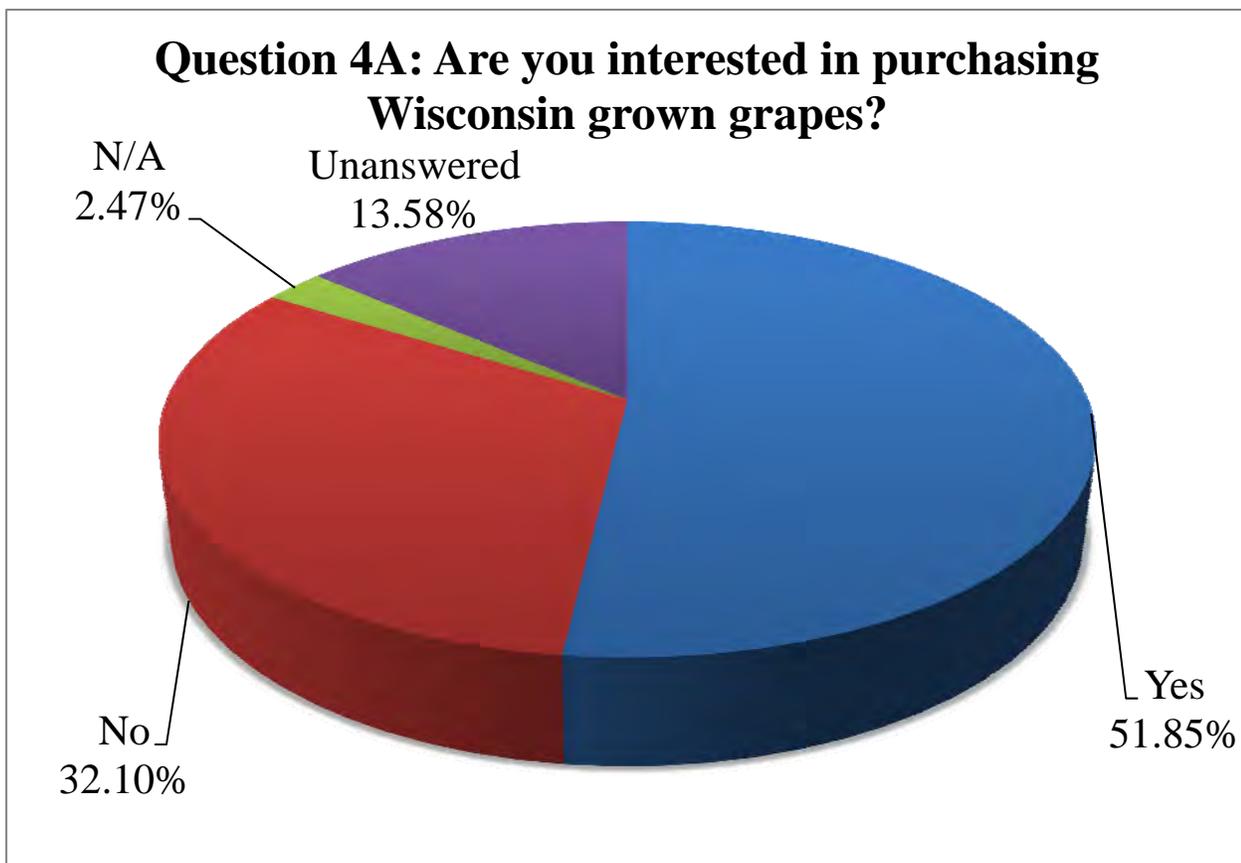
Question 3: Do you purchase Wisconsin grown grapes?		
Yes	34.57%	28
No	49.38%	40
N/A	2.47%	2
Unanswered	13.58%	11
Total	100.00%	81



QUESTION 4A: ARE YOU INTERESTED IN PURCHASING WISCONSIN GROWN GRAPES?

There are 42 wineries interested in purchasing Wisconsin grown grapes this year. This number is up from 28 Wisconsin wineries that purchased Wisconsin grown grapes last year.

Question 4A: Are you interested in purchasing Wisconsin grown grapes? If so, which varieties?		
Yes	51.85%	42
No	32.10%	26
N/A	2.47%	2
Unanswered	13.58%	11
Total	100.00%	81



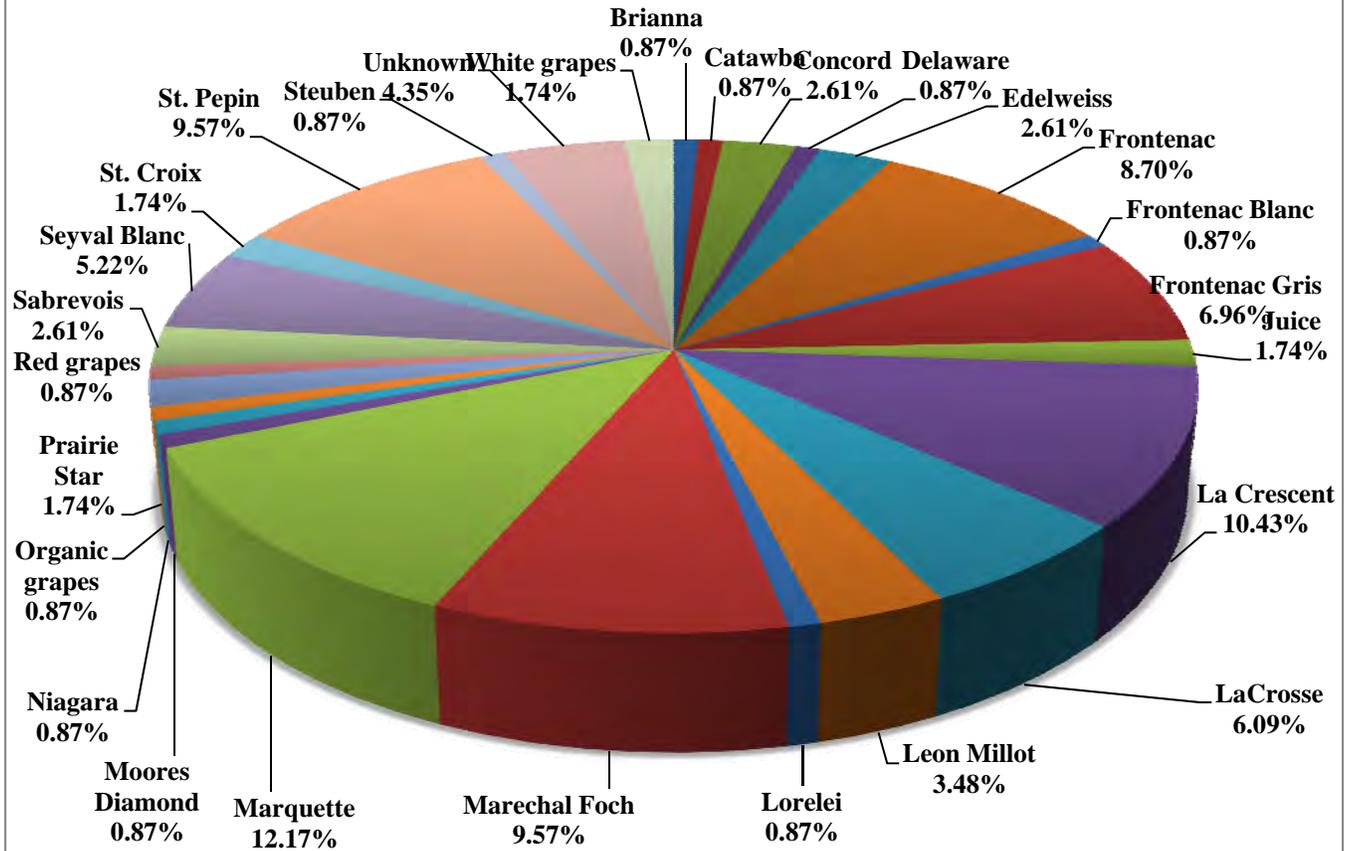
QUESTION 4B: IF SO, WHICH VARIETIES?

Wineries indicated that they were most interested in purchasing the following varieties: Marquette (12.17%), La Crescent (10.43%), Frontenac (8.70%), Marechal Foch (9.57%), St. Pepin (9.57%), Frontenac Gris (6.96%) and LaCrosse (6.09%).

Varieties		
Brianna	0.87%	1
Catawba	0.87%	1
Concord	2.61%	3
Delaware	0.87%	1
Edelweiss	2.61%	3
Frontenac	8.70%	10
Frontenac Blanc	0.87%	1
Frontenac Gris	6.96%	8
Juice	1.74%	2
La Crescent	10.43%	12
LaCrosse	6.09%	7
Leon Millot	3.48%	4
Lorelei	0.87%	1
Marechal Foch	9.57%	11
Marquette	12.17%	14
Moore's Diamond	0.87%	1
Niagara	0.87%	1
Organic grapes	0.87%	1
Prairie Star	1.74%	2
Red grapes	0.87%	1
Sabrevois	2.61%	3
Seyval Blanc	5.22%	6
St. Croix	1.74%	2
St. Pepin	9.57%	11
Steuben	0.87%	1
Unknown	4.35%	5
White grapes	1.74%	2
TOTAL	100.00%	115

QUESTION 4B: IF SO, WHICH VARIETIES?

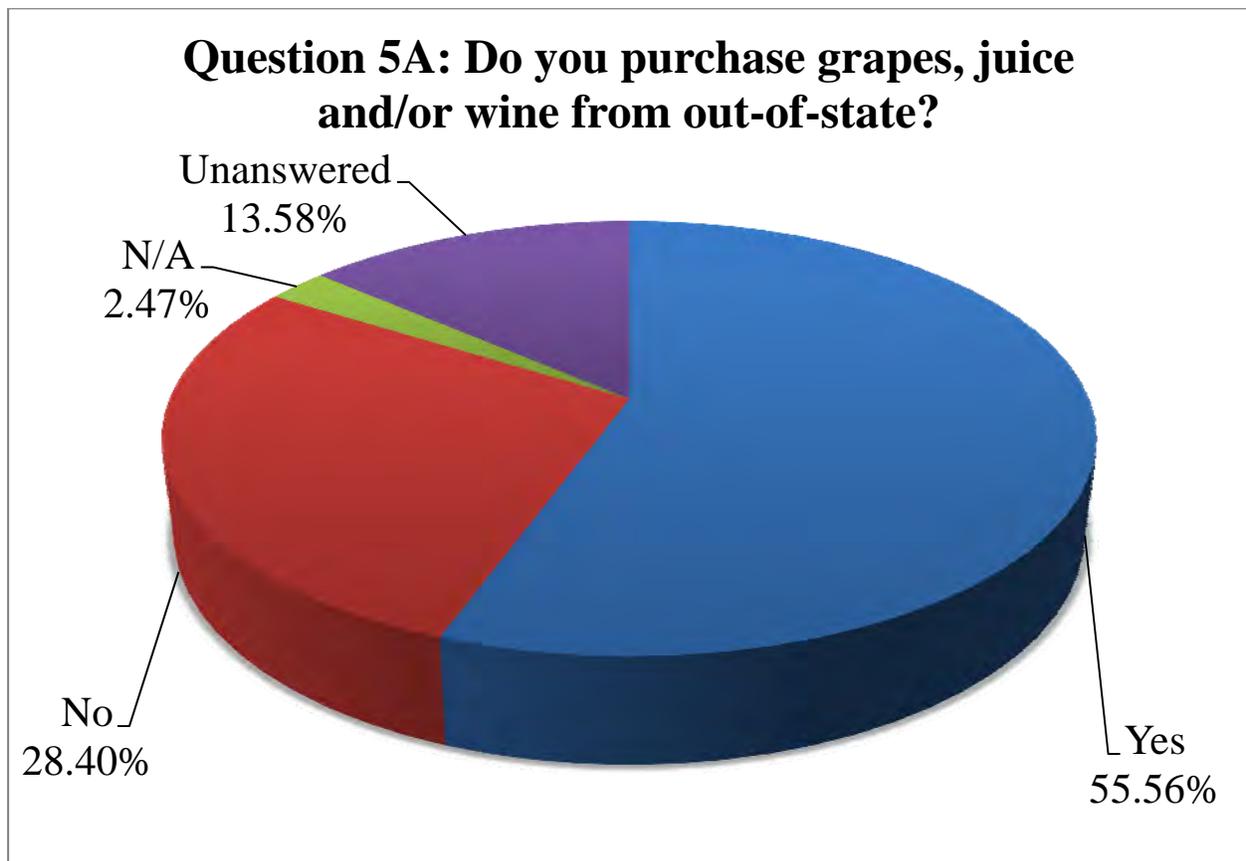
Question 4B: If so, which varieties?



QUESTION 5A: DO YOU PURCHASE GRAPES, JUICE AND/OR WINE FROM OUT-OF-STATE?

There are 45 wineries (55.56%) that currently purchase grapes, juice and/or wine from other states and other countries due to the cost, supply, varietal selections and simplicity in doing so.

Question 5A: Do you purchase grape, juice and/or wine from out-of-state?		
Yes	55.56%	45
No	28.40%	23
N/A	2.47%	2
Unanswered	13.58%	11
Total	100.00%	81



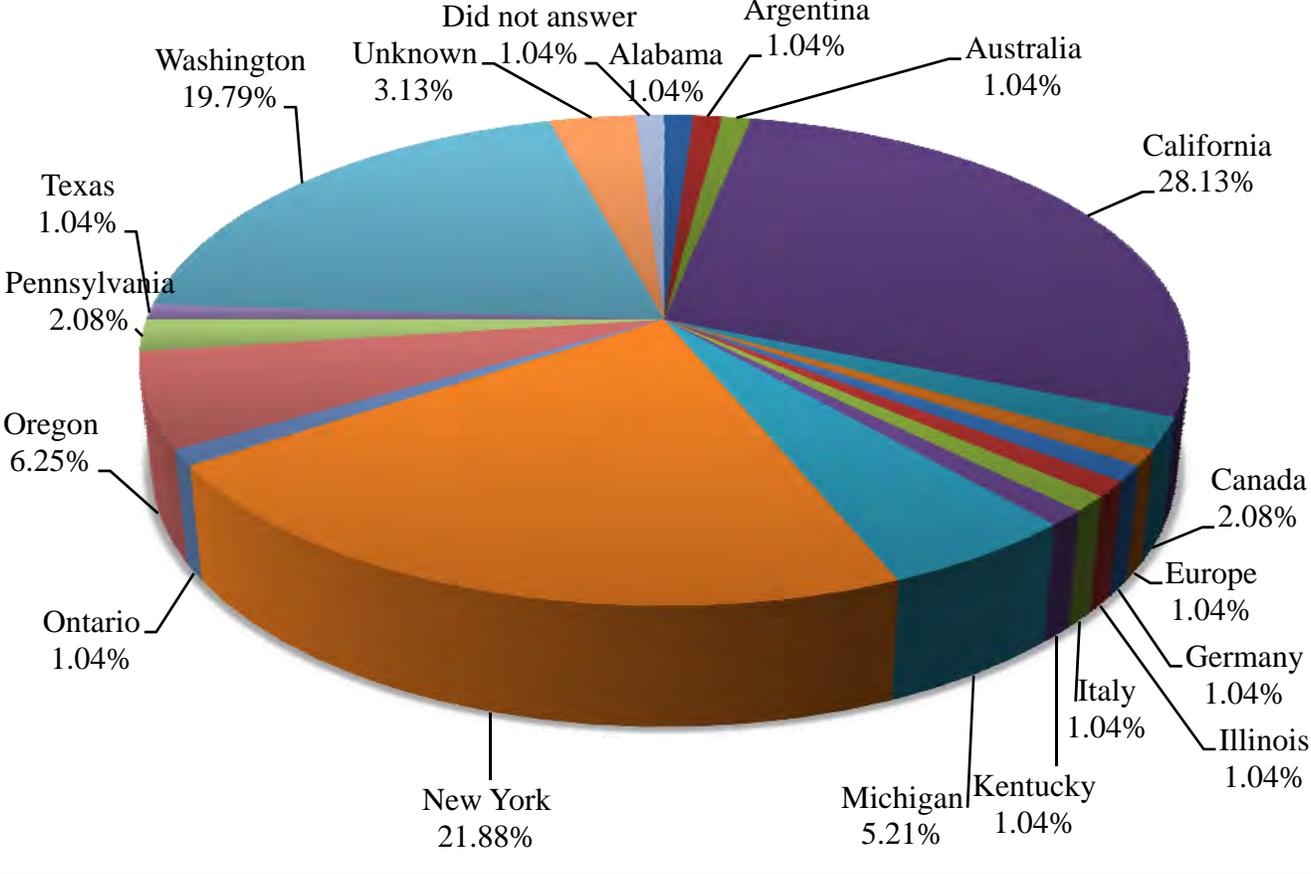
QUESTION 5B: IF YOU PURCHASE GRAPES, JUICE AND/OR WINE FROM OUT-OF-STATE, PLEASE LIST THESE STATES AND COUNTRIES?

The top three states in which Wisconsin wineries source grapes, juice and/or wine are California (28.13%), New York (21.88%) and Washington (19.79%).

States and Countries		
Alabama	1.04%	1
Argentina	1.04%	1
Australia	1.04%	1
California	28.13%	27
Canada	2.08%	2
Europe	1.04%	1
Germany	1.04%	1
Illinois	1.04%	1
Italy	1.04%	1
Kentucky	1.04%	1
Michigan	5.21%	5
New York	21.88%	21
Ontario	1.04%	1
Oregon	6.25%	6
Pennsylvania	2.08%	2
Texas	1.04%	1
Washington	19.79%	19
Unknown	3.13%	3
Did not answer	1.04%	1
TOTAL	100.00%	96

QUESTION 5B: IF YOU PURCHASE GRAPES, JUICE AND/OR WINE FROM OUT-OF-STATE, PLEASE LIST THESE STATES AND COUNTRIES?

Question 5B: If you purchase grapes, juice and/or wine from out-of-state, please list these states and countries.



APPENDIX A: WISCONSIN WINERIES SURVEY 2011

The Wisconsin Grape Growers Association needs your help. As part of a USDA Specialty Crops Grant, I was hired as the Grape Marketing Coordinator. My job is to research the Wisconsin wine and grape industry for the next year to get a better understanding of where the Wisconsin Grape and Wine Industry stands. Over the next year I will be collecting and analyzing data, promoting Wisconsin accredited wines, helping build relationships between growers and wineries, implementing tools to help growers (i.e.: yield calculation, contracts, historical data tracking workbooks) and much more.

Please take a quick minute to complete the five question survey below. If you have questions, please feel free to email me at Becky@wigrapes.org or give me a call at 503.428.6331. I may be following up with you for more information, and I look forward to meeting all of you sometime this year. The data collected will be used collaboratively and all business and personal names will remain anonymous. Thank you very much for your time.

Cheers,

Becky Rochester

Wisconsin Wineries Survey 2011

1. Do you produce wine(s) with Wisconsin grown grapes? (Yes or No)
2. Do you grow grapes? (Yes or No)
3. Do you purchase Wisconsin grown grapes? (Yes or No)
4. Are you interested in purchasing Wisconsin grown grapes? (Yes or No) If so, which varieties? (List varieties)
5. If you purchase grapes, juice and/or wine from out-of-state? If you purchase grapes, juice and/or wine from out-of-state, please list these states and countries.

APPENDIX B: WISCONSIN WINERIES SURVEY 2011 RESULTS (JUNE 2, 2011)

Winery Name	Completed Survey	Question 1 Do you produce wine(s) with Wisconsin grown grapes?	Question 2 Do you grow grapes?	Question 3 Do you purchase Wisconsin grown grapes?	Question 4 A Are you interested in purchasing Wisconsin grown grapes? If so, which varieties?	Question 4 B Are you interested in purchasing Wisconsin grown grapes? If so, which varieties?	Question 5 A Do you purchase grapes, juice and/or wine from out-of-state?	Question 5 B If you purchase grapes, juice and/or wine from out-of-state, please list these states and countries.
Winery 1	No							
Winery 2	No							
Winery 3	No							
Winery 4	No							
Winery 5	No							
Winery 6	No							
Winery 7	No							
Winery 8	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Winery 9	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Winery 10	Yes	Yes	No	Yes	Yes	La Crescent, LaCrosse, St.Pepin	No	N/A
Winery 11	Yes	No	No	No	Yes	Red	No	N/A
Winery 12	Yes	No	No	No	No	N/A	No	N/A
Winery 13	Yes	No	No	No	No	N/A	No	N/A
Winery 14	Yes	No	No	No	Yes	Unknown	No	N/A
Winery 15	Yes	Yes	No	Yes	Yes	Frontenac, Marechal Foch, Leon Millot, St. Pepin	No	N/A
Winery 16	Yes	No	No	No	No	N/A	No	N/A
Winery 17	Yes	No	No	No	No	N/A	No	N/A
Winery 18	Yes	No	No	No	No	N/A	No	N/A
Winery 19	Yes	No	No	No	No	N/A	No	N/A
Winery 20	Yes	Yes	No	Yes	Yes	Sabrevois	No	N/A
Winery 21	Yes	No	No	No	No	N/A	No	N/A
Winery 22	Yes	No	No	No	No	N/A	No	N/A
Winery 23	Yes	No	No	No	No	N/A	No	N/A
Winery 24	Yes	Yes	Yes	Yes	Yes	Must be certified organic grapes	No	N/A
Winery 25	Yes	Yes	Yes	No	Yes	Marechal Foch, St. Pepin	No	N/A
Winery 26	Yes	No	Yes	No	Yes	Frontenac, La Crescent, Seyval Blanc, Marquette	No	N/A
Winery 27	Yes	No	Yes	No	Yes	Marechal Foch, Marquette	No	N/A
Winery 28	Yes	Yes	Yes	Yes	Yes	La Crescent	No	N/A
Winery 29	Yes	Yes	Yes	No	Yes	Unknown	No	N/A
Winery 30	Yes	Yes	Yes	Yes	Yes	Unknown	No	N/A
Winery 31	Yes	Yes	Yes	No	No	N/A	No	N/A
Winery 32	Yes	No	Yes	No	No	N/A	No	N/A
Winery 33	Yes	No	No	No	No	N/A	Yes	California, Washington, Italy, Australia
Winery 34	Yes	Yes	No	Yes	Yes	Marquette	Yes	California, New York, Washington
Winery 35	Yes	Yes	No	Yes	Yes	Marquette	Yes	New York, Washington
Winery 36	Yes	No	No	No	No	N/A	Yes	Kentucky
Winery 37	Yes	No	No	No	No	N/A	Yes	California, Washington
Winery 38	Yes	No	No	No	Yes	Unknown	Yes	California
Winery 39	Yes	No	No	No	No	N/A	Yes	California
Winery 40	Yes	No	No	No	Yes	Marechal Foch, Seyval Blanc	Yes	California, New York, Oregon, Washington
Winery 41	Yes	Yes	No	Yes	Yes	Seyval Blanc	Yes	New York
Winery 42	Yes	Yes	No	Yes	Yes	Concord, Whites	Yes	California, New York, Oregon, Washington
Winery 43	Yes	No	No	No	Yes	Juice	Yes	California, Oregon, Washington, Germany
Winery 44	Yes	No	No	No	No	N/A	Yes	California, Oregon, Texas, Washington, Canada
Winery 45	Yes	No	No	No	Yes	Juice	Yes	California
Winery 46	Yes	No	No	No	No	N/A	Yes	Unknown
Winery 47	Yes	No	No	No	No	N/A	Yes	Unknown
Winery 48	Yes	Yes	No	Yes	Yes	Marquette, Marechal Foch	Yes	California, New York, Washington
Winery 49	Yes	Yes	No	Yes	No	N/A	Yes	California, New York, Pennsylvania
Winery 50	Yes	Yes	Yes	No	No	N/A	Yes	Alabama, Washington
Winery 51	Yes	Yes	Yes	No	No	N/A	Yes	Did not answer

APPENDIX B: WISCONSIN WINERIES SURVEY 2011 RESULTS (JUNE 2, 2011)

Winery Name	Completed Survey	Question 1 Do you produce wine(s) with Wisconsin grown grapes?	Question 2 Do you grow grapes?	Question 3 Do you purchase Wisconsin grown grapes?	Question 4 A Are you interested in purchasing Wisconsin grown grapes? If so, which varieties?	Question 4 B Are you interested in purchasing Wisconsin grown grapes? If so, which varieties?	Question 5 A Do you purchase grapes, juice and/or wine from out-of-state?	Question 5 B If you purchase grapes, juice and/or wine from out-of-state, please list these states and countries.
Winery 52	Yes	Yes	Yes	No	Yes	St. Pepin, Steuben, LaCrosse, Sabrevois, Marquette	Yes	California, New York, Oregon, Washington, Argentina, Europe, Canada
Winery 53	Yes	Yes	Yes	Yes	Yes	LaCrosse, St. Pepin, Prairie Star, Lorelei, Brianna	Yes	Pennsylvania
Winery 54	Yes	Yes	Yes	No	Yes	Edelweiss, Sabrevois	Yes	California
Winery 55	Yes	Yes	Yes	Yes	Yes	LaCrosse, Seyval Blanc	Yes	California, New York
Winery 56	Yes	Yes	Yes	Yes	Yes	Edelweiss, Frontenac	Yes	New York
Winery 57	Yes	No	Yes	No	No	N/A	Yes	California
Winery 58	Yes	Yes	Yes	Yes	Yes	Marquette, St. Croix, Leon Millot, Frontenac, Marechal Foch, Frontenac gris, St. Pepin, La Crescent, LaCrosse	Yes	California, Washington, Illinois, Michigan, New York
Winery 59	Yes	No	Yes	No	No	N/A	Yes	California, New York, Washington
Winery 60	Yes	Yes	Yes	No	Yes	Frontenac, Frontenac gris, La Crescent, Marquette, St. Pepin	Yes	California, Washington
Winery 61	Yes	No	Yes	Yes	Yes	Frontenac, Frontenac gris, Marquette	Yes	California, Washington
Winery 62	Yes	Yes	Yes	Yes	Yes	Frontenac gris, Marquette, Frontenac blanc, Prairie Star, La Crescent	Yes	Unknown
Winery 63	Yes	Yes	Yes	Yes	Yes	La Crescent, Marquette, St. Pepin, Seyval Blanc, Marechal Foch, Frontenac	Yes	California
Winery 64	Yes	Yes	Yes	Yes	Yes	Frontenac, Frontenac gris, La Crescent	Yes	New York, Washington
Winery 65	Yes	Yes	Yes	Yes	Yes	La Crescent, Frontenac, Frontenac gris	Yes	California, Washington, New York
Winery 66	Yes	No	Yes	No	No	N/A	Yes	California, New York, Washington
Winery 67	Yes	Yes	Yes	Yes	Yes	LaCrosse, St. Pepin	Yes	Michigan, New York
Winery 68	Yes	Yes	Yes	Yes	Yes	Marquette, Marechal Foch, La Crescent, St. Croix	Yes	Michigan, New York
Winery 69	Yes	Yes	Yes	Yes	No	N/A	Yes	New York
Winery 70	Yes	No	Yes	No	No	N/A	Yes	California
Winery 71	Yes	No	Yes	No	Yes	Unknown	Yes	Oregon, California, Michigan, Ontario
Winery 72	Yes	Yes	Yes	Yes	Yes	Frontenac gris	Yes	California
Winery 73	Yes	Yes	Yes	Yes	Yes	Marechal Foch, Frontenac, Frontenac gris, Leon Millot, Delaware, Marquette, Moores Diamond, St. Pepin, Concord, Catawba, Seyval Blanc, Niagara	Yes	New York
Winery 74	Yes	Yes	Yes	Yes	Yes	Leon Millot, Marechal Foch, white grapes	Yes	California
Winery 75	Yes	Yes	Yes	No	Yes	La Crescent	Yes	Michigan
Winery 76	Yes	Yes	Yes	No	Yes	Concord, Edelweiss, Traminette	Yes	New York
Winery 77	Yes	Yes	Yes	Yes	Yes	LaCrosse, St. Pepin and La Crescent, Marquette	Yes	New York, Washington
Winery 78	No							
Winery 79	No							
Winery 80	No							
Winery 81	No							

APPENDIX C: WISCONSIN WINERIES TT&B & WI WINERY PERMITS

TTB #	WI Winery Permit	Winery Name
WI-W-68	Yes	Apple Barn Orchard & Winery
WI-W-78	Yes	Appletreow Winery
WI-W-15055	Yes	Armstrong Apples
WI-W-15042	No	Autumn Winery
WI-W-15005	Yes	Autumn Harvest Winery
WI-W-15030	Yes	Bauer-Kearns Winery
WI-W-62	Yes	Bayfield Winery, LTD.
WI-W-60	Yes	Botham Vineyards & Winery
WI-W-86	Yes	Brigadoon Winery
WI-W-84	Yes	Burr Oak Winery
WI-W-15039	Yes	Cap N Corks
WI-W-15019	Yes	Captain's Walk Winery
WI-W-58	Yes	Cedar Creek Winery
WI-W-15000	Yes	Chateau St. Croix Winery & Vineyard
WI-W-87	Yes	Clover Meadow Winery
WI-W-15046	Yes	Cold Spring Vineyard
WI-W-15045	Yes	Danzinger Vineyards
WI-W-15008	Yes	DNA Vintners
WI-W-53	Yes	Door Peninsula Winery
WI-W-15054	Yes	Elmaro Vineyard (West Prairie Winery, LLC)
WI-W-15064	Yes	Fawn Creek Vineyard & Winery
WI-W-15057	Yes	Fermenting Cellars
WI-W-15067	No	Fisher King Winery
WI-W-15009	No	Galloway Company
WI-W-15053	Yes	Grandpa Fro's Invention Farm & Country Winery
WI-W-15051	Yes	Harbor Ridge Winery
WI-W-15012	Yes	Hook Stone Winery
WI-W-15060	Yes	Infinity Beverages
WI-W-72	Yes	Kerrigan Brothers Winery
WI-W-15047	Yes	Landta Wines LLC (Wine Tyme Winery)
WI-W-15014	Yes	Ledgestone Vineyards
WI-W-20002	Yes	Lewis Station (The Wine Vineyard LLC)
WI-W-15003	Yes	Lil' Ole Winemaker Shoppe
WI-W-15028	Yes	Maiden Rock Winery & Cidery
WI-W-15027	Yes	Maiden Wines
WI-W-79	Yes	Mason Creek Winery
Custom Crush Client	No	Muller Wines
WI-W-15013	Yes	Munson Bridge Winery
2011	No	Musetta
WI-W-63	Yes	New Glarus Primrose Winery
WI-W-15031	Yes	Northleaf Winery
WI-W-15038	Yes	O'Neil Creek Winery
WI-W-76	Yes	Orchard Country Winery
WI-W-15016	Yes	Parallel 44 Vineyard & Winery
WI-W-15022	Yes	Pine River Winery
WI-W-15024	Yes	Quinney Estate Winery
WI-W-88	Yes	Red Oak Vineyard
WI-W-15032	Yes	River Bend Vineyard & Winery
WI-W-15058	Yes	S&J Winery LLC
WI-W-15062	No	Sandstone Ridge
WI-W-15020	Yes	Seven Hawks Vineyards
WI-W-81	Yes	Simon Creek Vineyard & Winery
WI-W-15018	Yes	Sinnipee Valley Vineyard
WI-W-15043	Yes	Spurgeon Vineyards & Winery
WI-W-15021	Yes	Staller Estate Winery
WI-W-65	Yes	Stone's Throw Winery
WI-W-15044	No	Studio Winery
WI-W-83	Yes	Tenba Ridge Winery
WI-W-15058	Yes	The Chiselled Grape Winery
WI-W-15034	No	The Wine Zellar
WI-W-15049	Yes	The WineSitters
WI-W-32	Yes	Three Lakes Winery
WI-W-15036	No	Tourdote Winery
WI-W-15007	No	Trade River Winery
WI-W-85	Yes	Trout Springs Winery
WI-W-15041	Yes	Two Brothers Wines LLC
WI-W-15026	Yes	Valley Vineyard
WI-W-15059	Yes	Van Price Innovations LLC (Lance's Winery)
WI-W-71	Yes	Van Wychen Wines, INC.
WI-W-15007	Yes	Vernon Vineyards
WI-W-15056	Yes	Vetro Winery, LLC
WI-W-15033	Yes	Vines to Cellar
Custom Crush Client	No	Vino in the Valley
WI-W-67	Yes	Von Klaus Winery
WI-W-45	Yes	Von Stiehl Winery
WI-W-82	Yes	Weggy Winery
WI-W-15025	Yes	Whispering Winds Winery LLC
WI-W-64	Yes	White Winter Winery
WI-W-34	Yes	Wollersheim Winery
WI-W-57	Yes	Woodland Trail Winery
WI-W-15040	Yes	Zydeco Cyder Company, INC (Shepard's Hard Cyder Winery)

APPENDIX D: WISCONSIN WINERIES BY COUNTY

TTB #	Winery Name	County
WI-W-62	Bayfield Winery, LTD.	Bayfield
WI-W-64	White Winter Winery	Bayfield
WI-W-15014	Ledgestone Vineyards	Brown
WI-W-85	Trout Springs Winery	Brown
WI-W-15045	Danzinger Vineyards	Buffalo
WI-W-15020	Seven Hawks Vineyards	Buffalo
WI-W-15007	Trade River Winery	Burnett
WI-W-15024	Quinney Estate Winery	Calumet
WI-W-15005	Autumn Harvest Winery	Chippewa
WI-W-15038	O'Neil Creek Winery	Chippewa
WI-W-15032	River Bend Vineyard & Winery	Chippewa
WI-W-15013	Munson Bridge Winery	Clark
WI-W-15064	Fawn Creek Vineyard & Winery	Columbia
WI-W-15036	Tourdot Winery	Columbia
WI-W-15067	Fisher King Winery	Dane
WI-W-53	Door Peninsula Winery	Door
WI-W-15051	Harbor Ridge Winery	Door
WI-W-76	Orchard Country Winery	Door
WI-W-88	Red Oak Vineyard	Door
WI-W-81	Simon Creek Vineyard & Winery	Door
WI-W-65	Stone's Throw Winery	Door
WI-W-15047	Landta Wines LLC (Wine Tyme Winery)	Douglas
Custom Crush Client	Muller Wines	Douglas
WI-W-15019	Captain's Walk Winery	Dunn
WI-W-15039	Cap N Corks	Eau Claire
WI-W-15060	Infinity Beverages	Eau Claire
WI-W-15055	Armstrong Apples	Fond du Lac
WI-W-15030	Bauer-Kearns Winery	Grant
WI-W-15018	Sinnipee Valley Vineyard	Grant
WI-W-82	Weggy Winery	Grant
WI-W-15025	Whispering Winds Winery LLC	Grant
WI-W-63	New Glarus Primrose Winery	Green
WI-W-60	Botham Vineyards & Winery	Iowa
WI-W-15043	Spurgeon Vineyards & Winery	Iowa
WI-W-15062	Sandstone Ridge Vineyard & Winery	Jackson
WI-W-20002	Lewis Station Winery (The Wine Vineyard LLC)	Jefferson
WI-W-15056	Vetro Winery, LLC	Jefferson
WI-W-84	Burr Oak Winery	Juneau
WI-W-15016	Parallel 44 Vineyard & Winery	Kewaunee
WI-W-45	Von Stiehl Winery	Kewaunee
WI-W-15008	DNA Vintners	La Crosse
WI-W-15049	The WineSitters	La Crosse
WI-W-15053	Grandpa Fro's Invention Farm & Country Winery	Langlade
WI-W-15059	Van Price Innovations LLC	Langlade
WI-W-15003	Li'l Ole Winemaker Shoppe	Marathon
WI-W-15058	S&J Winery LLC	Monroe
WI-W-71	Van Wychen Wines, INC.	Monroe
WI-W57	Woodland Trail Winery	Oconto
WI-W-86	Brigadoom Winery	Oneida
WI-W-32	Three Lakes Winery	Oneida
WI-W-72	Kerrigan Brothers Winery	Outagamie
WI-W-58	Cedar Creek Winery	Ozaukee
WI-W-15058	The Chiselled Grape Winery	Ozaukee
WI-W-15033	Vines to Cellar	Ozaukee
WI-W-15028	Maiden Rock Winery & Cidery	Pepin
2011	Musetta	Pepin
WI-W-15027	Maiden Wines	Pierce
WI-W-15026	Valley Vineyard	Pierce
Custom Crush Client	Vino in the Valley	Pierce
WI-W-15042	Autumn Winery	Polk
WI-W-15000	Chateau St. Croix Winery & Vineyard	Polk
WI-W-78	Appletreow Winery	Racine
WI-W-15040	Zydeco Cyder Company, INC (Shepard's Hard Cyder Winery)	Richland
WI-W-15057	Fermenting Cellars	Rock
WI-W-15031	Northleaf Winery	Rock
WI-W-67	Von Klaus Winery	Sauk
WI-W-34	Wollersheim Winery	Sauk
WI-W-15012	Hook Stone Winery	Sawyer
WI-W-15054	Elmaro Vineyard (West Prairie Winery, LLC)	Trempealeau
WI-W-83	Tenba Ridge Winery	Trempealeau
WI-W-15007	Vernon Vineyards	Vernon
WI-W-68	Apple Barn Orchard & Winery	Walworth
WI-W-15021	Staller Estate Winery	Walworth
WI-W-15044	Studio Winery	Walworth
WI-W-87	Clover Meadow Winery	Washburn
WI-W-15046	Cold Spring Vineyard	Washington
WI-W-15034	The Wine Zellar	Washington
WI-W-79	Mason Creek Winery	Waukesha
WI-W-15041	Two Brothers Wines LLC	Waukesha
WI-W-15022	Pine River Winery	Waushara
WI-W-15009	Galloway Company	Winnebago

APPENDIX E: WISCONSIN WINERY COOPERATIVE MEMBERS AS OF OCTOBER 2010

TTB #	Winery Name	Member of Wisconsin Winery Cooperative as of October 2010
Iowa	*Eagle's Landing Winery, LLC (Iowa)	Yes
WI-W-68	Apple Barn Orchard & Winery	No
WI-W-78	Appletreow Winery	No
WI-W-15055	Armstrong Apples	No
WI-WI-15005	Autumn Harvest Winery	No
WI-W-15042	Autumn Winery	No
WI-W-15030	Bauer-Kearns Winery	No
WI-W-62	Bayfield Winery, LTD.	Yes
WI-W-60	Botham Vineyards & Winery	No
WI-W-86	Brigadoom Winery	Yes
WI-W-84	Burr Oak Winery	Yes
WI-W-15039	Cap N Corks	No
WI-W-15019	Captain's Walk Winery	No
WI-W-58	Cedar Creek Winery	No
WI-W-15000	Chateau St. Croix Winery & Vineyard	No
WI-W-87	Clover Meadow Winery	No
WI-W-15046	Cold Spring Vineyard	No
WI-W-15045	Danzinger Vineyards	No
WI-W-15008	DNA Vintners	Yes
WI-W-53	Door Peninsula Winery	No
WI-W-15054	Elmaro Vineyard (West Prairie Winery, LLC)	No
WI-W-15064	Fawn Creek Vineyard & Winery	No
WI-W-15057	Fermenting Cellars	No
WI-W-15067	Fisher King Winery	No
WI-W-15009	Galloway Company	No
WI-W-15053	Grandpa Fro's Invention Farm & Country Winery	Yes
WI-W-15051	Harbor Ridge Winery	No
WI-W-15012	Hook Stone Winery	Yes
WI-W-15060	Infinity Beverages	No
WI-W-72	Kerrigan Brothers Winery	Yes
WI-W-15047	Landta Wines LLC (Wine Tyme Winery)	No
WI-W-15014	Ledgestone Vineyards	Yes
WI-W-20002	Lewis Station Winery (The Wine Vineyard LLC)	No
WI-W-15003	Lil' Ole Winemaker Shoppe	Yes
WI-W-15028	Maiden Rock Winery & Cidery	No
WI-W-15027	Maiden Wines	Yes
WI-W-79	Mason Creek Winery	No
Custom Crush Client	Muller Wines	No
WI-W-15013	Munson Bridge Winery	Yes
2011	Musetta	No
WI-W-63	New Glarus Primrose Winery	Yes
WI-W-15031	Northleaf Winery	No
WI-W-15038	O'Neil Creek Winery	No
WI-W-76	Orchard Country Winery	No
WI-W-15016	Parallel 44 Vineyard & Winery	No
WI-W-15022	Pine River Winery	No
WI-W-15024	Quinney Estate Winery	No
WI-W-88	Red Oak Vineyard	Yes
WI-W-15032	River Bend Vineyard & Winery	No
WI-W-15058	S&J Winery LLC	No
WI-W-15062	Sandstone Ridge Vineyard & Winery	No
WI-W-15020	Seven Hawks Vineyards	Yes
WI-W-81	Simon Creek Vineyard & Winery	No
WI-W-15018	Sinnipee Valley Vineyard	Yes
WI-W-15043	Spurgeon Vineyards & Winery	No
WI-W-15021	Staller Estate Winery	No
WI-W-65	Stone's Throw Winery	No
WI-W-15044	Studio Winery	No
WI-W-83	Tenba Ridge Winery	No
WI-W-15058	The Chiselled Grape Winery	No
WI-W-15034	The Wine Zellar	No
WI-W-15049	The WineSitters	Yes
WI-W-32	Three Lakes Winery	No
WI-W-15036	Tourdot Winery	N/A
WI-W-15007	Trade River Winery	N/A
WI-W-85	Trout Springs Winery	Yes
WI-W-15041	Two Brothers Wines LLC	No
WI-W-15026	Valley Vineyard	No
WI-W-15059	Van Price Innovations LLC (Lance's Winery)	No
WI-W-71	Van Wychen Wines, INC.	No
WI-W-15007	Vernon Vineyards	No
WI-W-15056	Vetro Winery, LLC	Yes
WI-W-15033	Vines to Cellar	Yes
Custom Crush Client	Vino in the Valley	No
WI-W-67	Von Klaus Winery	No
WI-W-45	Von Stiehl Winery	No
WI-W-82	Weggy Winery	Yes
WI-W-15025	Whispering Winds Winery LLC	No
WI-W-64	White Winter Winery	No
WI-W-34	Wollersheim Winery	No
WI-W57	Woodland Trail Winery	Yes
WI-W-15040	Zydeco Cyder Company, INC (Shepard's Hard Cyder Winery)	No

