

Marketing Chestnuts to Investigate Chefs and Consumer Interests and Develop Product Quality Criteria

A Final Report on the Research
Conducted for:

Federal State Marketing Improvement Program

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And
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Executive Summary

The Midwest Nut Producers Council (MNPC) collaborated with the Chestnut Research Team at Michigan State University in 2000 and 2001 to execute MNPC's first FSMIP chestnut grant with outstanding results. The model that emerged was a partnership between the land-grant university, grower groups, state departments of agriculture and the United States Department of Agriculture. The research based information was developed and extended to growers through the Extension Service as well as the website, www.chestnutgrower.org. Results from this grant have been published in the two U.S. trade journals (Hager 2001 and Elia 2002), and in one horticulture journal (Kelley and Behe, 2002). Additionally, we understand that the trade articles were re-printed in Australia and New Zealand. A food science study undertaken by the Chestnut Research Team was funded by other sources and yielded critical insight into storage viability for both unprocessed and processed chestnuts. Building on these research projects, growers can now more rationally consider the risks and opportunities implicit in growing and marketing this new crop in the United States.

Chestnuts were prevalent in the American diet until 60 years ago, when chestnut blight eradicated millions of trees and eliminated chestnuts from our diets. The Midwest Nut Producers Council (MNPC) was formed in 1991 to re-establish a viable market for edible chestnuts in the United States while the industry was re-emerging. Re-introducing chestnuts to the American public is a formidable activity. While there is some romance and nostalgia around the holidays for the song that begins "Chestnuts roasting on an open fire," the marketing reality is that few Americans have consumed chestnuts in any form. From the research feedback given by elite chefs in Michigan, and in talking with people eating chestnuts at public events MNPC has attended, we have determined that fresh market chestnuts have limited viability beyond an extremely limited audience of food enthusiasts. Even the chefs welcomed suggestions on uses for the chestnuts. Surprising, considering they set, rather than follow, trends rather than follow trends. Currently, chestnuts are primarily imported for the Christmas holiday as a novelty crop. Elite chefs expressed a strong preference for having peeled, frozen chestnuts, and expressed a willingness to pay up to \$10 per pound for them. Given the difficulty of peeling chestnuts for use in cooking, few Americans are likely to buy chestnuts a second time, if they even use them the first time. Researchers saw first-hand, Italian chestnuts (in the shell), which were sold wholesale for \$1.35 per pound to a major regional supermarket chain. We have concluded, based on the research results of this FSMIP grant, that it is not feasible to try to compete with the imported Italian chestnuts in the shell, but rather to pursue the highly profitable route to develop value-added processed chestnuts.

Chestnuts are a tough nut to crack, literally. The first step in processing chestnuts was to examine the technology available for removing the peel. This was accomplished when the Chestnut Research Team when they and a group of Michigan chestnut farmers toured Boema, Inc. of Neive, Italy manufacturers of a chestnut peeling line. A chestnut-peeling machine was purchased by MNPC (with support of a USDA Rural Development RBEG grant) from the Boema Company in Italy and imported to Michigan. This machine will help MNPC conduct

studies and complete research that will provide restaurants with a peeled product. A successful preliminary test of the machine occurred in June 2002. *It is the only manufactured chestnut peeling line in the Western Hemisphere.*

So far the chestnut product line has developed from the frozen hand-peeled chestnuts from this FSMIP grant last fall, to starting product development and researching demand for chestnut puree, crumbles, and three different soups. The Chestnut Research team will utilize a new, recently awarded Federal State Marketing Improvement Program. This newly-funded research will develop protocols for handling, processing and marketing chestnuts into value-added products with substantial profit potential. Elite restaurant chefs who participated in the first FSMIP study besieged us with requests for more peeled chestnuts. Since the peeling line was not in the country yet, the Chestnut Research Team peeled 400 lbs. of chestnuts by hand, one by one. Hand-peeling cannot adequately fulfill the chefs' demand. The Chestnut Research Team literally burned hands and cut fingers in this research process and became personally convinced of the need for the peeled chestnut products the chefs so much wanted. The research protocols for the first FSMIP grant required that researchers and growers consume several recipes to insure chefs were actually using chestnuts. Chefs were required to provide recipes that they developed and served to their customers. Out of this methodology came the opportunity to do a very diverse tasting of chestnut dishes, prepared by some of America's best chefs. One recipe for a basil pesto was especially noteworthy. Another preparation used in several different restaurants was chestnut crumbles, which was used as a low calorie batter or coating for fish and meat. This was used on perch, sea bass, sturgeon, salmon, rainbow trout, whitefish, pork and lamb, and tasted delightful. At a festival at Chestnut Town USA (Cadillac, Michigan) researchers served a chestnut soup to over a 1,000 people of all ages. Informal discussions with several of the participating chefs suggested that chestnuts, as an ingredient, added a buttery flavor without fat calories. They also catalyzed some otherwise subtle flavors into having more presence.

