No. 8200005

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Agri Sales, Inc.

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 MADE 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 EIGHTEEN 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, OR 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. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321

LIMA BEAN

'Maffei 15'

AMENDED CERTIFICATE

*Original grant August 19, 1982

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, D.C. this thirty-first day of March in the year of our Lord one thousand nine hundred and ninety-seven.

Attest:

Marsha A. Stanton
Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

Dan Glickman
Secretary of Agriculture

INSTRUCTIONS

GENERAL: Send an original copy of the application and exhibits, at least 2,500 viable seeds, and $500 fee ($250 filing fee and $250 examination fee) to U.S. Dept. of Agriculture, Agricultural Marketing Service, Livestock, Poultry, Grain and Seed Division, Plant Variety Protection Office, National Agricultural Library Building, Beltsville, Maryland 20705. (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 Give the date the applicant determined that he had a new variety based on (1) the definition in section 41(a) of the Act and (2) the date a decision was made to increase the seed.

13a Give: (1) the genealogy, including public and commercial varieties, lines, or clones used, and the breeding method; (2) the details of subsequent stages of selection and multiplication; (3) the type and frequency of variants during reproduction and multiplication and state how these variants may be identified and (4) evidence of uniformity and stability.

13b Give a summary statement of the variety's novelty. Clearly state how this novel variety may be distinguished from all other varieties in the same crop. If the new variety most closely resembles one or a group of related varieties: (1) identify these varieties and state all differences objectively; (2) attach statistical data for characters expressed numerically and demonstrate that these differences are significant; and (3) submit, if helpful, seed and plant specimens or photographs of seed and plant comparisons clearly indicating novelty.

13c Fill in the Exhibit C, Objective Description form, for all characteristics for which you have adequate data.

13d Describe any additional characteristics that are not described, or whose description cannot be accurately conveyed in Exhibit C. Use comparative varieties as is necessary to reveal more accurately the description of characteristics that are difficult to describe, such as, plant habit, plant color, disease resistance, etc.

14a If "YES" is specified (seed of this variety be sold by variety name only as a class of certified seed) the applicant may NOT reverse his affirmative decision after the variety has either been sold and so labeled, his decision published, or the certificate has been issued. However, if the applicant specified "NO," he may change his choice. (See section 180.16 of the Regulations and Rules of Practice.)

15a See section 42 of the Plant Variety Protection Act and section 180.7 of the Regulations and Rules of Practice.

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
LIVESTOCK, POULTRY, GRAIN & SEED DIVISION

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

INSTRUCTIONS: *See Reverse.*

FORM APPROVED
OMB NO. 40-R3822

No certificate for plant variety protection may be issued unless a completed application form has been received (5 U.S.C. 553).

1a. TEMPORARY DESIGNATION OF VARIETY: Maffei 15	1b. VARIETY NAME: Maffei 15 SEE 820812	FOR OFFICIAL USE ONLY — PV NUMBER: 8200005
2. KIND NAME: Lima Bean	3. GENUS AND SPECIES NAME: Phaseolus lunatus	FILING DATE: 10/19/81 — TIME: 2:00 A.M. / P.M.
4. FAMILY NAME (BOTANICAL): Fabaceae	5. DATE OF DETERMINATION: September 1, 1980	FEE RECEIVED: $ 500.00 $ 250.00 — DATE: 10/19/81 7/19/82
6. NAME OF APPLICANT(S): Agri Sales, Inc. RWS 3-8-96 ~~L. D. MAFFEI SEED CO., INC.~~	7. ADDRESS (*Street and No. or R.F.D. No., City, State, and ZIP Code*): ~~P.O. Box 903 Newman, CA 95360~~ 385 East Morley Dr. P.O. Box 2028 Saginaw, MI 48605	8. TELEPHONE AREA CODE AND NUMBER: (209)862-2841
9. IF THE NAMED APPLICANT IS NOT A PERSON, FORM OF ORGANIZATION: (*Corporation, partnership, association, etc.*) Corporation	10. IF INCORPORATED, GIVE STATE AND DATE OF INCORPORATION: California	11. DATE OF INCORPORATION: 1961