APPENDIX F: BADGER STATE WINERY COOPERATIVE MEMBERS AS OF OCTOBER 2010

TTB #	Winery Name	Member of Badger State Winery Cooperative of October 2010
WI-W-68	Apple Barn Orchard & Winery	Yes
WI-W-78	Appletreow Winery	No
WI-W-15055	Armstrong Apples	No
WI-W-15005	Autumn Harvest Winery	Yes
WI-W-15042	Autumn Winery	No
WI-W-15030	Bauer-Kearns Winery	Yes
WI-W-62	Bayfield Winery, LTD.	No
WI-W-60	Botham Vineyards & Winery	No
WI-W-86	Brigadoom Winery	No
WI-W-84	Burr Oak Winery	No
WI-W-15039	Cap N Corks	No
WI-W-15019	Captain's Walk Winery	No
WI-W-58	Cedar Creek Winery	No
WI-W-15000	Chateau St. Croix Winery & Vineyard	No
WI-W-87	Clover Meadow Winery	No
WI-W-15046	Cold Spring Vineyard	No
WI-W-15045	Danzinger Vineyards	Yes
WI-W-15008	DNA Vintners	No
WI-W-53	Door Peninsula Winery	No
WI-W-15054	Elmaro Vineyard (West Prairie Winery, LLC)	No
WI-W-15064	Fawn Creek Vineyard & Winery	No
WI-W-15057	Fermenting Cellars	No
WI-W-15067	Fisher King Winery	No
WI-W-15009	Galloway Company	No
WI-W-15053	Grandpa Fro's Invention Farm & Country Winery	No
WI-W-15051	Harbor Ridge Winery	No
WI-W-15012	Hook Stone Winery	No
WI-W-15060	Infinity Beverages	No
WI-W-72	Kerrigan Brothers Winery	No
WI-W-15047	Landta Wines LLC (Wine Tyme Winery)	No
WI-W-15014	Ledgestone Vineyards	No
WI-W-20002	Lewis Station Winery (The Wine Vineyard LLC)	No
WI-W-15003	Lil' Ole Winemaker Shoppe	No
WI-W-15028	Maiden Rock Winery & Cidery	Yes
WI-W-15027	Maiden Wines	No
WI-W-79	Mason Creek Winery	No
Custom Crush Client	Muller Wines	No
WI-W-15013	Munson Bridge Winery	No
2011	Musetta	No
WI-W-63	New Glarus Primrose Winery	No
WI-W-15031	Northleaf Winery	Yes
WI-W-15038	O'Neil Creek Winery	No
WI-W-76	Orchard Country Winery	No
WI-W-15016	Parallel 44 Vineyard & Winery	No
WI-W-15022	Pine River Winery	No
WI-W-15024	Quinney Estate Winery	No
WI-W-88	Red Oak Vineyard	No
WI-W-15032	River Bend Vineyard & Winery	No
WI-W-15058	S&J Winery LLC	No
WI-W-15062	Sandstone Ridge Vineyard & Winery	No
WI-W-15020	Seven Hawks Vineyards	No
WI-W-81	Simon Creek Vineyard & Winery	No
WI-W-15018	Sinnipee Valley Vineyard	No
WI-W-15043	Spurgeon Vineyards & Winery	No
WI-W-15021	Staller Estate Winery	Yes
WI-W-65	Stone's Throw Winery	No
WI-W-15044	Studio Winery	No
WI-W-83	Tenba Ridge Winery	Yes
WI-W-15058	The Chiselled Grape Winery	No
WI-W-15034	The Wine Zellar	No
WI-W-15049	The WineSitters	No
WI-W-32	Three Lakes Winery	No
WI-W-15036	Tourdote Winery	N/A
WI-W-15007	Trade River Winery	N/A
WI-W-85	Trout Springs Winery	No
WI-W-15041	Two Brothers Wines LLC	No
WI-W-15026	Valley Vineyard	Yes
WI-W-15059	Van Price Innovations LLC (Lance's Winery)	No
WI-W-71	Van Wychen Wines, INC.	Yes
WI-W-15007	Vernon Vineyards	No
WI-W-15056	Vetro Winery, LLC	No
WI-W-15033	Vines to Cellar	No
Custom Crush Client	Vino in the Valley	No
WI-W-67	Von Klaus Winery	No
WI-W-45	Von Stiehl Winery	No
WI-W-82	Weggy Winery	No
WI-W-15025	Whispering Winds Winery LLC	Yes
WI-W-64	White Winter Winery	No
WI-W-34	Wollersheim Winery	No
WI-W57	Woodland Trail Winery	No
WI-W-15040	Zydeco Cyder Company, INC (Shepard's Hard Cyder Winery)	No

APPENDIX G: WISCONSIN WINERY ASSOCIATION MEMBERS & WISCONSIN GRAPE GROWERS ASSOCIATION MEMBERS

TTB #	Winery Name	WWA Members	WGGA Members
WI-W-68	Apple Barn Orchard & Winery	Yes	No
WI-W-78	Appletreow Winery	Yes	No
WI-W-15055	Armstrong Apples	Yes	No
WI-WI-15042	Autmn Winery	No	No
WI-W-15005	Autumn Harvest Winery	Yes	No
WI-W-15030	Bauer-Kearns Winery	No	No
WI-W-62	Bayfield Winery, LTD.	Yes	No
WI-W-60	Botham Vineyards & Winery	No	No
WI-W-86	Brigadoom Winery	No	No
WI-W-84	Burr Oak Winery	Yes	No
WI-W-15039	Cap N Corks	Yes	No
WI-W-15019	Captain's Walk Winery	Yes	No
WI-W-58	Cedar Creek Winery	Yes	Yes
WI-W-15000	Chateau St. Croix Winery & Vineyard	Yes	No
WI-W-87	Clover Meadow Winery	Yes	No
WI-W-15046	Cold Spring Vineyard	No	Yes
WI-W-15045	Danzinger Vineyards	Yes	Yes
WI-W-15008	DNA Vintners	No	No
WI-W-53	Door Peninsula Winery	Yes	Yes
WI-W-15054	Elmaro Vineyard (West Prairie Winery, LLC)	Yes	Yes
WI-W-15064	Fawn Creek Vineyard & Winery	Yes	No
WI-W-15057	Fermenting Cellars	No	No
WI-W-15067	Fisher King Winery	No	Yes
WI-W-15009	Galloway Company	No	No
WI-W-15053	Grandpa Fro's Invention Farm & Country Winery	No	No
WI-W-15051	Harbor Ridge Winery	Yes	No
WI-W-15012	Hook Stone Winery	Yes	No
WI-W-15060	Infinity Beverages	No	No
WI-W-72	Kerrigan Brothers Winery	Yes	No
WI-W-15047	Landta Wines LLC	No	No
WI-W-15014	Ledgestone Vineyards	Yes	Yes
WI-W-20002	Lewis Station Winery (The Wine Vineyard LLC)	No	No
WI-W-15003	Lil' Ole Winemaker Shoppe	No	No
WI-W-15028	Maiden Rock Winery & Cidery	Yes	Yes
WI-W-15027	Maiden Wines	No	No
WI-W-79	Mason Creek Winery	No	No
Custom Crush Client	Muller Wines	No	No
WI-W-15013	Munson Bridge Winery	Yes	No
2011	Musetta	No	No
WI-W-63	New Glarus Primrose Winery	Yes	No
WI-W-15031	Northleaf Winery	Yes	No
WI-W-15038	O'Neil Creek Winery	Yes	Yes
WI-W-76	Orchard Country Winery	Yes	No
WI-W-15016	Parallel 44 Vineyard & Winery	Yes	Yes
WI-W-15022	Pine River Winery	No	No
WI-W-15024	Quinney Estate Winery	No	Yes
WI-W-88	Red Oak Vineyard	No	No
WI-W-15032	River Bend Vineyard & Winery	Yes	No
WI-W-15058	S&J Winery LLC	No	No
WI-W-15062	Sandstone Ridge Vineyard & Winery	No	Yes
WI-W-15020	Seven Hawks Vineyards	Yes	No
WI-W-81	Simon Creek Vineyard & Winery	Yes	No
WI-W-15018	Sinnipee Valley Vineyard	No	Yes
WI-W-15043	Spurgeon Vineyards & Winery	Yes	No
WI-W-15021	Staller Estate Winery	Yes	No
WI-W-65	Stone's Throw Winery	Yes	No
WI-W-15044	Studio Winery	No	No
WI-W-83	Tenba Ridge Winery	Yes	No
WI-W-15058	The Chiselled Grape Winery	No	Yes
WI-W-15034	The Wine Zellar	No	No
WI-W-15049	The WineSitters	No	No
WI-W-32	Three Lakes Winery	Yes	No
WI-W-15036	Tourdot Winery	N/A	N/A
WI-W-15007	Trade River Winery	N/A	N/A
WI-W-85	Trout Springs Winery	Yes	No
WI-W-15041	Two Brothers Wines LLC	No	No
WI-W-15026	Valley Vineyard	No	No
WI-W-15059	Van Price Innovations LLC (Lance's Winery)	No	No
WI-W-71	Van Wychen Wines, INC.	No	No
WI-W-15007	Vernon Vineyards	Yes	No
WI-W-15056	Vetro Winery, LLC	Yes	Yes
WI-W-15033	Vines to Cellar	Yes	No
Custom Crush Client	Vino in the Valley	No	No
WI-W-67	Von Klaus Winery	No	No
WI-W-45	Von Stiehl Winery	Yes	No
WI-W-82	Weggy Winery	Yes	Yes
WI-W-15025	Whispering Winds Winery LLC	No	No
WI-W-64	White Winter Winery	Yes	No
WI-W-34	Wollersheim Winery	Yes	Yes
WI-W57	Woodland Trail Winery	No	No
WI-W-15040	Zydeco Cyder Company, INC (Shepard's Hard Cyder Winery)	No	No

REPORT OF WISCONSIN GRAPE GROWERS SURVEY 2011

(Published December 2011)



Survey Director
Becky Rochester
Wisconsin Grape Marketing Coordinator

Contributors and Sponsors

Wisconsin Grape Growers Association
Wisconsin Winery Association
Tim Rehbein, Vernon County UW-Extension Agricultural Agent

REPORT OF WISCONSIN GRAPE GROWERS SURVEY 2011

Introduction: In February 2011, the Wisconsin Grape Growers Survey 2011 was developed by Becky Rochester, Grape Marketing Coordinator for the Wisconsin Grape Growers Association (WGGA), with the support of the Wisconsin Winery Association (WWA) and Tim Rehbein, Vernon County UW-Extension Agricultural Agent. The Grape Marketing Coordinator position is currently funded by a USDA Specialty Crops Grant 2010. The information collected will be used as a baseline to measure growth of the Wisconsin grape and wine industry. To measure the current state of Wisconsin vineyards in Wisconsin, a survey was conducted to 301 individuals. The list includes all WGGA Members and other individuals who are not members of WGGA but either currently grow grapes, plan to plant grapes in the future or have an interest in the industry, and it was compiled by Becky Rochester.

Objective: The purpose of this survey was to get a better understanding of the present cold climate grape growing industry in Wisconsin. By documenting where we are today, we will be able to better assess growth and trends in the future.

The surveys objectives assess the following: 1) the current number of grape growers in Wisconsin, 2) the current number of grape growers in Wisconsin by county, 3) the year the vineyard was first planted, 4) the total acreage of grapes planted today (bearing), 5) the total acreage of grapes planted today (non-bearing), 6) total acreage of grapes planted by county, 7) grape varieties planted prior to 2007, 8) grape varieties planted 2007-2010, 9) grape varieties pulled out and why they were pulled out, 10) if planning to plant more grapes in the future and if so how many acres and which varieties, 11) total pounds of grapes harvested in 2010 (pounds/tons) and what was done with them, 12) varieties and pounds per variety looking to sell for the 2011 harvest (pounds/tons), 13) whether have a bonded winery or starting one in the next five years, 14) whether attended the 2011 Wisconsin Fresh Fruit & Vegetable Conference, 15) whether a current WGGA Member or would like information on becoming a member and 16) any additional comments or feedback.

Methodology: The survey¹ was comprised of six parts: General Information, Vineyard Information, Grape Varieties Planted Today, Planting Grapes In Future Acreage & Varieties, Grape Harvest and Misc. Information. The survey was largely distributed electronically via email and gave the individual the option to either take the survey online by clicking on a link to the survey created in Google Docs or by printing the attached Adobe PDF document and mailing it back. There were 57 people in the database without an email address, so a hard copy survey was mailed to them. The reason for conducting this survey electronically was to reduce the costs associated with postage and copying and to speed up the data collection time.

The survey was first emailed on March 4, 2011 to all members of the Wisconsin Grape Growers Association (WGGA) by Becky Rochester. Responses were collected from March 4, 2011 to October 2, 2011. Please see Table 1 for Survey Implementation Schedule:

Date	Activity
March 4, 2011	First emailing of survey
April 1, 2011	Second emailing of survey
April 15-September 30, 2011	Telephone follow-up to non-respondents
October 2, 2011	Survey closed

¹ Wisconsin Grape Growers Survey 2011 Appendix A.

Response Rate: To measure the current state of Wisconsin vineyards in Wisconsin, a survey was conducted to 301 individuals. There were 30 people in the database who did not qualify for the survey (vineyard out-of-state, are an associate or affiliate member of WGGGA or do not grow grapes or are a hobby grower who only has a couple of vines in their backyard); therefore, a revised survey population was set to 271 instead of the initial 301. There were 141 growers who responded to the survey for a 52.03% response rate. There were 130 growers who did not respond to the survey for a 47.97% non-response rate.

Overview of Wisconsin Grape and Wine Industry: Over the past five years there has been tremendous growth in the Wisconsin wine industry. Wineries are being approached by more and more growers who are looking to sell their grapes. The market for grapes is very competitive, and there is currently a shortage of Wisconsin grown grapes in Wisconsin. In Wisconsin grapes are grown for use in wine, fresh fruit (table grapes), jam, jelly and for research purposes.

Wisconsin is divided into 5 distinct wine regions:

1. **Door County:** There's no place quite like Door County, which offers an intriguing mix of charming small towns, eclectic shops and eateries, and coastal views reminiscent of America's Atlantic Coast. You'll stumble upon fishing villages, small farms, numerous parks and nature areas that make the Door Peninsula a mesmerizing and rewarding place to explore.
2. **Glacial Hills Region:** Just minutes from the bustle of Milwaukee, wine enthusiasts will find respite in the wineries of the Glacial Hills region of Wisconsin. The defining geographic feature is the rolling landscape. Pristine remnants of forests, meadows and glacial formations are preserved by the Kettle Moraine State Forest, which offers trail systems for hiking, biking, bird watching or picnicking with your favorite bottle of wine.
3. **Driftless Region:** The Driftless Region is a land of surprises. The glaciers that shaped the majority of the state spared this region bordered by the Chippewa, Mississippi and Wisconsin Rivers. It is a landscape of high plateaus webbed with crystal clear rivers and cut by deep green valleys. Nearly every small stream that flows through the region is loaded with native brook trout and wild brown trout.
4. **Fox Valley:** From Lake Winnebago to Green Bay, Wisconsin's Fox Valley is quintessential Wisconsin, offering a mixture of neat dairy farms, sprawling waterscapes and hardworking communities. This complex and thriving region presents the visitor with a surprising mix of shopping, dining and attractions—and some of the most interesting wineries in the state.
5. **Northwoods Region:** The Northwoods of Wisconsin is famous for its beautiful lakes as well as its outstanding forest trails. You're never more than a mile or two from a designated hiking or biking trail. Northwoods lakes and flowages are famous for their great fishing and friendly resorts. Untamed rivers offer outstanding canoeing and kayaking.

Wisconsin American Viticultural Areas (AVA): Wisconsin has two AVA's—Lake Wisconsin and Upper Mississippi Valley. The Lake Wisconsin AVA was established in 1994 and is located in south central Wisconsin. It now is located within the Upper Mississippi Valley AVA. The wine growing region borders both Lake Wisconsin and the Wisconsin River. The first grapes were planted in the area by Agoston Haraszthy in 1847, before he would later immigrate to California. Most vineyards in the area are planted at elevations between 800 feet (240 m) and 900 feet (270 m) above sea level. Distinguishing features include transitional zone from unglaciated to glaciated topography. The area soils are gravel and sandy loam from glacial deposits. French hybrid grapes have had the most success in the Lake Wisconsin area, and the most important grape varietal grown in the area is Marechal Foch. The AVA covers 43.75 square miles in Columbia and Dane counties.

The Upper Mississippi Valley AVA covers 29,914 square miles (77,477 square kilometers) located along the Upper Mississippi River and its tributaries in northeast Iowa, northwest Illinois, southeast Minnesota and southwest Wisconsin. Upon its approval on June 22, 2009, with the effective date of July 22, 2009, it became

the world's largest designated appellation. The boundaries of the AVA share the unique geographical connection of all being part of the "driftless" Paleozoic Plateau and therefore do not have the same type of vineyard soils as wine regions that were in areas that have experienced glaciation in their history.

A third AVA, the Wisconsin Ledge, is currently set for approval by the TTB. If approved, the Wisconsin Ledge AVA would encompass some 3,800 square miles in northeastern Wisconsin including Door, Kewaunee, Manitowoc, Sheboygan, Ozaukee, Washington, Dodge, Fond du Lac, Calumet, Outagamie and Brown counties. Largely surrounded by water—notably Lakes Michigan and Winnebago, Green Bay and the Fox River—the Ledge sits on the Niagara Cuesta landform, an easterly sloping plateau on the western edge of the Niagara Escarpment.

Conclusions: Overall, the grape industry in Wisconsin has grown exponentially in the last five years. The majority of vineyards were planted between 2005-2010. The survey indicated that growers are committed to planting larger commercial vineyards in the next five years.

Based on the results from the Wisconsin Grape Growers Survey 2011, the total acreage reported was approximately 358.24 acres of which 260.86 acres were in the bearing stage and 97.38 acres were non-bearing; however, we estimate the total acreage to be closer to 750 acres statewide. For the purpose of this survey, an acre of grapes equates to 545 vines per acre with 8 feet by 10 feet plantings. Sometimes, vines per acre and actual acreage reported did not meet this estimated acreage. Therefore, the numbers reported by growers are best estimations. The largest vineyard reported was 24 acres. There were several respondents who indicated that they only had a backyard “hobby” vineyard.

There were 91 grape varieties that were reported planted in Wisconsin². These varieties include American, Seedless, Hybrid and Vinifera grapes. Frontenac, Marquette, St. Pepin, La Crescent, Frontenac gris, Marechal Foch, LaCrosse, St. Croix, Edelweiss, Prairie Star, Brianna and Sabrevois were the most widely planted varieties in Wisconsin.

Top 12 Grape Varieties Grown in Wisconsin:

1. **Frontenac:** Introduced in 1995, Frontenac is the first in a series of new wine grape varieties developed by the University of Minnesota for Upper Midwest conditions. A cross of *V. riparia* 89 with the French hybrid Landot 4511, Frontenac combines many of the best characteristics of each parent. Frontenac is a very cold hardy vine and has borne a full crop after temperatures as low as -30 F. It is also a very disease resistant variety with good resistance to powdery mildew and near-immunity to downy. Initially acids are high, but often drop dramatically late in the season. Fortunately, the pH does not often rise to dangerous levels. It produces only a moderate number of tendrils, which facilitates vine management. It has been used to produce dry red wine, rose', and port. Wines produced from Frontenac have cherry, blackberry, black currant and plum notes. Frontenac produces grapes with high sugar and high acidity, so acid reducing techniques are often used by the winemaker.
2. **Marquette:** Marquette is a promising red wine variety that combines high levels of cold hardiness, disease resistance, and excellent wine quality. It has withstood temperatures as low as -36 F without serious injury. Marquette is a cousin of Frontenac and grandson of Pinot noir. It originated from a cross of MN 1094, a complex hybrid of *V. riparia*, *V. vinifera*, and other *Vitis* species, with Ravat 262. Viticulturally, Marquette is outstanding. Resistance to downy mildew, powdery mildew, and black rot has been very good. Its open, orderly growth habit makes vine canopy management efficient. Marquette's high sugar and moderate acidity make it very manageable in the winery. Finished wines are complex, with attractive ruby color, pronounced tannins, and desirable notes of cherry, berry, black pepper, and spice on both nose and palate. As a red wine, Marquette represents a new standard in cold hardy viticulture and enology.

² A complete list of grape varieties reported planted in Wisconsin can be found in Appendix B.

3. **St. Pepin:** St. Pepin is a sister seedling of LaCrosse. It has the disadvantage of being pistillate (it requires cross pollination with another variety). One row of St. Pepin next to one row of another variety (i.e. LaCrosse) will do well. Unlike many wine grapes, St. Pepin is also pleasing either as a table grape or for juice. It should be pruned to a high bud count to make sure there is adequate fruit production. Small berries are formed on medium loose clusters. It ripens mid season to about 20 degrees Brix and 1.0% total acidity. When well ripened, fruit quality is similar to Riesling. St. Pepin makes a fruitier wine. Due to its winter hardiness and low acidity, it can be made into ice wine in the north. It was developed by Elmer Swenson.
4. **La Crescent:** La Crescent is a white wine grape from the University of Minnesota that has excellent winter hardiness (hardy to -36 F) and wine quality. The vine is very vigorous, moderately productive with a sprawling growth habit. It is moderately susceptible to black rot and powdery mildew and has a low susceptibility to Botrytis bunch rot, crown gall, Eutypa die back, and Phomopsis cane and leaf spot. Ripens mid-season. With an intense nose of apricot, peach, and citrus the wine is excellent as a dry or sweet wine. Sugar can develop to 22-27 degrees Brix with high acid.
5. **Frontenac gris:** Selected by the University of Minnesota. Frontenac gris is a bud sport of Frontenac, identical in most respects but lacking dark skin color. Culturally, it is identical to Frontenac, having high vigor and yields. Hardy to at least -38 F. Disease resistance is good, with moderate susceptibility to powdery mildew and black rot, and very low susceptibility to downy mildew. Small grey berries are born on medium sized, loose clusters. Berry splitting and botrytis have not been observed. Suitable for high quality table and dessert wines, possibly ice wine as well. Ripens mid season with aromas that include peach, apricot, citrus and pineapple. Labrusca and herbaceous aromas have not been detected. The unique flavors make this an excellent table grape as well.
6. **Marechal Foch:** Has synonym name Kuhlmann 188-2. Having good resistance to the usual diseases, it normally ripens in early September. Prof. Kuhlmann, the hybridizer, reported using an American riparia-rupestris hybrid variety as one of the parents but, confusingly, others argue that he instead somewhat misleadingly used the Oberlin 595 S.P, a Gamay based French-American hybrid developed by his father-in-law, in the cross with Gold Riesling that created the offspring cultivar. Marechal Foch is a very early ripening black grape with small berries. Vines are hardy with medium vigor and production. Marechal Foch can be made into a variety of wines ranging from a light red wine similar to Beaujolais, to a more extracted red wine with intense dark purple color and black fruit flavor, to a sweet, fortified, port-style wine.
7. **LaCrosse:** Hardy to -25 F. Vigor and disease resistance are moderate. Sugar can develop to 19-21 degrees Brix. This is one of the leading white wine varieties in some Upper Midwest states. It ripens late season. LaCrosse produces medium size white grapes much like Seyval Blanc. It makes a good stand alone varietal wine, but is also used for blending for lighter wines to add body and finish. When fermented in oak, LaCrosse makes a nice dry wine. Aromas range from pear, apricot, and slightly Muscat to citrus & floral, depending on the winemaking style. It was developed by Elmer Swenson.
8. **St. Croix:** St. Croix produces a sweet bluish-red grape that makes an excellent table grape, and is also great for red wine. Very winter hardy vines with little or no winter injury, vigorous growth and good resistance to powdery mildew and black rot. Hardy to -32 degrees F. Be sure not to pick the grapes before they are fully ripe, or you will miss out on full flavor (watch for fruit to turn a darker color). St. Croix makes a medium to full-bodied, dry, deep red wine with soft tannins and good fruit aromas, with currant and other dried fruit flavor qualities. It was developed by Elmer Swenson.
9. **Edelweiss:** Edelweiss is an early ripening, white grape that produces large clusters of medium-sized fruit that is sweet and has a pleasant flavor. It is very winter hardy and has excellent disease resistance, but may require winter protection for reliable fruiting in Zones 3 and 4. When fruit is harvested early, it can make a sweet white wine with mild, fruity Labrusca flavor. Its high sugar content makes it an

excellent dessert white wine grape. Edelweiss can also be used as a table grape, and for juices and jellies. Elmer Swenson, Wisconsin grape breeder, released Edelweiss jointly with the University of Minnesota.

10. **Prairie Star:** Also known by the synonym name ES 3-24-7. Is a cross between ES 2-7-13 and ES 2-8-1. It was developed by Elmer Swenson in 1980 and released around 1994. Prairie Star has excellent winter hardiness and moderate disease resistance, and is well adapted to a vertical shoot positioning system. It produces a neutral white wine with good mouth feel and finish. In some years it has a strong floral nose. Prairie Star is also used for blending to help add body to more neutral wines. Fruit matures to excellent sugar content and acidity for winemaking.
11. **Brianna:** Brianna produces large clusters of medium-sized white grapes. It is very cold hardy and shows good fungal resistance. Brianna can be used as a table grape and produces a nice white dessert wine. Wines are semi-sweet with pineapple nose and flavor. It was developed by Elmer Swenson.
12. **Sabrevois:** Sabrevois is a sister variety of St. Croix, but with better winter hardiness reported up to -35 degrees F. It also has very good disease resistance. It is quite vigorous and exhibits good upright growth patterns. It produces bunches of small to medium-sized berries, with moderate sugars and slightly high acids. Sabrevois is a black wine grape bred by Elmer Swenson. If picked early, Sabrevois can make a high acid, medium bodied complex red wine with good tannins. Its varietal wine has been reported to age well and improve after two years in the bottle. A 50-50 blend with Frontenac has been recommended. If pressed early it can make a desirable rose', but is best as part of a blend with other red hybrids with high sugars.

The top grape varieties that were pulled out for various reasons including low vigor, winter kill, or just plain died are Seyval Blanc, Marechal Foch, Vignoles, Traminette, Frontenac and La Crescent.

Out of 72 counties in Wisconsin, there were 49 counties that reported having one or more vineyards. Vernon (10.64%), Dane (6.38%), Door (5.67%) and Polk (4.96%) counties reported the highest number of vineyards planted per county. Highest total acreage reported by county is as follows: Vernon (47.92 acres), Dane (31.58 acres), Grant (27.00 acres), Brown (22.50 acres) and Door (22.20 acres).

There was a huge interest in planting more grapes in the future. Out of 141 survey participants, 121 (85.11%) indicated that they are interested or may be interested in planting more grapes in the future. Growers estimated that in the next five years, up to 352.35 acres of grapes will be planted. The most popular varieties growers indicated they would like to plant in the future are Marquette (17.49%), La Crescent (8.52%), Frontenac (8.07%), Frontenac gris (8.07%) and St. Pepin (7.17%).

Wisconsin grape growers reported a total of 690,799 pounds or 345 tons of grapes harvested in 2010. Besides 299,163 pounds of unknown varieties harvested, the top five varieties of grapes harvested were Marechal Foch (61,519 pounds or 30.75 tons), Frontenac (59,786 pounds or 29.89 tons), Marquette (51,291 pounds or 25.64 tons), La Crescent (42,069 pounds or 21.03 tons) and Frontenac gris (31,655 pounds or 15.82 tons).

Wisconsin grape growers estimated a total of 419,540 pounds or 210 tons of grapes to be harvested in 2011. The total reported is lower than 2010 because a lot of growers did not answer this question. Some reasons they may have not answered this question include grapes not bearing yet or they just do not have the education or tools to do an accurate crop estimate. Besides 5,900 pounds of unknown varieties harvested, the top five varieties of grapes estimated for 2011 were Marquette (92,280 pounds or 46.14 tons), Marechal Foch (79,845 pounds or 39.92 tons), Frontenac (63,220 pounds or 31.61 tons), La Crescent (36,250 pounds or 18.12 tons) and Frontenac gris (27,906 pounds or 13.95 tons).

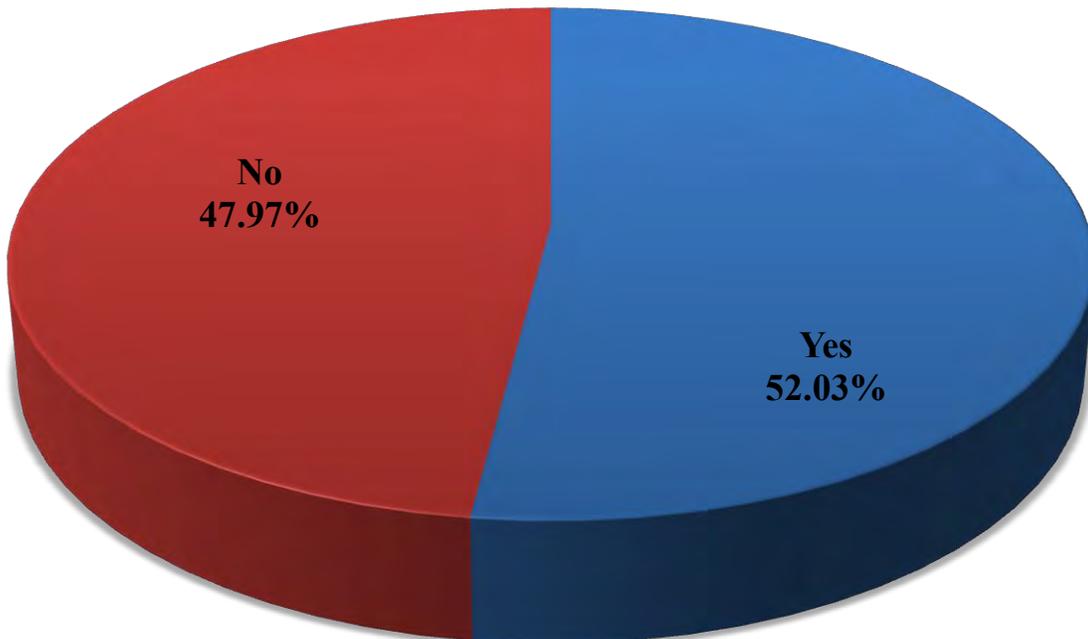
Overall, the market for Wisconsin grown grapes looks strong. With smart planning (site selection, grape varieties and proper communication between growers and wineries) Wisconsin grape growers should be on the road to a successful venture in agriculture.

RESPONSE RATE FOR WISCONSIN GRAPE GROWERS SURVEY 2011

The Wisconsin Grape Growers Survey 2011 was sent to 301 individuals. There were 30 people in the database who did not qualify for the survey (vineyard out-of-state, are an associate or affiliate member of WGGGA and do not grow grapes or are a hobby grower who only has a couple of vines in their backyard); therefore, a revised survey population was set to 271 instead of the initial 301. There were 141 growers who responded to the survey for a 52.03% response rate. There were 130 growers who did not respond to the survey for a 47.97% non-response rate. The survey began in early March and data was collected through the beginning of October. Surveys were emailed directly to growers and some surveys were mailed to growers who did not have an email address. Follow up phone calls were placed to remind growers to take the survey.

Response Rate		
Yes	52.03%	141
No	47.97%	130
Total	100.00%	271

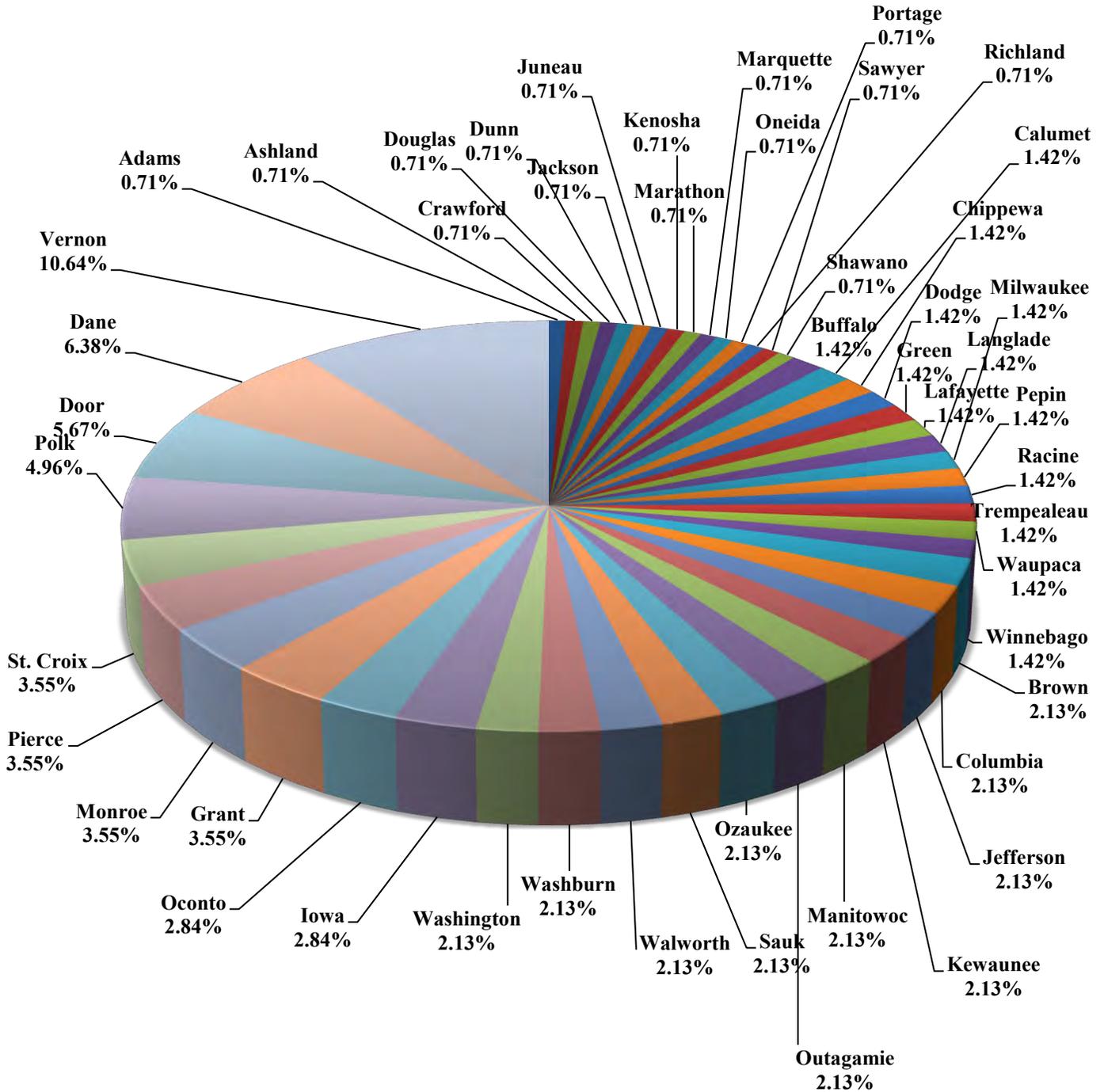
Wisconsin Grape Growers Survey 2011 Response Rate (Out Of 271 Surveys Sent)



WISCONSIN VINEYARDS BY COUNTY

Out of 72 counties in Wisconsin, there were 49 counties that reported having one or more vineyards. Vernon (10.64%), Dane (6.38%), Door (5.67%) and Polk (4.96%) counties reported the highest number of vineyards planted per county.

Which County Is Your Vineyard Located In?

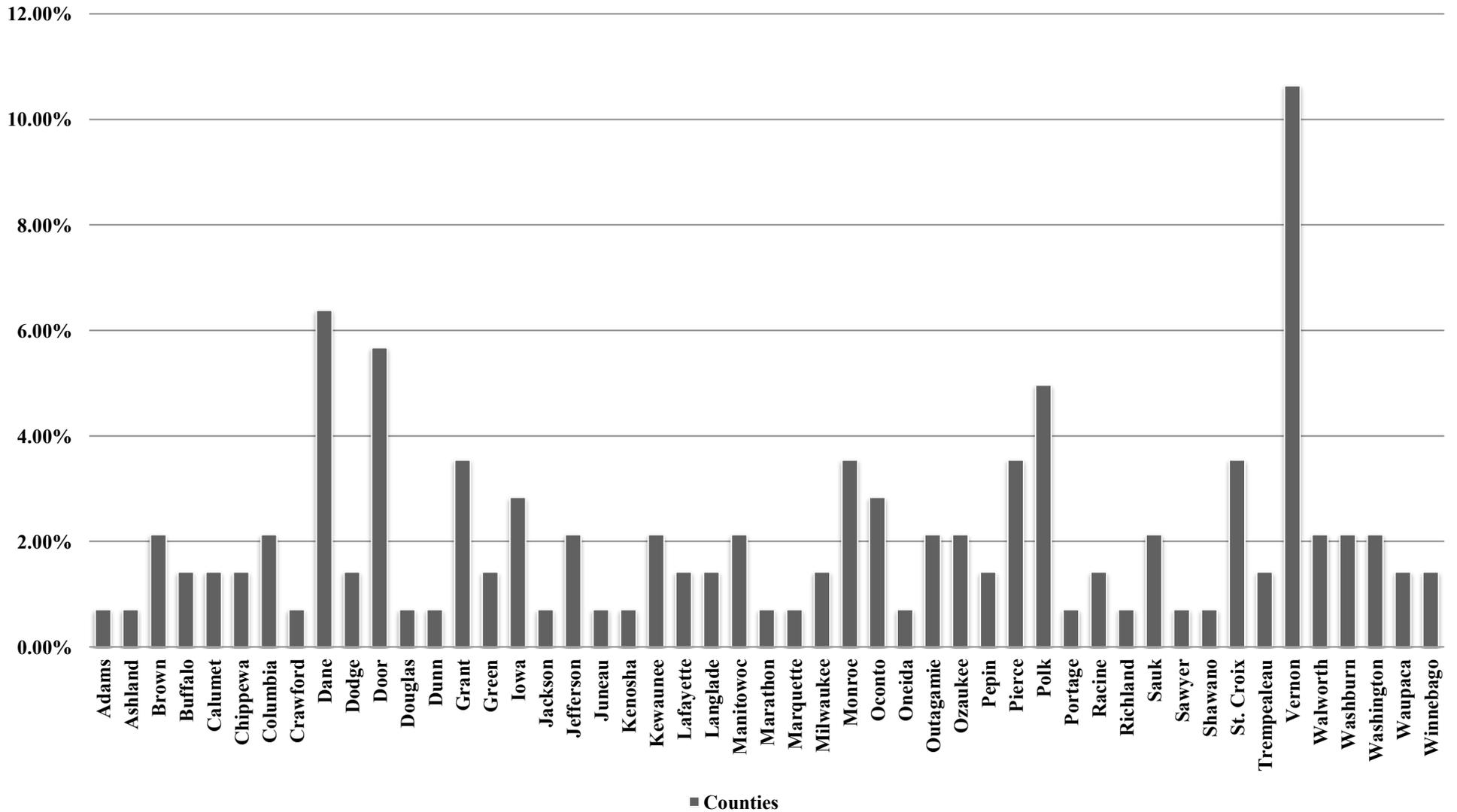


WISCONSIN VINEYARDS BY COUNTY

Which County Is Your Vineyard Located In?		
Adams	0.71%	1
Ashland	0.71%	1
Brown	2.13%	3
Buffalo	1.42%	2
Calumet	1.42%	2
Chippewa	1.42%	2
Columbia	2.13%	3
Crawford	0.71%	1
Dane	6.38%	9
Dodge	1.42%	2
Door	5.67%	8
Douglas	0.71%	1
Dunn	0.71%	1
Grant	3.55%	5
Green	1.42%	2
Iowa	2.84%	4
Jackson	0.71%	1
Jefferson	2.13%	3
Juneau	0.71%	1
Kenosha	0.71%	1
Kewaunee	2.13%	3
Lafayette	1.42%	2
Langlade	1.42%	2
Manitowoc	2.13%	3
Marathon	0.71%	1
Marquette	0.71%	1
Milwaukee	1.42%	2
Monroe	3.55%	5
Oconto	2.84%	4
Oneida	0.71%	1
Outagamie	2.13%	3
Ozaukee	2.13%	3
Pepin	1.42%	2
Pierce	3.55%	5
Polk	4.96%	7
Portage	0.71%	1
Racine	1.42%	2
Richland	0.71%	1
Sauk	2.13%	3
Sawyer	0.71%	1
Shawano	0.71%	1
St. Croix	3.55%	5
Trempealeau	1.42%	2
Vernon	10.64%	15
Walworth	2.13%	3
Washburn	2.13%	3
Washington	2.13%	3
Waupaca	1.42%	2
Winnebago	1.42%	2
Total	100.00%	141

WISCONSIN VINEYARDS BY COUNTY

Which County Is Your Vineyard Located In?