The newly awarded FSMIP grant will take the next logical step in developing the chestnut industry into a profitable and viable industry that embraces value-added processed chestnuts. Rather than using the traditional agricultural product development model of "grow as much as you can and then figure out what to do with it", we are trying to overcome those natural tendencies and use a more scientific/commercial model to find out what products customers want and then provide them. The second FSMIP grant will establish the viability of the first several value-added chestnut products.

Acknowledgement of Collaborators

The Michigan Nut Producers Council would like to acknowledge the help of the following public and private agencies who donate time, expertise, advertisement, and/or funding to further the growth and development of the chestnut industry:

- United States Department of Agriculture Federal State Market Improvement Program
- United States Department of Agriculture Rural Development Program
- Michigan Department of Agriculture
- Michigan Agricultural Experiment Station
- The Michigan State University Chestnut Research Team representing the Departments of Agricultural Engineering, Food Science and Human Nutrition, Horticulture, Packaging, Plant Pathology and Michigan State University Extension
- Project GREEN (Generating Research and Extension to meet Economic and Environmental Needs)
- United States Forest Service
- Michigan Nut Growers Association
- Northern Nut Growers Association
- Cadillac Area Visitors Bureau
- Western Chestnut Growers Alliance
- Chestnut Growers Incorporated
- Lansing Downtown Business Association

Goals of the Project

The goal of Phase One was to research and identify market opportunities for edible chestnuts and obtain feedback from those markets to help producers develop criteria to support industry quality standards. Under this goal, we utilized two dozen of Michigan's finest chefs to first test unpeeled product and then peeled product. The chefs gave important and necessary feedback on quality, usage, and time issues for chestnuts. They also gave valuable input for products of the future as well as quantities and prices growers might expect to obtain from this market.

The goal of Phase Two was to develop criteria, based on the response of the markets during Phase One that could be applied to quality standards model for edible chestnut. Without receiving feedback from markets, it is impossible to predict cash flow and profits for growers, determine best product preparation, packaging and quality control, and determine the germplasm that should be established in future plantings. Under this goal, we created a temporary and easily understood "sorting standard" (based on nut size and variety, ie., Chinese chestnut versus European chestnut) to present to markets in Phase One. We also came up with a list of chestnut defections and tried to assign a descriptor to them to help standardize the problem's name. A little more work with documentation and photographing of the defects needs to happen to aid in cementing the descriptors.

Phase One- Market Opportunities

Study 1: Chefs' Perceptions and Uses of 'Colossal' Chestnuts

Methods

During August 2000, 21 restaurants in Michigan were asked to participate in chestnut research using 'Colossal' chestnuts, a larger, sweeter chestnut than traditional Asian or European chestnuts, with 20 completing a follow-up telephone survey. Restaurants were chosen primarily from two metropolitan areas in Michigan.

Results

Conversations and follow-up telephone interviews with chefs revealed that few knew how to properly prepare chestnuts and several were having difficulty removing the shells and pellicle. Comments indicated that peeling the chestnuts was a labor intensive job. Like so many U.S. businesses, some chefs had either a small or inadequate staff to perform this duty. Chefs commented that they made the extra effort to remove the shell since the nuts were free, but seven would have preferred them peeled. Eleven additional chefs would prefer to purchase unpeeled chestnuts expressed several reasons for their choice: a) a belief that the shell protected nuts from harvest to arrival at the restaurant, preserving freshness; b) a desire to roast food and a liking for the taste and texture of the nut after roasting, because some moisture was removed; c) a preference for the shells intact because roasting the shells traps steam and keeps the nut moister; and d) a desire to pay the lowest price possible and belief that unpeeled chestnuts were less expensive than peeled chestnuts. One chef noticed that as the nuts aged and the space between the nut and the shell increased, the shells were easier to remove.

