No. 7200050

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

National Seed Development Organization

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND TO BE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF seventeen YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. UNITED STATES SEED OF THIS VARIETY (1) SHALL BE SOLD BY VARIETY NAME ONLY AS PART OF CERTIFIED SEED AND (2) SHALL CONFORM TO THE NUMBER OF GENERATIONS BY THE OWNER OF THE RIGHTS. (84 STAT. 1542, AS AMENDED 7 U.S.C. 2321 ET SEQ.)

ITALIAN RYEGRASS

'Maris Ledger'

In Testimony Whereof, *I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of* Washington *this* 18th *day of* December *in the year of our Lord one thousand nine hundred and* eighty.

Attest:

Commissioner,
Plant Variety Protection Office
Grain Division
Agricultural Marketing Service

Secretary of Agriculture

FORM GR-470
(12-15-72)

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
GRAIN DIVISION
HYATTSVILLE, MARYLAND 20782

FORM APPROVED
OMB NO. 40-R3712

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

INSTRUCTIONS: *See Reverse.*

1. VARIETY NAME OR TEMPORARY DESIGNATION MARIS LEDGER	2. KIND NAME ITALIAN RYEGRASS (TETRAPLOID)	FOR OFFICIAL USE ONLY PV NUMBER 72050
3. GENUS AND SPECIES NAME Lolium multiflorum	4. FAMILY NAME (*Botanical*) GRAMINEAE	FILING DATE 10.27.71 / TIME 4 P.M.
	5. DATE OF DETERMINATION Dec. 1970	FEE RECEIVED $ 250 / $ 250.00 / $ 250.00 / BALANCE DUE $ — / $ / $ 10/29/80
6. NAME OF APPLICANT(S) NATIONAL SEED DEVELOPMENT ORGANISATION LTD Newton Hall Newton CAMBRIDGE Tel Cambridge 871167	7. ADDRESS (*Street and No. or R.F.D. No., City, State, and ZIP Code*) NATIONAL SEED DEVELOPMENT ORGANISATION LTD Newton Hall Newton CAMBRIDGE Tel Cambridge 871167	8. TELEPHONE AREA CODE AND NUMBER Cambridge ENGLAND
9. IF THE NAMED APPLICANT IS NOT A PERSON, FORM OF ORGANIZATION: (*Corporation, partnership, association, etc.*) State Sponsored	10. STATE OF INCORPORATION ~~Limited Company~~ England UKE	11. DATE OF INCORPORATION March 1967

12. Name and mailing address of applicant representative(s), if any, to serve in this application and receive all papers:
As in 6 and 7 above

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13. CHECK BOX BELOW FOR EACH ATTACHMENT SUBMITTED:

- [x] 13A. Exhibit A, Origin and Breeding History of the Variety (*See Section 52 of the Plant Variety Protection Act.*)
- [x] 13B. Exhibit B, Botanical Description of the Variety
- [x] 13C. Exhibit C, Objective Description of the Variety
- [x] 13D. Exhibit D, Data Indicative of Novelty
- [x] 13E. Exhibit E, Statement of the Basis of Applicant's Ownership

14A. Does the applicant(s) specify that seed of this variety be sold by variety name only as a class of certified seed? (*See Section 83(a). (If "Yes," answer 14B and 14C below.)* Ext 5/2/80 as per letter [X] YES [ ] NO

14B. Does the applicant(s) specify that this variety be limited as to number of generations? [x] YES [ ] NO

14C. If "Yes," to 14B, how many generations of production beyond breeder seed? [ ] FOUNDATION [ ] REGISTERED [x] CERTIFIED

The applicant declares that a viable sample of basic seed of this variety will be deposited upon request before issuance of a certificate and will be replenished periodically in accordance with such regulations as may be applicable.

The undersigned applicant(s) of this sexually-reproduced novel plant variety believes that the variety is distinct, uniform, and stable as required in Section 41 and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act.

Applicant is informed that false representation herein can jeopardize protection and result in penalties.

30/10/75
(DATE)

(SIGNATURE OF APPLICANT)

(DATE)

(SIGNATURE OF APPLICANT)

INSTRUCTIONS

GENERAL: Send an original copy of the application, exhibits and $250.00 fee to U.S. Dept. of Agriculture, Agricultural Marketing Service, Grain Division, 6525 Belcrest Road, Hyattsville, Maryland 20782. (See Section 180.175 of the regulations and rules of practice.) Retain one copy for your files. All items on the face of the form are self-explanatory unless noted below.