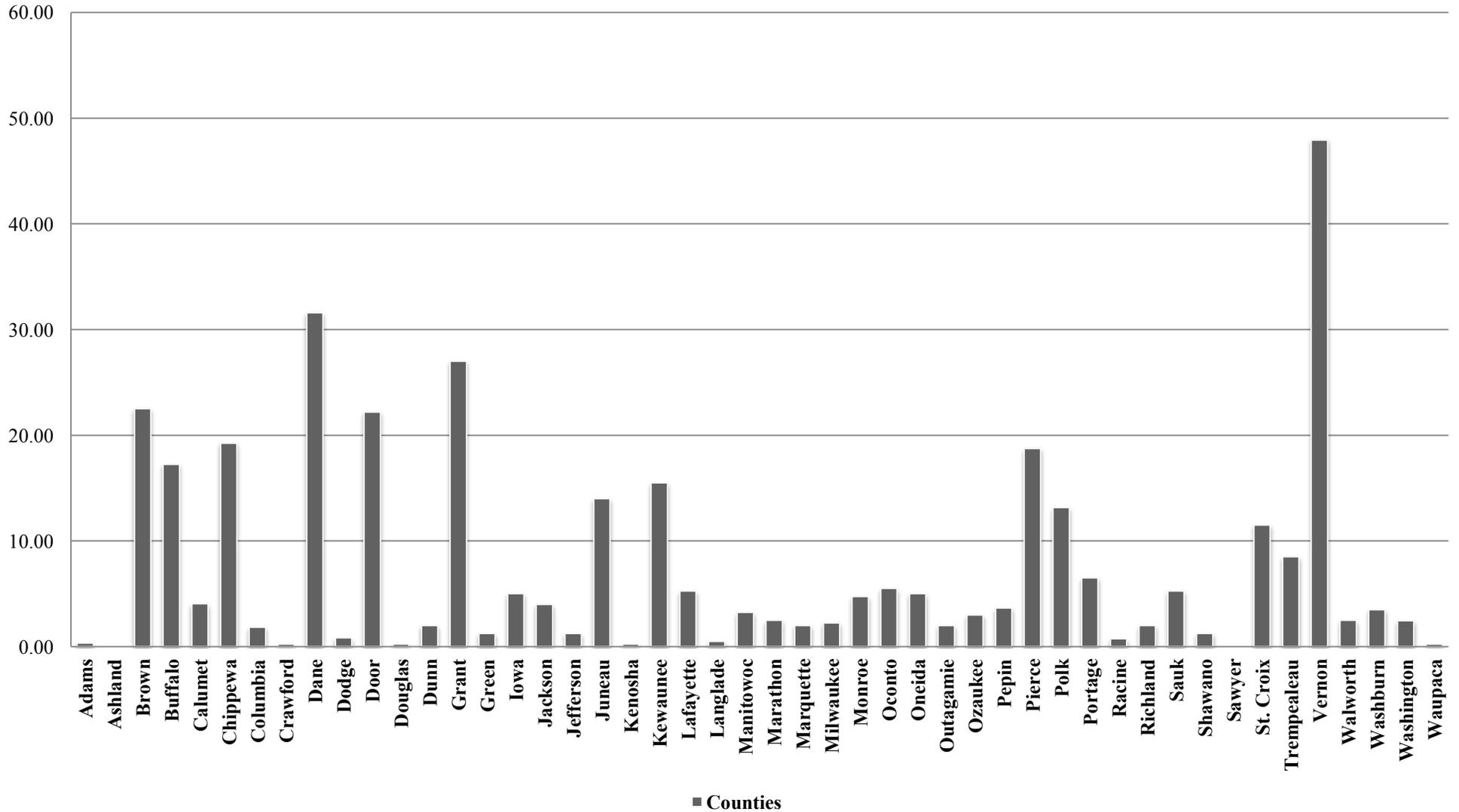
TOTAL ACREAGE REPORTED BY COUNTY

Total acreage reported was 358.24 acres. Highest total acreage reported by county is as follows: Vernon (47.92 acres), Dane (31.58 acres), Grant (27.00 acres), Brown (22.50 acres) and Door (22.20 acres).

Total Acreage Reported By County	
Adams	0.33
Ashland	0.00
Brown	22.50
Buffalo	17.25
Calumet	4.05
Chippewa	19.25
Columbia	1.83
Crawford	0.25
Dane	31.58
Dodge	0.83
Door	22.20
Douglas	0.25
Dunn	2.00
Grant	27.00
Green	1.25
Iowa	5.00
Jackson	4.00
Jefferson	1.25
Juneau	14.00
Kenosha	0.25
Kewaunee	15.50
Lafayette	5.25
Langlade	0.50
Manitowoc	3.25
Marathon	2.50
Marquette	2.00
Milwaukee	2.25
Monroe	4.75
Oconto	5.50
Oneida	5.00
Outagamie	2.00
Ozaukee	3.00
Pepin	3.65
Pierce	18.75
Polk	13.15
Portage	6.50
Racine	0.75
Richland	2.00
Sauk	5.25
Shawano	1.25
Sawyer	0.00
St. Croix	11.50
Trempealeau	8.50
Vernon	47.92
Walworth	2.50
Washburn	3.50
Washington	2.45
Waupaca	0.25
Winnebago	3.75
Total	358.24

TOTAL ACREAGE REPORTED BY COUNTY

Total Acreage Reported By County



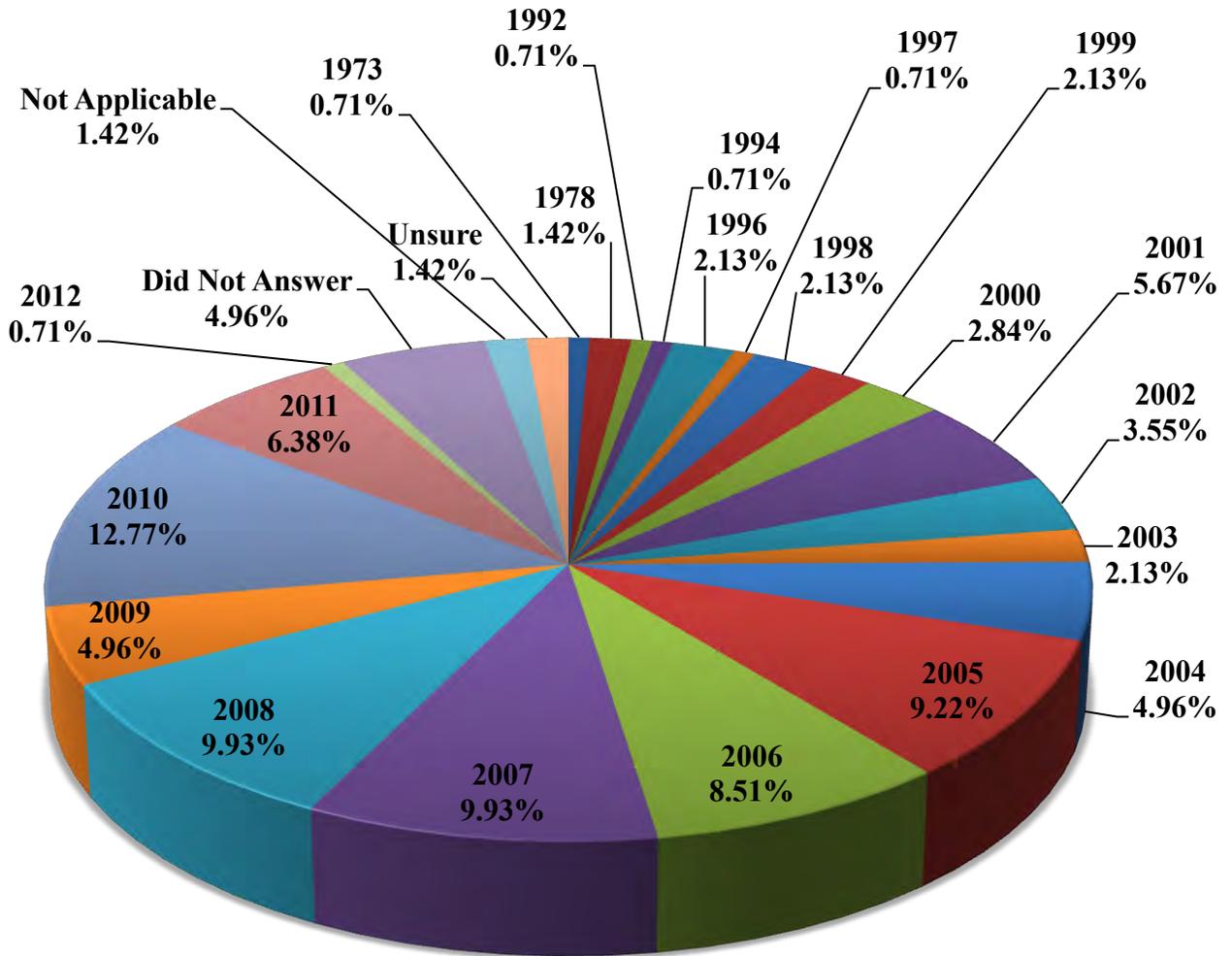
YEAR WHEN VINEYARD WAS FIRST PLANTED

Year When Vineyard Was First Planted		
1973	0.71%	1
1978	1.42%	2
1992	0.71%	1
1994	0.71%	1
1996	2.13%	3
1997	0.71%	1
1998	2.13%	3
1999	2.13%	3
2000	2.84%	4
2001	5.67%	8
2002	3.55%	5
2003	2.13%	3
2004	4.96%	7
2005	9.22%	13
2006	8.51%	12
2007	9.93%	14
2008	9.93%	14
2009	4.96%	7
2010	12.77%	18
2011	6.38%	9
2012	0.71%	1
Did Not Answer	4.96%	7
Not Applicable	1.42%	2
Unsure	1.42%	2
Total	100.00%	141

YEAR WHEN VINEYARD WAS FIRST PLANTED

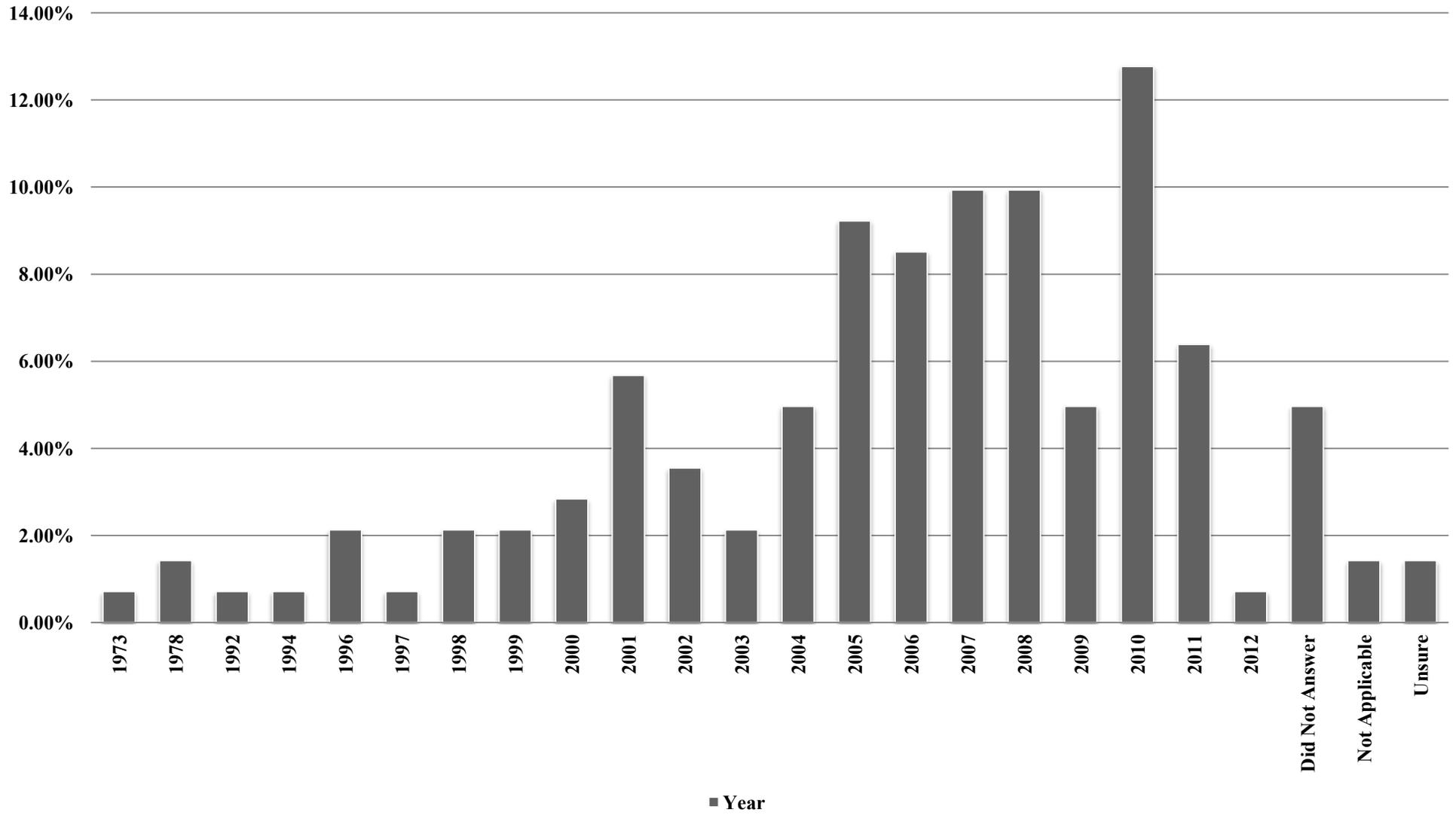
According to the survey, 50 percent of reported vineyards were planted in Wisconsin between 2005-2010. The earliest reported year was 1973 and there were a few people who reported planting in 2011 and 2012.

Year When Vineyard Was First Planted



YEAR WHEN VINEYARD WAS FIRST PLANTED

Year When Vineyard Was First Planted



TOTAL ACREAGE OF GRAPES PLANTED IN WISCONSIN

Based on the results from the Wisconsin Grape Growers Survey 2011, the total acreage reported was approximately 358.24 acres of which 260.86 acres were in the bearing stage and 97.38 acres were non-bearing; however, the total acreage is estimated to be closer to 750 acres statewide.

Total Acreage Of Grapes Bearing
260.86 Acres

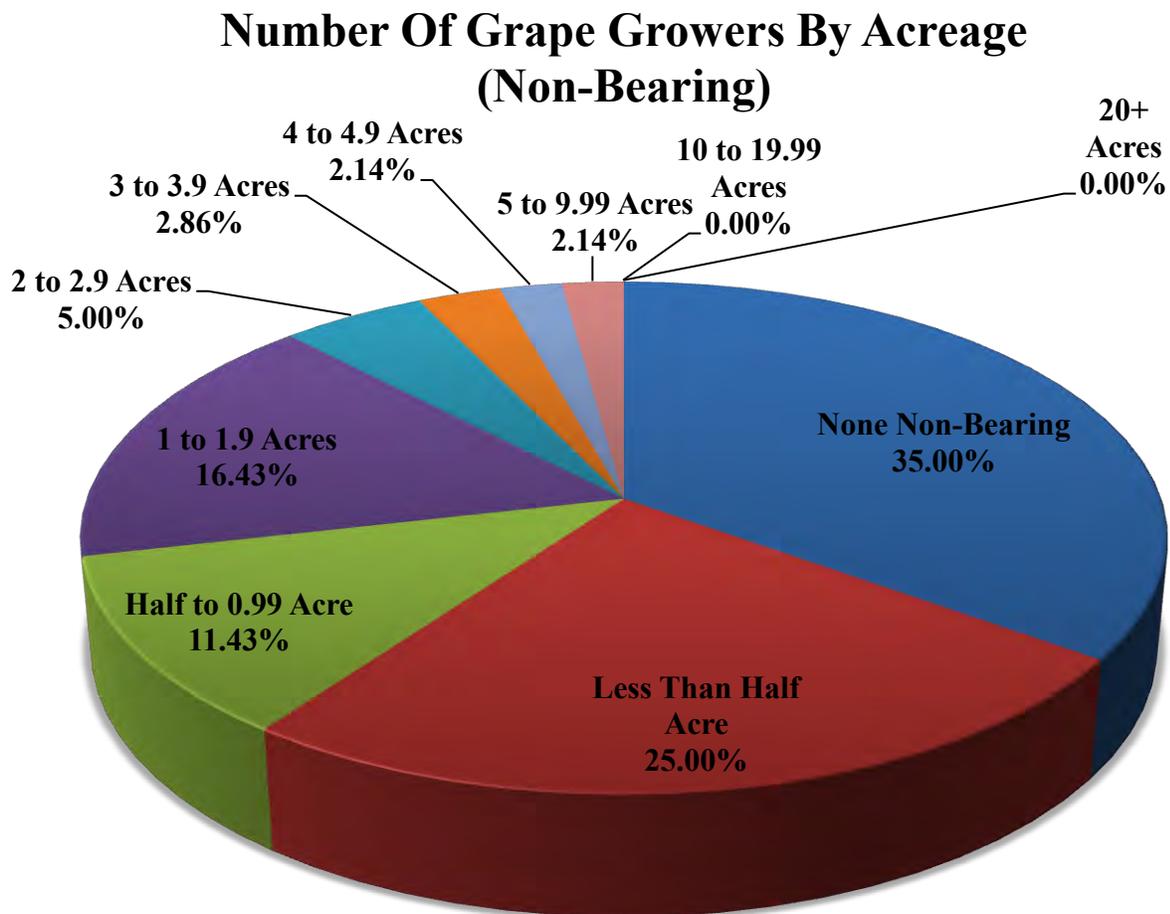
Total Acreage Of Grapes Non-Bearing
97.38 Acres

Grand Total Acreage Of Grapes
358.24 Acres

NUMBER OF GRAPE GROWERS BY ACREAGE

Out of the 141 survey respondents, 49 (34.75%) do not have acreage with non-bearing vines. There were 51 (36.17%) growers who reported less than an acre of non-bearing vines.

Number Of Grape Growers By Acreage (Non-Bearing)		
None Non-Bearing	34.75%	49
Less Than Half Acre	24.82%	35
Half to 0.99 Acre	11.35%	16
1 to 1.9 Acres	16.31%	23
2 to 2.9 Acres	4.96%	7
3 to 3.9 Acres	2.84%	4
4 to 4.9 Acres	2.13%	3
5 to 9.99 Acres	2.13%	3
10 to 19.99 Acres	0.00%	0
20+ Acres	0.00%	0
No Response	0.71%	1
Total	100.00%	141

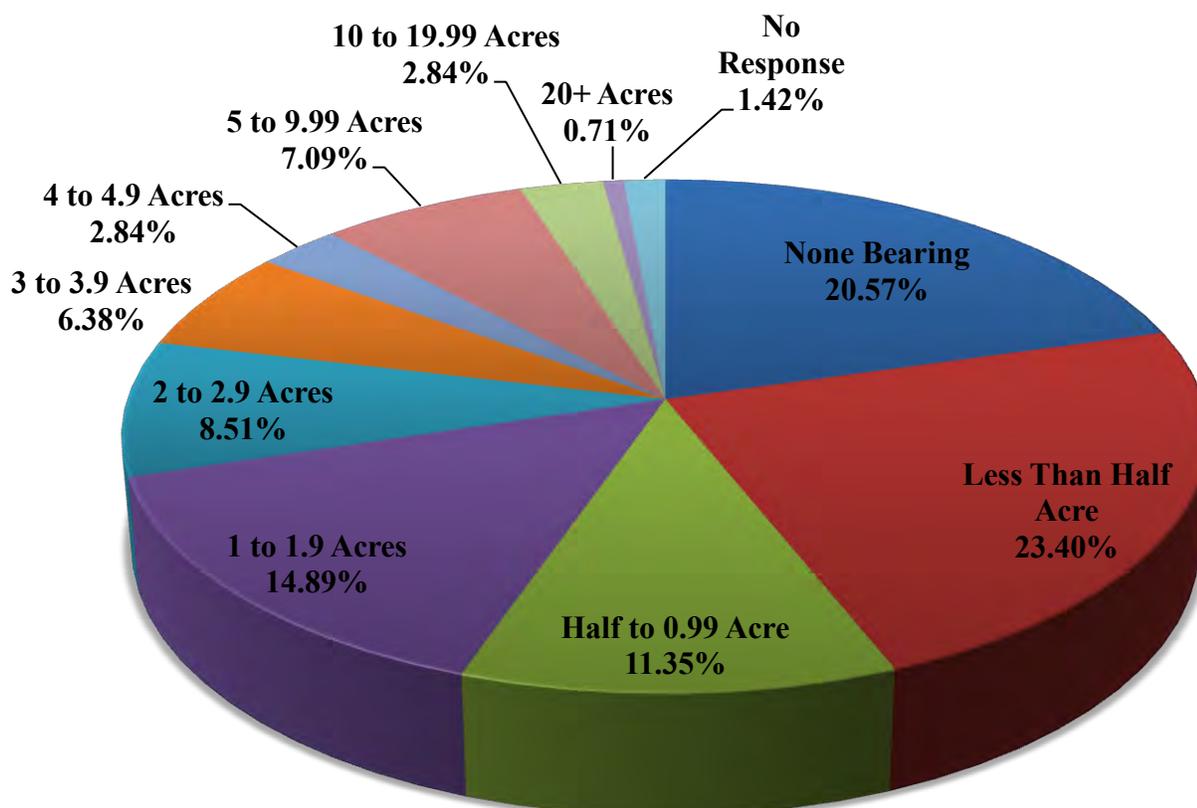


NUMBER OF GRAPE GROWERS BY ACREAGE

Out of the 141 survey respondents, 29 (20.57%) do not have acreage with bearing vines. There were 49 (34.75%) growers who reported less than an acre of bearing vines. There were 21 (14.89%) growers who reported having a vineyard between 1 to 1.9 acres. There were few commercial vineyards greater than 10 acres reported.

Number Of Grape Growers By Acreage (Bearing)		
None Bearing	20.57%	29
Less Than Half Acre	23.40%	33
Half to 0.99 Acre	11.35%	16
1 to 1.9 Acres	14.89%	21
2 to 2.9 Acres	8.51%	12
3 to 3.9 Acres	6.38%	9
4 to 4.9 Acres	2.84%	4
5 to 9.99 Acres	7.09%	10
10 to 19.99 Acres	2.84%	4
20+ Acres	0.71%	1
No Response	1.42%	2
Total	100.00%	141

Number Of Grape Growers By Acreage (Bearing)

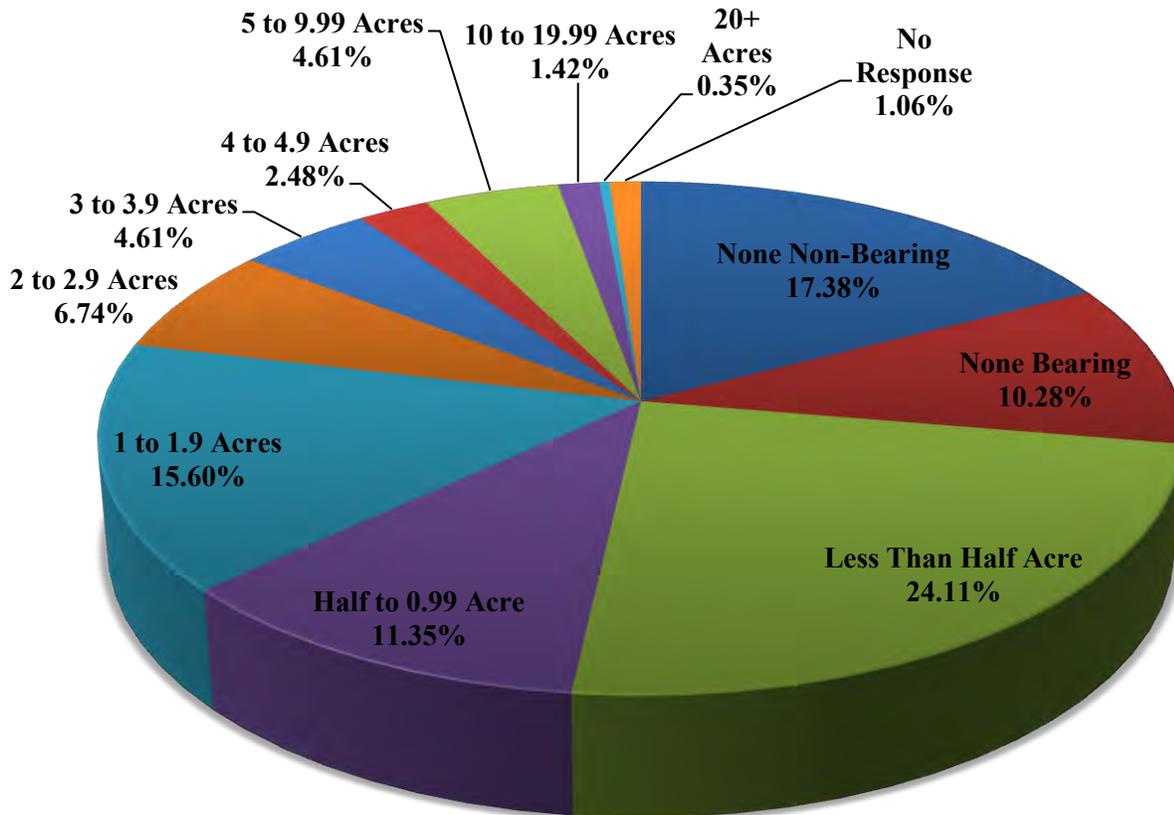


NUMBER OF GRAPE GROWERS BY ACREAGE

Overall there were a majority of growers who have less than half an acre of grapes planted in Wisconsin. There were 44 growers (15.60%) who reported having 1 to 1.9 acres of grapes planted. There were 8 growers (2.83%) who reported having 10+ acres of grapes planted.

Number Of Grape Growers By Acreage (All)		
None Non-Bearing	17.38%	49
None Bearing	10.28%	29
Less Than Half Acre	24.11%	68
Half to 0.99 Acre	11.35%	32
1 to 1.9 Acres	15.60%	44
2 to 2.9 Acres	6.74%	19
3 to 3.9 Acres	4.61%	13
4 to 4.9 Acres	2.48%	7
5 to 9.99 Acres	4.61%	13
10 to 19.99 Acres	1.42%	4
20+ Acres	0.35%	1
No Response	1.06%	3
Total	100.00%	282

Number Of Grape Growers By Acreage (All)



GRAPE VARIETIES PLANTED IN WISCONSIN PRIOR TO 2007

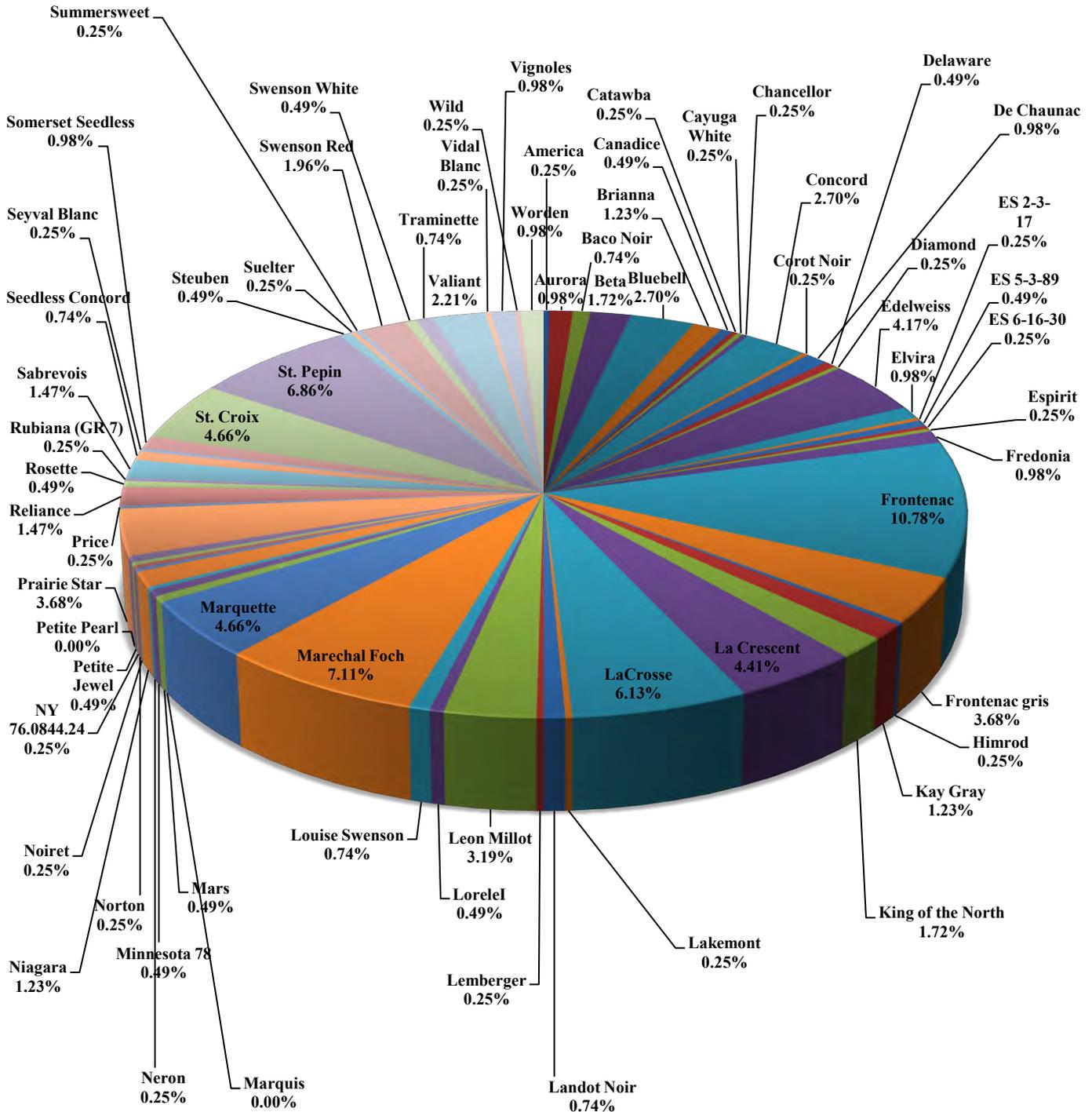
Grape Varieties Planted Prior To 2007		
Alpenglow	0.00%	-
America	0.25%	1
Aurora	0.98%	4
Baco Noir	0.74%	3
Baltica	0.00%	-
Beta	1.72%	7
Bluebell	2.70%	11
Brianna	1.23%	5
Canadice	0.49%	2
Catawba	0.25%	1
Cayuga White	0.25%	1
Chancellor	0.25%	1
Chardonel	0.00%	-
Chontay	0.00%	-
Concord	2.70%	11
Corot Noir	0.25%	1
De Chaunac	0.98%	4
Delaware	0.49%	2
Diamond	0.25%	1
Edelweiss	4.17%	17
Einset	0.00%	-
Elvira	0.98%	4
ES 15-53	0.00%	-
ES 2-3-17	0.25%	1
ES 5-3-89	0.49%	2
ES 6-16-30	0.25%	1
ES Variety	0.00%	-
Espirit	0.25%	1
Flandreau	0.00%	-
Fredonia	0.98%	4
Frontenac	10.78%	44
Frontenac blanc	0.00%	-
Frontenac gris	3.68%	15
Golden Muscat	0.00%	-
Himrod	0.25%	1
Kay Gray	1.23%	5
King of the North	1.72%	7
Kishwaukee	0.00%	-
La Crescent	4.41%	18
LaCrosse	6.13%	25
Lakemont	0.25%	1
Landot Noir (4511)	0.74%	3
Lemberger	0.25%	1
Leon Millot	3.19%	13
Lorelei (ES 5-4-29)	0.49%	2
Louise Swenson	0.74%	3

Grape Varieties Planted Prior To 2007		
Marechal Foch	7.11%	29
Marquette	4.66%	19
Marquis	0.00%	-
Mars	0.49%	2
Minnesota 78	0.49%	2
MN 1200	0.00%	-
MN 1220	0.00%	-
Neron	0.25%	1
Niagara	1.23%	5
Noiret	0.25%	1
Norton	0.25%	1
NY76.0844.24	0.25%	1
Other	0.00%	-
Petite Amie	0.00%	-
Petite Jewel	0.49%	2
Petite Pearl	0.00%	-
Prairie Star	3.68%	15
Price	0.25%	1
Reliance	1.47%	6
Riesling/C3309	0.00%	-
Rosette	0.49%	2
Rubiana (GR 7)	0.25%	1
Sabrevois	1.47%	6
Seedless Concord	0.74%	3
Seyval Blanc	0.25%	1
Somerset Seedless	0.98%	4
St. Croix	4.66%	19
St. Pepin	6.86%	28
St. Vincent	0.00%	-
Steuben	0.49%	2
Suelter	0.25%	1
Summersweet	0.25%	1
Swenson Red	1.96%	8
Swenson White	0.49%	2
Traminette	0.74%	3
Trollhaugen	0.00%	-
Valiant	2.21%	9
Valvin Muscat	0.00%	-
Van Buren	0.00%	-
Vanessa	0.00%	-
Vidal Blanc	0.25%	1
Vignoles	0.98%	4
Wild	0.25%	1
Worden	0.98%	4
Zilga	0.00%	-
Total	100.00%	408

GRAPE VARIETIES PLANTED IN WISCONSIN PRIOR TO 2007

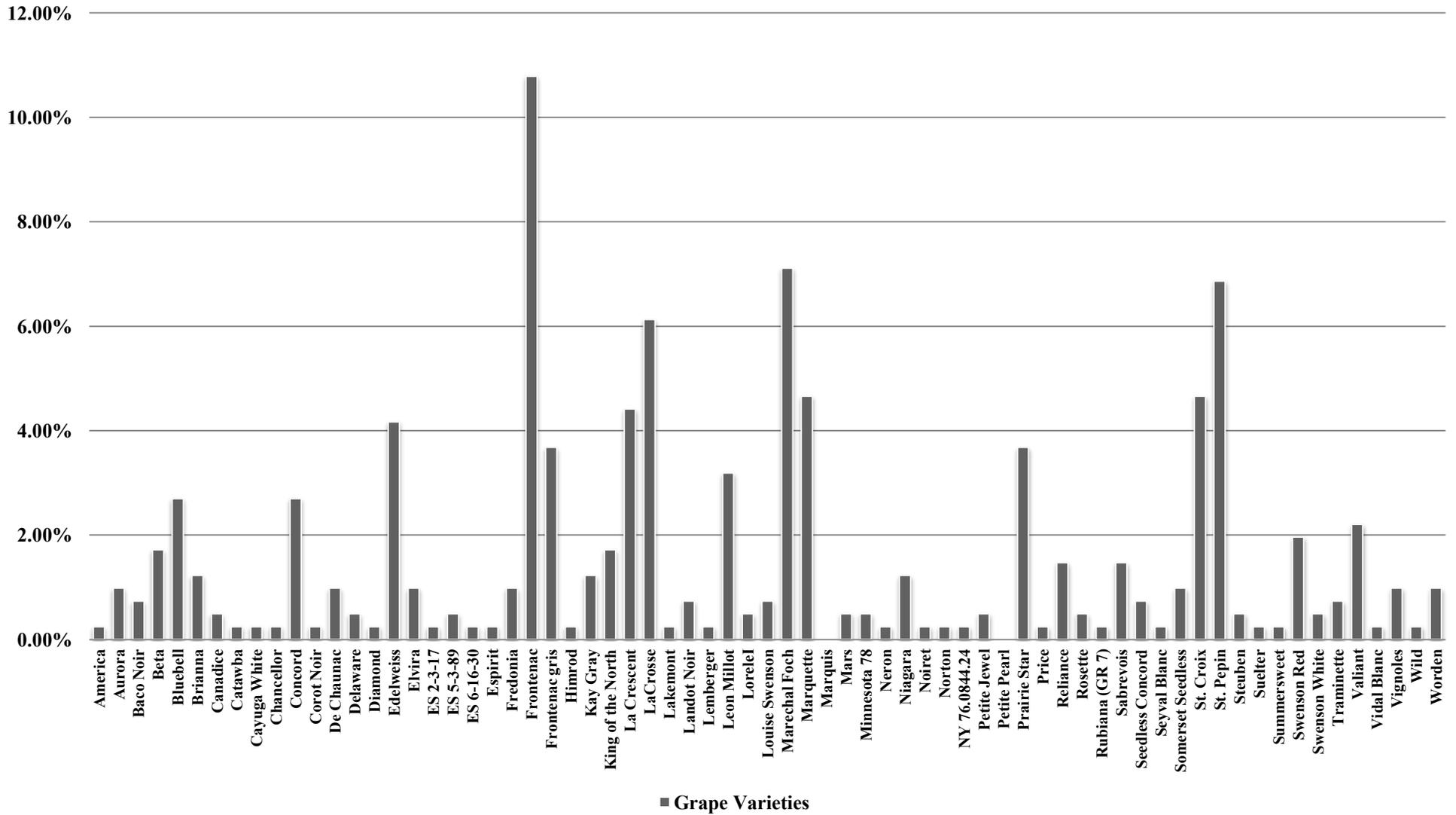
The top ten grape varieties planted in Wisconsin prior to 2007 were Frontenac, Marechal Foch, St. Pepin, LaCrosse, Marquette, St. Croix, La Crescent, Edelweiss, Frontenac gris and Prairie Star.