All chefs reported that they stored chestnuts in a walk-in type of refrigeration unit. Chefs noted that the nuts needed to be removed from either the plastic bags (which caused condensation) or nylon netting (which caused moisture loss). One chef would prefer that nuts be placed in perforated bags to allow air movement. Another stored nuts in a cooler in a bucket of water to keep them anaerobic. One chef with an extensive facility stored them in a 0! 1EC (32! 24EF) meat aging box with little air movement and low humidity. Nuts were stored for as few as 2 d to more than 30 d. A few chefs processed the nuts and froze them for later use. Overall, chefs need additional information about storing chestnuts and must have proper storing materials when chestnuts are delivered.

Chefs prepared a variety of chestnut dishes, from entire meals to desserts. Meals included a chestnut soup with corn; chestnut gnocchi with garlic, parmesan, and parsley; sautéed pork tenderloin with chestnut cornmeal breading, mashed potatoes, and sugar snap peas with peppers; baby greens with grilled apples, stilton cheese, and dried chestnut vinaigrette; and chestnut crème brûlée. During the follow-up



survey, the chefs conveyed how they enjoyed being included in the research and had a wonderful time creating the recipes and dinners and “competing” with fellow chefs.

Summary

From the results of this study, we believe that ‘Colossal’ chestnuts can be profitably marketed to chefs. A high percentage of chefs answered questions about the nut’s characteristics positively and enjoyed working creatively with the nuts. There is a precedent for using chestnuts with wild game, during fall and winter, in the restaurants that participated in this experiment. With local growers supplying the chestnuts, we will be able to meet the chefs’ demand and increase sales for growers. Although this is only the first step in a multidirectional marketing study, researchers have now made a connection with the chefs that will allow testing of other chestnuts and chestnut products. This unique, seasonal, niche product has high profit potential among elite chefs, perhaps even beyond Michigan.

Study 2: Chef Perceptions and Uses of Frozen, Peeled ‘Chinese’ and ‘Colossal’ Chestnuts

In November 2002, twelve Michigan chefs were given 5 pounds both of peeled and non-peeled chestnuts of the ‘Colossal’ variety and 5 pounds both of peeled and non-peeled chestnuts of the ‘Chinese’ variety to prepare dishes of their choice. Information gathered during follow-up showed that most chefs had positive experiences using the peeled chestnuts, saving them time and labor costs.

Objectives for this study were to: a) To determine whether selected Michigan elite chefs prefer to use shelled or unshelled chestnuts; b.) To assess which characteristics were important to these chefs when choosing to use shelled and unshelled chestnuts for use in their meal presentations; c.) To distinguish if chefs perceive significant differences between the ‘Colossal’ and the ‘Chinese’ varieties of chestnuts; and d) To see and sample meals created by the chefs using shelled and unshelled chestnuts.

Methods

We conducted this study to determine chefs’ acceptance and uses of peeled and unpeeled chestnuts of both the ‘Chinese’ and ‘Colossal’ varieties during the fall of 2001. During November 2001, 12 restaurants from Michigan were contacted to participate in research. Restaurants were primarily from Metro-Detroit area (5), greater Lansing area (3) and northern lower Michigan (4). The study was approved by the Institutional Review Board for Protection of Human Subjects at Michigan State University prior to implementation. Upon initial contact, chefs were told that researchers would like to send them between 5 lbs each of peeled and unpeeled ‘Colossal’ chestnuts (a larger chestnut than traditional Asian or European chestnuts, the size for this study would focus on nuts between 2 1/4 and 2 1/2 inches in diameter) and 5 lbs each of peeled and unpeeled ‘Chinese’ chestnuts for them to use in a dish(es) of their choice. Chefs were also told that they would receive a \$50 check for agreeing to participate in the survey and another check for \$200 when they answered questions during a follow-up telephone survey. Follow-up survey was conducted after chefs prepared and served their chestnut dinner. Some of

the questions the chefs were asked included: Whether they had used chestnuts before, whether they preferred the ‘Colossal’ or ‘Chinese’ chestnut varieties and why, where they had purchased chestnuts before, and how much they would pay for peeled and unpeeled chestnuts. Chefs were also asked to provide a copy of the recipe(s) they used in their chestnut dinners. After explaining the research and obtaining initial consent, all 12 chefs agreed to participate.