ITEM

5 Insert the date the applicant determined that he had a new variety based on the definition in Section 41 (a) of the Act and decision is made to increase the seed.

13a First, give the genealogy, including public and commercial varieties, lines, or clones used, and the breeding method. Second, give the details of subsequent stages of selection and multiplication. Third, indicate the type and frequency of variants during reproduction and multiplication and state how these variants may be identified. Fourth, provide evidence on stability.

13b First, give any special characteristics of the seed and of the plant as it passes through the seedling stage, flowering stage and the fruiting stage. Second, describe the mature plant and compare it with a similar commercial variety grown under the same conditions, and indicate the differences.

13c A supplemental form will be furnished by the PVPO to describe in detail a variety for each kind of seed.

13d Provide complete data indicative of novelty. Seed and plant specimens or photographs of seed and plant comparisons clearly indicating novelty may be submitted. Seeds submitted may be sterile.

13e Indicate whether applicant is the actual breeder, the employer of the breeder, the owner through purchase or inheritance, etc.

Origin of Material

Material from three sources of Italian ryegrass contributed to the variety approximately as follows : 45% Tetrone, 35% C1V and 20% from uncertified commercial material.
Selected material from these sources was combined using polycross and recurrent selection. The recurrent selection varying in plant number over four generations which followed was aided by a controlled environment for selection for disease and cold tolerance and then selection for yield in the field. Yield was measured by some four drymatter cuts during the season from a bulked polycross population compared with standard varieties e.g. Tetila.

Variants/Stability

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The basic plants reselected over 4 generations were finally observed not to have any significant variants. In stability tests two seed lots over three harvest years were compared in the same year and trial and were found not to differ statistically at the 1% level. These results were confirmed by comparative trials for national listing when two seed stocks were compared over at least three harvests in the same year and trial.

WME/PMF

EXHIBIT B

BOTANICAL DESCRIPTION

MARIS LEDGER (1G2) : Tetraploid Italian ryegrass

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Lolium multiflorum 2n = 28

ORIGIN : A tetraploid form of Lolium multiflorum derived from 3 seed sources, with recurrent selection for disease resistance and cold tolerance

HEADING DATE : Early - (20 days earlier than S23 perennial ryegrass)

% HEADING IN YEAR OF SOWING : less than 20%, following spring sowing

HABIT OF GROWTH : Erect

LEAVES : longer and wider than those of diploid L. multiflorum varieties.

PERSISTENCY : average for the multiflorum type

SEED SIZE : 1000 seed wt. 4.8g - nearly twice the weight of the mean for L. multiflorum varieties.

DISEASE RESISTANCE : Trials conducted at Cambridge, U.K. Lat. 52° N Maris Ledger showed excellent resistance to foliar disease including Puccinia spp and Erysiphe spp

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EXHIBIT B | MARIS LEDGER | Tetraploid Italian Ryegrass

Additions

Seed size	-	similar to those of other tetraploid multiflorum types e.g. Sabalan, Tetila.
Disease	-	Maris Ledger has shown more tolerance to the diseases Puccinia spp. and Erysiphe spp. than other tetraploid varieties e.g. Tetila
Persistence	-	marginally less persistent than the varieties Sabalan and Tetila.

WME/PMF

~~Voluntarily abandoned~~ EAT 11/19/79

EXHIBIT C MARIS LEDGER Tetraploid Italian ryegrass

Additions

Habit of growth - Maris Ledger is more erect than Tetila and similar varieties the difference being significant statistically at the 1% level.

Height of plant - Maris Ledger is also taller at ear emergence than Tetila and similar varieties the difference again being statistically different at the 1% level.

WME/PMF

Application No.
72050, '~~Maris~~'
'Maris Ledger'

9/3/75

U.S. DEPARTMENT OF AGRICULTURE
Agricultural Marketing Service
Grain Division
Objective Description of Cultivars
RYEGRASS
(Lolium spp.)