Grapes Varieties Planted In Wisconsin Prior To 2007



GRAPE VARIETIES PLANTED IN WISCONSIN PRIOR TO 2007

Grape Varieties Planted In Wisconsin Prior To 2007



GRAPE VARIETIES PLANTED IN WISCONSIN 2007 TO 2010

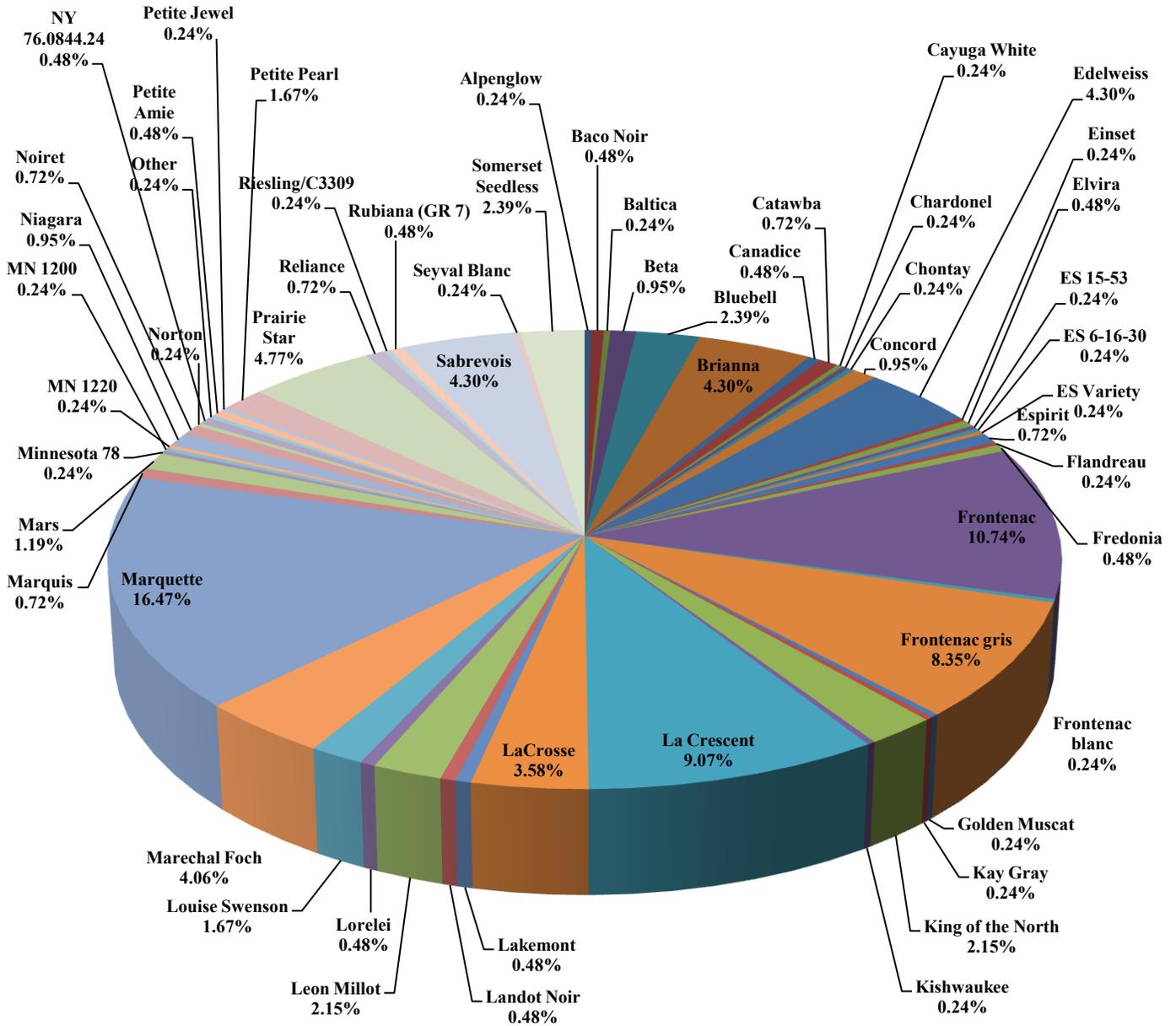
Grape Varieties Planted 2007 To 2010		
Alpenglow	0.20%	1
America	0.00%	-
Aurora	0.00%	-
Baco Noir	0.40%	2
Baltica	0.20%	1
Beta	0.80%	4
Bluebell	2.00%	10
Brianna	3.61%	18
Canadice	0.40%	2
Catawba	0.60%	3
Cayuga White	0.20%	1
Chancellor	0.00%	-
Chardonel	0.20%	1
Chontay	0.20%	1
Concord	0.80%	4
Corot Noir	0.00%	-
De Chaunac	0.00%	-
Delaware	0.00%	-
Diamond	0.00%	-
Edelweiss	3.61%	18
Einset	0.20%	1
Elvira	0.40%	2
ES 15-53	0.20%	1
ES 2-3-17	0.00%	-
ES 5-3-89	0.00%	-
ES 6-16-30	0.20%	1
ES Variety	0.20%	1
Espirit	0.60%	3
Flandreau	0.20%	1
Fredonia	0.40%	2
Frontenac	9.02%	45
Frontenac blanc	0.20%	1
Frontenac gris	7.01%	35
Golden Muscat	0.20%	1
Himrod	0.00%	-
Kay Gray	0.20%	1
King of the North	1.80%	9
Kishwaukee	0.20%	1
La Crescent	7.62%	38
LaCrosse	3.01%	15
Lakemont	0.40%	2
Landot Noir	0.40%	2
Lemberger	0.00%	-
Leon Millot	1.80%	9
Lorelei	0.40%	2
Louise Swenson	1.40%	7

Grape Varieties Planted 2007 To 2010		
Marechal Foch	3.41%	17
Marquette	13.83%	69
Marquis	0.60%	3
Mars	1.00%	5
Minnesota 78	0.20%	1
MN 1200	0.20%	1
MN 1220	0.20%	1
Neron	0.00%	-
Niagara	0.80%	4
Noiret	0.60%	3
Norton	0.20%	1
NY 76.0844.24	0.40%	2
Other	0.20%	1
Petite Amie	0.40%	2
Petite Jewel	0.20%	1
Petite Pearl	1.40%	7
Prairie Star	4.01%	20
Price	0.00%	-
Reliance	0.60%	3
Riesling/C3309	0.20%	1
Rosette	0.00%	-
Rubiana (GR 7)	0.40%	2
Sabrevois	3.61%	18
Seedless Concord	0.00%	-
Seyval Blanc	0.20%	1
Somerset Seedless	2.00%	10
St. Croix	4.01%	20
St. Pepin	6.21%	31
St. Vincent	0.20%	1
Steuben	0.00%	-
Suelter	0.00%	-
Summersweet	0.20%	1
Swenson Red	1.00%	5
Swenson White	0.40%	2
Traminette	0.80%	4
Trollhaugen	0.40%	2
Valiant	0.40%	2
Valvin Muscat	0.20%	1
Van Buren	0.20%	1
Vanessa	1.20%	6
Vidal Blanc	0.00%	-
Vignoles	0.20%	1
Wild	0.20%	1
Worden	0.20%	1
Zilga	0.20%	1
Total	100.00%	499

GRAPE VARIETIES PLANTED IN WISCONSIN 2007 TO 2010

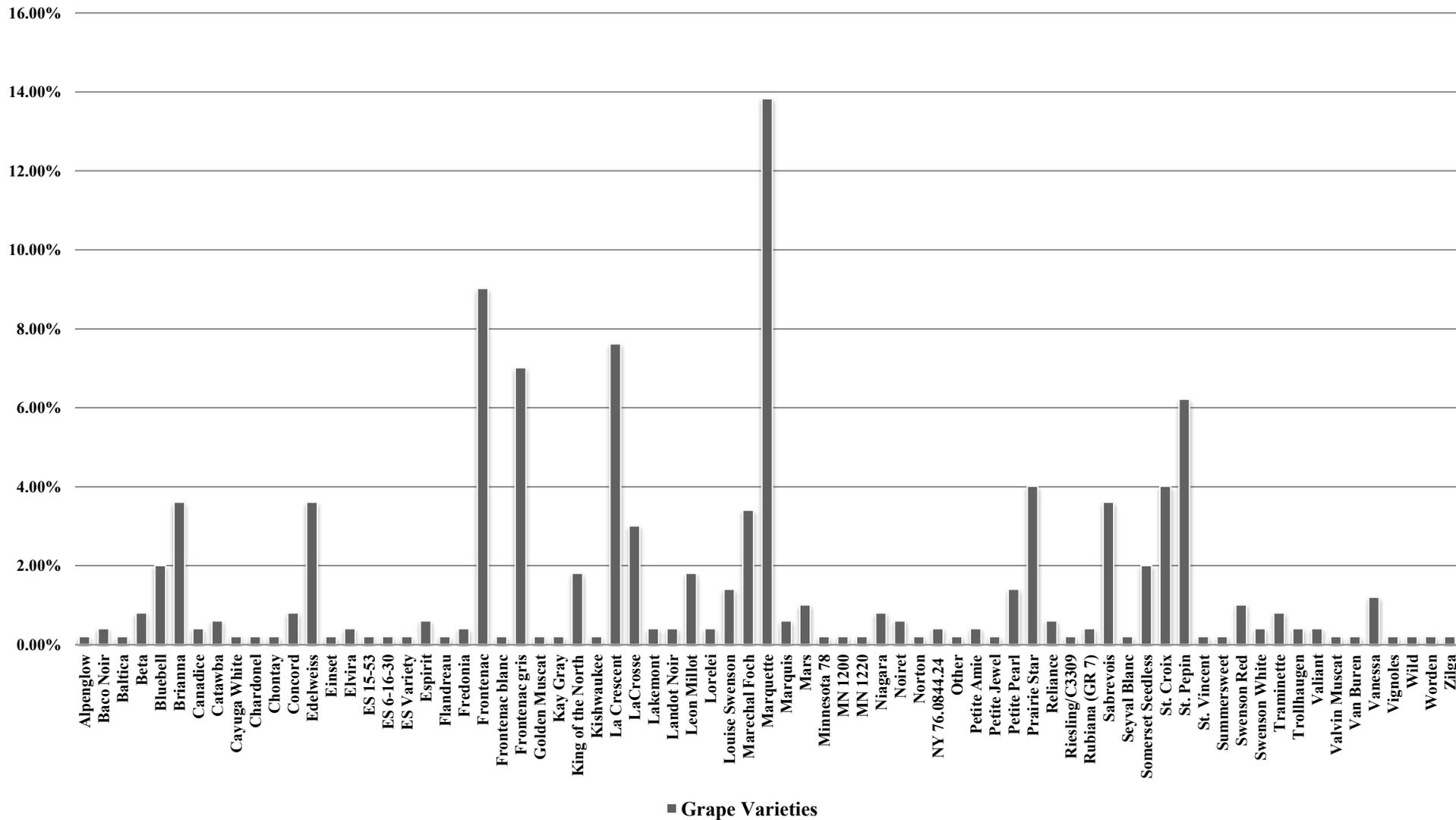
The top ten grape varieties planted in Wisconsin from 2007 to 2010 were Marquette, Frontenac, La Crescent, Frontenac gris, St. Pepin, Prairie Star, St. Croix, Brianna, Edelweiss and Sabrevois. The only significant change from Grape Varieties Planted in Wisconsin Prior to 2007 (see above) is that Marechal Foch and LaCrosse were bumped out of the top ten varieties planted by Brianna and Sabrevois.

Grape Varieties Planted In Wisconsin 2007 To 2010



GRAPE VARIETIES PLANTED IN WISCONSIN 2007 TO 2010

Grape Varieties Planted In Wisconsin 2007 To 2010



TOP GRAPE VARIETIES PLANTED IN WISCONSIN

Top 12 Grape Varieties Planted In Wisconsin			
Variety	Prior To 2007	2007 To 2010	Total
Frontenac	44	45	89
Marquette	19	69	88
St. Pepin	28	31	59
La Crescent	18	38	56
Frontenac gris	15	35	50
Marechal Foch	29	17	46
LaCrosse	25	15	40
St. Croix	19	20	39
Edelweiss	17	18	35
Prairie Star	15	20	35
Sabrevois	6	18	24
Brianna	5	18	23

Top 10 Grape Varieties Planted In Wisconsin Prior To 2007	
Frontenac	44
Marechal Foch	29
St. Pepin	28
LaCrosse	25
Marquette	19
St. Croix	19
La Crescent	18
Edelweiss	17
Frontenac gris	15
Prairie Star	15

Top 10 Grape Varieties Planted In Wisconsin 2007 To 2010	
Marquette	69
Frontenac	45
La Crescent	38
Frontenac gris	35
St. Pepin	31
Prairie Star	20
St. Croix	20
Brianna	18
Edelweiss	18
Sabrevois	18

GRAPE VARIETIES PULLED OUT

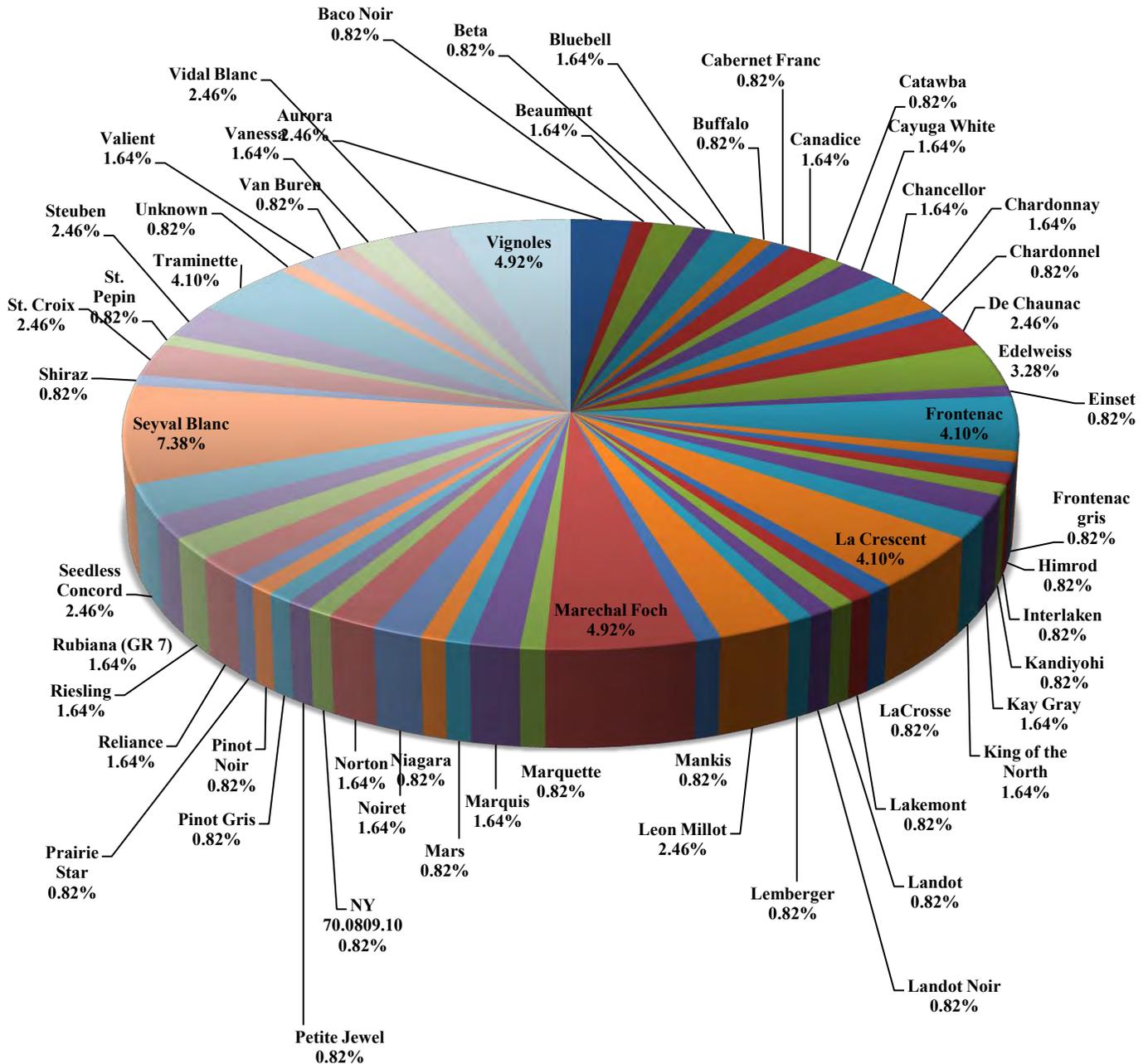
Grape Varieties Pulled Out		
Aurora	2.46%	3
Baco Noir	0.82%	1
Beaumont	1.64%	2
Beta	0.82%	1
Bluebell	1.64%	2
Buffalo	0.82%	1
Cabernet Franc	0.82%	1
Canadice	1.64%	2
Catawba	0.82%	1
Cayuga White	1.64%	2
Chancellor	1.64%	2
Chardonnay	1.64%	2
Chardonnell	0.82%	1
De Chaunac	2.46%	3
Edelweiss	3.28%	4
Einset	0.82%	1
Frontenac	4.10%	5
Frontenac gris	0.82%	1
Himrod	0.82%	1
Interlaken	0.82%	1
Kandiyohi	0.82%	1
Kay Gray	1.64%	2
King of the North	1.64%	2
La Crescent	4.10%	5
LaCrosse	0.82%	1
Lakemont	0.82%	1
Landot	0.82%	1
Landot Noir	0.82%	1
Lemberger	0.82%	1
Leon Millot	2.46%	3

Grape Varieties Pulled Out		
Mankis	0.82%	1
Marechal Foch	4.92%	6
Marquette	0.82%	1
Marquis	1.64%	2
Mars	0.82%	1
Niagara	0.82%	1
Noiret	1.64%	2
Norton	1.64%	2
NY 70.0809.10	0.82%	1
Petite Jewel	0.82%	1
Pinot Gris	0.82%	1
Pinot Noir	0.82%	1
Prairie Star	0.82%	1
Reliance	1.64%	2
Riesling	1.64%	2
Rubiana (GR 7)	1.64%	2
Seedless Concord	2.46%	3
Seyval Blanc	7.38%	9
Shiraz	0.82%	1
St. Croix	2.46%	3
St. Pepin	0.82%	1
Steuben	2.46%	3
Traminette	4.10%	5
Unknown	0.82%	1
Valiant	1.64%	2
Van Buren	0.82%	1
Vanessa	1.64%	2
Vidal Blanc	2.46%	3
Vignoles	4.92%	6
Total	100.00%	122

GRAPE VARIETIES PULLED OUT

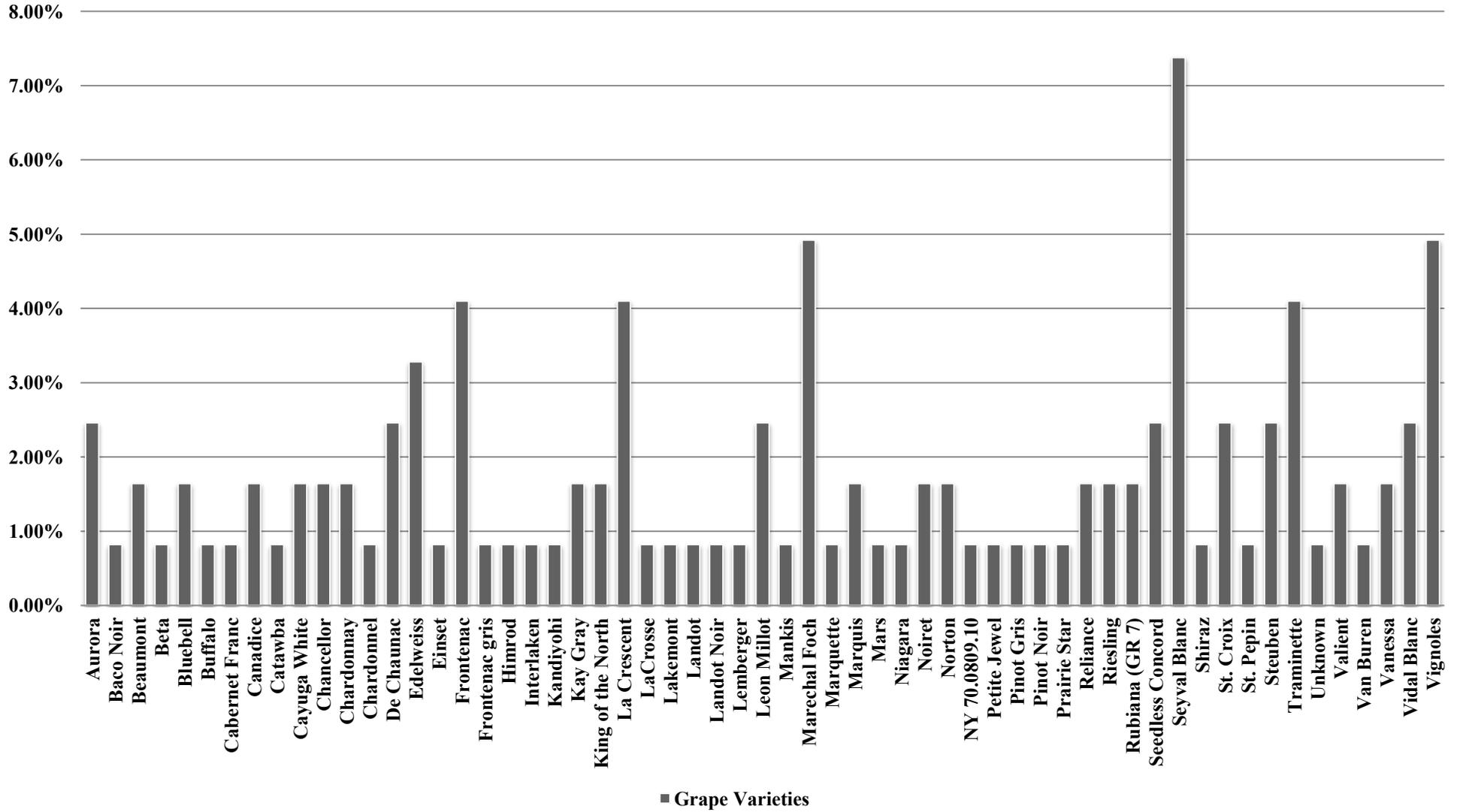
The top five grape varieties that were reported pulled out by growers in Wisconsin were Seyval Blanc (7.38%), Marechal Foch (4.92%), Vignoles (4.92%), Traminette (4.10%), Frontenac (4.10%) and La Crescent (4.10%). Listed below you will find the reasons why these grape varieties along with other grape varieties were pulled out.

Grape Varieties Pulled Out



GRAPE VARIETIES PULLED OUT

Grape Varieties Pulled Out



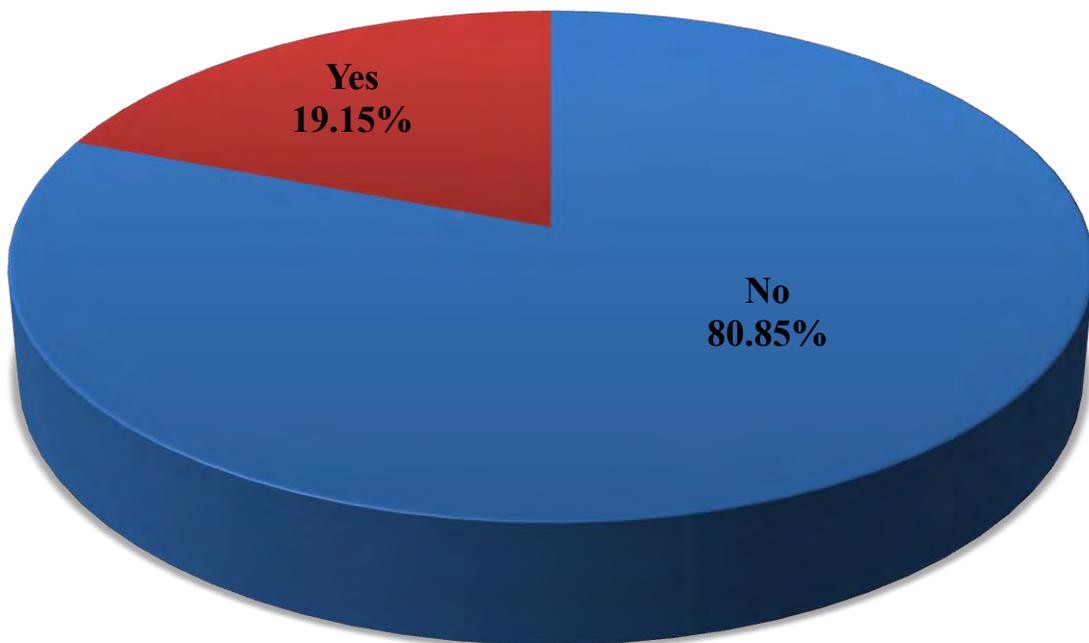
REASONS WHY GRAPE VARIETIES PULLED OUT

Reasons Why Grape Varieties Pulled Out
Bad trellis design
Bird at leaves
Bunch rot
Damaged by tractor
Did not care for grapes
Did not like wine made from it
Died
Died due to late freeze
Disease
Downy mildew
Draught
Failure to ripen
Flavor profile
Frost
Froze
Fungus prone
Low production
Low quality
Low vigor
Make room for another variety
Mildew
More than winery needed, so planted more desirable variety
No market for grapes
Not hardy enough
Not long enough growing season
Not worth it
Planted on bad area near wood which caused low vigor
Planted too close together
Poor drainage
Poor fruit set
Poor quality
Small berry size
Splitting fruit
Too much tannin
Too tart
Tried to propagate own vines but they were too weak so pulled out after 3 years
Variety must be cluster thinned and no time to do it
Wine tasted like Concord grape and can't sell it or give it away
Winter kill

DURING THE 2010 HARVEST, I (PLEASE SELECT ALL THAT APPLY BELOW): [SOLD MY GRAPES TO A LOCAL WINERY (WINERIES)]

During The 2010 Harvest, I (Please Select All That Apply Below): [Sold My Grapes To A Local Winery (Wineries)]		
No	80.85%	114
Yes	19.15%	27
Total	100.00%	141

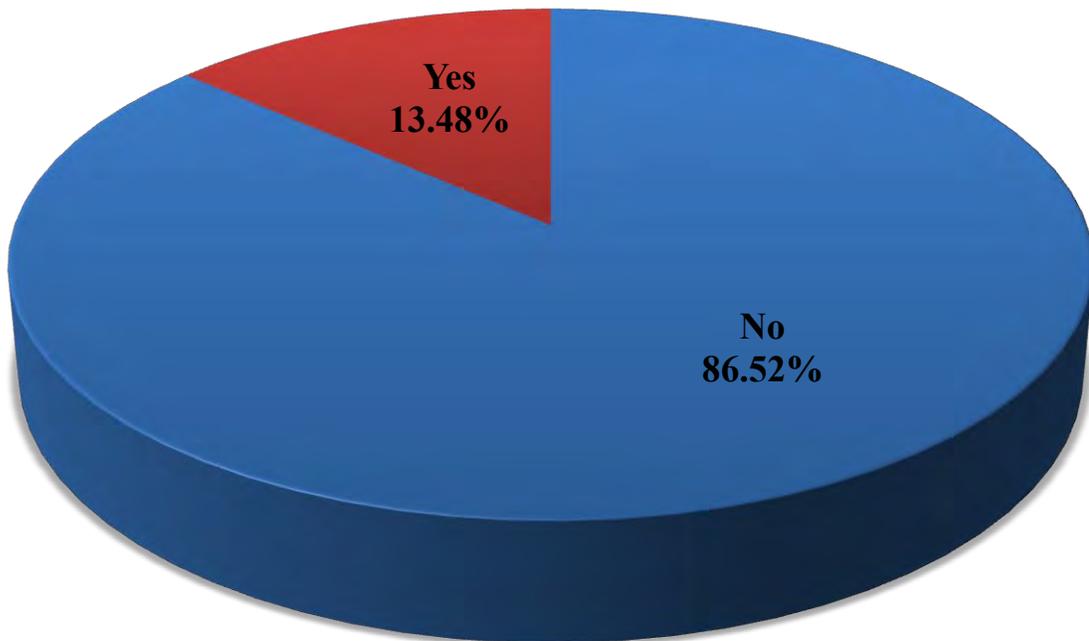
During The 2010 Harvest, I (Please Select All That Apply Below): [Sold My Grapes To A Local Winery (Wineries)]



DURING THE 2010 HARVEST, I (PLEASE SELECT ALL THAT APPLY BELOW): [SOLD MY GRAPES TO A HOME WINEMAKER]

During The 2010 Harvest, I (Please Select All That Apply Below): [Sold My Grapes To A Home Winemaker]		
No	86.52%	122
Yes	13.48%	19
Total	100.00%	141

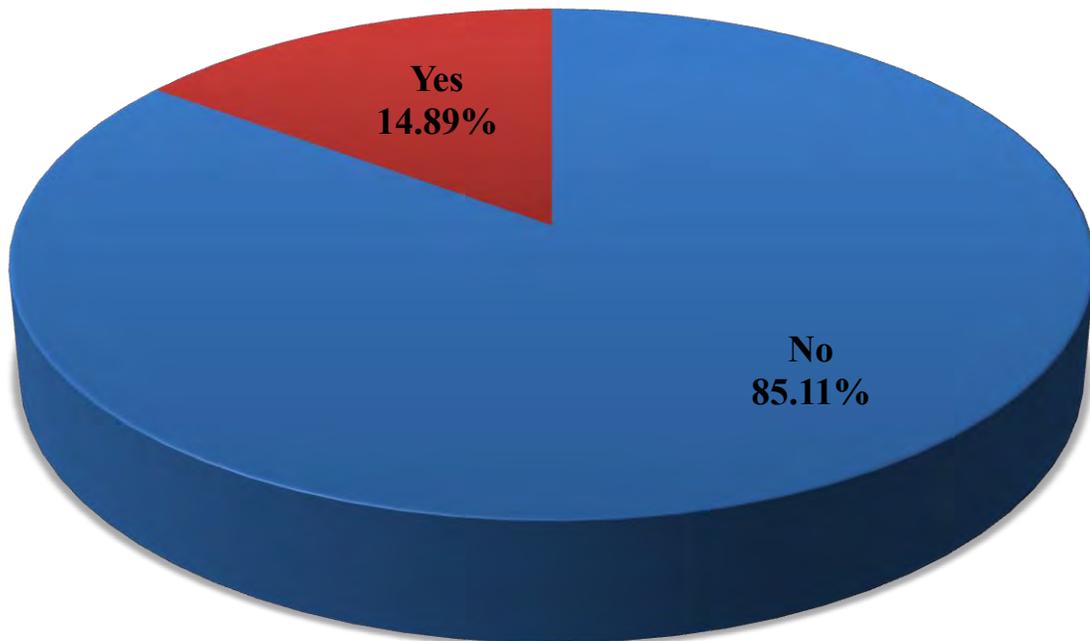
During The 2010 Harvest, I (Please Select All That Apply Below): [Sold My Grapes To A Home Winemaker]



DURING THE 2010 HARVEST, I (PLEASE SELECT ALL THAT APPLY BELOW): [MADE WINE COMMERCIALY WITH MY GRAPES]

During The 2010 Harvest, I (Please Select All That Apply Below): [Made Wine Commercially With My Grapes]		
No	85.11%	120
Yes	14.89%	21
Total	100.00%	141

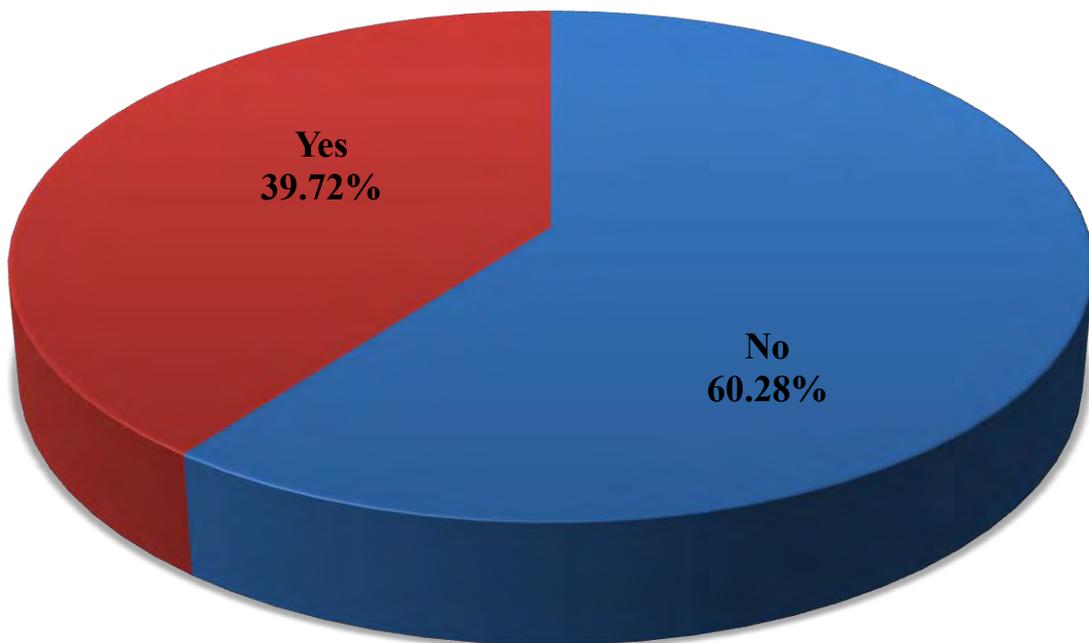
During The 2010 Harvest, I (Please Select All That Apply Below): [Made Wine Commercially With My Grapes]



DURING THE 2010 HARVEST, I (PLEASE SELECT ALL THAT APPLY BELOW): [MADE WINE AS A HOBBY WITH MY GRAPES]

During The 2010 Harvest, I (Please Select All That Apply Below): [Made Wine As A Hobby With My Grapes]		
No	60.28%	85
Yes	39.72%	56
Total	100.00%	141

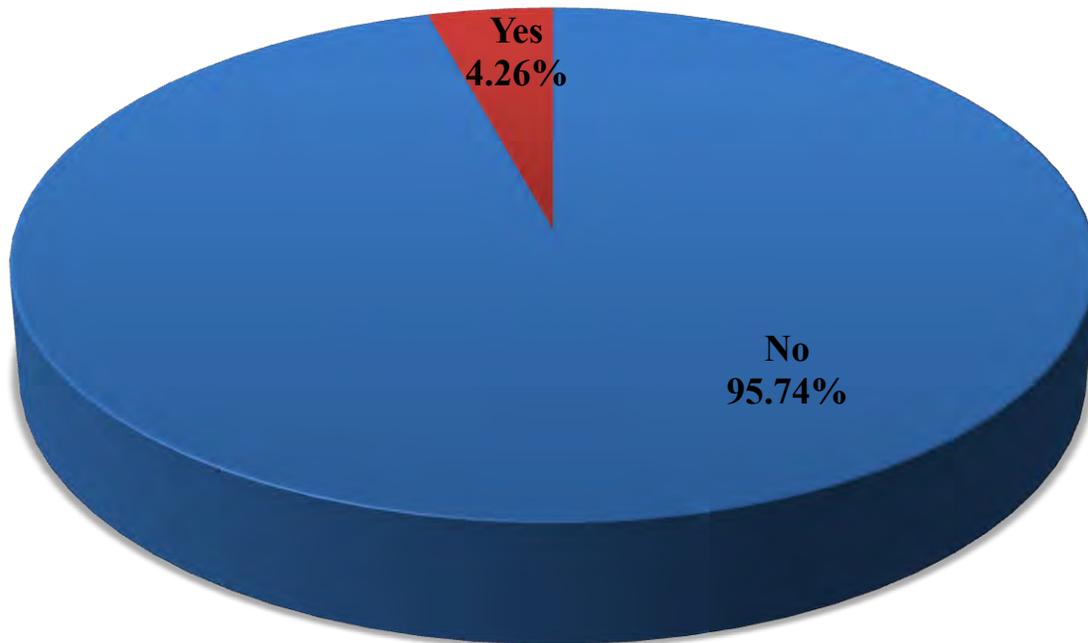
During The 2010 Harvest, I (Please Select All That Apply Below): [Made Wine As A Hobby With My Grapes]



DURING THE 2010 HARVEST, I (PLEASE SELECT ALL THAT APPLY BELOW): [DID NOTHING WITH MY GRAPES]

During The 2010 Harvest, I (Please Select All That Apply Below): [Did Nothing With My Grapes]		
No	95.74%	135
Yes	4.26%	6
Total	100.00%	141

During The 2010 Harvest, I (Please Select All That Apply Below): [Did Nothing With My Grapes]

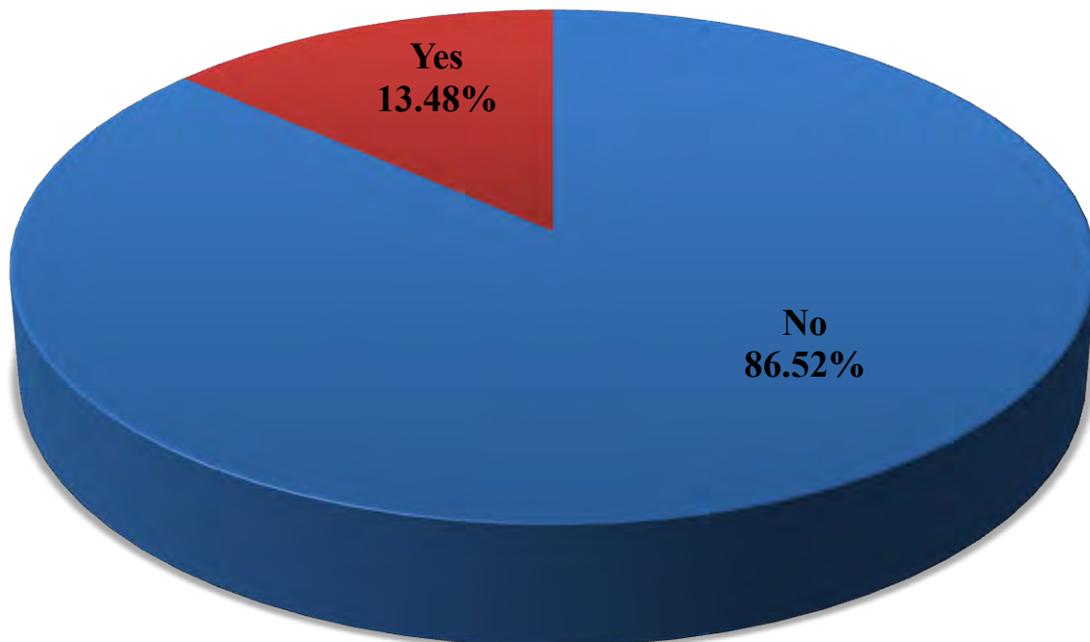


DURING THE 2010 HARVEST, I (PLEASE SELECT ALL THAT APPLY BELOW): [LET THE BIRDS EAT MY GRAPES]

Some growers who reported yes to “Let the birds eat my grapes”, didn’t actually plan on letting the birds eat them on purpose. They either didn’t use netting or waited too long to put the netting on.

During The 2010 Harvest, I (Please Select All That Apply Below): [Let The Birds Eat My Grapes]		
No	86.52%	122
Yes	13.48%	19
Total	100.00%	141

During The 2010 Harvest, I (Please Select All That Apply Below): [Let The Birds Eat My Grapes]

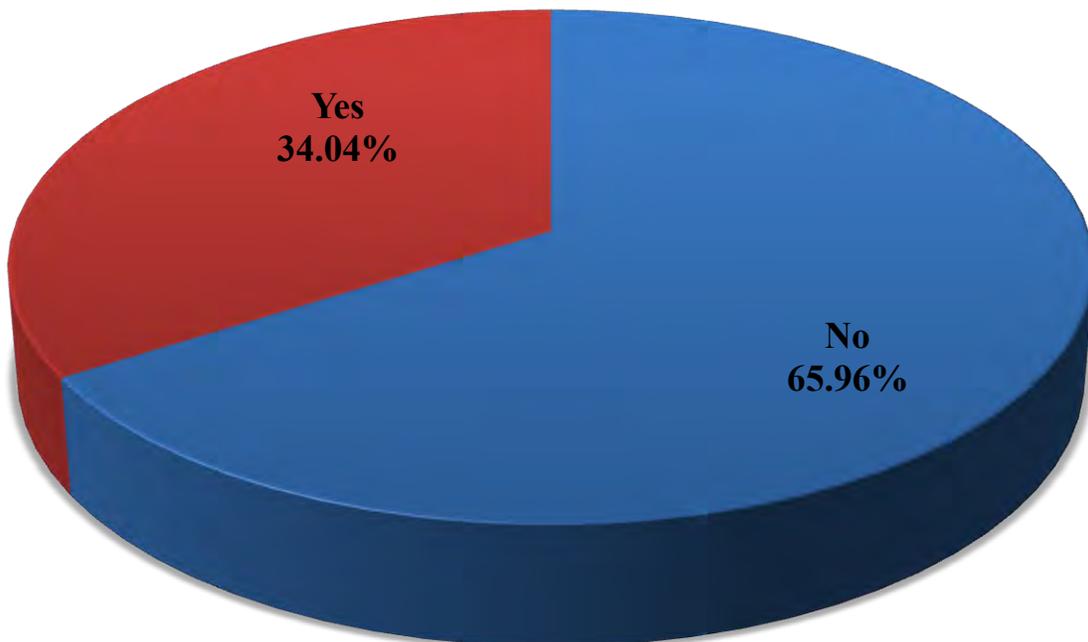


DURING THE 2010 HARVEST, I (PLEASE SELECT ALL THAT APPLY BELOW): [OTHER]

There were a lot of notes indicating that the vineyards were not bearing grapes yet, some lost their crop to frost or disease while other growers use their grapes for juice, jam and jelly.

During The 2010 Harvest, I (Please Select All That Apply Below): [Other]		
No	65.96%	93
Yes	34.04%	48
Total	100.00%	141

During The 2010 Harvest, I (Please Select All That Apply Below): [Other]



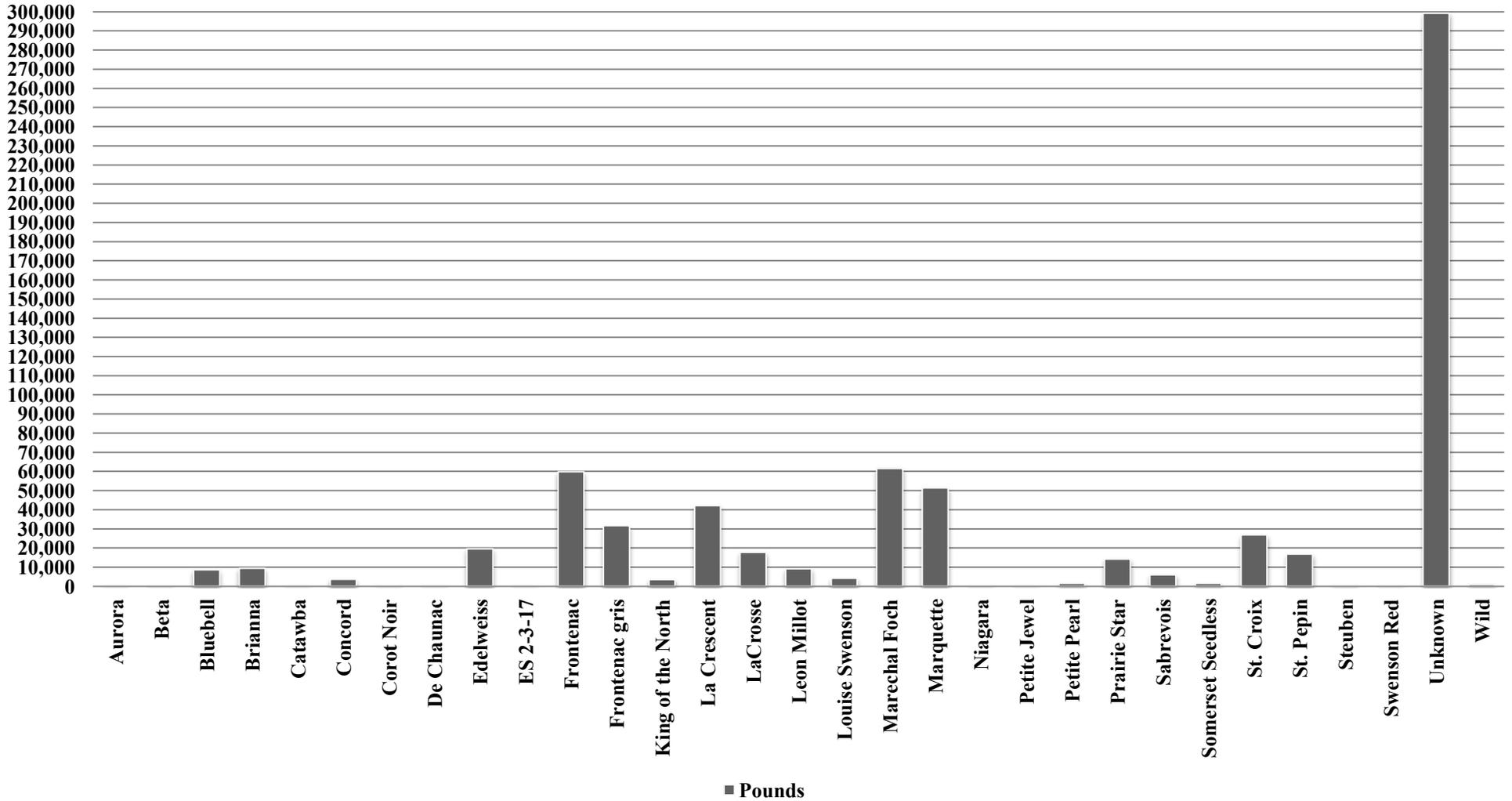
**GRAPE VARIETIES AND POUNDS PER VARIETY THAT YOU HARVESTED LAST YEAR
(2010)**

Wisconsin grape growers reported a total of 690,799 pounds or 345 tons of grapes harvested in 2010. Besides 299,163 pounds of unknown varieties harvested, the top five varieties of grapes harvested were Marechal Foch (61,519 pounds or 30.75 tons), Frontenac (59,786 pounds or 29.89 tons), Marquette (51,291 pounds or 25.64 tons), La Crescent (42,069 pounds or 21.03 tons) and Frontenac gris (31,655 pounds or 15.82 tons).