‘Chinese’ and ‘Colossal’ varieties of chestnuts were hand-peeled in a torturous process during mid-November in the Food Safety and Human Nutrition building using steam to loosen the shell and pellicle. After peeling, the chestnuts were vacuum packed and frozen in a -20 F degree freezer. From mid-November through the first week in December, the frozen chestnuts, fresh chestnuts and a cookbook were delivered to the chefs.



Results

Approximately one week after the chestnut meals were prepared, the chefs were contacted by telephone and asked follow-up questions. All 12 chefs responded positively to the peeled chestnut product. Aside from the chestnuts the researchers supplied the chefs, they were asked whether they typically utilize chestnuts in their food presentations. Seven of the chefs responded they did, but five chefs had not. All five chefs who did not typically utilize chestnuts in the past said they would start using chestnuts if they could buy the peeled product. Even though all did not use the chestnuts on a regular or seasonal basis, all had used chestnuts at one time in the past from either canned, pureed, or non-peeled forms, but only on special occasions and very infrequently. For those chefs who typically bought chestnuts or chestnut products, they obtained the products from a variety of sources, which included local market places that had imported products, local produce and grocery stores. Three chefs believed they were buying the Italian variety of chestnuts, three did not know the variety or source, and one was buying an American variety. Most of the chefs thought the chestnuts supplied to them in the study were better quality than the ones they bought through other sources. One chef felt the product he received rated about the same as the one he was supplied with and one only bought canned product.

The chefs were asked to compare the ‘Chinese’ and ‘Colossal’ varieties of chestnuts and decide which chestnuts they would prefer to purchase in the future. In general, all chefs were pleased with the quality of both varieties of the peeled and non-peeled chestnuts. *Most responded favorably when asked about the flavor, texture, and firmness.* One chef thought the ‘Chinese’ variety had better quality. Two chefs thought the ‘Chinese’ variety was sweeter. Two others thought the ‘Chinese’ chestnuts had better flavor. Another noted that the ‘Chinese’ chestnuts were a little darker yellow when peeled. Three chefs found the ‘Colossal’ chestnut flavor to be a little sweeter and one a softer texture. Another chef felt the ‘Chinese’ variety had the ‘nuttier’ taste of what people would consider a ‘typical’ nut. In the future, five chefs liked and would buy both the ‘Chinese’ and ‘Colossal’ chestnuts. Four chefs would prefer to buy the peeled ‘Chinese’ variety and three would prefer to buy the peeled ‘Colossal’ variety. If they

were to buy non-peeled chestnuts, four chefs would prefer to buy the 'Colossal' variety because they took on the 'roasted' flavor and they were easier to peel than the 'Chinese' variety. Besides the four chefs noting that the larger 'Colossal' cultivar was easier to peel and gave them more nuts/labor cost, overall, the actual size of the chestnuts did not influence whether the chefs would buy the 'Colossal' or 'Chinese'. Only two chefs preferred working with larger nuts and one preferred working with smaller nuts. The chefs were asked to evaluate the firmness of the chestnuts on a scale of 1 to 5 with one being rock hard and five very soft. The peeled chestnuts received an average of 2.4 and the unpeeled chestnuts received an average of 2.1.

The chefs reported that the peeled product saved enormous time and labor costs. The quality was good and all found they could essentially use both the peeled and unpeeled chestnuts in the presentations as they had planned. Some of the chefs noted that the peeled chestnuts had higher moisture levels and were a little more spongy than the non-peeled product. For the most part this did not seem to hinder cooking. Most perceived that the frozen chestnuts needed to be used for applications where the chestnuts were an ingredient, where as, the non-shelled chestnuts could be used in raw applications such as garnishes and in salads. Two chefs noticed the non-peeled chestnuts had a brighter color than the frozen chestnuts. One chef found the frozen chestnuts did not shave as well with a truffle shaver than the non-peeled chestnuts. One chef found he could not pulverize the peeled chestnuts as well for a puree than the non-peeled chestnuts and another found the peeled chestnuts harder to toast than the non-peeled chestnuts, perhaps due to the higher moisture levels.