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1. SPECIES:
[1] 1=L. multiflorum (annual or Italian: includes Westerwoldicum)
2=L. perenne (perennial) 3=L. rigidum (includes Wimmera)
4=Hybrid (of species) _____ 5=Other (specify) _____

2. PLOIDY:
[2] 1=Diploid 2=Tetraploid 3= Other (specify) _____

3. DURATION:
[1] 1=Annual or biennial 2=Short lived perennial (3-4 years)
3=Perennial (more than 4 years)

STANDARD CULTIVARS

1=Gulf	2=Wimmera 62	3=Linn	4=Pelo
5=Norlea	6=Aberystwyth S-23	7=Manhattan	8=Pennfine

4. MATURITY (50% Headed): (Use standard cultivars from above.)
[3] 1=Very early 3=Early 5=Medium 7=Late 9=Very late
[2][0] Days earlier than [6] standard cultivar
[ ][ ] Days later than [ ] standard cultivar

5. MATURE PLANT HEIGHT: (Use standard cultivars from above.)
[ ][ ][ ] cm. High [ ][ ][ ] cm. Shorter than [ ] standard cultivar
[ ][ ][ ] cm. Taller than [ ] standard cultivar

6. PERCENT WINTER DAMAGE (estimated as percent of the area appearing dead):
(Use standard cultivars from above.)
[ ][ ][ ] Percent damage of application cultivar
[ ][ ][ ] Percent damage of [ ] standard cultivar

7. TURF DENSITY: (Use standard cultivars from above.)
[ ][ ][ ] Tillers per 100 sq. cm.
[ ][ ][ ] Less tillers per 100 sq. cm. than [ ] standard cultivar
[ ][ ][ ] More tillers per 100 sq. cm. than [ ] standard cultivar

8. FLAG LEAF (at full growth): (Use standard cultivars from above.)
[ ][ ][ ] cm. Length(from ligule to tip)
[ ][ ][ ] cm. Shorter than [ ] standard cultivar
[ ][ ][ ] cm. Longer than [ ] standard cultivar
[ ][ ][ ] mm. Width (at widest point)
[ ][ ][ ] mm. Narrower than [ ] standard cultivar
[ ][ ][ ] mm. Wider than [ ] standard cultivar
[ ] Flag leaf at boot stage: 1=Deflexed 3=Recurved 5=Horizontal
7=Semi-erect 9=Erect

9. LEAVES:
[1] Vernation: 1=Leaves rolled in young shoots
2=Leaves semi-rolled (folded with rolled edges)
3=Leaves folded in young shoots
[1][0][0] % Plants with anthocyanin in lower leaf sheath
[2] Foliage color: 1=yellow green 2=medium green 3=blue green

10. SPIKE:
[ ][ ][ ] mm. Spike length (tip to internode below lowest floret)
[ ][ ] mm. Shorter than
[ ][ ] mm. Longer than
(Use standard cultivars from above.)

10. SPIKE (continued):

[ ] mg. per ten spikes (trimmed to internode below lowest floret)
[ ] mg. lighter per ten spikes than [ ]
[ ] mg. heavier per ten spikes than [ ] } Use standard cultivars from above.
[ ] Florets per spikelet

Percentage of plants with:

Rachis: [ ] % smooth [ ] % rough
Spike color: [98] % green [2] % purple
Lemma: [ ] % awned [ ] mm. awn length

[2] mm. glume length
1=Spikelet length nearly equal to outer glumes
2=Spikelet length much longer than outer glumes

11. COLEOPTILE:

[ ] %Plants with anthocyanin in coleoptile

12. ANTHER COLOR:

[ ] % Plants with white anthers [ ] % Plants with yellow anthers
[ ] % Plants with purple anthers

13. ROOT AND PLANT CHARACTERS:

[ ] % Plants with prostrate growth habit
[100] % Plants with upright growth habit
[100] % Plants with fluorescent roots

14. SEED:

[480] mg. per 1,000 seed [80] mm. total length (excluding awns) of 10 seeds [18] mm. total width of 10 seeds

15. DISEASE (0=Not tested, 2=Highly susceptible, 4=Moderately susceptible, 6=Moderately resistant, 8=Highly resistant):

[8] Crown rust (Puccinia coronata)
[0] Leaf spot (Helminthosporium)
[0] Snow mold (Typhula)
[0] Dollar spot (Sclerotinia)
[8] Mildew
[0] Red thread (Corticium)
[0] Brown patch (Rhizoctonia)
[ ] Other (specify) _____

16. INSECT (0=Not tested, 2=Highly susceptible, 4=Moderately susceptible, 6=Moderately resistant, 8=Highly resistant):

[0] Specify _____

17. GIVE RESEMBLANCE VALUE IN LEFT COLUMN AND VARIETY IN RIGHT COLUMN FOR VARIETY WITH WHICH COMPARISON IS MADE: (1=Less than, 2=Same as, 3=More erect, more resistant, denser, more persistent, darker or greater height.)