Grape Varieties And Pounds Per Variety That You Harvested Last Year (2010)	Total Pounds
Aurora	50
Beta	275
Bluebell	8,559
Brianna	9,330
Catawba	70
Concord	3,670
Corot Noir	200
De Chaunac	10
Edelweiss	19,508
ES 2-3-17	6
Frontenac	59,786
Frontenac gris	31,655
King of the North	3,540
La Crescent	42,069
LaCrosse	17,743
Leon Millot	9,128
Louise Swenson	4,175
Marechal Foch	61,519
Marquette	51,291
Niagara	260
Petite Jewel	169
Petite Pearl	1,550
Prairie Star	14,190
Sabrevois	6,015
Somerset Seedless	1,500
St. Croix	26,845
St. Pepin	16,790
Steuben	500
Swenson Red	233
Unknown	299,163
Wild	1,000
Grand Total Pounds Reported 2010	690,799
Grand Total Tons Reported 2010	345

GRAPE VARIETIES AND POUNDS PER VARIETY THAT YOU HARVESTED LAST YEAR (2010)

Grape Varieties And Pounds Per Variety That You Harvested Last Year (2010)



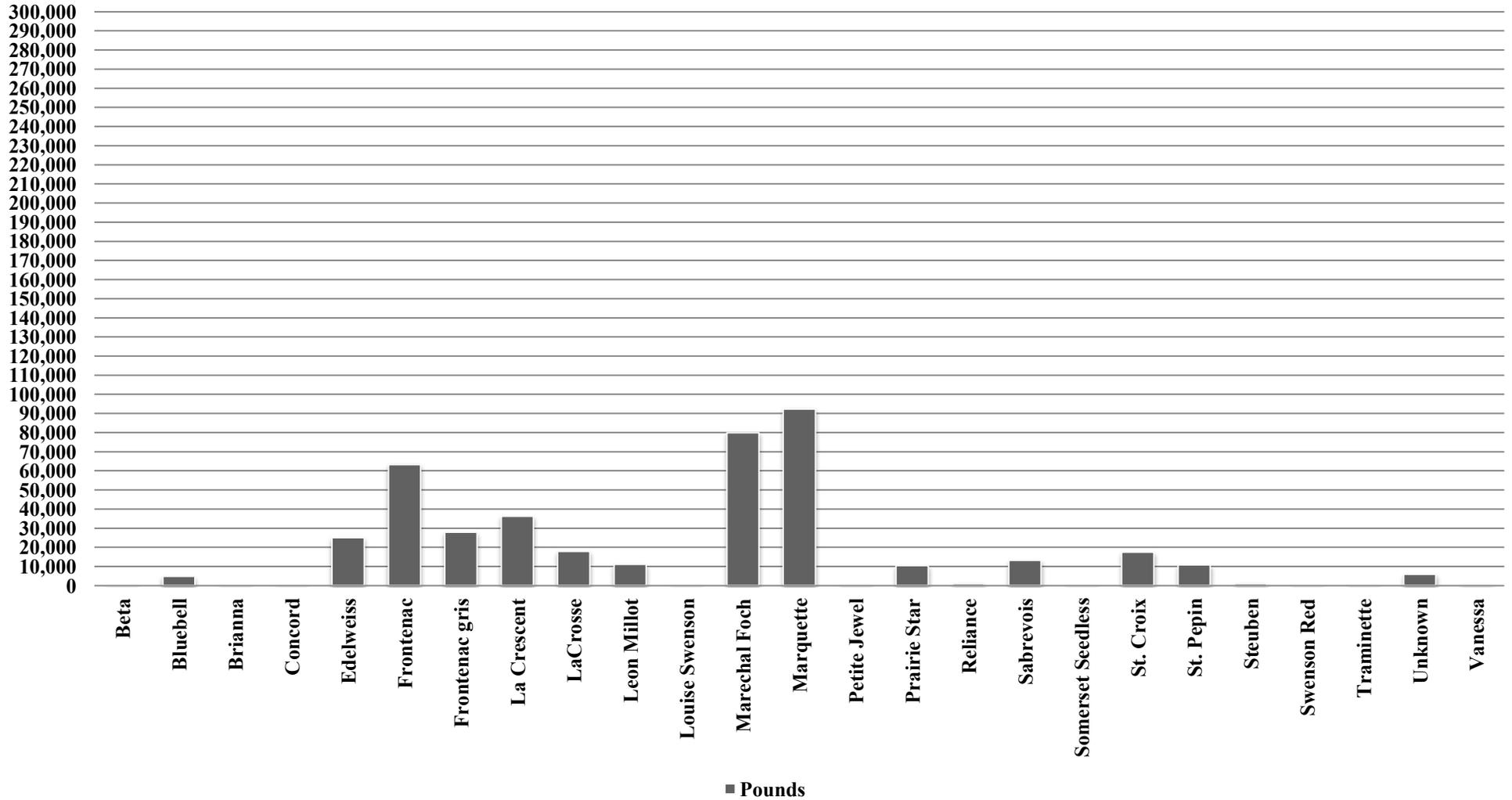
**GRAPE VARIETIES AND POUNDS PER VARIETY THAT YOU ARE LOOKING TO SELL
THIS HARVEST (2011)**

Wisconsin grape growers estimated a total of 419,540 pounds or 210 tons of grapes harvested in 2011. The total is lower than 2010 because a lot of growers did not answer this question. Some reasons they may have not answered this question include grapes not bearing yet or they just do not have the education or tools to do an accurate estimate. Besides 5,900 pounds of unknown varieties harvested, the top five varieties of grapes estimated for 2011 were Marquette (92,280 pounds or 46.14 tons), Marechal Foch (79,845 pounds or 39.92 tons), Frontenac (63,220 pounds or 31.61 tons), La Crescent (36,250 pounds or 18.12 tons) and Frontenac gris (27,906 pounds or 13.95 tons).

Grape Varieties And Pounds Per Variety That You Are Looking To Sell This Harvest (2011)	Total Pounds
Beta	40
Bluebell	4,791
Brianna	200
Concord	120
Edelweiss	25,000
Frontenac	63,220
Frontenac gris	27,906
La Crescent	36,250
LaCrosse	17,890
Leon Millot	11,100
Louise Swenson	100
Marechal Foch	79,845
Marquette	92,280
Petite Jewel	325
Prairie Star	10,440
Reliance	1,000
Sabrevois	13,200
Somerset Seedless	20
St. Croix	17,460
St. Pepin	10,790
Steuben	1,000
Swenson Red	113
Traminette	50
Unknown	5,900
Vanessa	500
Grand Total Pounds Estimated 2011	419,540
Grand Total Tons Estimated 2011	210

GRAPE VARIETIES AND POUNDS PER VARIETY THAT YOU ARE LOOKING TO SELL THIS HARVEST (2011)

Grape Varieties And Pounds Per Variety That You Are Looking To Sell This Harvest (2011)

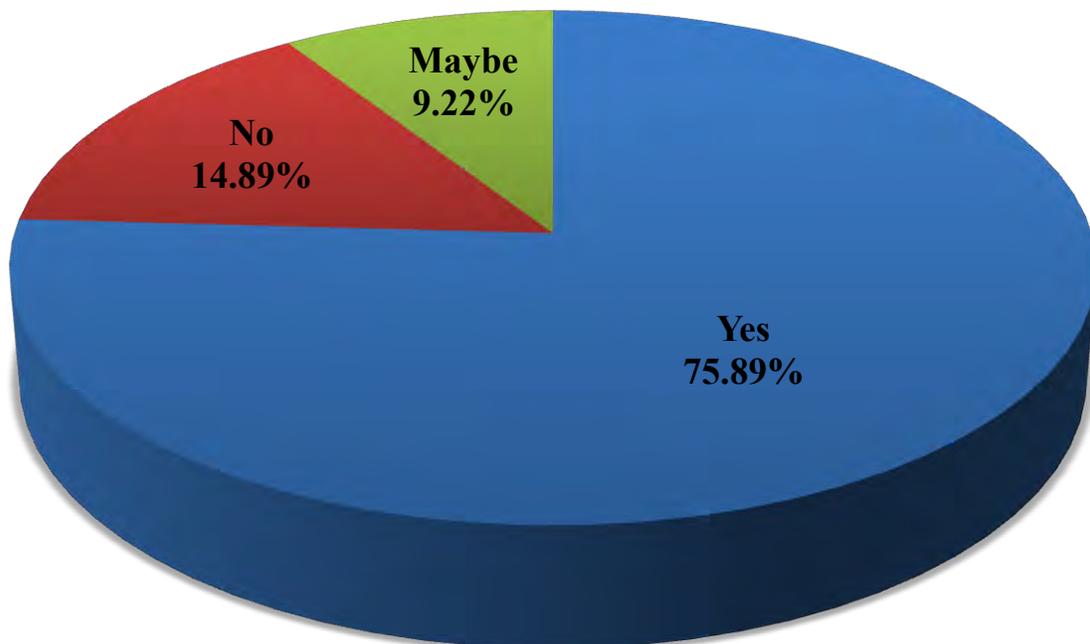


DO YOU PLAN ON PLANTING MORE GRAPES IN THE FUTURE?

There was a huge interest in planting more grapes in the future. Out of 141 survey participants, 121 (85.11%) indicated that they are interested or may be interested in planting more grapes in the future. Growers estimated that in the next five years, up to 352.35 acres of grapes will be planted. The most popular varieties growers indicated they would like to plant in the future are Marquette (17.49%), La Crescent (8.52%), Frontenac (8.07%), Frontenac gris (8.07%) and St. Pepin (7.17%).

Do You Plan On Planting More Grapes In The Future?		
Yes	75.89%	107
No	14.89%	21
Maybe	9.22%	13
Total	100.00%	141

Do You Plan On Planting More Grapes In The Future?



GRAPE VARIETIES PLANT IN FUTURE

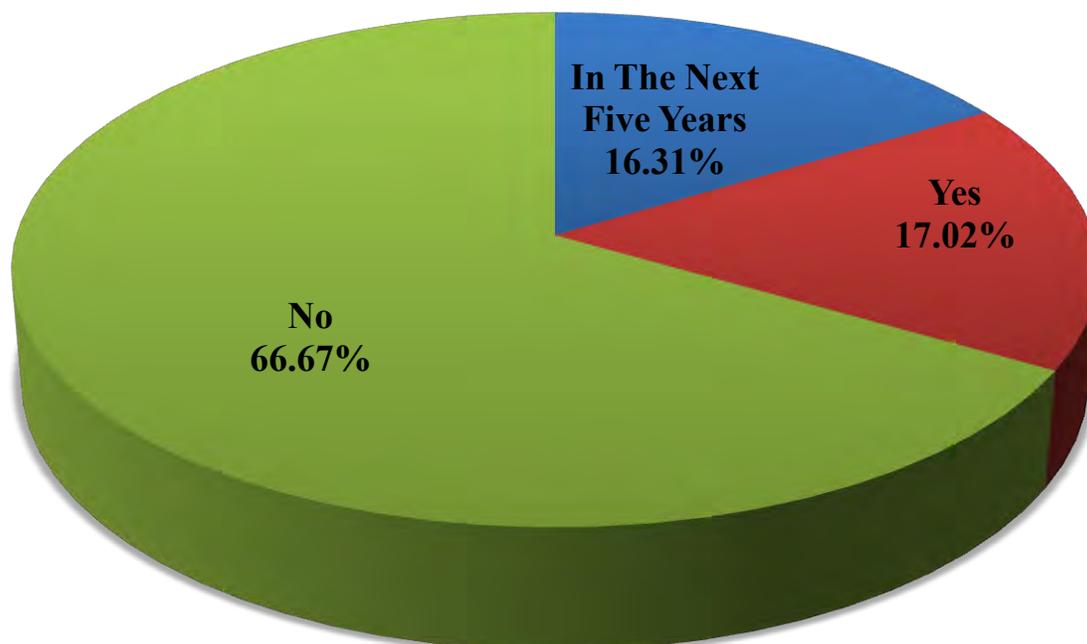
Grape Varieties Plant In Future		
Alpenglow	0.45%	1
Baco Noir	0.45%	1
Beta	0.45%	1
Bluebell	0.90%	2
Brianna	4.93%	11
Chardonnal	0.45%	1
Concord	0.90%	2
Edelweiss	2.24%	5
ES 5-14	0.45%	1
ES 5-3-89	0.45%	1
ES 6-16-30	0.45%	1
Frontenac	8.07%	18
Frontenac Blanc	3.59%	8
Frontenac Gris	8.07%	18
Kay Gray	0.45%	1
King of the North	0.45%	1
La Crescent	8.52%	19
LaCrosse	3.59%	8
Lakemont	0.45%	1
Landot Noir	0.45%	1
Lemberger	0.45%	1
Leon Millot	0.45%	1
Louise Swenson	2.24%	5
Marechal Foch	1.79%	4
Marquette	17.49%	39
Mars	0.45%	1
Petite Amie	0.45%	1
Petite Jewel	0.90%	2
Petite Pearl	4.48%	10
Prairie Star	1.79%	4
Rubiana (GR 7)	0.45%	1
Sabrevois	2.69%	6
Seyval Blanc	1.35%	3
Somerset Seedless	2.24%	5
St. Croix	4.48%	10
St. Pepin	7.17%	16
Swenson Red	0.45%	1
Traminette	1.79%	4
Trollhaugen	0.45%	1
Valiant	0.45%	1
Vanessa	0.45%	1
Vignoles	0.45%	1
Wild	0.45%	1
Worden	0.90%	2
Total	100.00%	223

DO YOU OWN AND OPERATE A FEDERALLY BONDED WISCONSIN WINERY?

There were 24 (17.02%) survey participants who currently own and operate a federally bonded Wisconsin winery and 23 (16.31%) who indicated they were interested in opening a winery in the next five years.

Do You Own And Operate A Federally Bonded Wisconsin Winery?		
In The Next Five Years	16.31%	23
Yes	17.02%	24
No	66.67%	94
Total	100.00%	141

Do You Own And Operate A Federally Bonded Wisconsin Winery?

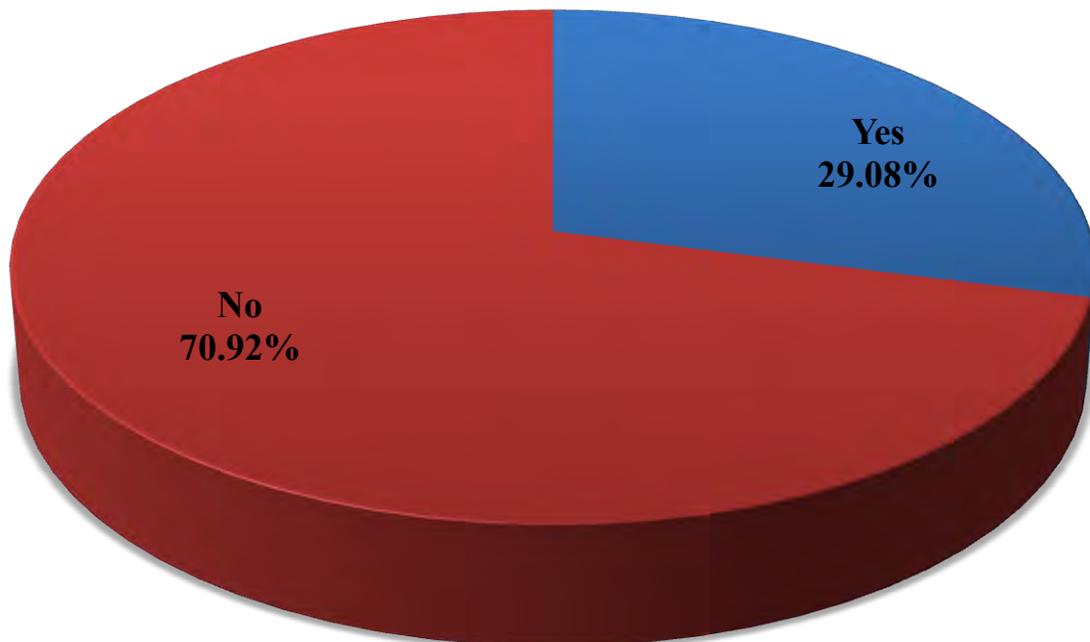


DID YOU ATTEND THE 2011 FRESH FRUIT & VEGETABLE CONFERENCE IN WISCONSIN DELLS?

Only 41 (28.87%) survey participants attended the 2011 Fresh Fruit & Vegetable Conference in Wisconsin Dells. There is huge potential to grow this event for the grape and winery track with proper marketing and communications. A lot of the survey participants indicated that they would like more educational and networking opportunities and this is a perfect place to start.

Did You Attend The 2011 Fresh Fruit & Vegetable Conference In Wisconsin Dells?		
Yes	29.08%	41
No	70.92%	100
Total	100.00%	141

Did You Attend The 2011 Fresh Fruit & Vegetable Conference In Wisconsin Dells?

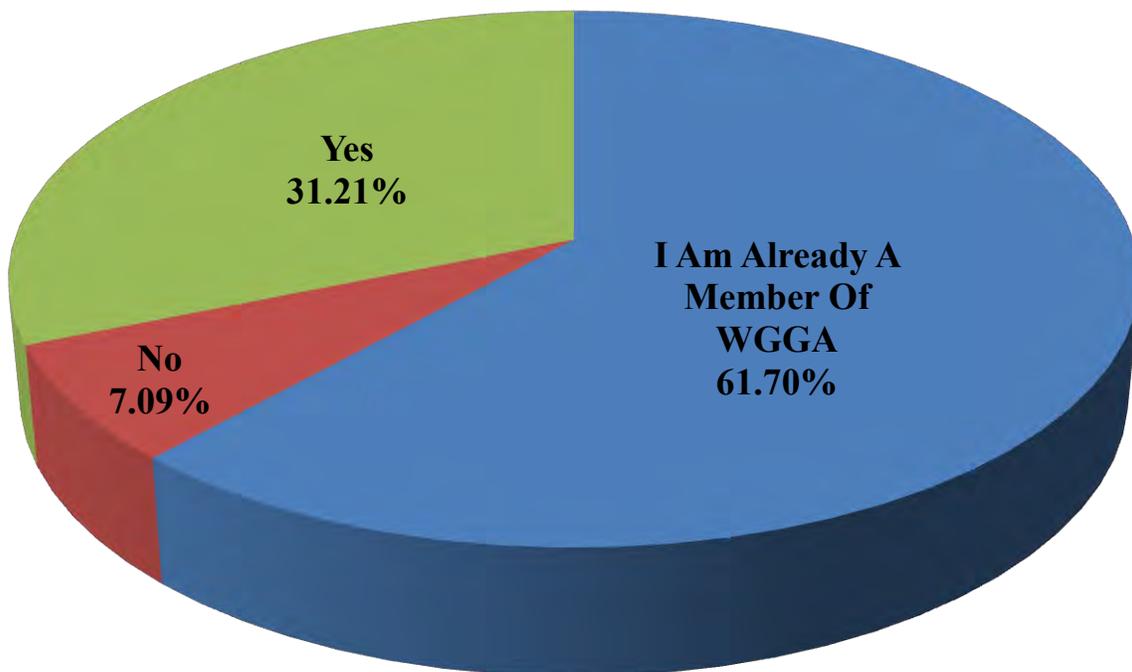


IF YOU DO NOT BELONG TO THE WISCONSIN GRAPE GROWERS ASSOCIATION (WGGA), WOULD YOU LIKE INFORMATION ON BECOMING A MEMBER?

The Wisconsin Grape Growers Association (WGGA) has 136 members. There were 87 (61.70%) survey participants who took the survey and were already members of the WGGA. There were 44 (31.21%) survey participants who indicated that they were interested in learning more about becoming a member of WGGA. WGGA membership information was emailed to each of them and 8 of them joined the association.

If You Do Not Belong To The Wisconsin Grape Growers Association (WGGA), Would You Like Information On Becoming A Member?		
I Am Already A Member Of WGGA	61.70%	87
No	7.09%	10
Yes	31.21%	44
Total	100.00%	141

If You Do Not Belong To The Wisconsin Grape Growers Association (WGGA), Would You Like Information On Becoming A Member?





APPENDIX A: WISCONSIN GRAPE GROWERS SURVEY 2011

This survey is being conducted by the Wisconsin Grape Growers Association (WGGA). The purpose of this survey is to get a better understanding of the present cold climate grape growing industry in Wisconsin. By documenting where we are today, we will be able to better assess growth and trends in the future. This survey should take 10-15 minutes to complete.

All completed surveys will be entered into a drawing for a free ticket to the 2012 Fresh Fruit & Vegetable Conference (\$63 value). Drawing for one free ticket to the 2012 Fresh Fruit & Vegetable Conference will take place on or by August 31, 2011.

This survey guarantees respondent confidentiality. All data will be used in a form that will make it impossible to determine the identity of the individual responses. That is, the survey responses will not be integrated, analyzed, or reported in any way in which the confidentiality of the survey responses is not absolutely guaranteed.

~~Survey ends June 30, 2011.~~ Survey deadline is extended to August 31, 2011.

Please feel free to contact Becky Rochester, Grape Marketing Coordinator, with any questions at becky@wigrapes.org.

Cheers,

Becky Rochester

GENERAL INFORMATION

Last Name:

First Name:

What is the name of your vineyard (if applicable)?:

Telephone Number:

i.e. 608-123-4567

Email Address:

VINEYARD INFORMATION

Which county is your vineyard located in?

Year when vineyard was first planted?

Total acreage of grapes planted today (bearing):

Total acreage of grapes planted today (non-bearing):

GRAPE VARIETIES PLANTED TODAY

Here is a list of some of the more popular Wisconsin varieties to help you out: Bluebell, Brianna, Catawba, Chardonnay, Concord, Edelweiss, ES 6-16-30, Espirit, Frontenac, Frontenac gris, Kay Gray, King of North, La Crescent, LaCrosse, Leon Millot, Marechal Foch, Marquette, Noiret, Prairie Star, Reliance, Sabrevois, St. Croix, St. Pepin, Seyval, Somerset Seedless, Steuben, Traminette, Valiant, Vidal Blanc, Vignoles, Other

Please list grape varieties you planted prior to 2007 and number of vines planted by variety:

i.e.: Frontenac 500 vines

Please list grape varieties you planted between 2007-2010 and number of vines planted by variety:

i.e.: Frontenac 500 vines

Please list grape varieties you planted but have pulled out, number of vines that were planted by variety and reason why pulled out:

i.e.: Frontenac 500 vines low vigor, flavor profiles, marketing

Do you plan on planting more grapes in the future? (circle one)

Yes

No

Other

PLANTING GRAPES IN FUTURE ACREAGE & VARIETIES

Here is a list of some of the more popular Wisconsin varieties to help you out: Bluebell, Brianna, Catawba, Chardone, Concord, Edelweiss, ES 6-16-30, Espirit, Frontenac, Frontenac gris, Kay Gray, King of North, La Crescent, LaCrosse, Leon Millot, Marechal Foch, Marquette, Noiret, Prairie Star, Reliance, Sabrevois, St. Croix, St. Pepin, Seyval, Somerset Seedless, Steuben, Traminette, Valiant, Vidal Blanc, Vignoles, Other

Total acreage you estimate you will plant to grapes over the next five years:

i.e. 3.25 acres

Please list all grape varieties you will plant in the future and number of vines:

i.e.: Frontenac 500 vines

GRAPE HARVEST

During the 2010 harvest, I (please circle all that apply below):

Sold my grapes to a local winery (wineries)

Sold my grapes to a home winemaker

Made wine commercially with my grapes

Made wine as hobby with my grapes

Did nothing with my grapes

Let the birds eat my grapes

Other

If you chose "Other" above, please make note below:

Please list varieties and pounds per variety that you harvested last year (2010):

i.e.: Frontenac 100 pounds

Please list varieties and pounds per variety that you are looking to sell this harvest (2011):

i.e.: Frontenac 100 pounds

APPENDIX B: GRAPE VARIETIES GROWN IN WISCONSIN

Variety	Prior to 2007	2007-2010	Percentage	Total
Alpenglow	-	1	0.11%	1
America	1	-	0.11%	1
Aurora	4	-	0.44%	4
Baco Noir	3	2	0.55%	5
Baltica	-	1	0.11%	1
Beta	7	4	1.21%	11
Bluebell	11	10	2.32%	21
Brianna	5	18	2.54%	23
Canadice	2	2	0.44%	4
Catawba	1	3	0.44%	4
Cayuga White	1	1	0.22%	2
Chancellor	1	-	0.11%	1
Chardonnay	-	1	0.11%	1
Chontay	-	1	0.11%	1
Concord	11	4	1.65%	15
Corot Noir	1	-	0.11%	1
De Chaunac	4	-	0.44%	4
Delaware	2	-	0.22%	2
Diamond	1	-	0.11%	1
Edelweiss	17	18	3.86%	35
Einset	-	1	0.11%	1
Elvira	4	2	0.66%	6
ES 15-53	-	1	0.11%	1
ES 2-3-17	1	-	0.11%	1
ES 5-3-89	2	-	0.22%	2
ES 6-16-30	1	1	0.22%	2
ES Variety	-	1	0.11%	1
Espirit	1	3	0.44%	4
Flandreau	-	1	0.11%	1
Fredonia	4	2	0.66%	6
Frontenac	44	45	9.81%	89
Frontenac blanc	-	1	0.11%	1
Frontenac gris	15	35	5.51%	50
Golden Muscat	-	1	0.11%	1
Himrod	1	-	0.11%	1
Kay Gray	5	1	0.66%	6
King of the North	7	9	1.76%	16
Kishwaukee	-	1	0.11%	1
La Crescent	18	38	6.17%	56
LaCrosse	25	15	4.41%	40
Lakemont	1	2	0.33%	3
Landot Noir	3	2	0.55%	5
Lemberger	1	-	0.11%	1
Leon Millot	13	9	2.43%	22
Lorelei	2	2	0.44%	4
Louise Swenson	3	7	1.10%	10
Marechal Foch	29	17	5.07%	46
Marquette	19	69	9.70%	88
Marquis	-	3	0.33%	3
Mars	2	5	0.77%	7
Minnesota 78	2	1	0.33%	3
MN 1200	-	1	0.11%	1
MN 1220	-	1	0.11%	1
Neron	1	-	0.11%	1
Niagara	5	4	0.99%	9
Noiret	1	3	0.44%	4
Norton	1	1	0.22%	2
NY 76.0844.24	1	2	0.33%	3
Other	-	1	0.11%	1
Petite Amie	-	2	0.22%	2
Petite Jewel	2	1	0.33%	3
Petite Pearl	-	7	0.77%	7
Prairie Star	15	20	3.86%	35
Price	1	-	0.11%	1
Reliance	6	3	0.99%	9
Riesling/C3309	-	1	0.11%	1
Rosette	2	-	0.22%	2
Rubiana (GR 7)	1	2	0.33%	3
Sabrevois	6	18	2.65%	24
Seedless Concord	3	-	0.33%	3
Seyval Blanc	1	1	0.22%	2
Somerset Seedless	4	10	1.54%	14
St. Croix	19	20	4.30%	39
St. Pepin	28	31	6.50%	59
St. Vincent	-	1	0.11%	1
Steuben	2	-	0.22%	2
Suelter	1	-	0.11%	1
Summersweet	1	1	0.22%	2
Swenson Red	8	5	1.43%	13
Swenson White	2	2	0.44%	4
Traminette	3	4	0.77%	7
Trollhaugen	-	2	0.22%	2
Valiant	9	2	1.21%	11
Valvin Muscat	-	1	0.11%	1
Van Buren	-	1	0.11%	1
Vanessa	-	6	0.66%	6
Vidal Blanc	1	-	0.11%	1
Vignoles	4	1	0.55%	5
Wild	1	1	0.22%	2
Worden	4	1	0.55%	5
Zilga	-	1	0.11%	1
Total	408	499	100.00%	907

Annual Report to the 2010 Specialty Crop Block Grant

Improving nitrogen use efficiency and reducing nitrogen losses in sweet corn production systems

Nick George, Midwest Food Processors Association
Matt Ruark, University of Wisconsin-Madison

Objectives

The overall goal of this research was to develop improved nitrogen (N) recommendations for sweet corn grown in Wisconsin. Specific objectives include: (i) determine the effects of hybrid, planting density, N rate and their interactions on sweet corn yield, (ii) evaluate nitrogen use efficiency (NUE) components across improved management practices, and (iii) evaluate nitrate concentrations in groundwater below conventional and optimized sweet corn management practices.

Materials and Methods

Four research experiments were planned for the 2011 growing season and conducted at the Hancock Agricultural Research Station. The first experiment evaluated two sweet corn hybrids across seven N rates (0, 50, 100, 150, 150, 200, and 250 lb ac⁻¹). One N rate (50 lb ac⁻¹) was applied once at V5. Two N rates (100 and 150 lb ac⁻¹) were applied over two applications (V5 and V8) and three N rates (150, 200, and 250 lb ac⁻¹) were applied over three applications (V5, V8, VT). Yield was collected by hand and whole plots samples were collected for NUE analysis, which included:

$$\text{Agronomic efficiency (AE)} = (Y_N - Y_0) / \text{N applied}$$

$$\text{Uptake efficiency (UE)} = (\text{AGB}_N - \text{AGB}_0) / \text{N applied}$$

$$\text{Removal efficiency (RE)} = (\text{Ear}_N - \text{Ear}_0) / \text{N applied}$$

Where Y_N , AGB_N and Ear_N is the yield, total N content of the above ground biomass, and total N content of the ear, respectively, for a N fertilizer treatment. Y_0 , AGB_0 and Ear_0 is the yield, total N content of the above ground biomass, and total N content of the ear for the treatment not receiving N fertilizer.

The second study compared two sweet corn hybrids at two rates of N (130 lb ac⁻¹ and 200 lb ac⁻¹) at four seeding densities (18000, 24000, 30000, and 36000 seeds ac⁻¹). Yield was collected by hand and whole plant samples were collected for NUE. The third planned study was going to focus evaluating the N response of nine different hybrids. Unfortunately, the late planting date did not result in any yield from this study. It will be repeated in 2012. In addition to yield, kernel recovery was evaluated on the first and second studies and allows for yield reporting in cases per acre (i.e. canned product).

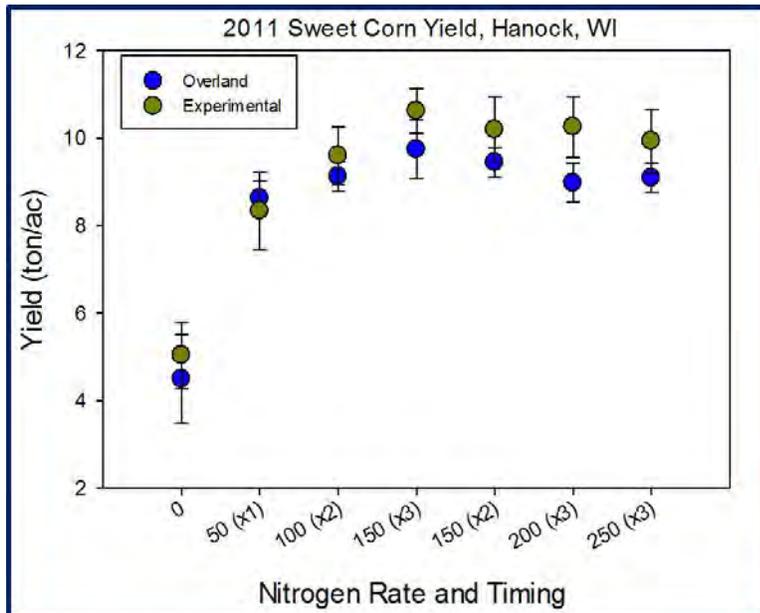
The fourth study evaluates four N management practices: 200 lb ac⁻¹ (224 kg ha⁻¹) of N (high input), 150 lb ac⁻¹ (168 kg ha⁻¹) of N (standard input), 150 lb ac⁻¹ (168 kg ha⁻¹) of N as polymer coated urea (controlled input), and no N applied (no input) and their impact on groundwater N concentrations (nitrate, ammonium, and organic N). The high input treatment included N application as a standard grower application rate of 200 lb ac⁻¹, applied as urea and ammonium sulfate in three applications

(preplant, 4 weeks after planting, 6 weeks after planting). The standard input will be the recommended rate of N (150 lb ac^{-1}) applied as urea and ammonium sulfate in three applications. The controlled input treatment included the recommended rate of N (150 lb ac^{-1}) as ESN[®] applied entirely at planting. The no input treatment will have no fertilizer N additions and be used as a control.

The plot sizes were 48 x 50 ft, an adequate size where adjacent plots will not influence the water quality dynamics at the groundwater interface. In each plot three groundwater monitoring wells were installed, which were PVC pipes (3.2 cm in diameter) with well screens with 0.5 mm slot width. The wells were installed in 2010 and potatoes were grown. However, the water table rose during the 2010 growing season, so longer well screens were attached to each PVC pipe and wells were reinstalled. Wells were sampled weekly and analyzed for nitrate, ammonium, and total N, with organic N determined as the difference between total N and the sum of nitrate-N and ammonium-N. In order to develop a partial nitrogen budget and to determine nitrogen use efficiency components both above ground biomass and ears will be analyzed for total N.

Results

Results from the 2011 growing season indicate that the Experimental variety (22-85) out-yielded the Overland variety across most N rates. Also, for both varieties, yields were maximized with 150 lb ac^{-1} of N when applied over three applications. The 22-85 variety also out-yielded the Overland variety when



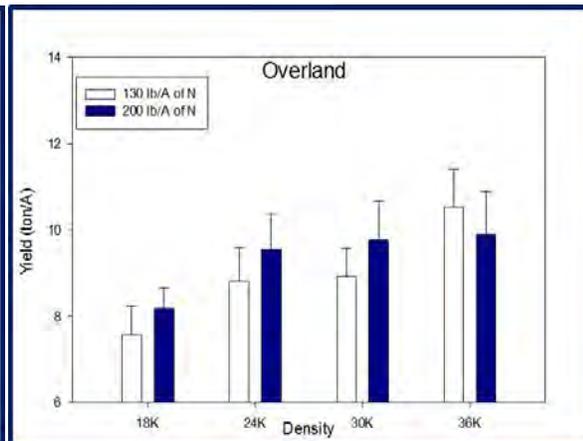
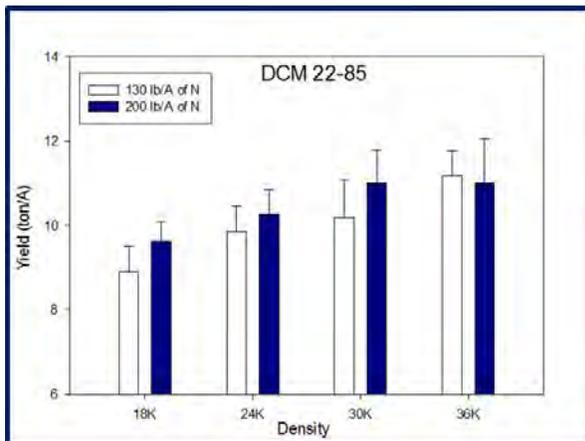
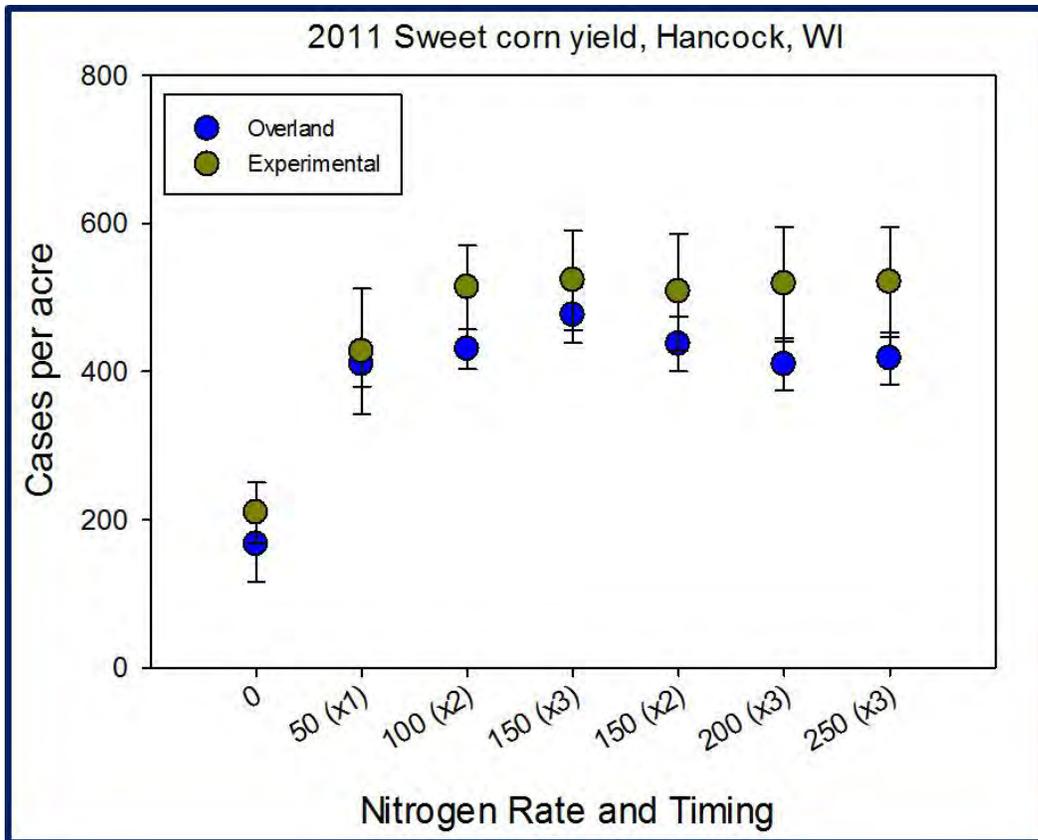
determined as cases per acre.

However, the optimum N rate to maximize cases per acre was only 100 lb ac^{-1} .

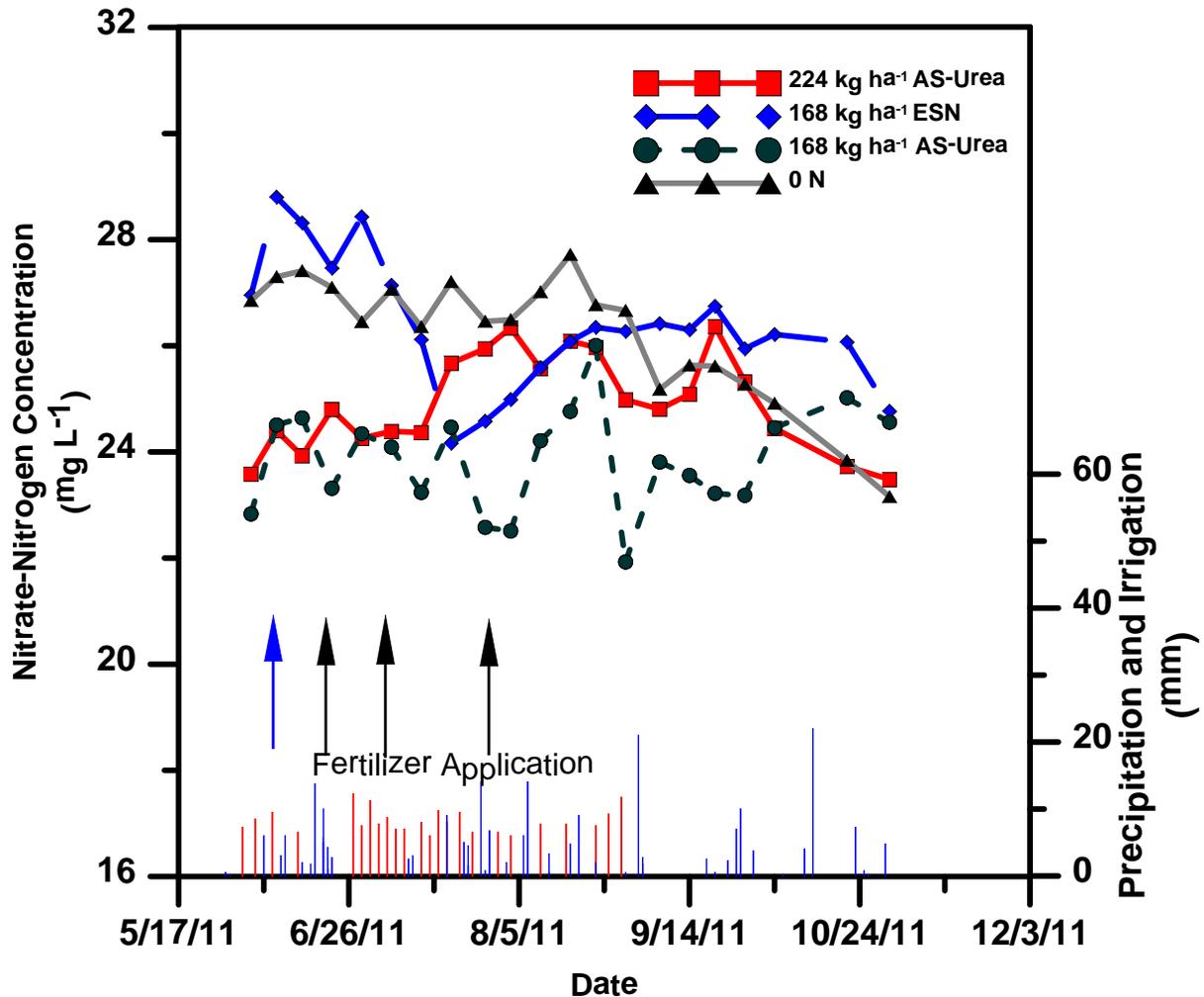
This data is in agreement with previous results that show new varieties will out-yield older varieties. It also implies that newer varieties will have greater NUE compared to older varieties, since they maximize yield at the same N rate.