Most of the chefs did not have any problems storing the peeled and non-peeled products. The chefs interviewed had stored the chestnuts for a several weeks to a month. All kept the frozen vacuum-packed peeled chestnuts in the freezer and kept the non-peeled products in a refrigerator or walk-in cooler. Another chef took the non-peeled chestnuts out of the plastic bag and stored them in sealed plastic containers. An additional chef kept the plastic bag open in the walk-in cooler. Half of the chefs immediately peeled the non-shelled chestnuts and either processed them or froze them for later use.

Chefs were asked how much they would be willing to pay per pound for good quality Michigan peeled and non-peeled chestnuts. Seven chefs said they would be willing to pay \$3 to \$12 per pound for the non-peeled chestnuts. The average price those chefs were willing to pay was \$4.70. Three were unsure of what they would pay and two would not buy non-peeled chestnuts. Eight chefs were willing to pay from \$5-12 per pound for the peeled chestnut product. The average price those chefs were willing to pay was \$7.56. Three were unsure of what they would pay and one chef thought the chestnuts would be similar to the walnuts he gets for \$3-5 per pound.

Chefs prepared a variety of chestnut dishes, from entire meals to simply desserts. A meal may include an apple acorn squash soup with chestnuts and smoked chicken; potato gnocchi with chestnut foam; chestnut crusted venison loin with ginger plum sauce; roasted chestnut and duck confit salad with mustard vinaigrette; and chestnut ice cream filled bon bons. Two of the smaller restaurants thought they would purchase about 10 to 20 pounds of chestnuts for the entire season. Five chefs would purchase 5 to 20 pounds of chestnuts per week.



Five more chefs were unsure of the amount of chestnuts they would need. Several of the chefs noted they also cater functions and banquets and if they were to include chestnuts in those meals they would need a larger amount of chestnuts for those events. Ten of the chefs also noted that they would prefer to buy and serve chestnuts in the fall and winter seasons. Two chefs would serve the chestnuts year round if there was demand from their customers for the dishes and one said he would serve the chestnuts all year round.

All 12 chefs who completed the follow-up questions were male. Chefs worked at both private and public restaurants and served between 100 to 2000 dinners per week, depending on season. Prices ranged from \$12.50 to \$70 for a five-course meal. The chefs had a range from 8 to 40 years of experience. Five of the chefs were certified or held culinary degrees from the US or from other countries.

Summary

There appears to be a market in Michigan for both peeled and unpeeled chestnuts among upscale professional chefs in Michigan. Chefs used both types of products and both types of chestnuts provided in a wide range of dishes. More importantly, their expressed preferences can be translated into different market segments. Peeling the product is necessary to prepare and eat chestnuts. Chefs expressed few limitations in use when the chestnuts were peeled and frozen prior to delivery. Commercially, a peeling machine could expedite the peeling process. It would appear that, after some cost analysis, a profitable peeled product can be created and marketed within Michigan and perhaps throughout the Midwest and maybe beyond.

Phase Two – Quality Standards

Chestnut growers in various regions of the United States selected different species of chestnuts in which to establish their orchards. For example, the west coast chestnut growers selected European or European/Japanese hybrid varieties, the east coast and southeast chose varieties of Chinese chestnut and the midwestern growers have planted both European/Japanese hybrid and Chinese chestnuts. This has resulted in various interpretations of quality and size. The European and European/Japanese hybrid varieties are generally larger, not quite as sweet, and more invaginated than Chinese chestnuts. Therefore, a large chestnut to an east coast grower would be comparatively small to a west coast grower. In the Midwest, the nomenclature on size becomes even more difficult as growers of Chinese chestnuts find it difficult to communicate regarding size and value at the same meeting with growers of European/Japanese hybrid varieties.

To help begin discussion on chestnut standards, Michigan State University (MSU) in conjunction with the Midwest Nut Producers Council (MNPC) hosted a Chestnut Marketing Roundtable Discussion, June 15-16, 2001 at the Kellogg Center on campus. Growers from California, Delaware, Kentucky, Michigan, Ohio, Oregon, Virginia and Washington state were present along with university researchers from Missouri and MSU. USDA representatives included Gerry Berney, Agriculture Marketing Service and Phil Eastman of Standardization Section, Fresh Products Branch, AMS Fruit and Vegetable Programs.