12. NAME AND MAILING ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS:

~~Dr. Vernon J. Fisher, L. D. Maffei Seed Co., Inc., Box 903, Newman, CA 95360~~ RWS 7-1-96

13. CHECK BOX BELOW FOR EACH ATTACHMENT SUBMITTED:

- [XX] 13A. Exhibit A, Origin and Breeding History of the Variety (*See Section 52 of the Plant Variety Protection Act.*)
- [XX] 13B. Exhibit B, Novelty Statement.
- [XX] 13C. Exhibit C, Objective Description of the Variety (*Request form from Plant Variety Protection Office.*)
- [ ] 13D. Exhibit D, Additional Description of the Variety.

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.*) [ ] YES [X] NO

14b. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS? [ ] YES [ ] NO

14c. IF "YES," TO 14B, HOW MANY GENERATIONS OF PRODUCTION BEYOND BREEDER SEED? [ ] FOUNDATION [ ] REGISTERED [ ] CERTIFIED

15a. DID THE APPLICANT(S) FILE FOR PROTECTION OF THIS VARIETY IN OTHER COUNTRIES? [ ] YES [XX] NO (*If "Yes," give name of countries and dates.*)

15b. HAVE RIGHTS BEEN GRANTED THIS VARIETY IN OTHER COUNTRIES? [ ] YES [XX] NO (*If "Yes," give name of countries and dates.*)

16. DOES THE APPLICANT(S) AGREE TO THE PUBLICATION OF HIS/HER (THEIR) NAME(S) AND ADDRESS IN THE OFFICIAL JOURNAL? [XX] YES [ ] NO

17. The applicant(s) declare(s) that a viable sample of basic seed of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable.

The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) 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 Act.

Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.

10/13/81 (DATE) — Robert C. Maffei (SIGNATURE OF APPLICANT)

(DATE) — (SIGNATURE OF APPLICANT)

FORM GR-470 (1-78)

EXHIBIT A. ORIGIN AND BREEDING HISTORY.

Maffei 15 is a sister line of Maffei 76 and Maffei 8, having been developed from the breeding line B2C, a joint release of the AR-SEA-USDA and the Delaware Agricultural Experiment Station, carrying resistance to Downy Mildew Races A, B, C and D.

Maffei 15 descended from Individual Plant No. 1 of Pure Line ML 4377. This individual plant was distinctive in having a higher average number of seeds per pod than other plants of the pure line, as grown in 1977. Selected uniform seeds were grown in a nursery planting in 1978 and the resultant plants and seeds were subjected only to routine roguing and milling procedures through seed increase planting in 1979 and 1980. In September 1980 the uniform maturity and rigid type plant were deemed distinctive and advantageous over Maffei 76 and Maffei 8 so that Maffei 15 should be released as a separate variety. This led to a seed increase planting of 22 acres in 1981.

Stability is indicated by uniformity of plants and seeds through seed increase plantings of 1979, 1980 and 1981.

No variants have been found except a trace (perhaps 0.01%) are male sterile and consequently more vigorous than normal plants. They usually set a few pods late in their life cycle. Also an occasional plant will have variegated rather than plain primary leaves.

EXHIBIT B. NOVELTY STATEMENT.

Maffei 15 most closely resembles Maffei 8 and Maffei 76. However the primary leaves of Maffei 15 are plain whereas those of Maffei 8 are variegated; and Maffei 15 exhibits less elongation of the main axis prior to anthesis than Maffei 76, resulting in Maffei 15 having a more upright architecture at maturity than Maffei 76.

The marked early elongation of Maffei 76, which is less pronounced in Maffei 15 and Maffei 8, is shown in Table 1. Anthesis began 40 days after planting.

TABLE 1. Height (Cm) of main axis of three varieties at various dates in 1980.