Results from the seeding density study indicate that different varieties responded differently to seeding

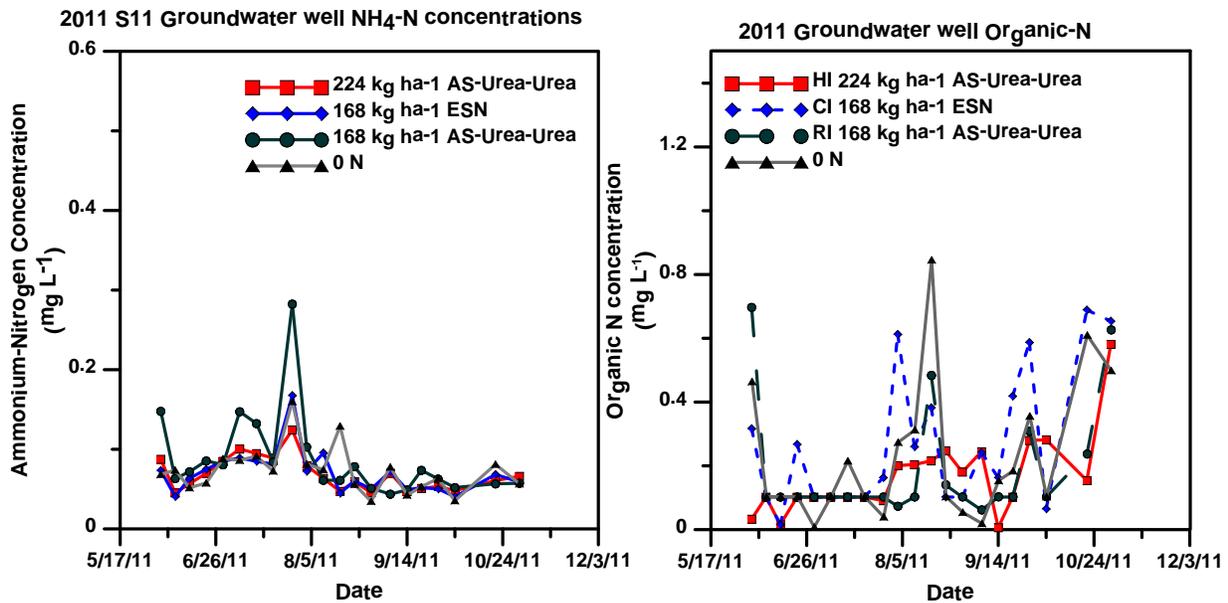
density. Overland maximized yield at 24,000 seeds per acre when fertilized with 200 lb ac^{-1} of N, but maximized yield at 36,000 seeds per acre when only fertilized with 130 lb ac^{-1} of N. A similar, but less pronounced trend was observed with the 22-85 variety.



2011 Field S11 Groundwater Well NO₃-N Concentrations



Groundwater nitrate concentrations did not appear to be affected by N management practices in 2011. This is in contrast to 2010 where ESN significantly reduced groundwater concentrations over one year. There are three possible explanations for this difference. The first is that there was not an intense rainfall event during the 2011 growing season that would have flushed nitrate out of the soil profile. The second is that background concentrations were sufficiently high to mask any effect. In fact the high rate of N resulted in similar concentrations of nitrate as the no input treatment. The third is that ESN resulted in lower yield (16.3 Mg ha⁻¹ or 7.2 tons ac⁻¹) compared to the high input (20.0 Mg ha⁻¹ or 8.9 tons ac⁻¹) or standard input (18.9 Mg ha⁻¹ or 8.4 tons ac⁻¹). Less N would have been taken up in the ESN treatment plots, meaning more N would be available to be leached. ESN has performed well on field corn in this region. It is unclear why ESN performed so poorly in 2011. Ammonium and organic N concentrations were all well below 1 ppm in concentration. These are not major sources of groundwater N.



Continuing activities

Whole plant samples are currently being processed and analyzed for total N to calculate NUE.

Extension

Results from this study have been presented at the 2011 Midwest Food Processors Association (100 people in attendance) and the 2011 Soil Fertility and Nutrient Management Meetings (450 attendees). In 2012 these research results will be presented at the 2012 Wisconsin Potato and Vegetable Growers Association Meeting, the 2012 Processing Crops Conference, and at a County-based processing crops workshop in Fond du Lac County, WI. At the 2011 MWFPA meeting a survey was conducted to summarize current N management practices among the sweet corn processing community. The results will be summarized and presented at the next MWFPA field day.

SURVEY OF THE ECONOMIC IMPACT OF POTENTIALLY INVASIVE SPECIES IN WISCONSIN

What's the reason for so much concern about invasive species? Around the world governmental agencies and non-governmental organizations concerned with preserving our existing biodiversity are exploring the best ways to minimize the degradation of natural and planted landscapes by invasive plant species. These non-native invasive species can out-compete native species primarily because the conditions, animals and fungi that kept them in check in their native lands do not exist here. This reduces the numbers of the out-competed species as well as the associated pollinators, seed eaters, foragers, etc. that make up that biological community. These plants cause a wide range of ecological and economic harm, such as: preventing the regeneration of forest trees, altering watershed ability to hold and cleanse run-off, increasing the risk of wildfires, increasing shoreline erosion, decreasing fish and wildlife habitat, poisoning livestock, obstructing hiking, hunting, and fishing access, hindering boating and damaging physical infrastructures.

How does this relate to nursery operations? Historically, a large proportion of the species that have become invasive, were intentionally imported as ornamental landscape plants, for erosion control, or for livestock forage.

What has Wisconsin done so far to address this problem? In Wisconsin, Species Assessment Groups (SAGs), comprised of experts in their respective fields and representatives of stakeholder groups, were developed in 2007. Their task has been to provide guidance to the Wisconsin Department of Natural Resources (WDNR) and the Wisconsin Council on Invasive Species (WCIS), a formal advisory body created by the state legislature and appointed by the Governor. Greg Long has been representing the Wisconsin Nursery Association on the WCIS and the task force that created it since 2001. The WCIS has been working with the WDNR to identify invasive species and to classify them according to a number of criteria, (including: their abundance, level of threat posed to the state's ecology and to the economies of various stakeholders). For each of the species of interest, the appropriate SAG is charged with recommending the level of restriction, if any, that is appropriate to protect the state's resources while simultaneously minimizing economic hardship where it can be avoided. From 2004 to 2009 the WCIS, WDNR and the SAGs worked to compose a comprehensive invasive species rule (NR 40) and an initial list of invasive species that would be prohibited or restricted. For a listing of those species and a copy of the rule, see: <http://dnr.wi.gov/invasives/classification/> All agreed that the initial listing would primarily include those species that were not economically important to a significant sector of Wisconsin's economy. Once the rule was in place and being implemented, these organizations would look at the second round of species to be assessed. This "Round 2" would include an assessment of those species known to be or potentially invasive, but also currently in use in the landscape or agricultural industries. This survey is a step in developing that assessment.

How does this survey help? The Wisconsin Nursery Association was fortunate this year to obtain grant funds through the Specialty Crop Block Grant (USDA) program to enable us to collect the necessary economic data to assist this process. The intent of this survey is to provide the SAGs with information about the taxa and volume of plants on the pending list of potentially invasive plants that are being produced and sold by Wisconsin nursery growers. Without this information they will not be able to consider the full impact of their recommendations on the state's economy as well as the livelihoods of the green industry producers. This survey is meant to capture potential revenue losses only, not other economic impacts.

How will this information be used? The survey responses will be tabulated and summarized. This information will be provided to the WDNR to be included in their review of information available on these taxa. It will also be provided to the SAGs when they meet later in 2011 to assess the Round 2 species.

Will confidentiality be assured? Yes. The data will be carefully presented by using categories, sums, and averages so that the identities of individual respondents are obscured. Only WNA staff or representatives requiring access to the raw data in order to tabulate the results will have access to it. They have agreed to extreme levels of confidentiality.

Why is my input needed? Because only those nurseries growing products directly can give the SAGs an accurate picture of how large a proportion of their incomes are made up of sales of these plants.

Will respondents have access to the findings of the survey? Yes, the survey results will be made public in a number of ways, including: posting on the Wisconsin Green Industry Federation website: www.wislf.net

DIRECTIONS FOR COMPLETION

MARKING YOUR RESPONSES. You may use a slash, an X, a check, or fill in the circle to the left of the chosen response. This will be tabulated manually, so use whatever method you choose so long as it is clear!

(a) Do you grow this taxon? This is a convenient (and space efficient) way of asking “Do you grow this genus, species, hybrid or cultivar?” It refers to the plant named in the box to the left of the “a” and any of its cultivars and hybrids. If you are not sure if what you are growing is the plant in question, you can sometimes resolve this by checking out the online pictures and information, including synonyms provided at: <http://plants.usda.gov/>
Additional information on the plants’ characteristics and status in Wisconsin can be found at: <http://http://dnr.wi.gov/invasives/plants.asp?filterBy=Classification>

(b) Percent of gross sales contributed by this taxon. This will be an estimation! You can decide to use the most recent year’s numbers, a more representative recent year’s numbers, or an average over the last few years.

(c) Production trend for the coming season. For the 2011 season, how will you be adjusting your quantities relative to last year’s production starts.

(d) Time required to produce the largest size offered. How much time is required for you to produce this plant from start to finish? This will inform the SAG how many years of product are in production and could impact whether a future date instead of an immediate change in status may be appropriate.

(e) Estimated wholesale value of plants in production. Include any stock already ordered and all stock in production. Especially if you do field production, include the cost of harvesting in this estimate.

(f) Observed invasive tendencies. Plants can vary in their behavior based on regional soil, climate, and biological associates. As a plant professional, your observations on how plants are performing in the fields and non-planted landscapes in your area can help inform the SAG’s understanding of the relative threats posed by these plants. Be sure to check all that apply. IF YOU HAVE NOT WATCHED CLOSELY ENOUGH TO EVALUATE – LEAVE BLANK!

only where planted - Never seen outside of cultivation. Stays where planted and doesn’t produce viable seed.

“runs” – Spreads vigorously by vegetative means (runners, stolens, rhizomes, vines).

open ground – Seeds into areas that have been cultivated/tilled.

managed areas – Seeds into and persists in areas that are mown at least annually. Include pastures and road r-o-w.

“old fields” – Seeds into areas that were disturbed but have minimal or no management presently.

undisturbed areas – Seeds into and persists in areas that have been undisturbed for many years, such as established prairies and/or later succession wooded areas.

(g) Top cultivars grown. Some cultivars are not as invasive as others. This section enables the SAG to evaluate the situation at a finer scale than by species alone. List the cultivars (however many space is provided for, or, that you grow) that make up to largest percentage of your production for that species/taxon and specify the percent of total production of that taxon this cultivar makes up. Example: Norway maple may make up between 3 – 4.9% of your sales (enter in b); of that amount, you may produce 20% Deborah, 15% Pond, 12% Cleveland, etc. If you grow seedling or un-named plants enter them as “species”.

(h) Cultivars with no observed invasive tendencies. List cultivars that have shown no invasive traits (example s = last 5 options in f) and/or are less invasive than the species or other cultivars. Specify which condition you’ve observed with “not” or “less”. **If you have grown these taxa under conditions where invasive tendencies would not be expressed**, such as sold before possible fruit set, grown indoors and/or with no hospitable seed bed nearby (i.e., grown on concrete, landscape fabric, or gravel), **leave blank**.

ADDITIONAL SPACE for observations and comments can be found on page 19.

Questions about the survey? Contact either:

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414-529-4705

Susan Wiegrefe, SCBG Economic Survey Project Coordinator

swiegrefe@att.net

715-220-1183

Taxon (1): **Amur cork tree, *Phellodendron amurense***

a) Number of Respondents Selling: **12**

b) Percent of **gross plant sales** contributed by this taxon:

11 < 1% **1** 1 - 2.9% **0** 3 – 4.9% **0** 5 – 6.9% **0** 7 – 8.9% **0** > 9% **0** not disclosed

Total dollar amount contributed (median of % category x median of gross sales category for each totaled) **\$35,083**

Rank among 63 taxa (1 = most) **28**

c) Trend for 2011 season (tally)

2 increased **4** unchanged **2** temp. reduced **0** dec. slightly **2** phasing out **0** discontinued **2** not disclosed

d) Time required to produce (tally)

0 < 6 months **0** 6 to 12 months **2** 1 to 2 years **0** 2 to 3 years **1** 3 to 5 years **7** over 5 years **2** not disclosed

e) Estimated wholesale value of plants in production (category median x count, totaled): **\$21,000** (tally below by category)

5 < \$1,000 **2** \$1.0K to 2.5K **2** \$2.5K to 5K **1** \$5K to 10K **0** \$10K to 25K **0** > \$25K **2** not disclosed

f) Observed invasive tendencies (crosstabs by EcoRegion) **# of surveys with coded comments = 6**

Of the 4 respondents who specified “stays where planted”, 2 grow male cultivars exclusively, 2 (CSH, SEGP) grow the species all or in part

SEGP 1 “open ground” and “managed areas”

SWS 1 “runs”

g) Top cultivars grown, where noted.

‘Eyestopper’, ‘Macho’, ‘His Majesty’, and undisclosed male cultivar(s).

h) Cultivars with no or reduced invasive tendencies, where noted. (Crosstab by EcoRegion, as appropriate).

‘Eyestopper’, ‘Macho’, ‘His Majesty’ = all male (staminate) cultivars

i) Comments grouped by EcoRegion.

(WCR) “(have) not observed to spread on 20-yr old plantings, including females.”

Synthesis:

5 of the 12 growers are growing male cultivars exclusively; however, in order to have rootstock for budding, pistillate plants are required somewhere - ?? how successful are tissue culture and/or cutting propagation for this taxon ?? (ask Mike Yanney)

Taxon (**2**): **Scots pine, Scotch pine, *Pinus sylvestris***

a) Number of Respondents Selling: **47**

b) Percent of **gross plant sales** contributed by this taxon:

28 < 1% **8** 1 - 2.9% **8** 3 – 4.9% **1** 5 – 6.9% **1** 7 – 8.9% **1** > 9% **0** not disclosed

Total dollar amount contributed (median of % category x median of gross sales category for each totaled) **\$863,573**

Rank among 63 taxa (1 = most) **2**

c) Trend for 2011 season (tally)

3 increased **14** unchanged **0** temp. reduced **7** dec. slightly **16*** phasing out **3** discontinued **4** not disclosed

*This was the largest number and percentage of growers phasing out of a crop. Frequent comment was to the effect that there is no longer demand for the species and it has value only as a Christmas tree.

d) Time required to produce (tally)

2 < 6 months **0** 6 to 12 months **0** 1 to 2 years **4** 2 to 3 years **9** 3 to 5 years **27** over 5 years **5** not disclosed

e) Estimated wholesale value of plants in production (category median x count, totaled): **\$294,250** (tally below by category)

14 < \$1,000 **7** \$1.0K to 2.5K **6** \$2.5K to 5K **7** \$5K to 10K **5** \$10K to 25K **3** > \$25K **5** not disclosed

f) Observed invasive tendencies (crosstabs by EcoRegion) 34 coded responses;

*= internally inconsistent response (“only where planted” AND another category)

EcoRegion	N	only where planted	runs	open ground	managed areas	"old fields"	undisturbed areas
CLMC	2	1			1		
CSH	1	1					
CSP	1	1					
CSP/FT	2			1	1	2	1
FT	3	3					
NCF	1	1					
NES	1					1	
NLMC	1	1*		1		1	1
SEGP	7	5		1	1	2	
SEGP/CSH	1	1					
SEGP/SLMC	2	2			1*		
SLMC	5	2			1	1	1
SWS	1	1					
WCR	3	2				1	
WP	3	2				1	

g) Top cultivars grown, where noted.

Very few respondents specified cultivars being grown. Out of 47 respondents, 3 listed ‘French Blue’, 2 ‘East Anglia/ican’, 1 ‘Highland’, 1 ‘Wateri’, 1 ‘Viridis Compacta’ and 1 ‘Austrian Hills’.

h) Cultivars with no or reduced invasive tendencies, where noted. (Crosstab by EcoRegion, as appropriate). (No additional information)

i) Comments grouped by EcoRegion. From surveys with no coded invasiveness observations = no notation, if also coded notations = (+)

CSH - No observed invasive tendencies.(+)

CSP - For Christmas tree production - and very valuable for this. No value as a nursery crop (+)

SEGP - ... grown to be harvested for pulp in 10+ years

Not much demand anymore. (+)

Can't see this as a problem.

SEGP/SLMC - Observed no seedlings in large field of Scots.

SLMC - Have not seen it to be invasive. (+)

Synthesis:

Difficult to discern a pattern in observations. Both CSP and FT indicated "only where planted", but on border between the two it is observed to be growing in old fields and more.

Taxon (**3**): **Callery pear, *Pyrus calleryana***

a) Number of Respondents Selling: **34**

b) Percent of **gross plant sales** contributed by this taxon:

14 < 1% **13** 1 - 2.9% **4** 3 – 4.9% **1** 5 – 6.9% **0** 7 – 8.9% **1** > 9% **1** not disclosed

Total dollar amount contributed (median of % category x median of gross sales category for each totaled) **\$582,853**

Rank among 63 taxa (1 = most) **5**

c) Trend for 2011 season (tally)

3 increased **20** unchanged **5** temp. reduced **2** dec. slightly **0** phasing out **0** discontinued **4** not disclosed

d) Time required to produce (tally)

1 < 6 months **1** 6 to 12 months **1** 1 to 2 years **2** 2 to 3 years **15** 3 to 5 years **8** over 5 years **6** not disclosed

e) Estimated wholesale value of plants in production (category median x count, totaled): **\$341,750** =#2 in survey (tally below by category)

6 < \$1,000 **5** \$1.0K to 2.5K **4** \$2.5K to 5K **5** \$5K to 10K **3** \$10K to 25K **6** > \$25K **5** not disclosed

f) Observed invasive tendencies: coded responses (crosstabs by EcoRegion) **22 coded responses**

EcoRegion	N	"only where planted"	"runs"	"open ground"	"managed areas"	"old fields"	"undisturbed areas"
CLMC	3	3					
CSH	2	2					
CSP	1	1					
SEGP	8	8					
SEGP/CSH	1	1					
SEGP/SLMC	2	2					
SLMC	3	1	1				1
WCR	1	1					

WP	1	1					
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g) Top cultivars grown, where noted. [24 surveys disclosed the cultivars they grow](#)

[‘Autumn Blaze’ \(17\), ‘Chanticleer’ \(11\), ‘Cleveland Select’ \(4\), ‘Aristocrat’ \(4\), ‘Redspire’ \(3\) and 6 others, including Korean Sun \(TM\) a *P. fauriei* selection. and Prairie Gem, a *P. ussuriensis* selection.](#)

h) Cultivars with no or reduced invasive tendencies, where noted. (Crosstab by EcoRegion, as appropriate).

CMC all cultivars - NO tendency

CHS ‘Cleveland Select’ and ‘Autumn Blaze’ - NO tendency

CSP ‘Redspire’ and ‘Chanticleer’ – NO tendency

SEGP all cultivars – NO tendency

SEGP ‘Autumn Blaze’ and ‘Chanticleer’ – No tendency

SEGP/SLMC – ‘Chanticleer’ NONE (1), ‘Autumn Blaze’ – NONE (1)

i) Comments grouped by EcoRegion.

SEGP – “only observed suckering”

SLMC – “we have not seen any seedlings”

Synthesis:

[Some grow only one cultivar and will have very low fruit set under those conditions. With 23 growers having them in the field 3+ years (presumably from budded liners), seedlings should start to show if they are going to. *P. ussuriensis* and *P. fauriei* should be included with *P. calleryana* as they are completely interfertile. The latter characteristically has heavy and precocious fruit crops.] [personal observation (SJW) = invasive in Chicago area]

Taxon (4): **saltcedar, *Tamarix ramosissima***

a) Number of Respondents Selling: **7**

b) Percent of **gross plant sales** contributed by this taxon:

7 < 1% **0** 1 - 2.9% **0** 3 – 4.9% **0** 5 – 6.9% **0** 7 – 8.9% **0** > 9% **0** not disclosed

Total dollar amount contributed (median of % category x median of gross sales category for each totaled) **\$22,518**

Rank among 63 taxa (1 = most) **35**

c) Trend for 2011 season (tally)

0 increased **4** unchanged **0** temp. reduced **3** dec. slightly **0** phasing out **0** discontinued **0** not disclosed

d) Time required to produce (tally)

0 < 6 months **2** 6 to 12 months **3** 1 to 2 years **0** 2 to 3 years **0** 3 to 5 years **1** over 5 years **1** not disclosed

e) Estimated wholesale value of plants in production (category median x count, totaled): **\$4,750** (tally below by category)

6 < \$1,000 **1** \$1.0K to 2.5K **0** \$2.5K to 5K **0** \$5K to 10K **0** \$10K to 25K **0** > \$25K **0** not disclosed

f) Observed invasive tendencies (crosstabs by EcoRegion)

6 coded responses, all indicating “only where planted” : FT (1), SEGP (2), WRC (2), WRC/FT (1). Of these, 3 grow exclusively ‘Summer Glow’ – the other (in SEGP) grows the species, but we don’t know if it is seedling or clonal.

g) Top cultivars grown, where noted.

‘Summer Glow’ is grown to the exclusion of species by 4 of the 7 growers

h) Cultivars with no or reduced invasive tendencies, where noted. (Crosstab by EcoRegion, as appropriate).

‘Summer Glow’ SEGP (1), WRC (1), WRC/FT (1)

i) Comments grouped by EcoRegion. (No additional information)

Synthesis:

[Especially problematic in infertile, droughty, alkaline to saline locations in southwestern US. No data from sandy regions of WI. May be self-incompatible which could reduce incidence of seedlings where cultivar is grown exclusively.]

Taxon (5): **white mulberry, *Morus alba***

a) Number of Respondents Selling: **8**

b) Percent of **gross plant sales** contributed by this taxon:

8 < 1% **0** 1 - 2.9% **0** 3 – 4.9% **0** 5 – 6.9% **0** 7 – 8.9% **0** > 9% **0** not disclosed

Total dollar amount contributed (median of % category x median of gross sales category for each totaled) **\$22,965**

Rank among 63 taxa (1 = most) **34**

c) Trend for 2011 season (tally)

0 increased **5** unchanged **1** temp. reduced **0** dec. slightly **1** phasing out **0** discontinued **1** not disclosed

d) Time required to produce (tally)

1 < 6 months **2** 6 to 12 months **2** 1 to 2 years **0** 2 to 3 years **2** 3 to 5 years **0** over 5 years **1** not disclosed

e) Estimated wholesale value of plants in production (category median x count, totaled): **\$9,250** (tally below by category)

4 < \$1,000 **2** \$1.0K to 2.5K **1** \$2.5K to 5K **0** \$5K to 10K **0** \$10K to 25K **0** > \$25K **1** not disclosed

f) Observed invasive tendencies (crosstabs by EcoRegion)

5 coded responses all indicating “only where planted”: CLMC (1), FT (1), SEGP (1), SLMC (1), WCR (1). 3 of these only grow ‘Chaparral’ (= male)

g) Top cultivars grown, where noted.

‘Chaparral’ (3), ‘Northrop’ (1), and “Weeping” (2). Chaparral and this particular weeper are male. 2 growers indicate they are growing the species and/or a subspecies. ‘Northrop’ is a fruit crop on the East Coast, where 100% of this crop is being marketed (contract grower).

h) Cultivars with no or reduced invasive tendencies, where noted. (Crosstab by EcoRegion, as appropriate).

All male cultivars.

i) Comments grouped by EcoRegion. (No additional information)

Synthesis:

[If male cultivars are to be grown – especially if they need to be grafted high on a standard because they are weepers, some seedlings MAY be needed. Clonal male rootstock is likely, but not necessarily, cost prohibitive. Tissue culture propagation is possible for this. Rootstock has also been known to out-survive its scion.]

Taxon (6): **white poplar, *Populus alba***

a) Number of Respondents Selling: **2**

b) Percent of **gross plant sales** contributed by this taxon:

2 < 1% **0** 1 - 2.9% **0** 3 – 4.9% **0** 5 – 6.9% **0** 7 – 8.9% **0** > 9% **0** not disclosed

Total dollar amount contributed (median of % category x median of gross sales category for each totaled) **\$18,750 (1 actual grower)**

Rank among 63 taxa (1 = most) **37**

c) Trend for 2011 season (tally)

0 increased **2** unchanged **0** temp. reduced **0** dec. slightly **0** phasing out **0** discontinued **0** not disclosed

d) Time required to produce (tally)

0 < 6 months **0** 6 to 12 months **0** 1 to 2 years **2** 2 to 3 years **0** 3 to 5 years **0** over 5 years **0** not disclosed

e) Estimated wholesale value of plants in production (category median x count, totaled): **\$5,500** (tally below by category)

0 < \$1,000 **1** \$1.0K to 2.5K **1** \$2.5K to 5K **0** \$5K to 10K **0** \$10K to 25K **0** > \$25K **0** not disclosed

f) Observed invasive tendencies (crosstabs by EcoRegion) **3 coded responses:**

CSP/FT (1) “open ground” and “managed areas”

SEGP (1) “open ground”, “managed areas”, “old fields”, and “undisturbed areas” ...the respondent making this observation is not growing the taxon

SEGP (1) “only where planted” ... this nursery grows cultivars ‘Siouxland’ (= *P. deltoides*!) and ‘Lombardi’ (= *P. nigra italica*)

g) Top cultivars grown, where noted.

‘Siouxland’ and ‘Lombardi’ **NOT THIS TAXON**

h) Cultivars with no or reduced invasive tendencies, where noted. (Crosstab by EcoRegion, as appropriate).

SEGP - 'Siouxland' and 'Lombardi' NOT THIS TAXON

i) Comments grouped by EcoRegion. (No additional information)

Synthesis:

[Another dioecious taxon, but are there male cultivars available? Appears not to be popular nor contribute significant economic value.]

Taxon (**7**): **Amur maple, *Acer ginnala***

a) Number of Respondents Selling: **53**

b) Percent of **gross plant sales** contributed by this taxon:

30 < 1% **15** 1 - 2.9% **3** 3 – 4.9% **1** 5 – 6.9% **1** 7 – 8.9% **0** > 9% **3** not disclosed

Total dollar amount contributed (median of % category x median of gross sales category for each totaled) **\$470,745**

Rank among 63 taxa (1 = most) **6**

c) Trend for 2011 season (tally)

0 increased **25** unchanged **4** temp. reduced **5** dec. slightly **11** phasing out **1** discontinued **7** not disclosed

d) Time required to produce (tally)

8 < 6 months **6** 6 to 12 months **4** 1 to 2 years **8** 2 to 3 years **12** 3 to 5 years **5** over 5 years **10** not disclosed

e) Estimated wholesale value of plants in production (category median x count, totaled): **\$138,750** (tally below by category)

24 < \$1,000 **6** \$1.0K to 2.5K **3** \$2.5K to 5K **7** \$5K to 10K **3** \$10K to 25K **0** > \$25K **10** not disclosed

f) Observed invasive tendencies (crosstabs by EcoRegion) (38 coded responses) (* = internally inconsistent, "only where planted and 1 other)

EcoRegion	N	"only where planted"	"runs"	"open ground"	"managed areas"	"old fields"	"undisturbed areas"
CLMC	5	4			1		
CSH	3	2			1		
CSP	1	1					
FT	2	2					
NCF	2	2					
NHL	2	2					
NLMC	1	1		1*			
SEGP	7	4		3	2	1	1

SEGP/SLMC	2			2			
SLMC	4	2	1*	1		1	
SWS	1			1			
WCR	2	1		1	1	1	1
WCR/CSH	1			1			1
WCR/FT	1			1		1	
WP	5	3			1		1

g) Top cultivars grown, where noted. 22 respondents provided cultivar and/or species information. Frequency of each listed below.

‘Flame’ (11), species (9), Bailey Compact (5), ‘Compactum’ (4), ‘Emerald Elf’ (3), ‘Embers’ (2), and 1 each: ‘Summer Splendor’, MN Red, “dwarf”, ‘Burgundy’, and ‘Curiel’s Gold’.

h) Cultivars with no or reduced invasive tendencies, where noted. (Crosstab by EcoRegion, as appropriate).

CLMC – Species NONE (1)

CSP – ‘Flame’ NONE (1)

SEGP – ‘Burgundy’ NONE (1)

SEGP/SLMC – ‘Compactum’ and ‘Curiel’s Gold’ NONE (1)

WRC – ‘Bailey Compact’ NONE (1)

i) Comments grouped by EcoRegion.

SEGP/SLMC – “Seedlings under shrub forms, not under tree forms” (1)

NLMC – “No serious weediness issues in Door County.” (1)

SLMC – “minimally invasive” (1)

WCR – “Let’s get rid of this species.” (1)

WCR/FT – “Emerald Elf seeds near itself because of its short stature” (1)

Synthesis:

[Complicated scenario. Will supply raw data minus ID of respondents if committee desires to look at relationships between fields. For instance where 'Burgundy' was noted as non-invasive, 'Flame' was also grown.]

Taxon (8): **Norway maple, *Acer platanoides***

a) Number of Respondents Selling: **64**

b) Percent of **gross plant sales** contributed by this taxon:

19 < 1% **13** 1 - 2.9% **7** 3 – 4.9% **7** 5 – 6.9% **4** 7 – 8.9% **12** > 9% **2** not disclosed

Total dollar amount contributed (median of % category x median of gross sales category for each totaled) **\$1,515,063**

Rank among 63 taxa (1 = most) **1**

c) Trend for 2011 season (tally)

2 increased **30** unchanged **5** temp. reduced **9** dec. slightly **11** phasing out **2** discontinued **5** not disclosed

d) Time required to produce (tally)

5 < 6 months **2** 6 to 12 months **2** 1 to 2 years **9** 2 to 3 years **19** 3 to 5 years **22** over 5 years **5** not disclosed

e) Estimated wholesale value of plants in production (category median x count, totaled): **\$669,750 = #1 in survey** (tally below by category)

13 < \$1,000 **14** \$1.0K to 2.5K **5** \$2.5K to 5K **9** \$5K to 10K **8** \$10K to 25K **11** > \$25K **4** not disclosed

f) Observed invasive tendencies (crosstabs by EcoRegion) **39 coded responses**

EcoRegion	N	"only where planted"	"runs"	"open ground"	"managed areas"	"old fields"	"undisturbed areas"
CLMC	4	2			2		
CSH	2	1					1
FT	2	2					
NHL	1	1					
NLMC	2			1	1	1	1
SEGP	15	9		4	3	4	3
SEGP/CSH	1	1					
SEGP/SLMC	1	1					

SLMC	4	2			1		1
SWS	1	1					
UNKNOWN	1	1					
WCR	2			1	2	1	1
WCR/CSH	1			1	1		1
WP	2	1			1		

g) Top cultivars grown, where noted. 38 respondents provided cultivar/species information. Frequencies of occurrence:

'Deborah' (26), 'Royal Red' (21), 'Emerald Queen' (18), Emerald Luster (17), 'Crimson King' (13), 'Superform' (9), 'Columnare' (9), 'Princeton Gold' (6), 'Fairview' (4), "variegated" (3), species (2), 'Crimson Sentry' (2); and 1 each – 'Parkway', 'Jade Glen', 'Jade Green', 'Schwedleri' and "red leaf"

h) Cultivars with no or reduced invasive tendencies, where noted. (Crosstab by EcoRegion, as appropriate).

CLMC – "all cultivars" NONE (1); "Norway maple" NONE (1); 'Royal Red', 'Fairview' and 'Deborah' NONE (1)

CSH – "all cultivars" NONE (1)

CSP – Crimson King, Emerald Queen, Emerald Lustre, Crimson Sentry, Deborah, Columnare' NONE (1)

SEGP – 'Deborah' (3) Emerald Lustre (1) Emerald Queen (1) NONE

SEGP/SLMC – 'Superform' (1) 'Fairview' (1) Emerald Lustre (1) Royal Red (1) Emerald Queen (1) Columnare (1) Deborah (1) Princeton Gold (1)

WRC – "all taxa" NONE (1)

WRC/FT – 'Royal Red' NONE (1)

i) Comments grouped by EcoRegion.

CLMC – "Seeding is the problem".

"There is no other tree species that can replace Norway maple as a useful urban tree species."

CLMC (cont.)

“Because of Norway maple there are a lot of good maples on burn piles.”

NLMC – “There are a lot of disease issues (anthracnose, tar spot) in our area.”

“Invasive where-ever samaras whirl and grow.”

SEGP – “Red leaf maples are too valuable/desirable to ban.”

“Really haven’t had too much problem with reseeding. Red-leaf maples still popular, but green leaf are losing popularity.”

“Dislike this tree.”

“This is a good item.”

SLMC – “Have not seen seedling near nursery - think Crimson King few seedlings [?].”

“Not many seedlings mature [? Survive?]”

“We will continue to produce the red leaf cvs. in response to popular demand.”

“Haven’t lined out any in 4 years.”

WCR - "Hideous tree. Red-leaved varieties seem to set less seed."

WCR/FT – “Haven’t observed variegated cv. long enough to evaluate.”

Synthesis:

[Easily THE most contentious taxon. Contributes hugely to a lot of growers’ profitability...at what price to native vegetation? Even suggesting phased restrictions will immediately kill demand. Easy to grow – performs well even in tough locations, but can out-shade even sugar maple.

Taxon (9): **black alder, *Alnus glutinosa***

a) Number of Respondents Selling: **7**

b) Percent of **gross plant sales** contributed by this taxon:

4 < 1% **3** 1 - 2.9% **0** 3 – 4.9% **0** 5 – 6.9% **0** 7 – 8.9% **0** > 9% **0** not disclosed

Total dollar amount contributed (median of % category x median of gross sales category for each totaled) **\$121,063**

Rank among 63 taxa (1 = most) **12**

c) Trend for 2011 season (tally)

0 increased **4** unchanged **0** temp. reduced **2** dec. slightly **0** phasing out **0** discontinued **1** not disclosed

d) Time required to produce (tally)

0 < 6 months **0** 6 to 12 months **1** 1 to 2 years **1** 2 to 3 years **3** 3 to 5 years **1** over 5 years **1** not disclosed

e) Estimated wholesale value of plants in production (category median x count, totaled): **\$92,500** (tally below by category)

1 < \$1,000 **0** \$1.0K to 2.5K **1** \$2.5K to 5K **2** \$5K to 10K **2** \$10K to 25K **0** > \$25K **1** not disclosed

f) Observed invasive tendencies (crosstabs by EcoRegion)

EcoRegion	N	only where planted	runs	open ground	managed areas	"old fields"	undisturbed areas
SEGP	3	1		2		1	1
SEGP/SLMC	1			1			
SLMC	1	1					

g) Top cultivars grown, where noted. (No additional information).

h) Cultivars with no or reduced invasive tendencies, where noted. (Crosstab by EcoRegion, as appropriate). (No additional information)

i) Comments grouped by EcoRegion. [\(No additional information\)](#)

Synthesis:

Taxon (10): **Siberian elm, *Ulmus pumila***

a) Number of Respondents Selling: **4** All = Hybrids only

b) Percent of **gross plant sales** contributed by this taxon:

0 < 1% **1** 1 - 2.9% **0** 3 – 4.9% **0** 5 – 6.9% **1** 7 – 8.9% **1** > 9% **1** not disclosed

Total dollar amount contributed (median of % category x median of gross sales category for each totaled) **\$317,500 for 2 growers disclosing**

Rank among 63 taxa (1 = most) **7**

c) Trend for 2011 season (tally)

0 increased **2** unchanged **0** temp. reduced **0** dec. slightly **1** phasing out **0** discontinued **1** not disclosed

d) Time required to produce (tally)

0 < 6 months **0** 6 to 12 months **0** 1 to 2 years **1** 2 to 3 years **0** 3 to 5 years **2** over 5 years **1** not disclosed

e) Estimated wholesale value of plants in production (category median x count, totaled): **\$92,500** (tally below by category)

0 < \$1,000 **0** \$1.0K to 2.5K **0** \$2.5K to 5K **0** \$5K to 10K **1** \$10K to 25K **2** > \$25K **1** not disclosed

f) Observed invasive tendencies (crosstabs by EcoRegion) **Presumably observations of straight species' behavior (see responses to section h)**

EcoRegion	N	only where planted	runs	open ground	managed areas	"old fields"	undisturbed areas
CLMC	1	1					
SEGP	2	1	1	1	1	1	1
WCR/CSH	1			1		1	

g) Top cultivars grown, where noted. **No growers growing the species, (i. e., cultivars grown exclusively).** Cvs. and frequencies:

New Horizon (3), Regal (2), Princeton (1), Pioneer (1), Homestead (1) [ALL hybrids with < or = 50% *pumila* parentage.]

h) Cultivars with no or reduced invasive tendencies, where noted. (Crosstab by EcoRegion, as appropriate).

CLMC – all cultivars (none)

SEGP/CSH – New Horizon (none) [only this cv. is being grown]

i) Comments grouped by EcoRegion.

CLMC - phasing out grafted plants so as of 2012 will no longer need species

SEGP - “hate this tree” [non-grower]

Synthesis:

[Economic impact of straight species = zero]

Taxon (11): **black locust, *Robinia pseudoacacia***

a) Number of Respondents Selling: **7**

b) Percent of **gross plant sales** contributed by this taxon:

6 < 1% **1** 1 - 2.9% **0** 3 – 4.9% **0** 5 – 6.9% **0** 7 – 8.9% **0** > 9% **0** not disclosed

Total dollar amount contributed (median of % category x median of gross sales category for each totaled) **\$13,990**

Rank among 63 taxa (1 = most) **41**

c) Trend for 2011 season (tally)

1 increased **4** unchanged **0** temp. reduced **0** dec. slightly **2** phasing out **0** discontinued **0** not disclosed

d) Time required to produce (tally)

1 < 6 months **2** 6 to 12 months **1** 1 to 2 years **1** 2 to 3 years **0** 3 to 5 years **1** over 5 years **1** not disclosed

e) Estimated wholesale value of plants in production (category median x count, totaled): **\$3,500** (tally below by category)

7 < \$1,000 **0** \$1.0K to 2.5K **0** \$2.5K to 5K **0** \$5K to 10K **0** \$10K to 25K **0** > \$25K **0** not disclosed

f) Observed invasive tendencies (crosstabs by EcoRegion) * = internally inconsistent, i.e., only where planted AND another option

EcoRegion	N	only where planted	runs	open ground	managed areas	"old fields"	undisturbed areas
CSP	1				1		
CSP/FT	1	1	1*				
SEGP	3	2		1	1	1	1
SWS	1	1	1*				
WCR	1		1	1	1	1	1

g) Top cultivars grown, where noted. **Only 2 growers disclosed cv. mix.**

Twisty Baby (1), Purple Robe (1)

h) Cultivars with no or reduced invasive tendencies, where noted. (Crosstab by EcoRegion, as appropriate). [\(No additional information\)](#)

i) Comments grouped by EcoRegion.

CSH - Rootstock for cultivars, Purple Robe and Twisty Baby.

CSP - Big problem in ditches in our area. Very invasive and should not be grown or planted here. [Non-grower]

SEGP - Are harvested for fence posts - 5 yrs. since last harvest and anticipate at least 10 years until next.

Too many diseases. [Non-grower]

SWS - In 60+ years have seen little, if any, invasiveness by seed. This is a valuable species - especially on poor sites. Would like to see this dropped from the invasive list.

Synthesis:

Taxon (12): **glossy buckthorn, *Frangula alnus* (Syn. *Rhamnus frangula*)**

a) Number of Respondents Selling: **4**

b) Percent of **gross plant sales** contributed by this taxon:

2 < 1% **0** 1 - 2.9% **0** 3 – 4.9% **0** 5 – 6.9% **0** 7 – 8.9% **0** > 9% **2** not disclosed

Total dollar amount contributed (median of % category x median of gross sales category for each totaled) \$963 for 2 disclosing growers

Rank among 63 taxa (1 = most) **54**

c) Trend for 2011 season (tally)

1 increased **1** unchanged **0** temp. reduced **0** dec. slightly **0** phasing out **0** discontinued **2** not disclosed

d) Time required to produce (tally)

0 < 6 months **0** 6 to 12 months **1** 1 to 2 years **1** 2 to 3 years **0** 3 to 5 years **0** over 5 years **2** not disclosed

e) Estimated wholesale value of plants in production (category median x count, totaled): **\$1,000** (tally below by category)

2 < \$1,000 **0** \$1.0K to 2.5K **0** \$2.5K to 5K **0** \$5K to 10K **0** \$10K to 25K **0** > \$25K **2** not disclosed

f) Observed invasive tendencies (crosstabs by EcoRegion) **Non-growers (NG) commenting indicate highly invasive. Growers of cultivars did not complete coded evaluation.**

EcoRegion	N	only where planted	runs	open ground	managed areas	"old fields"	undisturbed areas
CSH	1(NG)			1	1	1	1
SEGP	1(NG)		1	1	1	1	1
WCR	1 (NG)						1

g) Top cultivars grown, where noted.

Fineline (3)

h) Cultivars with no or reduced invasive tendencies, where noted. (Crosstab by EcoRegion, as appropriate). [\(No additional information\)](#)

i) Comments grouped by EcoRegion.