After presentations by Gerry Berney and Phil Eastman on the process of standard setting in agriculture, Dennis Fulbright spoke on French chestnut standards recorded during a recent trip to the Second International Chestnut Meeting in Bordeaux, France. These talks were followed by H. Christopher Peterson, MSU Agricultural Economist speaking on “Maintaining profitability through grower control of production and marketing systems.” This talk was followed with Tom Kalchik speaking on “Benefits to the grower for establishing regional or national cooperatives.” After the talks, the growers discussed many of the issues involved in shipping and selling chestnuts. Discussions followed and transcripts are available. Ideas included incorporating ideas on standards including size and quality standards.

A consensus was achieved within this group to use the following words to communicate size to each other:

Giant	over 1 3/8 inch
Jumbo	1 1/4 to 1 3/8
Extra large	1 1/8 to 1 1/4
Large	1 to 1 1/8

These words have been used in the west with chestnut shelling.



Based on these suggested sizes, a chestnut sizer was purchased from Charles Edwards Products in the fall of 2001 to help size the chestnuts that were harvested in Michigan.

A list of defects to be investigated was also discussed and formulated at the meeting, but no consensus could be achieved as to how they should be applied:

- Worms; larvae (live worms, zero tolerance)
- Mold (internal rot)
- Mold (external to the shell)
- Major and minor defects in Australia
- Cut open Colossal opens (one chef reported 5% mold, no other chef reported them)
- Splits
- Sprouted nuts
- Multiple embryo (how to know, sample a certain %; what's the problem? Difficult to peel; one can be rotten then the other can be good but will rot earlier)
- Immature nuts
- Vary in color within a specific variety (internal or external)
- Foreign material
- Blanks
- Mechanical or animal damage (sorting machinery)



It was decided that these defects need to be recorded and photographed.

A follow up meeting was to be held in January at the Western Chestnut Growers Association Annual meeting in Oregon and each chestnut organization would send a representative.

Benefits from the Project

This grant was the first cornerstone in building a viable chestnut industry in the United States, for which the chestnut growers in the United States are most grateful. This grant has stimulated significant and substantial development of the industry and in particular, the market. The research that came out of this grant alone was invaluable to growers as we try to determine where to put our investments of time and money. This research showed us that while chefs in the first year were attracted to the novelty of the product and of being selected as chef-cooperators for this research project, the second year the novelty had worn off and we received much more candid responses. Working with the peeled, frozen chestnuts was obviously a relief from both the tedium and cost of having to remove the shell before use. In the second year, we received additional feedback that tells us that we have to do further work on how the chestnuts are frozen if they are to be crisp when thawed so that they can be used in salads or shaved. While we will continue to focus on developing the market for frozen, peeled chestnuts, it is clear that there will need to be some attention to providing chefs with fresh chestnuts. This will entail working further on storage research to extend the season of use of the fresh market product. Many other insights were gained in regard to what customers wanted, and since we have delayed developing products before a research basis for making these decisions was developed, we have increased the positive momentum in developing this industry.

Another aspect of benefit was the national dialogue on grading and standards that was brought on by the sizing aspect of this grant. The national meeting, while not funded by this grant, happened nonetheless. This grant brought chestnut growers closer to understanding the need for an orderly market and sizing of chestnuts has been a challenging dialogue because of grower investment in different chestnut varieties that yield different sizes. This grant provided chef comments with regard to nut size that has been most useful in moving the industry on from this challenge.

This grant also provided the stimulus for chestnut growers getting organized into a co-op, initially to provide product liability coverage. More importantly, the process of disseminating the research results has initiated discussions in regard to one national chestnut co-op to bring most of the growers in the country together. Proceeding from this model will unite growers and create the opportunity to develop the chestnut market in the United States in an orderly and profitable manner.

This grant provided the rallying point for the diverse, multi-disciplinary chestnut research team at Michigan State to come together in a true expression of this century's version of Land Grant cooperation. The grant became the focus of the multidisciplinary approach, even though the scope of work was straightforward. Each activity undertaken generated results shared with the research team, which in turn generated more questions in other disciplines. This in turn, has generated a true multi-disciplinary research effort that is laying the foundation for the industry. This synergy was a magnificent, if unanticipated, consequence of this grant that will pay dividends for many years to come.