Resemblance	Character	Similar variety
3	Plant habit (erectness)	S22
1	Tillering	"
3	Winter hardiness	"
3	High temp.stress resistance	"
1	Turf persistence	"
2	Plant color	"
	Vertical seedling growth rate	
	Crown density	
	Mower shredding resistance	

18. GIVE AREA OF ADAPTATION AND INTENDED USE: GENERAL - *

19. GIVE AREA TEST RESULTS PRESENTED FROM: CAMBRIDGE 52°N LAT

COMMENTS: * Especially valuable where foliar disease resistance important.

72050

HYBRID RYEGRASS
(*Lolium perenne* L. x *Lolium multiflorum* Lam.)

SABEL

Breeder: Welsh Plant Breeding Station, Plas Gogerddan, near Aberystwyth.

Origin: Material from a series of pair crosses between tetraploid *L. multiflorum* Lam. and early heading tetraploid *L. perenne* L.

CLASSIFICATION

Ploidy	:	Tetraploid
Ear emergence	:	Very early
Habit of growth	:	Intermediate
Height at ear emergence	:	Tall
Length of flag leaf	:	Very long
Width of flag leaf	:	Very wide
Tendency to flower in year of planting	:	Very little
Heading in aftermath	:	Very much

DIFFERENCES FROM SIMILAR VARIETIES:

Over one day earlier than Sabrina in ear emergence, but appears to be similar to Sabrina in most characters with the exception of Spring growth. It is significantly taller than Sabrina in Spring height.

ITALIAN RYEGRASS
(*Lolium multiflorum* Lam.)

MARIS LEDGER

Breeder: Plant Breeding Institute, Maris Lane, Trumpington, Cambridge, England.

Origin: Material selected from Tetrone C.I.V. and some commercial seed.

CLASSIFICATION:

Ploidy	:	Tetraploid
Ear emergence	:	Early
Habit of growth	:	Erect
Height at ear emergence	:	Tall
Length of flag leaf	:	Very long
Width of flag leaf	:	Very wide
Tendency to flower in year of planting	:	None or trace

DIFFERENCES FROM SIMILAR VARIETIES:

About 1½ days earlier than Tetila in ear emergence but more erect in habit of growth and taller in height at ear emergence than Tetila.

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Application No. 72050, 'Maris Ledger' Italian ryegrass

Exhibit D NOVELTY STATEMENT

'Maris Ledger' is most similar to 'Tetila' but 'Maris Ledger' is more erect in habit of growth and 4 centimeters taller at ear emergence than 'Tetila'.

MARIS LEDGER AND TETILA

The habit of growth is the angle that the outer shoots make with the horizontal. A visual estimate of 15° intervals.

Habit of Growth

	Maris Ledger	Tetila	P=0.05	P=0.01
1975/76	75.7 **	71.0	3.43	4.50
1974/75	78.5 **	74.2	2.97	3.92
1973/74	72.7	71.5	3.12	4.11
1972/73	73.2 **	70.6	1.15	1.51

Height at ear emergence (centimeters)

	Maris Ledger	Tetila	P=0.05	P=0.01
1975/76	69.8 **	60.7	5.28	6.94
1974/75	78.4	78.3	5.62	7.42
1973/74	82.4 *	77.0	4.79	6.3
1972/73	64.4	61.3	3.76	4.94

* Significant at 5% ** Significant at 1%

NATIONAL SEED DEVELOPMENT ORGANISATION LTD.
Newton Hall
Newton
CAMBRIDGE Tel Cambridge 871167

14/5/1980

Maris Ledger was earlier than Tetila in two years out of 3, with a mean difference of 0.6 days

Supporting data supplied by National Institute of Agricultural Botany, Cambridge U.K.

	Hybrid RG Date EE (Days after March 1st)					
	1975		1976		1977	
Maris Ledger	87.0	N.S.	85.4	*	82.9	N.S.
Tetila	85.8		86.9		84.5	
SE	0.47		0.55		0.59	
LSD 5%	1.3		1.5		1.65	
LSD 1%	1.8		2.0		2.16	

EXHIBIT E

P.V. Number 72050

MARIS LEDGER

Voluntarily abandoned
11/19/79

Basis of Applicant's ownership

This is to certify that the tetraploid Italian ryegrass MARIS LEDGER is jointly owned by the National Seed Development Organisation Limited, Cambridge and the Plant Breeding Institute, Cambridge.

Date 30. 10. 1975.

Signed .....

W.M. Evans
(Crop Variety Development Executive)