[WCR - "*R. frangula* does spread by seed."](#)

[WP - Have noticed fruit production on 'Fineline' of unknown viability.](#)

Synthesis:

Taxon (13): **privets, *Ligustrum spp.***

a) Number of Respondents Selling: **11**

b) Percent of **gross plant sales** contributed by this taxon:

8 < 1% **2** 1 - 2.9% **0** 3 – 4.9% **0** 5 – 6.9% **0** 7 – 8.9% **0** > 9% **1** not disclosed

Total dollar amount contributed (median of % category x median of gross sales category for each totaled) **\$118,028 (9 disclosing nurseries)**

Rank among 63 taxa (1 = most) **13**

c) Trend for 2011 season (tally)

2 increased **6** unchanged **0** temp. reduced **0** dec. slightly **1** phasing out **0** discontinued **2** not disclosed

d) Time required to produce (tally)

2 < 6 months **3** 6 to 12 months **3** 1 to 2 years **0** 2 to 3 years **0** 3 to 5 years **0** over 5 years **3** not disclosed

e) Estimated wholesale value of plants in production (category median x count, totaled): **\$12,350** (tally below by category)

6 < \$1,000 **1** \$1.0K to 2.5K **2** \$2.5K to 5K **0** \$5K to 10K **0** \$10K to 25K **0** > \$25K **2** not disclosed

f) Observed invasive tendencies (crosstabs by EcoRegion)

EcoRegion	N	only where planted	runs	open ground	managed areas	"old fields"	undisturbed areas
CLMC	2	1	1				
CSH	1	1					
CSP	1	1					
NLMC	1	1					
SEGP	2	1		1		1	

g) Top cultivars taxa grown, where noted. **9 growers disclosed taxon mix; frequencies below:**

vulgare ‘Cheyenne ‘ (4), Golden Vicary (3), *obtusifolium* (3), *arn.* River North (1), *arn.*(?) (1), Regal (1), *amurense* (2), *vulgare* (2), *sinense* (1), *lodense* (1)

h) Cultivars with no or reduced invasive tendencies, where noted. (Crosstab by EcoRegion, as appropriate).

CLMC - all cultivars (none)

CSP - *amurense* (none)

SEGP – *arn.* (none)

i) Comments grouped by EcoRegion.

NLMC - Not much interest in privet hedges in our area. No serious invasive problems observed in Door Co.

Synthesis: [In spite of wording survey in an attempt to determine whether specific species of interest are being grown, very little useful information on this was received. Because of the prevalence of interspecies hybrids in the industry, few growers appear to be aware of the exact species make-up of their crop.]

Taxon (14): **paradise plant, *Daphne mezereum***

a) Number of Respondents Selling: **2**

b) Percent of **gross plant sales** contributed by this taxon:

2 < 1% **0** 1 - 2.9% **0** 3 – 4.9% **0** 5 – 6.9% **0** 7 – 8.9% **0** > 9% **0** not disclosed

Total dollar amount contributed (median of % category x median of gross sales category for each totaled) **\$1,063**

Rank among 63 taxa (1 = most) **52**

c) Trend for 2011 season (tally)

0 increased **1** unchanged **0** temp. reduced **0** dec. slightly **0** phasing out **0** discontinued **1** not disclosed

d) Time required to produce (tally)

1 < 6 months **0** 6 to 12 months **0** 1 to 2 years **0** 2 to 3 years **0** 3 to 5 years **0** over 5 years **1** not disclosed

e) Estimated wholesale value of plants in production (category median x count, totaled): **\$500** (tally below by category)

1 < \$1,000 **0** \$1.0K to 2.5K **0** \$2.5K to 5K **0** \$5K to 10K **0** \$10K to 25K **0** > \$25K **1** not disclosed

f) Observed invasive tendencies (crosstabs by EcoRegion)

EcoRegion	N	only where planted	runs	open ground	managed areas	"old fields"	undisturbed areas
SEGP	2	2					

g) Top cultivars grown, where noted. **(No additional information)**

h) Cultivars with no or reduced invasive tendencies, where noted. (Crosstab by EcoRegion, as appropriate). **(No additional information)**

i) Comments grouped by EcoRegion.

SEGP - Persist where planted (1), Rarely sell (1)

Synthesis:

Taxon (15): **Siberian peashrub, *Caragana arborescens***

a) Number of Respondents Selling: **17**

b) Percent of **gross plant sales** contributed by this taxon:

15 < 1% **1** 1 - 2.9% **0** 3 – 4.9% **0** 5 – 6.9% **0** 7 – 8.9% **0** > 9% **1** not disclosed

Total dollar amount contributed (median of % category x median of gross sales category for each totaled) **\$47,905**

Rank among 63 taxa (1 = most) **24**

c) Trend for 2011 season (tally)

1 increased **8** unchanged **2** temp. reduced **1** dec. slightly **4** phasing out **0** discontinued **1** not disclosed

d) Time required to produce (tally)

5 < 6 months **1** 6 to 12 months **5** 1 to 2 years **1** 2 to 3 years **2** 3 to 5 years **1** over 5 years **2** not disclosed

e) Estimated wholesale value of plants in production (category median x count, totaled): (tally below by category)

14 < \$1,000 **2** \$1.0K to 2.5K **0** \$2.5K to 5K **0** \$5K to 10K **0** \$10K to 25K **0** > \$25K **1** not disclosed

f) Observed invasive tendencies (crosstabs by EcoRegion)

EcoRegion	N	only where planted	runs	open ground	managed areas	"old fields"	undisturbed areas
CLMC	1	1					
NHL	1	1					
SEGP	5	4		1	1	1	
SEGP/CSH	1	1					
SLMC	1	1					
SWS	1	1					
WP	1	1					

g) Top cultivars grown, where noted. 8 respondents provided cultivar/taxon data with frequency listed below

“Walker Weeping” (4), ‘Pendula’ (3), “Weeping” (2), “tree-form” (1), species (1)

h) Cultivars with no or reduced invasive tendencies, where noted. (Crosstab by EcoRegion, as appropriate).

CLMC All cultivars (NONE) (1)

WP Walker’s Weeping (NONE) (1)

i) Comments grouped by EcoRegion.

CLMC	Selling out, will not replant.
FT	container-grown only
NLMC	No serious invasive problems observed in Door Co.
SEGP	Only a few left - never popular. Never noticed any invasiveness.
SEGP	Common in DNR plantings - no escapes observed.
SEGP	Only carry weeping form top-grafted, not species.
SEGP/CSH	in production >8 yrs and have seen no spreading
SLMC	Have not found seedlings.
WCR/FT	Have not observed these very long.

Synthesis:

Taxon (16): **rose acacia, Robinia hispida**

a) Number of Respondents Selling: **1**

b) Percent of **gross plant sales** contributed by this taxon:

1 < 1% **0** 1 - 2.9% **0** 3 – 4.9% **0** 5 – 6.9% **0** 7 – 8.9% **0** > 9% **0** not disclosed

Total dollar amount contributed (median of % category x median of gross sales category for each totaled) **\$28**

Rank among 63 taxa (1 = most) **58**

c) Trend for 2011 season (tally)

0 increased **1** unchanged **0** temp. reduced **0** dec. slightly **0** phasing out **0** discontinued **0** not disclosed

d) Time required to produce (tally)

0 < 6 months **0** 6 to 12 months **1** 1 to 2 years **0** 2 to 3 years **0** 3 to 5 years **0** over 5 years **0** not disclosed

e) Estimated wholesale value of plants in production (category median x count, totaled): **\$500** (tally below by category)

1 < \$1,000 **0** \$1.0K to 2.5K **0** \$2.5K to 5K **0** \$5K to 10K **0** \$10K to 25K **0** > \$25K **0** not disclosed

f) Observed invasive tendencies (crosstabs by EcoRegion)

SEGP	0	0	1	1	1	0
SWS	1	1	0	0	0	0

g) Top cultivars grown, where noted. **(No additional information)**

h) Cultivars with no or reduced invasive tendencies, where noted. (Crosstab by EcoRegion, as appropriate). **(No additional information)**

i) Comments grouped by EcoRegion. **SWS** **The cultivar I have produces no seed.**

Synthesis:

Taxon (17): **winged euonymus, burning bush, *Euonymus alatus***

a) Number of Respondents Selling: **62**

b) Percent of **gross plant sales** contributed by this taxon:

37 < 1% **18** 1 - 2.9% **3** 3 – 4.9% **1** 5 – 6.9% **1** 7 – 8.9% **2** > 9% **0** not disclosed

Total dollar amount contributed (median of % category x median of gross sales category for each totaled) **\$739,445**

Rank among 63 taxa (1 = most) **3**

c) Trend for 2011 season (tally)

2 increased **41** unchanged **6** temp. reduced **3** dec. slightly **3** phasing out **1** discontinued **6** not disclosed

d) Time required to produce (tally)

16 < 6 months **9** 6 to 12 months **8** 1 to 2 years **7** 2 to 3 years **7** 3 to 5 years **4** over 5 years **11** not disclosed

e) Estimated wholesale value of plants in production (category median x count, totaled): **\$202,250** (tally below by category)

28 < \$1,000 **9** \$1.0K to 2.5K **6** \$2.5K to 5K **3** \$5K to 10K **3** \$10K to 25K **2** > \$25K **11** not disclosed

f) Observed invasive tendencies (crosstabs by EcoRegion)

EcoRegion	N	only where planted	"runs"	open ground	managed areas	"old fields"	undisturbed areas
CLMC	4	4	0	0	0	0	0
CSH	3	3	0	0	0	0	0
CSP	1	1	0	0	0	0	0
CSP/FT	1	1	0	0	0	0	0
FT	4	4	0	0	0	0	0
NCF	1	0	0	1	0	0	0
NHL	2	2	0	0	0	0	0
NLMC	1	0	0	1	0	0	0
SEGP	12	10	0	2	2	1	2

SEGP/CSH	1	1	0	0	0	0	0
SLMC	3	2	0	0	0	1	0
SWS	1	1	0	0	0	0	0
UNK	1	1	0	0	0	0	0
WCR	3	2	0	0	0	0	1
WCR/CSH	1	1	0	0	0	0	0
WCR/FT	1	0	0	1	0	0	0
WP	2	1	0	0	0	0	0
WP/WCR	1	0	0	0	1	0	0

g) Top cultivars grown, where noted. 36 nurseries provided data – frequencies of each taxon as follows:

‘Compactus’ (15), species (15), Chicago Fire™ (9), Grove Compact’ (7), ‘Fireball’ (6), “dwarf” (4), “compact” (3), ‘Nordine’ (3); 2 each - ‘Timber Creek’, Tures, and Little Moses; 1 each – ‘Rudy Haag’, “Japanese strain”, Velvet Blazer, Bailey, and Densata.

h) Cultivars with no or reduced invasive tendencies, where noted. (Crosstab by EcoRegion, as appropriate).

CLMC	all cultivars	(none)		
CLMC	all taxa	(none)		
CSH	dwarf	(none)	Chicago Fire	(none)
CSP	Compactus	(none)		
FT	Fireball	(none)		
FT	Grove Compact	(none)		
SEGP	Compactus	(none)		
SEGP	Japanese strains	(none)		
SLMC	Rudy Haag	(none)		
WP	Little Moses	(none)		

i) Comments grouped by EcoRegion.

CLMC	"We don't have problem with it spreading."
CLMC	Have seen seed on Compacta, none yet on Little Mosses. No seedlings observed
CSH	extremely few seedlings, if any survive - rabbits!
FT	container-grown
NHL	have never found Burning bush seedlings.
NHL	Not seeing these seed out or spread in the north. We do not grow Nordine strain.
NLMC	No serious invasive problems observed in Door Co.
SEGP	We never had much problem with invasiveness.
SEGP	Korean strains self-sow under parent plant.
SEGP	(The cultivars we carry) seem to be light fruiting
SEGP	We sell but don't grow this.
SEGP	Do not grow, sell less than 2 per year.
SEGP	This is a good item.
SEGP/SLMC	Compact shows seedlings beneath if not cultivated - especially if bark mulched."
SLMC	Does not become invasive in nursery.
SLMC	The public asks for this plant due to fall color.
WCR	"Sell only a few."
WCR	"Mild invasive in Dane and Iowa counties."
WCR/FT	"Seedlings come up under the parent plants."
WP/WCR	Reseeds into planting beds.
WP/WCR	Sell container grown

Synthesis:

Taxon (18): **jetbead, *Rhodotypos scandens***

a) Number of Respondents Selling: **2**

b) Percent of **gross plant sales** contributed by this taxon:

2 < 1% **0** 1 - 2.9% **0** 3 – 4.9% **0** 5 – 6.9% **0** 7 – 8.9% **0** > 9% **0** not disclosed

Total dollar amount contributed (median of % category x median of gross sales category for each totaled) **\$1,063**

Rank among 63 taxa (1 = most) **53**

c) Trend for 2011 season (tally)

0 increased **1** unchanged **0** temp. reduced **0** dec. slightly **0** phasing out **0** discontinued **1** not disclosed

d) Time required to produce (tally)

0 < 6 months **1** 6 to 12 months **0** 1 to 2 years **0** 2 to 3 years **0** 3 to 5 years **0** over 5 years **1** not disclosed

e) Estimated wholesale value of plants in production (category median x count, totaled): **\$500 for the 1 with info** (tally below by category)

1 < \$1,000 **0** \$1.0K to 2.5K **0** \$2.5K to 5K **0** \$5K to 10K **0** \$10K to 25K **0** > \$25K **1** not disclosed

f) Observed invasive tendencies (crosstabs by EcoRegion)

EcoRegion	N	only where planted	"runs"	open ground	managed areas	"old fields"	undisturbed areas
SEGP	2	1	0	0	0	0	1

g) Top cultivars grown, where noted. **[NAI]**

h) Cultivars with no or reduced invasive tendencies, where noted. (Crosstab by EcoRegion, as appropriate). **[NAI]**

i) Comments grouped by EcoRegion.

SEGP	Marginally hardy - never observed escaped specimen.
SEGP	Maybe sell 1-3/yr. Haven't sold in 4-5 yrs.

Synthesis:

Taxon (19): **Japanese barberry + hybrids, *Berberis thunbergii***

a) Number of Respondents Selling: **49**

b) Percent of **gross plant sales** contributed by this taxon:

21 < 1% **18** 1 - 2.9% **4** 3 – 4.9% **3** 5 – 6.9% **0** 7 – 8.9% **0** > 9% **3** not disclosed

Total dollar amount contributed (median of % category x median of gross sales category for each totaled) **\$653,885**

Rank among 63 taxa (1 = most) **4**

c) Trend for 2011 season (tally)

3 increased **28** unchanged **5** temp. reduced **5** dec. slightly **3** phasing out **0** discontinued **5** not disclosed

d) Time required to produce (tally)

9 < 6 months **8** 6 to 12 months **8** 1 to 2 years **10** 2 to 3 years **3** 3 to 5 years **1** over 5 years **10** not disclosed

e) Estimated wholesale value of plants in production (category median x count, totaled): **\$98,750** (tally below by category)

18 < \$1,000 **12** \$1.0K to 2.5K **5** \$2.5K to 5K **2** \$5K to 10K **2** \$10K to 25K **2** > \$25K **8** not disclosed

f) Observed invasive tendencies (crosstabs by EcoRegion)

EcoRegion	N	only where planted	"runs"	open ground	managed areas	"old fields"	undisturbed areas
CLMC	3	3	0	0	0	0	0
CSP	1	1	0	0	0	0	0
FT	3	3	0	0	0	0	0
NCF	1	1	0	0	0	0	0
NHL	1	1	0	0	0	0	0
NLMC	1	0	0	1	0	1	1
SEGP	7	6	0	0	0	1	0
SEGP/SLMC	1	1	0	0	0	0	0
SLMC	2	1	1	0	0	0	0

SWS	1	1	0	0	0	0	0
WCR	3	1	0	0	0	1	1
WCR/CSH	1	1	0	0	0	0	0
WP	2	2	0	0	0	0	0

g) Top cultivars grown, where noted. 34 responses with following frequencies:

Crimson Pygmy (22), Rose Glow (18), Concorde (8), Helmond Pillar (7), Golden Carousel/Bailsel (5), Marshall Upright (2), red leaf/atropurpurea (4), species (2), Royal Burgundy (2), Gold Ruby (2), Emerald Carousel (2); 1 each – Bailgreen, Bailone, Golden Nugget, Burgundy Carousel, Pigmy Concord, Golden Nugget, Bagatelle, Kobald, Sunjoy Golden Pillar, Gold Beret, Gold Ruby, Cabarret, Ruby Carousel, Gold Ring, green, other, Saujoy Pillar, x intermedia, thornless.

h) Cultivars with no or reduced invasive tendencies, where noted. (Crosstab by EcoRegion, as appropriate).

CLMC	all cultivars	none								
CLMC	Crimson Pygmy	none	Concorde	none	Rose Glow	none				
CSP	Crimson Pygmy	none	Rose Glow	none	atropurpurea	none	Aurea	none		
FT	Hedmond Pillar	none	Gold Beret	none						
FT	Rose Glow	none	Crimson Pygmy	none						
NCF	Crimson Pygmy	none	Cabarnet	none						
SEGP	Rose Glow	none	Pygmy							
SEGP	korean x japanese cvs	none								
WCR	all taxa	none								
WCR/FT	all taxa	none								
WP	Concorde	none	Golden Ruby	none	Sunsation	none	Rose Glow	none	Lime Glow	none

i) Comments grouped by EcoRegion.

CLMC	Fruits observed on all cvs - no seedlings observed.
CSH	Have never seen a seedling of the korean or colored-leaf (red, burgundy, gold) selections.
FT	"we do not grow these but bought 15 #2 pots to sell."
NHL	have never found barberry seedlings.
NHL	Have seen little unplanned spreading of above hybrids but understand birds can spread these, esp. Emerald Carousel.
NLMC	All cultivars produce seed - some more than others, Typically not used in natural settings.
SEGP	We grow Rosy Glow and buy in finished stock of Crimson Pygmy.
SEGP	No viable seeds are produced by korean x japanese hybrids
SEGP	Try to carry miniature types which have few fruits/seeds.
SEGP	We sell but don't grow this.
SEGP	Do not grow. Only use when specified.
SEGP	This is a good item.
SEGP/CSH	Only tested cultivars are legal to sell in US - see Black Stem Rust.
SLMC	only sold in containers - not showing up in nursery.
WCR	"I sell only varieties with low fruit set."
WCR	"Have seen Crimson Pygmy reseed in landscape areas with no to very little management."
WCR/FT	"we have not seen any of these produce a seedling."
WP	Phasing out unless sterile. Also Rosy Rocket, Helmond Pillar
WP/WCR	container grown

Synthesis:

Taxon (20): **common barberry, *Berberis vulgaris***

a) Number of Respondents Selling: **7**

b) Percent of **gross plant sales** contributed by this taxon:

5 < 1% **1** 1 - 2.9% **0** 3 – 4.9% **0** 5 – 6.9% **0** 7 – 8.9% **0** > 9% **1** not disclosed

Total dollar amount contributed (median of % category x median of gross sales category for each totaled) **\$4,618**

Rank among 63 taxa (1 = most) **48**

c) Trend for 2011 season (tally)

0 increased **3** unchanged **0** temp. reduced **0** dec. slightly **1** phasing out **0** discontinued **3** not disclosed

d) Time required to produce (tally)

3 < 6 months **1** 6 to 12 months **0** 1 to 2 years **0** 2 to 3 years **0** 3 to 5 years **0** over 5 years **3** not disclosed

e) Estimated wholesale value of plants in production (category median x count, totaled): **\$2,000** (tally below by category)

4 < \$1,000 **0** \$1.0K to 2.5K **0** \$2.5K to 5K **0** \$5K to 10K **0** \$10K to 25K **0** > \$25K **3** not disclosed

f) Observed invasive tendencies (crosstabs by EcoRegion)

EcoRegion	N	only where planted	"runs"	open ground	managed areas	"old fields"	undisturbed areas
FT	2	2	0	0	0	0	0
SEGP	1	0	0	1	1	1	1
SLMC	1	0	1	0	0	0	0
WCR	1	0	0	0	0	1	0

g) Top cultivars grown, where noted. (No additional information)

h) Cultivars with no or reduced invasive tendencies, where noted. (Crosstab by EcoRegion, as appropriate). (No additional information)

i) Comments grouped by EcoRegion.

CLMC	(Not carried) Unless ordered by LAs.
SEGP/CSH	Already illegal to grow under federal law - see Black Stem Rust.
WP/WCR	container grown

Synthesis:

Taxon (**21**): **English ivy, *Hedera helix***

a) Number of Respondents Selling: **23**

b) Percent of **gross plant sales** contributed by this taxon:

22 < 1% **1** 1 - 2.9% **0** 3 – 4.9% **0** 5 – 6.9% **0** 7 – 8.9% **0** > 9% **0** not disclosed

Total dollar amount contributed (median of % category x median of gross sales category for each totaled) **\$114,375**

Rank among 63 taxa (1 = most) **14**

c) Trend for 2011 season (tally)

0 increased **17** unchanged **0** temp. reduced **4** dec. slightly **0** phasing out **0** discontinued **2** not disclosed

d) Time required to produce (tally)

15 < 6 months **6** 6 to 12 months **0** 1 to 2 years **0** 2 to 3 years **0** 3 to 5 years **0** over 5 years **2** not disclosed

e) Estimated wholesale value of plants in production (category median x count, totaled): **\$19500** (tally below by category)

17 < \$1,000 **2** \$1.0K to 2.5K **2** \$2.5K to 5K **0** \$5K to 10K **0** \$10K to 25K **0** > \$25K **2** not disclosed

f) Observed invasive tendencies (crosstabs by EcoRegion) (*1 internally inconsistent – ALSO indicated only where planted)

EcoRegion	N	only where planted	"runs"	open ground	managed areas	"old fields"	undisturbed areas
CLMC	1	1	0	0	0	0	0
CSH	1	0	1	0	0	0	0
FT	3	3	0	0	0	0	0
NCF	1	1	0	0	0	0	0
SEGP	8	6	4*	1	0	0	0
SEGP/SLMC	1	0	1	0	0	0	0
WCR	1	1	0	0	0	0	0

- g) Top cultivars grown, where noted. 10 surveys responded with data indicating the following frequencies: Thorndale (4), Baltica (2), Hebron (2), and 1 each – “assorted”, Hedgehog, Gold Ingot, 238th Street, and “variegated”
- h) Cultivars with no or reduced invasive tendencies, where noted. (Crosstab by EcoRegion, as appropriate).

CLMC	all taxa	none
SEGP	Thorndale	none
WCR	Glacier	none

- i) Comments grouped by EcoRegion.

CLMC	[From description of operation - may be for interiorscapes only.]
NHL	Grow as greenhouse/indoor foliage plant.
NLMC	Only grow in greenhouse for inside house sales.
SEGP	I have never seen a seedling on or near production or stock beds area in 25 years.
SEGP	only vegetative spread. Always juvenile form in WI.
SEGP	We sell but don't grow this.
SEGP/SLMC	"In SE Wisc. Our Thorndale that climbs up a tree will die in winter."
WCR	Sold only as a potted plant. Doesn't overwinter well here.

Synthesis:

Taxon (**22**): **climbing euonymus, *Euonymus fortunei***

a) Number of Respondents Selling: **22**

b) Percent of **gross plant sales** contributed by this taxon:

16 < 1% **5** 1 - 2.9% **0** 3 – 4.9% **0** 5 – 6.9% **0** 7 – 8.9% **0** > 9% **1** not disclosed

Total dollar amount contributed (median of % category x median of gross sales category for each totaled) **\$170,218**

Rank among 63 taxa (1 = most) **10**

c) Trend for 2011 season (tally)

1 increased **14** unchanged **0** temp. reduced **3** dec. slightly **1** phasing out **0** discontinued **3** not disclosed

d) Time required to produce (tally)

6 < 6 months **7** 6 to 12 months **4** 1 to 2 years **0** 2 to 3 years **0** 3 to 5 years **0** over 5 years **5** not disclosed

e) Estimated wholesale value of plants in production (category median x count, totaled): **\$43,250** (tally below by category)

8 < \$1,000 **6** \$1.0K to 2.5K **3** \$2.5K to 5K **0** \$5K to 10K **1** \$10K to 25K **0** > \$25K **4** not disclosed

f) Observed invasive tendencies (crosstabs by EcoRegion) (***** 3 internally inconsistent responses = BOTH only where planted and another**)

EcoRegion	N	only where planted	"runs"	open ground	managed areas	"old fields"	undisturbed areas
CLMC	1	1	1	1	0	0	0
CSP	1	1	0	0	0	0	0
NCF	1	1	0	0	0	0	0
NLMC	1	0	1	0	0	0	0
SEGP	6	5	4***	0	1	0	0

SEGP/SLMC	1	0	1	0	0	0	0
SLMC	1	1	0	0	0	0	0
WCR	1	1	0	0	0	0	0

g) Top cultivars grown, where noted. 13 surveys provided data

Coloratus (7), Emerald Gaiety (7), Emerald 'n' Gold (5), Vegetus (2), and 1 each B'condy, Frosty Pearl, Gold Splash, Trautman, Kewanensis, Majestic Gold, Variegatus, and Sunspot.

h) Cultivars with no or reduced invasive tendencies, where noted. (Crosstab by EcoRegion, as appropriate).

CLMC	all taxa	none		
CSP	Emerald 'n Gold	none	Emerald Gaiety	none
SEGP	Coloratus	none		

i) Comments grouped by EcoRegion.

CLMC	Only (carry) when LAs order them.
CSH	Hard to grow/establish here, marginally hardy.
CSP	Hard to overwinter - difficult to grow.
NLMC	No seedling/volunteering problems observed. Large deer population browses euonymus - reduces use of species.
SEGP	I have never seen a seedling on or near production or stockbeds area in 25 years.
SEGP	We sell this only as finished stock - bought in.
SEGP	Never observed seedlings beyond one year of age.
SEGP	Only sell cultivars, not the species.
SEGP	This is a good item.
SEGP/SLMC	Durable groundcover.
SLMC	container plant – have not found any seedlings in nursery

Synthesis:

Taxon (**23**): **periwinkle, Vinca minor**

a) Number of Respondents Selling: **42**

b) Percent of **gross plant sales** contributed by this taxon:

35 < 1% **3** 1 - 2.9% **0** 3 – 4.9% **1** 5 – 6.9% **0** 7 – 8.9% **0** > 9% **3** not disclosed

Total dollar amount contributed (median of % category x median of gross sales category for each totaled) **\$200,125**

Rank among 63 taxa (1 = most) **9**

c) Trend for 2011 season (tally)

3 increased **33** unchanged **0** temp. reduced **3** dec. slightly **0** phasing out **0** discontinued **3** not disclosed

d) Time required to produce (tally)

22 < 6 months **10** 6 to 12 months **1** 1 to 2 years **0** 2 to 3 years **0** 3 to 5 years **0** over 5 years **9** not disclosed

e) Estimated wholesale value of plants in production (category median x count, totaled): **\$86,000** (tally below by category)

29 < \$1,000 **3** \$1.0K to 2.5K **3** \$2.5K to 5K **0** \$5K to 10K **1** \$10K to 25K **1** > \$25K **5** not disclosed

f) Observed invasive tendencies (crosstabs by EcoRegion) **Number of *s indicate number of internally inconsistent responses - this AND “only where planted”**.

EcoRegion	N	only where planted	"runs"	open ground	managed areas	"old fields"	undisturbed areas
CLMC	4	2	1*	0	1	1	0
CSH	2	2	0	0	0	0	0
FT	5	2	2	1	0	0	0
NCF	1	1	0	0	0	0	0
NHL	2	2	0	0	0	0	0
NLMC	1	0	1	0	0	0	0
SEGP	9	8	2**	0	1*	0	0
SEGP/SLMC	2	0	2	0	0	0	0

SLMC	1	0	1	0	0	0	0
SWS	1	0	1	0	0	0	0
WCR	5	4	2**	0	0	0	1*
WP	1	0	1	0	0	0	0

g) Top cultivars grown, where noted. 15 respondents provided data with following frequencies:

Bowles or Bowles selections (11), Illumination (7), Ralph Shugert (3), species (2), atropurpurea (2), and 1 each – Alba and Dart’s Blue.

h) Cultivars with no or reduced invasive tendencies, where noted. (Crosstab by EcoRegion, as appropriate).

CLMC	all taxa	none				
CLMC	all taxa	none				
SEGP	Bowles	none	atropurpurea	none	Alba	none
SEGP	Illumination	none				

i) Comments grouped by EcoRegion.

CLMC	Only when L As order them.
FT	runs - can be dug out and removed with success
FT	Tends to die back quite a bit over winter in Zone 4.
NHL	No invasiveness north of Rhinelander on sandy soils.
NLMC	Invasive colonies have been observed in Door Co. - we have not seen our plantings become problems - no deer browse.
SEGP	I have never seen a seedling on or near production or stock beds area in 25 years.
SEGP	We sell but don't grow this.
SEGP	This is a good item.
SEGP/SLMC	Another good groundcover.
WCR	I sell < \$50 worth.

Synthesis:

Taxon (24): **old man's beard, *Clematis vitalba***

a) Number of Respondents Selling: **5**

b) Percent of **gross plant sales** contributed by this taxon:

5 < 1% **0** 1 - 2.9% **0** 3 – 4.9% **0** 5 – 6.9% **0** 7 – 8.9% **0** > 9% **0** not disclosed

Total dollar amount contributed (median of % category x median of gross sales category for each totaled) **\$19,378**

Rank among 63 taxa (1 = most) **38**

c) Trend for 2011 season (tally)

0 increased **5** unchanged **0** temp. reduced **0** dec. slightly **0** phasing out **0** discontinued **0** not disclosed

d) Time required to produce (tally)

4 < 6 months **1** 6 to 12 months **0** 1 to 2 years **0** 2 to 3 years **0** 3 to 5 years **0** over 5 years **0** not disclosed

e) Estimated wholesale value of plants in production (category median x count, totaled): **\$2,500** (tally below by category)

5 < \$1,000 **0** \$1.0K to 2.5K **0** \$2.5K to 5K **0** \$5K to 10K **0** \$10K to 25K **0** > \$25K **0** not disclosed

f) Observed invasive tendencies (crosstabs by EcoRegion)

EcoRegion	N	only where planted	"runs"	open ground	managed areas	"old fields"	undisturbed areas
FT	1	1	0	0	0	0	0
SEGP	1	1	0	0	0	0	0
SLMC	1	1	0	0	0	0	0
WCR/CSH	1	1	0	0	0	0	0

g) Top cultivars grown, where noted. (No additional information)

h) Cultivars with no or reduced invasive tendencies, where noted. (Crosstab by EcoRegion, as appropriate). (No additional information)

i) Comments grouped by EcoRegion. [\(No additional information\)](#)

Synthesis:

Taxon (25): **lily of the valley, *Convallaria majalis***

a) Number of Respondents Selling: **34**

b) Percent of **gross plant sales** contributed by this taxon:

31 < 1% **2** 1 - 2.9% **0** 3 – 4.9% **0** 5 – 6.9% **0** 7 – 8.9% **0** > 9% **1** not disclosed

Total dollar amount contributed (median of % category x median of gross sales category for each totaled) **\$113,450**

Rank among 63 taxa (1 = most) **15**

c) Trend for 2011 season (tally)

0 increased **22** unchanged **0** temp. reduced **7** dec. slightly **1** phasing out **0** discontinued **4** not disclosed

d) Time required to produce (tally)

15 < 6 months **11** 6 to 12 months **0** 1 to 2 years **1** 2 to 3 years **0** 3 to 5 years **0** over 5 years **7** not disclosed

e) Estimated wholesale value of plants in production (category median x count, totaled): **\$24,250** (tally below by category)

23 < \$1,000 **3** \$1.0K to 2.5K **0** \$2.5K to 5K **1** \$5K to 10K **0** \$10K to 25K **0** > \$25K **7** not disclosed

f) Observed invasive tendencies (crosstabs by EcoRegion)

g) Top cultivars grown, where noted.

h) Cultivars with no or reduced invasive tendencies, where noted. (Crosstab by EcoRegion, as appropriate).

i) Comments grouped by EcoRegion.

Synthesis:

Taxon (26): **orange daylily, *Hemerocallis fulva***

a) Number of Respondents Selling: **14**

b) Percent of **gross plant sales** contributed by this taxon:

14 < 1% **0** 1 - 2.9% **0** 3 – 4.9% **0** 5 – 6.9% **0** 7 – 8.9% **0** > 9% **0** not disclosed

Total dollar amount contributed (median of % category x median of gross sales category for each totaled) **\$54,330**

Rank among 63 taxa (1 = most) **23**

c) Trend for 2011 season (tally)

0 increased **7** unchanged **0** temp. reduced **3** dec. slightly **2** phasing out **0** discontinued **2** not disclosed

d) Time required to produce (tally)

8 < 6 months **2** 6 to 12 months **1** 1 to 2 years **0** 2 to 3 years **0** 3 to 5 years **0** over 5 years **3** not disclosed

e) Estimated wholesale value of plants in production (category median x count, totaled): **\$10,500** (tally below by category)

10 < \$1,000 **1** \$1.0K to 2.5K **1** \$2.5K to 5K **0** \$5K to 10K **0** \$10K to 25K **0** > \$25K **2** not disclosed

f) Observed invasive tendencies (crosstabs by EcoRegion)

g) Top cultivars grown, where noted.

h) Cultivars with no or reduced invasive tendencies, where noted. (Crosstab by EcoRegion, as appropriate).

i) Comments grouped by EcoRegion.

Synthesis:

Taxon (27): **garden heliotrope, valerian, *Valeriana officinalis***

a) Number of Respondents Selling: **7**

b) Percent of **gross plant sales** contributed by this taxon:

7 < 1% **0** 1 - 2.9% **0** 3 – 4.9% **0** 5 – 6.9% **0** 7 – 8.9% **0** > 9% **0** not disclosed

Total dollar amount contributed (median of % category x median of gross sales category for each totaled) **\$17180**

Rank among 63 taxa (1 = most) **39**

c) Trend for 2011 season (tally)

0 increased **6** unchanged **0** temp. reduced **0** dec. slightly **1** phasing out **0** discontinued **0** not disclosed

d) Time required to produce (tally)

6 < 6 months **1** 6 to 12 months **0** 1 to 2 years **0** 2 to 3 years **0** 3 to 5 years **0** over 5 years **0** not disclosed

e) Estimated wholesale value of plants in production (category median x count, totaled): **\$3,500** (tally below by category)

7 < \$1,000 **0** \$1.0K to 2.5K **0** \$2.5K to 5K **0** \$5K to 10K **0** \$10K to 25K **0** > \$25K **0** not disclosed

f) Observed invasive tendencies (crosstabs by EcoRegion)

g) Top cultivars grown, where noted.

h) Cultivars with no or reduced invasive tendencies, where noted. (Crosstab by EcoRegion, as appropriate).

i) Comments grouped by EcoRegion.

Synthesis:

Taxon (28): **Grecian foxglove, *Digitalis lanata***

a) Number of Respondents Selling: **8**

b) Percent of **gross plant sales** contributed by this taxon:

7 < 1% **0** 1 - 2.9% **0** 3 – 4.9% **0** 5 – 6.9% **0** 7 – 8.9% **0** > 9% **1** not disclosed

Total dollar amount contributed (median of % category x median of gross sales category for each totaled) **\$11,403**

Rank among 63 taxa (1 = most) **42**

c) Trend for 2011 season (tally)

1 increased **3** unchanged **0** temp. reduced **1** dec. slightly **0** phasing out **0** discontinued **3** not disclosed

d) Time required to produce (tally)

5 < 6 months **1** 6 to 12 months **0** 1 to 2 years **0** 2 to 3 years **0** 3 to 5 years **0** over 5 years **2** not disclosed

e) Estimated wholesale value of plants in production (category median x count, totaled): **\$3,000** (tally below by category)

6 < \$1,000 **0** \$1.0K to 2.5K **0** \$2.5K to 5K **0** \$5K to 10K **0** \$10K to 25K **0** > \$25K **2** not disclosed

f) Observed invasive tendencies (crosstabs by EcoRegion)

g) Top cultivars grown, where noted.

h) Cultivars with no or reduced invasive tendencies, where noted. (Crosstab by EcoRegion, as appropriate).

i) Comments grouped by EcoRegion.

Synthesis:

Taxon (29): **forget-me-not, *Myosotis scorpioides***

a) Number of Respondents Selling: **25**

b) Percent of **gross plant sales** contributed by this taxon:

20 < 1% **2** 1 - 2.9% **2** 3 – 4.9% **0** 5 – 6.9% **0** 7 – 8.9% **0** > 9% **1** not disclosed

Total dollar amount contributed (median of % category x median of gross sales category for each totaled) **\$127,978**

Rank among 63 taxa (1 = most) **11**

c) Trend for 2011 season (tally)

0 increased **18** unchanged **1** temp. reduced **1** dec. slightly **0** phasing out **0** discontinued **5** not disclosed

d) Time required to produce (tally)

18 < 6 months **3** 6 to 12 months **0** 1 to 2 years **0** 2 to 3 years **0** 3 to 5 years **0** over 5 years **4** not disclosed

e) Estimated wholesale value of plants in production (category median x count, totaled): **\$18,250** (tally below by category)

18 < \$1,000 **1** \$1.0K to 2.5K **0** \$2.5K to 5K **1** \$5K to 10K **0** \$10K to 25K **0** > \$25K **5** not disclosed

f) Observed invasive tendencies (crosstabs by EcoRegion)

g) Top cultivars grown, where noted.

h) Cultivars with no or reduced invasive tendencies, where noted. (Crosstab by EcoRegion, as appropriate).

i) Comments grouped by EcoRegion.

Synthesis:

Taxon (30): **big-leaf lupine, *Lupinus polyphyllus***

a) Number of Respondents Selling: **19**

b) Percent of **gross plant sales** contributed by this taxon:

16 < 1% **1** 1 - 2.9% **1** 3 – 4.9% **0** 5 – 6.9% **0** 7 – 8.9% **0** > 9% **1** not disclosed

Total dollar amount contributed (median of % category x median of gross sales category for each totaled) **\$81,915**

Rank among 63 taxa (1 = most) **18**

c) Trend for 2011 season (tally)

2 increased **12** unchanged **0** temp. reduced **1** dec. slightly **1** phasing out **0** discontinued **3** not disclosed

d) Time required to produce (tally)

15 < 6 months **0** 6 to 12 months **1** 1 to 2 years **0** 2 to 3 years **0** 3 to 5 years **0** over 5 years **3** not disclosed

e) Estimated wholesale value of plants in production (category median x count, totaled): **\$18,750** (tally below by category)

15 < \$1,000 **0** \$1.0K to 2.5K **1** \$2.5K to 5K **1** \$5K to 10K **0** \$10K to 25K **0** > \$25K **2** not disclosed

f) Observed invasive tendencies (crosstabs by EcoRegion)

g) Top cultivars grown, where noted.

h) Cultivars with no or reduced invasive tendencies, where noted. (Crosstab by EcoRegion, as appropriate).

i) Comments grouped by EcoRegion.

Synthesis:

Taxon (31): **everlasting pea, *Lathyrus latifolia***

a) Number of Respondents Selling: **14**

b) Percent of **gross plant sales** contributed by this taxon:

13 < 1% **1** 1 - 2.9% **0** 3 – 4.9% **0** 5 – 6.9% **0** 7 – 8.9% **0** > 9% **0** not disclosed

Total dollar amount contributed (median of % category x median of gross sales category for each totaled) **\$62,920**

Rank among 63 taxa (1 = most) **22**

c) Trend for 2011 season (tally)

0 increased **9** unchanged **0** temp. reduced **2** dec. slightly **0** phasing out **1** discontinued **2** not disclosed

d) Time required to produce (tally)

9 < 6 months **2** 6 to 12 months **0** 1 to 2 years **0** 2 to 3 years **0** 3 to 5 years **0** over 5 years **3** not disclosed

e) Estimated wholesale value of plants in production (category median x count, totaled): **\$7,500** (tally below by category)

8 < \$1,000 **2** \$1.0K to 2.5K **0** \$2.5K to 5K **0** \$5K to 10K **0** \$10K to 25K **0** > \$25K **4** not disclosed

f) Observed invasive tendencies (crosstabs by EcoRegion)

g) Top cultivars grown, where noted.

h) Cultivars with no or reduced invasive tendencies, where noted. (Crosstab by EcoRegion, as appropriate).

i) Comments grouped by EcoRegion.

Synthesis:

Taxon (32): **flat pea, *Lathyrus sylvestris***

a) Number of Respondents Selling: **0**

b) Percent of **gross plant sales** contributed by this taxon:

< 1%	1 - 2.9%	3 – 4.9%	5 – 6.9%	7 – 8.9%	> 9%	not disclosed
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Total dollar amount contributed (median of % category x median of gross sales category for each totaled) **\$0**

Rank among 63 taxa (1 = most)

c) Trend for 2011 season (tally)

increased	unchanged	temp. reduced	dec. slightly	phasing out	discontinued	not disclosed
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d) Time required to produce (tally)

< 6 months	6 to 12 months	1 to 2 years	2 to 3 years	3 to 5 years	over 5 years	not disclosed
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e) Estimated wholesale value of plants in production (category median x count, totaled): **\$0** (tally below by category)

< \$1,000	\$1.0K to 2.5K	\$2.5K to 5K	\$5K to 10K	\$10K to 25K	> \$25K	not disclosed
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f) Observed invasive tendencies (crosstabs by EcoRegion)

g) Top cultivars grown, where noted.

h) Cultivars with no or reduced invasive tendencies, where noted. (Crosstab by EcoRegion, as appropriate).

i) Comments grouped by EcoRegion.

Synthesis:

Taxon (33): **bishop's weed, goutweed, *Aegopodium podagraria***

a) Number of Respondents Selling: **18**

b) Percent of **gross plant sales** contributed by this taxon:

16 < 1% **2** 1 - 2.9% **0** 3 – 4.9% **0** 5 – 6.9% **0** 7 – 8.9% **0** > 9% **0** not disclosed

Total dollar amount contributed (median of % category x median of gross sales category for each totaled) **\$86,238**

Rank among 63 taxa (1 = most) **17**

c) Trend for 2011 season (tally)

0 increased **8** unchanged **0** temp. reduced **5** dec. slightly **1** phasing out **0** discontinued **4** not disclosed

d) Time required to produce (tally)

9 < 6 months **4** 6 to 12 months **0** 1 to 2 years **0** 2 to 3 years **0** 3 to 5 years **0** over 5 years **5** not disclosed

e) Estimated wholesale value of plants in production (category median x count, totaled): **\$13,000** (tally below by category)

12 < \$1,000 **2** \$1.0K to 2.5K **1** \$2.5K to 5K **0** \$5K to 10K **0** \$10K to 25K **0** > \$25K **3** not disclosed

f) Observed invasive tendencies (crosstabs by EcoRegion)

g) Top cultivars grown, where noted.

h) Cultivars with no or reduced invasive tendencies, where noted. (Crosstab by EcoRegion, as appropriate).

i) Comments grouped by EcoRegion.