	Days after	Maffei 15			Maffei 8			Maffei 76	
Date	plantg.	Ht.	S.E.*	% of M76	Ht.	S.E.	% of M76	Ht.	S.E.
7/25	35	32.1	.8	85.7	30.2	.7	81.0	37.3	1.1
8/1	42	34.8	1.2	85.1	32.8	1.7	80.1	40.9	1.1
8/15	56	42.9	.9	94.9	38.4	1.0	84.8	45.2	1.1

* Standard error of the mean of 20 plants.

Maffei 15 reaches the prime stage for processing at about the same age as Kingston, slightly earlier than Maffei 76, appreciably earlier than Maffei 8, and much earlier than Bridgeton as shown by the following data. Processors generally prefer to harvest before a high percentage of pods have become dry, and yields are decreased if harvesting must be done while many pods are still too thin to contain a usable bean (about 3/8 inches in diameter).

The data below were based on evaluating all pods from 5 lineal feet of row for each variety on each date shown. The test was planted June 18, 1981.

TABLE 2. Percent of pods of five varieties in the thin, usable or prime, and dry stages of maturity at various dates in 1981:

Date	Stage	Kingston	Maffei 15	Maffei 76	Maffei 8	Bridgeton
9/11	Thin	29.8	19.2	23.5	66.7	56.6
	Prime	70.2	80.8	76.5	33.3	43.4
	Dry	0	0	0	0	0
9/14	Thin	14.5	13.5	17.9	24.1	31.0
	Prime	85.0	86.3	79 6	75.7	68.5
	Dry	0.5	0.2	2.5	0.2	0.5
9/15	Thin	15.3	17.0	16.3	12.7	25.8
	Prime	78.4	78.1	79.4	81.4	73.5
	Dry	6.3	4.9	4.3	5.9	0.7
9/16	Thin	7.2	17.3	24.4	19.4	27.8
	Prime	79.2	78.2	70.0	78.3	71.2
	Dry	12.6	4.5	5.6	2.3	1.0
9/18	Thin	2.5	4.9	7.3	19.1	25.2
	Prime	69.8	79.9	76.8	77.1	74.7
	Dry	27.7	15.0	15.9	3.8	0.1
9/21	Thin			10.3	12.1	24.8
	Prime			57.4	68.1	70.9
	Dry			32.3	18.8	4.3

TABLE 3. The following table summarizes the highlights of the data shown in Table 2:

VARIETY	First sampling date when occurrence of dry pods was excessive 1/.	% dry pods on that date	% thin pods on that date
Kingston	9/16	12.6	7.2
Maffei 15	9/18	15.0	4.9
Maffei 76	9/18	15.9	7.3
Maffei 8	9/21	18.8	12.1
Bridgeton 1/	9/21	4.3	24.8

1/. To be comparable to the other varieties, Bridgeton needed to be sampled about two days later.

8200005

LIMA BEAN APPLICATION NO. 8200005 - 'MAFFEI 15'

EXHIBIT B. NOVELTY STATEMENT. Revised 2/22/82

Maffei 15 most closely resembles Maffei 8 and Maffei 76. However the primary leaves of Maffei 15 are plain whereas those of Maffei 8 are variegated; Maffei 15 exhibits less elongation of the main axis prior to anthesis (61.4 cm for plants grown in the greenhouse) than Maffei 76 (ave. 68.6 cm), and the seeds of Maffei 15 are more plump or have a smaller ratio of width to thickness (ave. 1.94) than Maffei 76 (ave. 2.00).

The marked early elongation of Maffei 76 compared to Maffei 15 is shown in Tables 1 and 2. The taller heights in Table 1 than in Table 2 resulted from the normal greater elongation of bean plants grown under the reduced light of the greenhouse compared to those grown in the field, in the normal growing season.

Table 1. Height (cm.) of Main Axis of Maffei 15 and Maffei 76 Just Prior to Anthesis in Three Greenhouse Experiments.

		MAFFEI 15			MAFFEI 76		
No.	Procedure	HT	S.E.*	Seed Lot	HT	S.E.	Seed Lot
1	Measured 5/13/80, 1 plant per pot, 10 pots per variety.	64.2	3.8	ML 7378xS	68.9	2.1	989
2	Measured 2/1/82, 4 plants per pot, 9 pots per Variety, held-over seed.	60.5	3.5	VF-52	67.7	3.8	989
3	Measured 2/1/82, 4 plants per pot, 9 pots per variety, new seed.	59.5	2.7	L140	69.3	2.5	L110
	Mean of 3 experiments	61.4			68.6		

*Standard Error of the Mean.

Table 2. Height (cm.) of Main Axis of Maffei 15 and Maffei 76 at Various Dated in 1980(1).

		MAFFEI 15 (LOT ML 7378)			MAFFEI 76	
Date	Days After Planting	HT	S.E.	% of M76	HT	S.E.
7/25	35	32.1	0.8	85.7	37.3	1.1
8/1	42	34.8	1.2	85.1	40.9	1.1
8/15	56	42.9	0.9	94.9	45.2	1.1

(1). Mean of 20 plants.

Field notes in 1981 substantiated the greater elongation of Maffei 76 than Maffei 15, on a variety trial planted June 18, 1981. On July 23 the varieties and breeding lines were placed in the following classes from most to least elongate:

Class 1: Maffei 76, ML 6680
Class 2: Bridgeton, Maffei 15, ML 6178, ML 4078...
Class 3: Maffei 8, ML 7480
Class 4: Kingston, C-Elite, ML 4980, ML 5080...
Class 5: Kingston Lot VF51-80, ML 7580...

On August 17, 1981 field notes stated that Bridgeton had reached the same height as Maffei 76, but Maffei 15 had not.

The early elongation of Maffei 76 and Bridgeton produces a spindly plant that lodges badly. The pods tend to come in contact with the soil, producing Sclerotinia and water damage.

On the other hand, plants of Maffei 15 have a sturdy stem that produces an upright architecture. This enables more of the pods to avoid contact with the soil, reducing Sclerotinia and water damage. The stems (axillary branches as well as main stems) resemble those of Kingston more than those of Maffei 76 or Bridgeton. In fact, the stems are even stronger than those of Kingston, causing the crown set of pods to be less compact, so that Sclerotinia is hindered from spreading from pod to pod.

The plump nature of the seeds of Maffei 15 compared those of Maffei 76, or the smaller ratio of width to thickness for Maffei 15, is shown in Table 3.

Table 3. Ratio of Width to Thickness of Seeds of Maffei 15 and Maffei 76 for Three Seed Lots Each, means of 6 Replications of 25 Seeds Each.

MAFFEI 15				MAFFEI 76			
Year Grown	Lot No.	W/T	S.E.	Year Grown	Lot No.	W/T	S.E.
1979	7378xS	1.93	.01	1978	F11	2.00	.02
1980	VF-52	1.95	.01	1979	989	2.03	.01
1981	L140	1.93	.01	1981	L110	1.98	.01
Mean:		1.94				2.00	

An additional difference of very great commercial importance between Maffei 15 and Maffei 76 has been found. The pods of Maffei 15 split open more easily in the harvester, speeding up the harvesting operation. This appears to result from the pods having thin walls similar to those of Kingston, whereas those of Maffei 76 are similar to those of Bridgeton.

The number of seeds per pod appears to be higher in Maffei 15 than in Maffei 76.

8200005

L.D. MAFFEI Seed CO. INC.
GROWERS & DEALERS
NEWMAN, CALIFORNIA 95360
(209) 862-2841 P. O. BOX 903

February 24, 1982

Plant Variety Protection Office
U.S. Department of Agriculture
National Agricultural Library Building
Beltsville, MD 20705

Gentlemen:

Subject: Lima Bean Application No. 8200005. 'Maffei 15.'

In accordance with telephone conversation of February 22, 1982 between Mr. Thaddeus Frey and me, I have revised Exhibit B and am enclosing it for your consideration.

Since Maffei Seed Company owns the Certificate on 'Maffei 76,' we could market Maffei 15 as Maffei 76. However I feel that two important considerations make this inadvisable.

First, the two varieties are so fundamentally different that we may be charged with misbranding.

Second, Maffei 76 fits into the trade primarilly as a competitor or replacement for Bridgeton, whereas Maffei 15 is primarilly a competitor or replacement for Kingston. Bridgeton tends to be chosen where soil is relatively weak such that most varieties make too small a plant to have a large yield potential. Maffei 76 is resistant to Mildew Races C and D, making it a preferred choice over Bridgeton in many situations. Both are resistant to Races A and B.

Kingston tends to be chosen where mildew does not occur, and where highly productive soils cause Bridgeton to produce a large, weak plant that lodges badly and thus suffers badly from Sclerotinia and water damage.

Maffei 15, being free from the excessive early elongation of the main axis of Bridgeton and Maffei 76, forms a more rigid plant that resists lodging. It holds its pods off the ground, so as to reduce Sclerotimia and water damage better than Kingston, is more concentrated in its maturity, and holds its high quality longer

than Kingston when havest is delayed. These advantages cause Maffei 15 to be heralded as a great new variety for California, where Maffei 76 has gained almost no acceptance.

Thus the differences between Maffei 15 and Maffei 76 are very real, and I feel that labeling them as the same variety would be very improper.

I have long harbored a suspicion that an accidental out-cross to Kingston has occurred in the development of Maffei 15. I discounted this liklihood when I found from two years testing that Maffei 15 was resistant to Downy Mildew Races A to D. This possibility still exists however. I did not mention the possibility of an out-cross in Exhibit A. Perhaps I should have, but it seems to me that we should always consider the possibility of out-crosses and I doubt the propriety of expressing our frequent suspicions of something that could not be confirmed.

Sincerely,

Vernon J. Fisher

Vernon J. Fisher
Director of Research

VJF:jf
Enc.

12. INSECT RESISTANCE: (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

0 APHIDS	0 LEAF HOPPERS	0 POD BORER	0 LYGUS
0 THRIPS	0 WEAVILS	0 SEED CORN MAGGOT	0 OTHER (Specify) _____

13. PHYSIOLOGICAL RESISTANCE: (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

2 HEAT	0 COLD	2 DROUGHT	0 OTHER (Specify) _____

REFERENCES

The following publications may be used as references in completing this form:

1. Beans of New York. Vol. 1 Part II of Vegetables of New York. U.P. Hedrick et al. J. B. Lyon Company, Albany, N.Y. 1931.

2. Yarnell, S. H., Cytogenetics of the Vegetable Crops IV. Legumes. Bot. Rev. 31:247 - 330. 1965.

3. USDA Yearbook of Agriculture. 1937.

COLOR: Nickerson's or any recognized color fan may be used to determine the colors.

COMMENTS:

8200005

No. 8200005

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

L. D. Maffei Seed Co., Inc.

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 MADE 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 eighteen 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 (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

LIMA BEAN

'Maffei 15'

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* 19th *day of* August *in the year of our Lord one thousand nine hundred and* eighty-two.

Attest:

Kenneth H. Evans
Acting
Commissioner
Plant Variety Protection Office
Grain Division
Agricultural Marketing Service

John R Block
Secretary of Agriculture

7. FRESH PODS:

[3] Color: 1 = LIGHT GREEN (Thaxter) 2 = MEDIUM GREEN (Florida Butter) 3 = DARK GREEN (Thorogreen Early) 4 = OTHER (Specify) _____

[0 8] CM. LENGTH [2 0] MM. WIDTH (Between sutures) [0 8] MM. THICKNESS [2 5] WIDTH / THICKNESS X 10

[2] Cross section pod shape: 1 = FLAT 2 = OVAL 3 = ROUND

[2] Curvature: 1 = STRAIGHT 2 = SLIGHTLY CURVED 3 = CURVED

[5] MM. SPUR LENGTH

[1] Spur: 1 = STRAIGHT 2 = SLIGHTLY CURVED 3 = CURVED

[2] Surface: 1 = SHINY 2 = DULL

[1] Surface: 1 = SMOOTH 2 = BLISTERED

[2] Pubescence: 1 = NONE 2 = SPARSE 3 = CONSIDERABLE

[3] NUMBER OF SEEDS PER POD

[5 8] NUMBER PODS PER PLANT (Once over harvest)

[1] Machine harvest: 1 = ADAPTED 2 = NOT ADAPTED

Condition of pods at once-over harvest: [0 3] % DRY [0 0] % YELLOW [9 7] % GREEN

8. SEEDS:

[1] 1 = MONOCHROME 2 = POLYCHROME

[2] 1 = SHINY 2 = DULL

[0 3] Primary color: 1 = WHITE 2 = GREENISH WHITE 3 = GREEN 4 = YELLOW 5 = BUFF 6 = TAN

[ ] Secondary color: 7 = BROWN 8 = PINK 9 = RED 10 = PURPLE 11 = BLACK 12 = OTHER (Specify) _____

[ ] Color pattern: 1 = SPLASHED 2 = MOTTLED 3 = STRIPED 4 = FLECKED 5 = DOTTED

[ ] Secondary color location: 1 = HILAR RING 2 = HILAR SURFACE 3 = STROPHIOLE 4 = MICROPYLE 5 = SIDES 6 = DORSAL SURFACE 7 = NOT RESTRICTED TO ANY AREA 8 = COMBINATION OF LOCATIONS (Specify) _____

[1] Hilar ring: 1 = NOT PRESENT 2 = NARROW 3 = WIDE 4 = BUTTERFLY SHAPED

[1] Vein-like under coat pattern: 1 = ABSENT 2 = PRESENT

[2] Cotyledon color: 1 = WHITE 2 = PALE GREEN 3 = GREEN

[1] Seed coat 1=SMO 2=WRN

9. SEED SHAPE AND SIZE:

[3] Hilum view: 1 = FLAT 2 = ELLIPTICAL 3 = OVAL 4 = ROUND

[1] Side view: 1 = OVAL 2 = ROUND 3 = KIDNEY 4 = TRUNCATE ENDS

[~~2~~3] Cross section: 1 = FLAT 2 = ELLIPTICAL 3 = OVAL 4 = ROUND
JCF 820628

[4 0] GM. WEIGHT PER 100 SEEDS

[1] Classification: 1 = SIEVA 2 = INTERMEDIATE 3 = FORDHOOK

[0 9] MM. WIDTH (Dorsal to ventral)

[0 5] MM. THICKNESS (Side to side)

[1 3] MM. LENGTH

[1 ~~8~~ 8] WIDTH / THICKNESS X 10 JCF 820216

10. ANTHOCYANIN: (1 = Absent, 2 = Present)

[1] FLOWERS [1] STEM [1] PODS [1] SEEDS [1] LEAVES

11. DISEASE RESISTANCE: (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

[0] RUST (Specify race) _____	[0] ANGULAR LEAF SPOT	[0] BACTERIAL WILT
[0] COMMON BEAN MOSAIC	[0] ANTHRACNOSE	[0] LIMA BEAN MOSAIC
[0] SOUTHERN BEAN MOSAIC	[0] FUSARIUM ROOT ROT	[0] CURLY TOP
[0] N.Y. 15 BEAN MOSAIC	[2] DOWNY MILDEW A B C D Races	[0] POWDERY MILDEW
[0] BEAN MOSAIC VIRUS 4	[0] HALO BLIGHT	[0] FUSCOUS BLIGHT
[0] ALFALFA MOSAIC VIRUS	[0] ALFALFA MOSAIC VIRUS 2	[0] POD MOTTLE VIRUS
[0] RED NODE VIRUS	[0] ROOT KNOT NEMATODE	[0] OTHER (Specify) _____

FORM APPROVED. OMB NO. 40-R3712

FORM LPGS-470-15
(4-78)

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
LIVESTOCK, POULTRY, GRAIN & SEED DIVISION
BELTSVILLE, MARYLAND 20705

EXHIBIT C
(Lima Bean)

OBJECTIVE DESCRIPTION OF VARIETY

REFERENCES: See Reverse.

LIMA BEAN *(PHASEOLUS LUNATUS)*

NAME OF APPLICANT(S)

L. D. Maffei Seed Co, Inc.

ADDRESS *(Street and No. or R.F.D. No., City, State, and ZIP Code)*

P.O. Box 903
Newman, CA 95360

FOR OFFICIAL USE ONLY

PVPO NUMBER 8200015

VARIETY NAME OR TEMPORARY DESIGNATION

Maffei 15

Place the appropriate number that describes the varietal character of this variety in the boxes below:
Place a zero in first box (e.g. [0 8 9] or [0 9]) when number is either 99 or less or 9 or less.

1. TYPE:

[3] 1 = GREEN SHELL 2 = DRY EDIBLE 3 = DUAL PURPOSE

2. REGION OF ADAPTABILITY IN THE U.S.:

[6] Best adapted in: 1= NORTHWEST 2 = NORTHCENTRAL 3 = NORTHEAST 4 = SOUTHEAST 5 = SOUTHWEST 6 = MOST REGIONS

3. MATURITY (Days from seeding to first harvest):

[9 0] GREEN SHELLS [1 0 0] DRY SEEDS

[0 1] No. of days *Earlier* than: .... [7]
[ ] No. of days *Later* than ..... [ ]

1 = HENDERSON BUSH 2 = THAXTER 3 = BURPEE'S IMPROVED BUSH
4 = SIEVA 5 = FLORIDA BUTTER 6 = KING OF THE GARDEN
7 = OTHER (Specify) Maffei 76

4. PLANT:

[1] 1 = DETERMINATE, ERECT BUSH 2 = DETERMINATE, SPRAWLING BUSH 3 = DETERMINATE, SEMIPOLE 4 = INDETERMINATE, POLE

[0 4 1] CM. HEIGHT

[0 1] CM. LENGTH OF FIRST INTERNODE ABOVE PRIMARY LEAF

[6 0] CM. SPREAD

[0 8] NUMBER INTERNODES ON MAIN STALK BETWEEN PRIMARY LEAF AND BASE OF TERMINAL INFLORESCENCE

[0 4] MM. STALK DIAMETER ABOVE FIRST TRIFOLIATE LEAF

[2] Main stalk: 1 = BRITTLE 2 = WIREY

[1] Main stalk: 1 = STOUT 2 = THIN

[1] Flower position:
[1] Pod position:
1 = LOW, CONCENTRATED 2 = HIGH, CONCENTRATED 3 = SCATTERED

5. LEAVES:

[1] 1 = SMOOTH 2 = WRINKLED

[1] 1 = DULL 2 = GLOSSY

[1] Thickness: 1 = THIN 2 = MEDIUM 3 = THICK

[2] Size: 1 = SMALL (Sieva) 2 = MEDIUM 3 = LARGE (Prizetaker)

[0 7] CM. PETIOLE LENGTH (To basal leaflets of first trifoliate leaf)

[2] Tip shape of center leaflet: 1 = ROUNDED 2 = TAPER POINTED 3 = SHARP POINTED

[2] PUBESCENCE - Dorsal:
[2] PUBESCENCE - Ventral:
1 = NONE 2 = SLIGHT 3 = CONSIDERABLE

[3] Color: 1 = GRAY GREEN 2 = MEDIUM GREEN (Burpee's Improved Bush) 3 = DARK GREEN (Sieva)

6. FLOWERS:

[1] Color: 1 = WHITE 2 = CREAM 3 = PINK 4 = LILAC 5 = PURPLE 6 = OTHER *(Specify)*

[1 0] Racemes: CM. TO BASE OF TERMINAL FLORET [2 2] NUMBER FLOWERS PER RACEME