Synthesis:

Taxon (34): **globe thistle, *Echinops sphaerocephalus***

a) Number of Respondents Selling: **14**

b) Percent of **gross plant sales** contributed by this taxon:

12 < 1% **0** 1 - 2.9% **0** 3 – 4.9% **0** 5 – 6.9% **0** 7 – 8.9% **0** > 9% **2** not disclosed

Total dollar amount contributed (median of % category x median of gross sales category for each totaled) **\$32,680**

Rank among 63 taxa (1 = most) **29**

c) Trend for 2011 season (tally)

1 increased **6** unchanged **1** temp. reduced **2** dec. slightly **1** phasing out **0** discontinued **3** not disclosed

d) Time required to produce (tally)

9 < 6 months **1** 6 to 12 months **0** 1 to 2 years **0** 2 to 3 years **0** 3 to 5 years **0** over 5 years **4** not disclosed

e) Estimated wholesale value of plants in production (category median x count, totaled): **\$8,250** (tally below by category)

9 < \$1,000 **0** \$1.0K to 2.5K **1** \$2.5K to 5K **0** \$5K to 10K **0** \$10K to 25K **0** > \$25K **4** not disclosed

f) Observed invasive tendencies (crosstabs by EcoRegion)

g) Top cultivars grown, where noted.

h) Cultivars with no or reduced invasive tendencies, where noted. (Crosstab by EcoRegion, as appropriate).

i) Comments grouped by EcoRegion.

Synthesis:

Taxon (35): **colt's foot, *Tussilago farfara***

a) Number of Respondents Selling: 0

b) Percent of **gross plant sales** contributed by this taxon:

0 < 1% 0 1 - 2.9% 0 3 – 4.9% 0 5 – 6.9% 0 7 – 8.9% 0 > 9% 0 not disclosed

Total dollar amount contributed (median of % category x median of gross sales category for each totaled) \$0

Rank among 63 taxa (1 = most) 59 (=last)

c) Trend for 2011 season (tally)

0 increased 0 unchanged 0 temp. reduced 0 dec. slightly 0 phasing out 0 discontinued 0 not disclosed

d) Time required to produce (tally)

0 < 6 months 0 6 to 12 months 0 1 to 2 years 0 2 to 3 years 0 3 to 5 years 0 over 5 years 0 not disclosed

e) Estimated wholesale value of plants in production (category median x count, totaled): \$0 (tally below by category)

0 < \$1,000 0 \$1.0K to 2.5K 0 \$2.5K to 5K 0 \$5K to 10K 0 \$10K to 25K 0 > \$25K 0 not disclosed

f) Observed invasive tendencies (crosstabs by EcoRegion)

g) Top cultivars grown, where noted.

h) Cultivars with no or reduced invasive tendencies, where noted. (Crosstab by EcoRegion, as appropriate).

i) Comments grouped by EcoRegion.

Synthesis:

Taxon (36): **purple top vervain, *Verbena bonariensis***

a) Number of Respondents Selling: **10**

b) Percent of **gross plant sales** contributed by this taxon:

9 < 1% **0** 1 - 2.9% **0** 3 – 4.9% **0** 5 – 6.9% **0** 7 – 8.9% **0** > 9% **1** not disclosed

Total dollar amount contributed (median of % category x median of gross sales category for each totaled) **\$17,143**

Rank among 63 taxa (1 = most) **40**

c) Trend for 2011 season (tally)

1 increased **6** unchanged **0** temp. reduced **1** dec. slightly **0** phasing out **0** discontinued **2** not disclosed

d) Time required to produce (tally)

9 < 6 months **0** 6 to 12 months **0** 1 to 2 years **0** 2 to 3 years **0** 3 to 5 years **0** over 5 years **1** not disclosed

e) Estimated wholesale value of plants in production (category median x count, totaled): **\$4,000** (tally below by category)

8 < \$1,000 **0** \$1.0K to 2.5K **0** \$2.5K to 5K **0** \$5K to 10K **0** \$10K to 25K **0** > \$25K **2** not disclosed

f) Observed invasive tendencies (crosstabs by EcoRegion)

g) Top cultivars grown, where noted.

h) Cultivars with no or reduced invasive tendencies, where noted. (Crosstab by EcoRegion, as appropriate).

i) Comments grouped by EcoRegion.

Synthesis:

Taxon (37): **scarlet pimpernel, *Pimpinella saxifraga***

a) Number of Respondents Selling: 1

b) Percent of **gross plant sales** contributed by this taxon:

1 < 1% 0 1 - 2.9% 0 3 – 4.9% 0 5 – 6.9% 0 7 – 8.9% 0 > 9% 0 not disclosed

Total dollar amount contributed (median of % category x median of gross sales category for each totaled) \$8,750

Rank among 63 taxa (1 = most) 46

c) Trend for 2011 season (tally)

0 increased 1 unchanged 0 temp. reduced 0 dec. slightly 0 phasing out 0 discontinued 0 not disclosed

d) Time required to produce (tally)

1 < 6 months 0 6 to 12 months 0 1 to 2 years 0 2 to 3 years 0 3 to 5 years 0 over 5 years 0 not disclosed

e) Estimated wholesale value of plants in production (category median x count, totaled): \$500 (tally below by category)

1 < \$1,000 0 \$1.0K to 2.5K 0 \$2.5K to 5K 0 \$5K to 10K 0 \$10K to 25K 0 > \$25K 0 not disclosed

f) Observed invasive tendencies (crosstabs by EcoRegion)

g) Top cultivars grown, where noted.

h) Cultivars with no or reduced invasive tendencies, where noted. (Crosstab by EcoRegion, as appropriate).

i) Comments grouped by EcoRegion.

Synthesis:

Taxon (38): **garden yellow loosestrife, *Lysimachia vulgaris***

a) Number of Respondents Selling: **4**

b) Percent of **gross plant sales** contributed by this taxon:

3 < 1% **0** 1 - 2.9% **0** 3 – 4.9% **0** 5 – 6.9% **0** 7 – 8.9% **0** > 9% **1** not disclosed

Total dollar amount contributed (median of % category x median of gross sales category for each totaled) **\$9,813**

Rank among 63 taxa (1 = most) **43**

c) Trend for 2011 season (tally)

0 increased **2** unchanged **0** temp. reduced **1** dec. slightly **1** phasing out **0** discontinued **0** not disclosed

d) Time required to produce (tally)

3 < 6 months **0** 6 to 12 months **0** 1 to 2 years **0** 2 to 3 years **0** 3 to 5 years **0** over 5 years **1** not disclosed

e) Estimated wholesale value of plants in production (category median x count, totaled): **\$1,500** (tally below by category)

3 < \$1,000 **0** \$1.0K to 2.5K **0** \$2.5K to 5K **0** \$5K to 10K **0** \$10K to 25K **0** > \$25K **1** not disclosed

f) Observed invasive tendencies (crosstabs by EcoRegion)

g) Top cultivars grown, where noted.

h) Cultivars with no or reduced invasive tendencies, where noted. (Crosstab by EcoRegion, as appropriate).

i) Comments grouped by EcoRegion.

Synthesis:

Taxon (39): **moneywort, *Lysimachia nummularia***

a) Number of Respondents Selling: **25**

b) Percent of **gross plant sales** contributed by this taxon:

21 < 1% **3** 1 - 2.9% **0** 3 – 4.9% **0** 5 – 6.9% **0** 7 – 8.9% **0** > 9% **1** not disclosed

Total dollar amount contributed (median of % category x median of gross sales category for each totaled) **\$68,948**

Rank among 63 taxa (1 = most) **19**

c) Trend for 2011 season (tally)

1 increased **18** unchanged **0** temp. reduced **3** dec. slightly **0** phasing out **0** discontinued **3** not disclosed

d) Time required to produce (tally)

19 < 6 months **4** 6 to 12 months **0** 1 to 2 years **0** 2 to 3 years **0** 3 to 5 years **0** over 5 years **2** not disclosed

e) Estimated wholesale value of plants in production (category median x count, totaled): **\$12,000** (tally below by category)

20 < \$1,000 **2** \$1.0K to 2.5K **1** \$2.5K to 5K **0** \$5K to 10K **0** \$10K to 25K **0** > \$25K **2** not disclosed

f) Observed invasive tendencies (crosstabs by EcoRegion)

g) Top cultivars grown, where noted.

h) Cultivars with no or reduced invasive tendencies, where noted. (Crosstab by EcoRegion, as appropriate).

i) Comments grouped by EcoRegion.

Synthesis:

Taxon (40): **queen of the meadow, *Filipendula ulmaria***

a) Number of Respondents Selling: **13**

Percent of Respondents Selling:

b) Percent of **gross plant sales** contributed by this taxon:

11 < 1% **2** 1 - 2.9% **0** 3 – 4.9% **0** 5 – 6.9% **0** 7 – 8.9% **0** > 9% **0** not disclosed

Total dollar amount contributed (median of % category x median of gross sales category for each totaled) **\$37,225**

Rank among 63 taxa (1 = most) **27**

c) Trend for 2011 season (tally)

0 increased **9** unchanged **0** temp. reduced **2** dec. slightly **1** phasing out **0** discontinued **1** not disclosed

d) Time required to produce (tally)

8 < 6 months **2** 6 to 12 months **1** 1 to 2 years **0** 2 to 3 years **0** 3 to 5 years **0** over 5 years **2** not disclosed

e) Estimated wholesale value of plants in production (category median x count, totaled): **\$6,500** (tally below by category)

13 < \$1,000 **0** \$1.0K to 2.5K **0** \$2.5K to 5K **0** \$5K to 10K **0** \$10K to 25K **0** > \$25K **0** not disclosed

f) Observed invasive tendencies (crosstabs by EcoRegion)

g) Top cultivars grown, where noted.

h) Cultivars with no or reduced invasive tendencies, where noted. (Crosstab by EcoRegion, as appropriate).

i) Comments grouped by EcoRegion.

Synthesis:

Taxon (41): **yellow iris, *Iris pseudacorus***

a) Number of Respondents Selling: **20**

b) Percent of **gross plant sales** contributed by this taxon:

14 < 1% **3** 1 - 2.9% **0** 3 – 4.9% **0** 5 – 6.9% **0** 7 – 8.9% **0** > 9% **3** not disclosed

Total dollar amount contributed (median of % category x median of gross sales category for each totaled) **\$62,953**

Rank among 63 taxa (1 = most) **21**

c) Trend for 2011 season (tally)

1 increased **11** unchanged **0** temp. reduced **1** dec. slightly **1** phasing out **0** discontinued **6** not disclosed

d) Time required to produce (tally)

6 < 6 months **4** 6 to 12 months **0** 1 to 2 years **0** 2 to 3 years **1** 3 to 5 years **0** over 5 years **9** not disclosed

e) Estimated wholesale value of plants in production (category median x count, totaled): **\$10,500** (tally below by category)

12 < \$1,000 **1** \$1.0K to 2.5K **1** \$2.5K to 5K **0** \$5K to 10K **0** \$10K to 25K **0** > \$25K **6** not disclosed

f) Observed invasive tendencies (crosstabs by EcoRegion)

g) Top cultivars grown, where noted.

h) Cultivars with no or reduced invasive tendencies, where noted. (Crosstab by EcoRegion, as appropriate).

i) Comments grouped by EcoRegion.

Synthesis:

Taxon (42): **blackberry lily, *Belamcanda chinensis***

a) Number of Respondents Selling: **13**

b) Percent of **gross plant sales** contributed by this taxon:

11 < 1% **1** 1 - 2.9% **0** 3 – 4.9% **0** 5 – 6.9% **0** 7 – 8.9% **0** > 9% **1** not disclosed

Total dollar amount contributed (median of % category x median of gross sales category for each totaled) **\$39,090**

Rank among 63 taxa (1 = most) **26**

c) Trend for 2011 season (tally)

0 increased **8** unchanged **0** temp. reduced **3** dec. slightly **1** phasing out **0** discontinued **1** not disclosed

d) Time required to produce (tally)

9 < 6 months **2** 6 to 12 months **0** 1 to 2 years **0** 2 to 3 years **0** 3 to 5 years **0** over 5 years **2** not disclosed

e) Estimated wholesale value of plants in production (category median x count, totaled): **\$5,500** (tally below by category)

11 < \$1,000 **0** \$1.0K to 2.5K **0** \$2.5K to 5K **0** \$5K to 10K **0** \$10K to 25K **0** > \$25K **2** not disclosed

f) Observed invasive tendencies (crosstabs by EcoRegion)

g) Top cultivars grown, where noted.

h) Cultivars with no or reduced invasive tendencies, where noted. (Crosstab by EcoRegion, as appropriate).

i) Comments grouped by EcoRegion.

Synthesis:

Taxon (43): **butterfly dock, *Petasites hybridus***

a) Number of Respondents Selling: 0

b) Percent of **gross plant sales** contributed by this taxon:

0 < 1% 0 1 - 2.9% 0 3 – 4.9% 0 5 – 6.9% 0 7 – 8.9% 0 > 9% 0 not disclosed

Total dollar amount contributed (median of % category x median of gross sales category for each totaled) \$0

Rank among 63 taxa (1 = most) 59 (=last due to ties)

c) Trend for 2011 season (tally)

0 increased 0 unchanged 0 temp. reduced 0 dec. slightly 0 phasing out 0 discontinued 0 not disclosed

d) Time required to produce (tally)

0 < 6 months 0 6 to 12 months 0 1 to 2 years 0 2 to 3 years 0 3 to 5 years 0 over 5 years 0 not disclosed

e) Estimated wholesale value of plants in production (category median x count, totaled): \$0 (tally below by category)

0 < \$1,000 0 \$1.0K to 2.5K 0 \$2.5K to 5K 0 \$5K to 10K 0 \$10K to 25K 0 > \$25K 0 not disclosed

f) Observed invasive tendencies (crosstabs by EcoRegion)

g) Top cultivars grown, where noted.

h) Cultivars with no or reduced invasive tendencies, where noted. (Crosstab by EcoRegion, as appropriate).

i) Comments grouped by EcoRegion.

Synthesis:

Taxon (**44**): **lesser celandine, *Ranunculus ficaria***

a) Number of Respondents Selling: **2**

b) Percent of **gross plant sales** contributed by this taxon:

2 < 1% **0** 1 - 2.9% **0** 3 – 4.9% **0** 5 – 6.9% **0** 7 – 8.9% **0** > 9% **0** not disclosed

Total dollar amount contributed (median of % category x median of gross sales category for each totaled) **\$9625**

Rank among 63 taxa (1 = most) **44**

c) Trend for 2011 season (tally)

0 increased **2** unchanged **0** temp. reduced **0** dec. slightly **0** phasing out **0** discontinued **0** not disclosed

d) Time required to produce (tally)

1 < 6 months **0** 6 to 12 months **0** 1 to 2 years **0** 2 to 3 years **0** 3 to 5 years **0** over 5 years **1** not disclosed

e) Estimated wholesale value of plants in production (category median x count, totaled): **\$1,000** (tally below by category)

2 < \$1,000 **0** \$1.0K to 2.5K **0** \$2.5K to 5K **0** \$5K to 10K **0** \$10K to 25K **0** > \$25K **0** not disclosed

f) Observed invasive tendencies (crosstabs by EcoRegion)

g) Top cultivars grown, where noted.

h) Cultivars with no or reduced invasive tendencies, where noted. (Crosstab by EcoRegion, as appropriate).

i) Comments grouped by EcoRegion.

Synthesis:

Taxon (45): **tall buttercup, *Ranunculus acris***

a) Number of Respondents Selling: 1

b) Percent of **gross plant sales** contributed by this taxon:

1 < 1% 0 1 - 2.9% 0 3 – 4.9% 0 5 – 6.9% 0 7 – 8.9% 0 > 9% 0 not disclosed

Total dollar amount contributed (median of % category x median of gross sales category for each totaled) **\$3,750**

Rank among 63 taxa (1 = most) 49

c) Trend for 2011 season (tally)

0 increased 0 unchanged 0 temp. reduced 0 dec. slightly 1 phasing out 0 discontinued 0 not disclosed

d) Time required to produce (tally)

1 < 6 months 0 6 to 12 months 0 1 to 2 years 0 2 to 3 years 0 3 to 5 years 0 over 5 years 0 not disclosed

e) Estimated wholesale value of plants in production (category median x count, totaled): **\$500** (tally below by category)

1 < \$1,000 0 \$1.0K to 2.5K 0 \$2.5K to 5K 0 \$5K to 10K 0 \$10K to 25K 0 > \$25K 0 not disclosed

f) Observed invasive tendencies (crosstabs by EcoRegion)

g) Top cultivars grown, where noted.

h) Cultivars with no or reduced invasive tendencies, where noted. (Crosstab by EcoRegion, as appropriate).

i) Comments grouped by EcoRegion.

Synthesis:

Taxon (46): **Siberian squill, *Scilla siberia***

a) Number of Respondents Selling: **7**

b) Percent of **gross plant sales** contributed by this taxon:

5 < 1% **1** 1 - 2.9% **0** 3 – 4.9% **0** 5 – 6.9% **0** 7 – 8.9% **0** > 9% **1** not disclosed

Total dollar amount contributed (median of % category x median of gross sales category for each totaled) **\$21,413**

Rank among 63 taxa (1 = most) **36**

c) Trend for 2011 season (tally)

0 increased **4** unchanged **0** temp. reduced **0** dec. slightly **0** phasing out **0** discontinued **3** not disclosed

d) Time required to produce (tally)

1 < 6 months **2** 6 to 12 months **0** 1 to 2 years **0** 2 to 3 years **0** 3 to 5 years **0** over 5 years **4** not disclosed

e) Estimated wholesale value of plants in production (category median x count, totaled): **\$1,500** (tally below by category)

3 < \$1,000 **0** \$1.0K to 2.5K **0** \$2.5K to 5K **0** \$5K to 10K **0** \$10K to 25K **0** > \$25K **4** not disclosed

f) Observed invasive tendencies (crosstabs by EcoRegion)

g) Top cultivars grown, where noted.

h) Cultivars with no or reduced invasive tendencies, where noted. (Crosstab by EcoRegion, as appropriate).

i) Comments grouped by EcoRegion.

Synthesis:

Taxon (47): **star of Bethlehem, *Ornithogalum umbellatum***

a) Number of Respondents Selling: **3**

b) Percent of **gross plant sales** contributed by this taxon:

1 < 1% **1** 1 - 2.9% **0** 3 – 4.9% **0** 5 – 6.9% **0** 7 – 8.9% **0** > 9% **1** not disclosed

Total dollar amount contributed (median of % category x median of gross sales category for each totaled) **\$885**

Rank among 63 taxa (1 = most) **55**

c) Trend for 2011 season (tally)

0 increased **1** unchanged **0** temp. reduced **0** dec. slightly **0** phasing out **0** discontinued **2** not disclosed

d) Time required to produce (tally)

0 < 6 months **0** 6 to 12 months **0** 1 to 2 years **0** 2 to 3 years **0** 3 to 5 years **0** over 5 years **3** not disclosed

e) Estimated wholesale value of plants in production (category median x count, totaled): **\$0 disclosed** (tally below by category)

0 < \$1,000 **0** \$1.0K to 2.5K **0** \$2.5K to 5K **0** \$5K to 10K **0** \$10K to 25K **0** > \$25K **3** not disclosed

f) Observed invasive tendencies (crosstabs by EcoRegion)

g) Top cultivars grown, where noted.

h) Cultivars with no or reduced invasive tendencies, where noted. (Crosstab by EcoRegion, as appropriate).

i) Comments grouped by EcoRegion.

Synthesis:

Taxon (48): **wormwood, *Artemisia absinthium***

a) Number of Respondents Selling: **10**

b) Percent of **gross plant sales** contributed by this taxon:

9 < 1% **1** 1 - 2.9% **0** 3 – 4.9% **0** 5 – 6.9% **0** 7 – 8.9% **0** > 9% **0** not disclosed

Total dollar amount contributed (median of % category x median of gross sales category for each totaled) **\$26,253**

Rank among 63 taxa (1 = most) **32**

c) Trend for 2011 season (tally)

0 increased **9** unchanged **0** temp. reduced **0** dec. slightly **0** phasing out **0** discontinued **1** not disclosed

d) Time required to produce (tally)

7 < 6 months **2** 6 to 12 months **0** 1 to 2 years **0** 2 to 3 years **0** 3 to 5 years **0** over 5 years **1** not disclosed

e) Estimated wholesale value of plants in production (category median x count, totaled): **\$7,250** (tally below by category)

7 < \$1,000 **0** \$1.0K to 2.5K **1** \$2.5K to 5K **0** \$5K to 10K **0** \$10K to 25K **0** > \$25K **2** not disclosed

f) Observed invasive tendencies (crosstabs by EcoRegion)

g) Top cultivars grown, where noted.

h) Cultivars with no or reduced invasive tendencies, where noted. (Crosstab by EcoRegion, as appropriate).

i) Comments grouped by EcoRegion.

Synthesis:

Taxon (49): **live forever sedum, *Sedum telephium***

a) Number of Respondents Selling: **17**

b) Percent of **gross plant sales** contributed by this taxon:

13 < 1% **2** 1 - 2.9% **1** 3 – 4.9% **0** 5 – 6.9% **0** 7 – 8.9% **0** > 9% **1** not disclosed

Total dollar amount contributed (median of % category x median of gross sales category for each totaled) **\$39,445**

Rank among 63 taxa (1 = most) **25**

c) Trend for 2011 season (tally)

1 increased **11** unchanged **0** temp. reduced **2** dec. slightly **0** phasing out **0** discontinued **3** not disclosed

d) Time required to produce (tally)

9 < 6 months **3** 6 to 12 months **1** 1 to 2 years **0** 2 to 3 years **0** 3 to 5 years **0** over 5 years **4** not disclosed

e) Estimated wholesale value of plants in production (category median x count, totaled): **\$6,500** (tally below by category)

13 < \$1,000 **0** \$1.0K to 2.5K **0** \$2.5K to 5K **0** \$5K to 10K **0** \$10K to 25K **0** > \$25K **4** not disclosed

f) Observed invasive tendencies (crosstabs by EcoRegion)

g) Top cultivars grown, where noted.

h) Cultivars with no or reduced invasive tendencies, where noted. (Crosstab by EcoRegion, as appropriate).

i) Comments grouped by EcoRegion.

Synthesis:

(Because of extensive interspecific hybridization in the genus, even well-informed growers are not certain of the species make-up of their cultivars.)

Taxon (50): **bird's foot trefoil, *Lotus corniculatus***

a) Number of Respondents Selling: **3**

b) Percent of **gross plant sales** contributed by this taxon:

3 < 1% **0** 1 - 2.9% **0** 3 – 4.9% **0** 5 – 6.9% **0** 7 – 8.9% **0** > 9% **0** not disclosed

Total dollar amount contributed (median of % category x median of gross sales category for each totaled) **\$31,250**

Rank among 63 taxa (1 = most) **30**

c) Trend for 2011 season (tally)

0 increased **1** unchanged **0** temp. reduced **1** dec. slightly **0** phasing out **0** discontinued **1** not disclosed

d) Time required to produce (tally)

2 < 6 months **0** 6 to 12 months **0** 1 to 2 years **0** 2 to 3 years **0** 3 to 5 years **0** over 5 years **1** not disclosed

e) Estimated wholesale value of plants in production (category median x count, totaled): **\$1,000** (tally below by category)

2 < \$1,000 **0** \$1.0K to 2.5K **0** \$2.5K to 5K **0** \$5K to 10K **0** \$10K to 25K **0** > \$25K **1** not disclosed

f) Observed invasive tendencies (crosstabs by EcoRegion)

g) Top cultivars grown, where noted.

h) Cultivars with no or reduced invasive tendencies, where noted. (Crosstab by EcoRegion, as appropriate).

i) Comments grouped by EcoRegion.

Synthesis:

Taxon (51): **crown vetch, *Coronilla varia***

a) Number of Respondents Selling: **2**

b) Percent of **gross plant sales** contributed by this taxon:

2 < 1% **0** 1 - 2.9% **0** 3 – 4.9% **0** 5 – 6.9% **0** 7 – 8.9% **0** > 9% **0** not disclosed

Total dollar amount contributed (median of % category x median of gross sales category for each totaled) **\$403**

Rank among 63 taxa (1 = most) **56**

c) Trend for 2011 season (tally)

0 increased **1** unchanged **0** temp. reduced **0** dec. slightly **1** phasing out **0** discontinued **0** not disclosed

d) Time required to produce (tally)

1 < 6 months **0** 6 to 12 months **1** 1 to 2 years **0** 2 to 3 years **0** 3 to 5 years **0** over 5 years **0** not disclosed

e) Estimated wholesale value of plants in production (category median x count, totaled): **\$1,000** (tally below by category)

2 < \$1,000 **0** \$1.0K to 2.5K **0** \$2.5K to 5K **0** \$5K to 10K **0** \$10K to 25K **0** > \$25K **0** not disclosed

f) Observed invasive tendencies (crosstabs by EcoRegion)

g) Top cultivars grown, where noted.

h) Cultivars with no or reduced invasive tendencies, where noted. (Crosstab by EcoRegion, as appropriate).

i) Comments grouped by EcoRegion.

Synthesis:

Taxon (52): **ox-eye daisy, *Chrysanthemum leucanthemum***

a) Number of Respondents Selling: **14**

b) Percent of **gross plant sales** contributed by this taxon:

12 < 1% **2** 1 - 2.9% **0** 3 – 4.9% **0** 5 – 6.9% **0** 7 – 8.9% **0** > 9% **0** not disclosed

Total dollar amount contributed (median of % category x median of gross sales category for each totaled) **\$106,180**

Rank among 63 taxa (1 = most) **16**

c) Trend for 2011 season (tally)

2 increased **9** unchanged **0** temp. reduced **1** dec. slightly **1** phasing out **0** discontinued **1** not disclosed

d) Time required to produce (tally)

8 < 6 months **3** 6 to 12 months **1** 1 to 2 years **0** 2 to 3 years **0** 3 to 5 years **0** over 5 years **2** not disclosed

e) Estimated wholesale value of plants in production (category median x count, totaled): **\$12,500** (tally below by category)

10 < \$1,000 **2** \$1.0K to 2.5K **1** \$2.5K to 5K **0** \$5K to 10K **0** \$10K to 25K **0** > \$25K **1** not disclosed

f) Observed invasive tendencies (crosstabs by EcoRegion)

g) Top cultivars grown, where noted.

h) Cultivars with no or reduced invasive tendencies, where noted. (Crosstab by EcoRegion, as appropriate).

i) Comments grouped by EcoRegion.

Synthesis:

(Because of changes in the nomenclature in this genus and close relatives, it appears there is confusion about this taxon and it may be over reported.)

Taxon (53): **baby's breath, *Gypsophila paniculata***

a) Number of Respondents Selling: **27**

b) Percent of **gross plant sales** contributed by this taxon:

25 < 1% **1** 1 - 2.9% **0** 3 – 4.9% **0** 5 – 6.9% **0** 7 – 8.9% **0** > 9% **1** not disclosed

Total dollar amount contributed (median of % category x median of gross sales category for each totaled) **\$64,733**

Rank among 63 taxa (1 = most) **20**

c) Trend for 2011 season (tally)

1 increased **19** unchanged **0** temp. reduced **3** dec. slightly **1** phasing out **0** discontinued **3** not disclosed

d) Time required to produce (tally)

15 < 6 months **6** 6 to 12 months **0** 1 to 2 years **0** 2 to 3 years **0** 3 to 5 years **0** over 5 years **6** not disclosed

e) Estimated wholesale value of plants in production (category median x count, totaled): **\$14,250** (tally below by category)

21 < \$1,000 **0** \$1.0K to 2.5K **1** \$2.5K to 5K **0** \$5K to 10K **0** \$10K to 25K **0** > \$25K **5** not disclosed

f) Observed invasive tendencies (crosstabs by EcoRegion)

g) Top cultivars grown, where noted.

h) Cultivars with no or reduced invasive tendencies, where noted. (Crosstab by EcoRegion, as appropriate).

i) Comments grouped by EcoRegion.

Synthesis:

Taxon (54): **policeman's helmet, *Impatiens glandulifera***

a) Number of Respondents Selling: **0**

b) Percent of **gross plant sales** contributed by this taxon:

< 1%	1 - 2.9%	3 – 4.9%	5 – 6.9%	7 – 8.9%	> 9%	not disclosed
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Total dollar amount contributed (median of % category x median of gross sales category for each totaled) **\$0**

Rank among 63 taxa (1 = most) **59 (=last due to ties)**

c) Trend for 2011 season (tally)

increased	unchanged	temp. reduced	dec. slightly	phasing out	discontinued	not disclosed
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d) Time required to produce (tally)

< 6 months	6 to 12 months	1 to 2 years	2 to 3 years	3 to 5 years	over 5 years	not disclosed
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e) Estimated wholesale value of plants in production (category median x count, totaled): **\$0** (tally below by category)

< \$1,000	\$1.0K to 2.5K	\$2.5K to 5K	\$5K to 10K	\$10K to 25K	> \$25K	not disclosed
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f) Observed invasive tendencies (crosstabs by EcoRegion)

g) Top cultivars grown, where noted.

h) Cultivars with no or reduced invasive tendencies, where noted. (Crosstab by EcoRegion, as appropriate).

i) Comments grouped by EcoRegion.

Synthesis:

Taxon (55): **yellow bedstraw, *Galium verum***

a) Number of Respondents Selling: **1**

b) Percent of **gross plant sales** contributed by this taxon:

1 < 1% **0** 1 - 2.9% **0** 3 – 4.9% **0** 5 – 6.9% **0** 7 – 8.9% **0** > 9% **0** not disclosed

Total dollar amount contributed (median of % category x median of gross sales category for each totaled) **\$8,750**

Rank among 63 taxa (1 = most) **46 (tied)**

c) Trend for 2011 season (tally)

0 increased **1** unchanged **0** temp. reduced **0** dec. slightly **0** phasing out **0** discontinued **0** not disclosed

d) Time required to produce (tally)

1 < 6 months **0** 6 to 12 months **0** 1 to 2 years **0** 2 to 3 years **0** 3 to 5 years **0** over 5 years **0** not disclosed

e) Estimated wholesale value of plants in production (category median x count, totaled): **\$500** (tally below by category)

1 < \$1,000 **0** \$1.0K to 2.5K **0** \$2.5K to 5K **0** \$5K to 10K **0** \$10K to 25K **0** > \$25K **0** not disclosed

f) Observed invasive tendencies (crosstabs by EcoRegion)

g) Top cultivars grown, where noted.

h) Cultivars with no or reduced invasive tendencies, where noted. (Crosstab by EcoRegion, as appropriate).

i) Comments grouped by EcoRegion.

Synthesis:

Taxon (56): **Germander speedwell, *Veronica chameadrys***

a) Number of Respondents Selling: **6**

b) Percent of **gross plant sales** contributed by this taxon:

5 < 1% **0** 1 - 2.9% **0** 3 – 4.9% **0** 5 – 6.9% **0** 7 – 8.9% **0** > 9% **1** not disclosed

Total dollar amount contributed (median of % category x median of gross sales category for each totaled) **\$24,000**

Rank among 63 taxa (1 = most) **33**

c) Trend for 2011 season (tally)

1 increased **3** unchanged **0** temp. reduced **0** dec. slightly **1** phasing out **0** discontinued **1** not disclosed

d) Time required to produce (tally)

5 < 6 months **0** 6 to 12 months **0** 1 to 2 years **0** 2 to 3 years **0** 3 to 5 years **0** over 5 years **1** not disclosed

e) Estimated wholesale value of plants in production (category median x count, totaled): **\$2,500** (tally below by category)

5 < \$1,000 **0** \$1.0K to 2.5K **0** \$2.5K to 5K **0** \$5K to 10K **0** \$10K to 25K **0** > \$25K **1** not disclosed

f) Observed invasive tendencies (crosstabs by EcoRegion)

g) Top cultivars grown, where noted.

h) Cultivars with no or reduced invasive tendencies, where noted. (Crosstab by EcoRegion, as appropriate).

i) Comments grouped by EcoRegion.

Synthesis:

Taxon (57): **giant daisy, *Leucanthemella serotina***

a) Number of Respondents Selling: 1

b) Percent of **gross plant sales** contributed by this taxon:

1 < 1% 0 1 - 2.9% 0 3 – 4.9% 0 5 – 6.9% 0 7 – 8.9% 0 > 9% 0 not disclosed

Total dollar amount contributed (median of % category x median of gross sales category for each totaled) \$3,750

Rank among 63 taxa (1 = most) 50

c) Trend for 2011 season (tally)

0 increased 1 unchanged 0 temp. reduced 0 dec. slightly 0 phasing out 0 discontinued 0 not disclosed

d) Time required to produce (tally)

1 < 6 months 0 6 to 12 months 0 1 to 2 years 0 2 to 3 years 0 3 to 5 years 0 over 5 years 0 not disclosed

e) Estimated wholesale value of plants in production (category median x count, totaled): \$500 (tally below by category)

1 < \$1,000 0 \$1.0K to 2.5K 0 \$2.5K to 5K 0 \$5K to 10K 0 \$10K to 25K 0 > \$25K 0 not disclosed

f) Observed invasive tendencies (crosstabs by EcoRegion)

g) Top cultivars grown, where noted.

h) Cultivars with no or reduced invasive tendencies, where noted. (Crosstab by EcoRegion, as appropriate).

i) Comments grouped by EcoRegion.

Synthesis:

Taxon (58): **reed canary grass, *Phalaris arundinaceae***

a) Number of Respondents Selling: **6**

b) Percent of **gross plant sales** contributed by this taxon:

5 < 1% **1** 1 - 2.9% **0** 3 – 4.9% **0** 5 – 6.9% **0** 7 – 8.9% **0** > 9% **0** not disclosed

Total dollar amount contributed (median of % category x median of gross sales category for each totaled) **\$27,338**

Rank among 63 taxa (1 = most) **31**

c) Trend for 2011 season (tally)

0 increased **2** unchanged **0** temp. reduced **2** dec. slightly **0** phasing out **0** discontinued **2** not disclosed

d) Time required to produce (tally)

4 < 6 months **0** 6 to 12 months **0** 1 to 2 years **0** 2 to 3 years **0** 3 to 5 years **0** over 5 years **2** not disclosed

e) Estimated wholesale value of plants in production (category median x count, totaled): **\$2,000** (tally below by category)

4 < \$1,000 **0** \$1.0K to 2.5K **0** \$2.5K to 5K **0** \$5K to 10K **0** \$10K to 25K **0** > \$25K **2** not disclosed

f) Observed invasive tendencies (crosstabs by EcoRegion)

g) Top cultivars grown, where noted.

h) Cultivars with no or reduced invasive tendencies, where noted. (Crosstab by EcoRegion, as appropriate).

i) Comments grouped by EcoRegion.

Synthesis:

Taxon (59): **feathertop, bushgrass, *Calamagrostis epigejos***

a) Number of Respondents Selling: 1

b) Percent of **gross plant sales** contributed by this taxon:

1 < 1% 0 1 - 2.9% 0 3 – 4.9% 0 5 – 6.9% 0 7 – 8.9% 0 > 9% 0 not disclosed

Total dollar amount contributed (median of % category x median of gross sales category for each totaled) \$88

Rank among 63 taxa (1 = most) 57

c) Trend for 2011 season (tally)

0 increased 1 unchanged 0 temp. reduced 0 dec. slightly 0 phasing out 0 discontinued 0 not disclosed

d) Time required to produce (tally)

0 < 6 months 0 6 to 12 months 1 1 to 2 years 0 2 to 3 years 0 3 to 5 years 0 over 5 years 0 not disclosed

e) Estimated wholesale value of plants in production (category median x count, totaled): \$500 (tally below by category)

1 < \$1,000 0 \$1.0K to 2.5K 0 \$2.5K to 5K 0 \$5K to 10K 0 \$10K to 25K 0 > \$25K 0 not disclosed

f) Observed invasive tendencies (crosstabs by EcoRegion)

g) Top cultivars grown, where noted.

h) Cultivars with no or reduced invasive tendencies, where noted. (Crosstab by EcoRegion, as appropriate).

i) Comments grouped by EcoRegion.

Synthesis:

Taxon (60): **Amur silvergrass, Japanese plumegrass, *Miscanthus saccharifolius***

a) Number of Respondents Selling: 5

b) Percent of **gross plant sales** contributed by this taxon:

4 < 1% 1 1 - 2.9% 0 3 – 4.9% 0 5 – 6.9% 0 7 – 8.9% 0 > 9% 0 not disclosed

Total dollar amount contributed (median of % category x median of gross sales category for each totaled) \$9,340

Rank among 63 taxa (1 = most) 45

c) Trend for 2011 season (tally)

1 increased 3 unchanged 0 temp. reduced 0 dec. slightly 0 phasing out 1 discontinued 0 not disclosed

d) Time required to produce (tally)

2 < 6 months 1 6 to 12 months 0 1 to 2 years 0 2 to 3 years 0 3 to 5 years 0 over 5 years 2 not disclosed

e) Estimated wholesale value of plants in production (category median x count, totaled): \$1,500 (tally below by category)

3 < \$1,000 0 \$1.0K to 2.5K 0 \$2.5K to 5K 0 \$5K to 10K 0 \$10K to 25K 0 > \$25K 2 not disclosed

f) Observed invasive tendencies (crosstabs by EcoRegion)

g) Top cultivars grown, where noted.

h) Cultivars with no or reduced invasive tendencies, where noted. (Crosstab by EcoRegion, as appropriate).

i) Comments grouped by EcoRegion.

Synthesis:

Taxon (61): **Chinese plumegrass, eulalia, *Miscanthus sinensis***

a) Number of Respondents Selling: **32**

b) Percent of **gross plant sales** contributed by this taxon:

22 < 1% **5** 1 - 2.9% **1** 3 – 4.9% **0** 5 – 6.9% **0** 7 – 8.9% **0** > 9% **4** not disclosed

Total dollar amount contributed (median of % category x median of gross sales category for each totaled) **\$235,013**

Rank among 63 taxa (1 = most) **8**

c) Trend for 2011 season (tally)

2 increased **19** unchanged **1** temp. reduced **3.5** dec. slightly **1.5** phasing out **1** discontinued **4** not disclosed

d) Time required to produce (tally)

11 < 6 months **11** 6 to 12 months **3** 1 to 2 years **0** 2 to 3 years **0** 3 to 5 years **0** over 5 years **7** not disclosed

e) Estimated wholesale value of plants in production (category median x count, totaled): **\$83,000** (tally below by category)

17 < \$1,000 **4** \$1.0K to 2.5K **4** \$2.5K to 5K **2** \$5K to 10K **0** \$10K to 25K **1** > \$25K **4** not disclosed

f) Observed invasive tendencies (crosstabs by EcoRegion)

g) Top cultivars grown, where noted.

h) Cultivars with no or reduced invasive tendencies, where noted. (Crosstab by EcoRegion, as appropriate).

i) Comments grouped by EcoRegion.

Synthesis:

Taxon (62): **hybrid plumegrass, *Miscanthus x giganteus***

a) Number of Respondents Selling: 6

b) Percent of **gross plant sales** contributed by this taxon:

5 < 1% 0 1 - 2.9% 0 3 – 4.9% 0 5 – 6.9% 0 7 – 8.9% 0 > 9% 1 not disclosed

Total dollar amount contributed (median of % category x median of gross sales category for each totaled) \$1,625

Rank among 63 taxa (1 = most) 51

c) Trend for 2011 season (tally)

1 increased 1 unchanged 1 temp. reduced 1 dec. slightly 0 phasing out 1 discontinued 1 not disclosed

d) Time required to produce (tally)

3 < 6 months 1 6 to 12 months 0 1 to 2 years 0 2 to 3 years 0 3 to 5 years 0 over 5 years 2 not disclosed

e) Estimated wholesale value of plants in production (category median x count, totaled): \$2,000 (tally below by category)

4 < \$1,000 0 \$1.0K to 2.5K 0 \$2.5K to 5K 0 \$5K to 10K 0 \$10K to 25K 0 > \$25K 2 not disclosed

f) Observed invasive tendencies (crosstabs by EcoRegion)

g) Top cultivars grown, where noted.

h) Cultivars with no or reduced invasive tendencies, where noted. (Crosstab by EcoRegion, as appropriate).

i) Comments grouped by EcoRegion.

Synthesis:

Taxon (63): **black bamboo, *Phyllostachys nigra***

a) Number of Respondents Selling: 1

b) Percent of **gross plant sales** contributed by this taxon:

1 < 1% 0 1 - 2.9% 0 3 – 4.9% 0 5 – 6.9% 0 7 – 8.9% 0 > 9% 0 not disclosed

Total dollar amount contributed (median of % category x median of gross sales category for each totaled) gross sales not disclosed

Rank among 63 taxa (1 = most) 59 (=last due to ties)

c) Trend for 2011 season (tally)

0 increased 1 unchanged 0 temp. reduced 0 dec. slightly 0 phasing out 0 discontinued 0 not disclosed

d) Time required to produce (tally)

1 < 6 months 0 6 to 12 months 0 1 to 2 years 0 2 to 3 years 0 3 to 5 years 0 over 5 years 0 not disclosed

e) Estimated wholesale value of plants in production (category median x count, totaled): \$500 (tally below by category)

1 < \$1,000 0 \$1.0K to 2.5K 0 \$2.5K to 5K 0 \$5K to 10K 0 \$10K to 25K 0 > \$25K 0 not disclosed

f) Observed invasive tendencies (crosstabs by EcoRegion)

g) Top cultivars grown, where noted.

h) Cultivars with no or reduced invasive tendencies, where noted. (Crosstab by EcoRegion, as appropriate).

i) Comments grouped by EcoRegion.

Synthesis: