No. 8400068

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Mitsui Toatsu Chemicals, Inc. Japan

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 TY 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 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.)

BEAN

'Surfing F'

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* 31st *day of* July *in the year of our Lord one thousand nine hundred and* eighty-six.

Attest:

Kenneth R. Evans

Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

Richard E. Lyng

Secretary of Agriculture

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
LIVESTOCK, MEAT, GRAIN & SEED DIVISION

FORM APPROVED: OMB NO.0581-0055

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

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

(Instructions on reverse)

1. NAME OF APPLICANT(S): MITSUI TOATSU CHEMICALS,INC.

2. TEMPORARY DESIGNATION:

3. VARIETY NAME: SURFING F

4. ADDRESS *(Street and No. or R.F.D. No., City, State, and Zip Code)*: 2-5,KASUMIGASEKI 3-CHOME; CHIYODA-KU TOKYO,JAPAN 100

5. PHONE *(Include area code)*: 212-758-2878

FOR OFFICIAL USE ONLY

PVPO NUMBER: 8400068

6. GENUS AND SPECIES NAME: Phaseolus vulgaris

7. FAMILY NAME *(Botanical)*: Leguminosae

FILING — DATE: 3/20/84 — TIME: 2:30 ☐ A.M. ☒ P.M.

8. KIND NAME: Bean

9. DATE OF DETERMINATION: April 24,1979

FEES RECEIVED — AMOUNT FOR FILING: $ 1,800 — DATE: 3/20/84

AMOUNT FOR CERTIFICATE: $ 200. — DATE: June 16, 1986

10. IF THE APPLICANT NAMED IS NOT A "PERSON," GIVE FORM OF ORGANIZATION *(Corporation, partnership, association, etc.)*: Corporation

11. IF INCORPORATED, GIVE STATE OF INCORPORATION: Stock company

12. DATE OF INCORPORATION:

13. NAME AND ADDRESS OF APPLICANT REPRESENATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS

Martin A. Farber

866 United Nations Plaza,New York N.Y. 10017

14. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED

a. ☒ Exhibit A, Origin and Breeding History of the Variety *(See Section 52 of the Plant Variety Protection Act.)*

b. ☒ Exhibit B, Novelty Statement

c. ☒ Exhibit C, Objective Description of the Variety *(Request form from Plant Variety Protection Office.)*

d. ☒ Exhibit D, Additional Description of the Variety

15. 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) of the Plant Variety Protection Act.)* ☒ Yes *(If "Yes," answer items 16 and 17 below)* ☐ No

16. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS? ☒ Yes ☐ No

17. IF "YES" TO ITEM 16, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED? ☒ Foundation ☒ Registered ☒ Certified

18. DID THE APPLICANT(S) FILE FOR PROTECTION OF THE VARIETY IN THE U.S. OR OTHER COUNTRIES? ☒ Yes *(If "Yes," give names of countries and dates)* ☐ No

(Japan) November 29,1979

19. HAVE RIGHTS BEEN GRANTED IN THE U.S. OR OTHER COUNTRIES? ☒ Yes *(If "Yes," give names of countries and dates)* ☐ No

(Japan) July 28,1981

20. The applicant(s) declare(s) that a viable sample of basic seeds 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 Protection Act.

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

SIGNATURE OF APPLICANT: President of Mitsui Toatsu Chemicals,Inc. — DATE: November 22,1983

SIGNATURE OF APPLICANT: Y. Kasama — DATE: 3/16/84

SIGNED ON BEHALF OF THE APPLICANT BY MARTIN A. FARBER WHO IS APPLICANT'S REPRESENTATIVE AND ATTORNEY

MARTIN A. FARBER

FORM LMGS-470 (9-81) (Edition of 1-78 is obsolete)

SURFING F

Exhibit A

Origin and Breeding History of the Variety

1. Surfing was derived from a hand pollinated cross between "Monel" (a French cultivar with medium green, long and slender pods with suture string, and Japanese name 'Strainer') and 'Longjohn' (a New Zealand cultivar very similar to 'Oregon 58', and Japanese name 'Toyo Ingen') by Mitsui Toatsu Chemicals, Inc. The cross was made in Chigasaki-shi, Kanagawa-ken, Japan in 1975.

2. Selections were made based on developing 'Longjohn' with oval in cross section pods, and longer, straighter and slenderer pods and longer harvesting period besides. Plants with oval (in cross section) pods similar to 'Longjohn' were selected in the fifth generation of the breeding line 'Monel' X 'Longjohn'. Selections were made with the pedigree method in the eighth generation to the tenth generation of the breeding line in Chigasaki-shi, and two times (spring and summer seeding selections) a year.

3. The genetic makeup of the variety was stabilized in the tenth generation of the breedling line in 1979. Yield tests were made at the nursery of Mitsui Toatsu Chemicals, Inc. in the spring to summer and the summer to autumn of 1979. Data of spring seeding was attached.

Applicant: Mitsui Toatsu Chemicals, Inc.

Bean Application

No. 84 00068

'SURFING F'

Filed: March 17, 1984

(AN ADDENDUM TO EXHIBIT A)

Exhibit A: The variety 'Surfing F' can be maintained and reproduced through seed without changing its characteristics, from the completion of the variety as 'F_{10}' in the autumn of 1979 to 'F_{15}' in the spring of 1984.

Data attached to the exhibit A

1. Materials and method

Each of "Surfing F", its both parent cultivars, "Monel" and "Longjohn", "Surfing", derived from the same parents and "Shin Edogawa" which "Surfing F" resembles very closely, was seeded and raised with each of 10 cm Ø vinyl pots a seedling in the mixture of Kanto loam soil, peat moss and carbonized rice hull (sterilized with steam, with pH of 6.0, and containing 200 grams per m^3 of each of $N_1P_2O_5$ and K_2O) on 24 April, 1979.

The seedlings were grown in a greenhouse without heating for 12 days, and in addition outside for 4 days for hardening.

The plants were set in a field on 10 May, 1979. Treatments were arranged in a design with two replications at each location. Plots were 5.24 m^2. Planting rate was 32 plants a plot and plants were set in two stripes of 50 by 30 cm on rows with the width of 110 cm. Field soil was sterilized with chloropicrin before setting the plants. Rate of chloropicrin application was 3 liters per acre. Compound fertilizer (grade 16-16-16), super-phosphate, calcium magnesium carbonate and compost were broadcast and mixed deeply as basal application fertilizers 3 days before setting the plants and mulching was made with black colored polyethylene film immediately when the basal application was made. Ekatin granule and S-Seven dust were applied in planting holes after making holes through the polyethylene film. Rates of each insecticide were 500 grams per acre.

The plants were grown in plastic tunnels to prevent wind injury for about two weeks after setting the plants. The tunnels were about 1 m. in width and made with vinyl film 0.05 mm in thickness.

Data attached to the exhibit A

1. Materials and method

Each of "Surfing F", its both parent cultivars, "Monel" and "Bongsoon", "Surfing", derived from the same parents and "Shin Sogawa" which "Surfing F" resembles very closely, was seeded and raised with each of 10 cm Ø vinyl pots a seedling in the mixture of Kanto loam soil, peat moss and carbonized rice hull (sterilized with steam, with pH of 6.0, and containing 200 grams per m^3 or each of N, P_2O_5 and K_2O) on 24 April, 1979.

The seedlings were grown in a greenhouse without heating for 12 days, and in addition outside for 4 days for hardening.

The plants were set in a field on 10 May, 1979. Treatments were arranged in a design with two replications at each location. Plots were 5.4 m^2. Planting rate was 32 plants a plot and plants were set in two stripes of 50 by 30 cm on rows with the width of 110 cm. Field soil was sterilized with chloropicrin before setting the plants. Rate of chloropicrin application was 3 liters per acre. Compound fertilizer (grade 16-16-16), super-phosphate, calcium magnesium carbonate and compost were broadcast and mixed deeply as basal application fertilizers 3 days before setting the plants and mulching was made with black colored polyethylene film immediately when the basal application was made. Black pramia and 8-Seven dust were applied in planting holes after making holes through the polyethylene film. Rates of each insecticide were 500 grams per acre.

The plants were given a plastic tunnels to prevent wind injury for about two weeks after setting the plants. The tunnels were made with vinyl film 0.05 mm in thickness.

Compound fertilizer (grade 16-0-16) was applied additionally two times near plants on the rows under mulching film. Rates of the basal and additional applications of each fertilizer were shown in Table 1.

Table 1

Rates of fertilizer application

Kinds of fertilizers		Application Rates (kg. per acre) Basal application	Additional Application (1)	Additional Application (2)	Total
Compost		200	——	——	200
Calcium magnesium carbonate		15	——	——	15
Compound fertilizers and Superphosphate	N	1.0	0.3	0.3	1.6
	P_2O_5	1.7	——	——	1.7
	K_2O	1.0	0.3	0.3	1.6

Remarks : Dates of additional applications
(1) June 4 (2) June 22

Harvestings had been made from June 11 to July 6.

6

2. Results

(1) Growing behavior

Table 2

Growing Behavior

a	b	c	d	e	f	g	h	i	j	k
Monel	purple	43	2-3	2	-	3	2	2	7 June	1-2
Longjohn	white	35	2	2-3	-	1-2	2	3	31 May	3
Surfing	white	43	2-3	2	-	3	2	1-2	3 June	2-3
Shin Edogawa	purple	45	2-3	2-3	-	3	3	1-2	7 June	1-2
Surfing F	white	43	2-3	2	-	3	2	1-2	3 June	2-3

column a = Kinds of cultivars

characters

column b = Flower color at beginning time of harvesting

column c = Plant height (cm) at beginning time of harvesting

column d = Plant Vigor at beginning time of harvesting

(1 = weak, 2 = medium, 3 = strong)

column e = Darkness of leaf color at beginning time of harvesting

(2 = medium green, 3 = dark green)

column f = Severity at beginning time of harvesting

(no disease symptom)

column g = Plant Vigor at ending time of harvesting

(1 = weak, 2 = medium, 3 = strong)

column h = Darkness of leaf color at ending time of harvesting

(2 = medium green, 3 = dark green)

column i = Dead leaf number at ending time of harvesting

(1 = almost none, 2 = few, 3 = many)

column j = Beginning date of beginning time of blooming

column k = Flower number at beginning time of blooming

(1 = few, 2 = medium, 3 = many)

2. Results

(1) Growing behavior

Table 2

Growing behavior

a	b	c	d	e	f	g	h	i	j
Monal	purple	13	2-3	2	-	3	2	2	7 June	1-2
Ironjron	white	35	2	2-3	-	1-2	2	3	31 May	3
Bulting	white	43	2-3	2	-	3	2	1-2	3 June	2-3
Ohin										
Sugawa	purple	45	2-3	2-3	-	3	3	1-2	7 June	1-2
Surfing-r	white	43	2-3	2	-	3	2	1-	3 June	2-3

column a = kinds of cultivars

characters

column b = flower color at beginning time of harvesting

column c = Plant height (cm) at beginning time of harvesting

column d = Plant vigor at beginning time of harvesting

(1 = week, 2 = medium, 3 = strong)

column e = Darkness of leaf color at beginning time of harvesting

(2 = medium green, 3 = dark green)

column f = Severity at beginning time of harvesting

(no disease symptom)

column g = Plant vigor at ending time of harvesting

(1 = week, 2 = medium, 3 = strong)

column h = Darkness of leaf color at ending time of harvesting

(2 = medium green, 3 = dark green)

column i = Dead leaf at ending time of harvesting

(1 = few, 2 = few, 3 = many)

column j = Beginning [illegible] time of blooming

column k = Flower [illegible] time of blooming

(1 = few, medium 2 = man)

(2) Yield of pods

Table 3

Yield of pods

A	B	C	D	E	F	G
Pods with good quality						
Monel	626	3.40	416	1.86	1042	5.26
Longjohn	1250	8.62	208	1.58	1458	10.20
Surfing	784	4.24	824	4.28	1608	8.52
Shin Edogawa	698	4.38	602	3.08	1300	7.46
Surfing F	746	4.40	996	4.82	1742	9.22
Pods without good quality						
Monel	74	0.34	224	0.92	298	1.26
Longjohn	466	2.04	210	1.02	676	3.06
Surfing	88	0.38	216	0.86	304	1.24
Shin Edogawa	74	0.32	660	0.80	734	1.22
Surfing F	84	0.42	276	1.36	360	1.78

Column A = Kinds of cultivar

Yields:

Column B = Pod number per plot from 11 June to 22 June

Column C = Pod weight (kg) per plot from 11 June to 22 June

Column D = Pod number per plot from 25 June to 6 July

Column E = Pod weight (kg) per plot from 25 June to 6 July

Column F = Pod number per plot from 11 June to 6 July

Column G = Pod weight (kg) per plot from 11 June to 6 July

(2) Yield of pods

Table 3

Yield of pods

A	B	C	D	E	F	G
Pods with good quality						
Monel	626	3.40	416	1.86	1042	5.26
Longjohn	1250	8.62	208	1.50	1458	10.20
Surfing	784	4.24	824	4.28	1608	8.52
Shin Edogawa	698	4.38	602	3.08	1300	7.46
Surfing F	746	4.40	996	4.82	1742	9.22
Pods without good quality						
Monel	74	0.34	224	0.92	298	1.26
Longjohn	166	2.02	210	1.02	676	3.06
Surfing	88	0.38	216	0.86	304	1.24
Shin Edogawa	74	0.32	660	0.80	734	1.22
Surfing F	84	0.42	276	1.36	360	1.78

Column A = Kinds or cultivar

Yields:

Column B = Pod number per plot from 11 June to 22 June

Column C = Pod yield (kg) per plot from 11 June to 22 June

Column D = Pod number per plot from 25 June to 6 July

Column E = Pod yield (kg) per plot from 25 June to 6 July

Column F = Pod number per plot from 11 June to 6 July

Column G = Pod yield (kg) per plot from 11 June to 6 July

(3) Characteristics of pods

Table 4

Characteristics of pods

A	B	C	D	E	F	G	H	I	J	K
Monel	1-2	1-2	none-slight	present	oval	12.8	15	0.8	0.70	45
Longjohn	3-4	3-4	deep	absent	round	12.1	10	0.9	0.80	60
Surfing	3-35	1-2	deep	absent	round	12.8	15	0.7	0.63	49
Shin Edogawa	1-2	1-2	none-slight	present	oval	13.8	13	0.8	0.60	51
Surfing F	3	2	slight	absent	oval	13.8	15	0.8	0.60	54

Column A = Kinds of cultivars

characters

Column B = Darkness of exterior color

1 (light green), 2 (medium green), 3 (green), 4 (dark green)

Column C = Density of pod curving

1 (almost straight), 2 (slightly curved), 3 (curved), 4 (deeply curved)

Column D = constriction

Column E = suture string

Column F = cross section pod shape

Column G = pod length without spur (cm)

Column H = spur length (mm)

Column I = pod width (cm)

Column J = pod thickness (cm)

Column K = weight of ten pods (g)

(3) Characteristics of pods

Table 4

Characteristics of pods

A	B	C	D	E	F	G	H	I	J	K
Monel	1-2	1-2	none-slight	present	oval	12.8	15	0.8	0.70	45
Bonglohn	3-4	3-4	deep	absent	round	12.1	10	0.9	0.80	50
Spring	3-3	1-2	deep	absent	round	12.8	15	0.7	0.63	43
Shin Edogawa	1-2	1-2	none-slight	present	oval	13.8	13	0.8	0.60	51
Spring	2	2	slight	absent	oval	13.8	15	0.8	0.60	54

Column A = Kinds of cultivars

characters

Column B = Darkness of exterior color

1 (light green), 2 (medium green), 3 (green),

4 (dark green)

Column C = Density of pod curving

1 (almost straight), 2 (slightly curved),

3 (curved), 4 (deeply curved)

Column D = Pubescence

1 = present, 2 = future absent

Column E = Cross section pod shape

Column F = Length without spur (cm)

Column G = Pod width (mm)

Column H = Pod width (cm)

Column I = Pod thickness (cm)

Column K = Weight of ten pods (g)

Novelty is based on the unique combination of the following characters:

"SURFING F" closely resembes "SHIN EDOGAWA" in pod characteristics such as cross section pod shape, pod length, pod width, pod thickness, pod weight, and seed number. On the other hand "SURFING F" closely resembes "LONGJOHN" in pod characteristics such as surface condition, fiber content, suture string, pubescence, seed development and pod flavor, and in the other characteristics such as hypocotyl color (green), section number of main stalk, leaf color, flower color, seed coat color, and "SURFING F" closely resembles "MONEL" in pod characteristics such as spur shape and spur length, plant characteristics such as plant height, leaf size pod position and bush form, and disease tolerance besides. Market maturity, pest tolerance and flower number, pod exterior color and constriction are intermediate between those of "LONGJOHN" and those of "MONEL". Seed shape of "SURFING F" is oval in hilum view, cordate in cross section, reniform in side view and different from three caltivars mentioned above.

ADDENDUM TO THE

EXHIBIT B

Surfing F is most similar to Shin Edogawa. However Surfing F has white flowers and the suture string is absent, whereas Shin Edogawa has purple flowers and the suture string is present.

//

FORM APPROVED: OMB NO. 0581-0055

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
LIVESTOCK, POULTRY, GRAIN & SEED DIVISION
BELTSVILLE, MARYLAND 20705

EXHIBIT C
(Bean)

OBJECTIVE DESCRIPTION OF VARIETY

BEAN (Phaseolus vulgaris L.)

NAME OF APPLICANT(S): MITSUI TOATSU CHEMICALS, INC.

ADDRESS *(Street and No. or R.F.D. No., City, State, and Zip Code)*: 2-5, KASUMIGASEKI 3-CHOME, CHIYODA-KU TOKYO, JAPAN 100

FOR OFFICIAL USE ONLY

PVPO NUMBER: 8400068

VARIETY NAME OR TEMPORARY DESIGNATION: SURFING F

Place numbers in the boxes (e.g. [0 8 9]) for the characters that best describe this variety. Measured data should be for SPACED PLANTS. Ranges may also be given. Royal Horticultural Society or any recognized color standard may be used to determine plant colors; designate system used: _____. The location of test area is _____. Please answer questions appropriate for your variety if the information is available.

1. TYPE:

[2] 1 = Field *(dry-edible)* 2 = Garden

2. MARKET MATURITY:

[5 0] Days to edible pods

[6 0] Days to green shells

[1 1 5] Days to dry seeds

[1 0 5 0] Heat units to edible pods

[1 1 5 0] Heat units to green shells

[2 2 0 0] Heat units to dry seeds

[ ] No. days earlier than ..... [ ]

..... Same as .. [ ]

[0 5] No. days later than ..... [8]

1 = Tendercrop
2 = Kentucky Wonder
3 = Kinghorn Wax
4 = White Kidney
5 = Michelite 62
6 = Dwarf Horticultural
7 = Bush Blue Lake 290
8 = Other (specify below) Shin Edogawa

3. PLANT:

[1] 1 = Determinate 2 = Indeterminate

[0 4 5] cm height

[ ] cm shorter than ..... [ ]

Same as .. [8]

[ ] cm taller than ..... [ ]

comparison variety from above

[ ] cm spread

[ ] Number primary branches near base

[ ] cm narrower than ..... [ ]

width same as ... [8]

[ ] cm wider than ..... [ ]

comparison variety from above

[ ] Branching habit: 1 = compact 2 = open

[2] Main stalk: 1 = brittle 2 = wirey

[1] 1 = stout 2 = thin

3. PLANT: (Cont'd)

[1] Pod position: 1 = low 2 = high 3 = scattered

[1] Bush form (illustrated below):

1 = spherical bush form 2 = stem bush form 3 = wide bush form 4 = high bush form

5 = other (specify) _____

4. LEAVES:

[1] 1 = smooth 2 = wrinkled

[2] 1 = dull 2 = glossy

[3] Size: 1 = small (Earliwax) 2 = medium 3 = large (Tendercrop)

[2] Color: 1 = light green (as light or lighter than Bountiful) 2 = medium green
3 = dark green (as dark or darker than Bush Blue Lake 290)

5. FLOWERS:

[1] Color: 1 = white 2 = cream 3 = pink 4 = lilac 5 = purple 6 = Other (specify) _____

[5][0] Days to 50% bloom

6. FRESH PODS: (Edible maturity, average for 20 pods)

[3] Exterior color: 1 = light green (as light or lighter than Bountiful)
2 = medium green
3 = dark green (as dark or darker than Bush Blue Lake 290)
4 = light yellow (Brittlewax)
5 = golden yellow (Cherokee Wax)
6 = green-red variagated (Horticultural)
7 = other (specify)

_____

% Sieve size distribution at optimum maturity for non-flat pods

Note:
1 = 4.76 mm to 5.76 mm
2 = 5.76 mm to 7.34 mm
3 = 7.34 mm to 8.34 mm
4 = 8.34 mm to 9.53 mm
5 = 9.53 mm to 10.72 mm
6 = 10.72 mm or larger

1	2	3	4	5	6

3 sieve	[ ][ ] cm length	[ ][ ] mm width	[ ][ ] mm thickness
4 sieve	[ ][ ] cm length	[ ][ ] mm width	[ ][ ] mm thickness
5 sieve	[ ][ ] cm length	[ ][ ] mm width	[ ][ ] mm thickness
6 sieve	[ ][ ] cm length	[ ][ ] mm width	[ ][ ] mm thickness

6. FRESH PODS: (Cont'd)

[2] Cross section pod shape: 1 = flat 2 = oval 3 = round 4 = heart

[1] Creaseback: 1 = present 2 = absent

[1] Pubescence: 1 = none 2 = sparse 3 = considerable

[2] Spur: 1 = straight 2 = slightly curved 3 = curved

[2] Constrictions: 1 = none 2 = slight 3 = deep

[3] Pod flesh: 1 = light 2 = medium 3 = dark

[1][5] mm spur length

[1] Fiber: 1 = none 2 = sparse 3 = considerable

[7] Number of seeds per pod

[1] Surface: 1 = smooth 2 = rough

[2] Suture string: 1 = present 2 = absent

[2] Seed development (Snap Bean): 1 = slow 2 = medium 3 = fast

[2] Machine harvest: 1 = adapted 2 = not adapted

[ ] Pod flavor:
(1) Standard (Tendercrop)
(2) Mild Blue Lake (BBL 274)
(3) Strong Blue Lake (Pole FM1)
(4) Mild Romano (Roma)
(5) Strong Romano (Pole Romano)
(6) Other (specify) _____

7. SEED COAT COLOR:

[1] 1 = Monochrome 2 = Polychrome

[1] 1 = shiny 2 - dull

[1] Primary color:

[ ] Secondary color:

1 = white 2 = yellow 3 = buff 4 = tan
5 = brown 6 = pink 7 = red 8 = purple
9 = blue 10 = black 11 = other (specify) _____

[1] Color Pattern: 1 = none 2 = splashed 3 = mottled 4 = striped 5 = flecked 6 = dotted

[ ] Secondary color location: 1 = hilar ring 2 = ventral surface
3 = sides 4 = dorsal surface
5 = not restricted to any area 6 = combination of location (specify below)
_____

[1] Hilar ring on colored seeds: 1 = absent 2 = narrow 3 = butterfly shaped

8. SEED SHAPE AND SIZE:

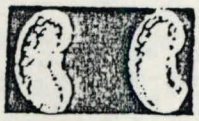
[2] Hilum view: 1 = elliptical 2 = oval 3 = round

[3] Cross section: 1 = elliptical 2 = oval 3 = cordate 4 = round

[3] Side view:


1 = oval to oblong


2 = round


3 = reniform

8. SEED SHAPE AND SIZE: (Cont'd)

[2] 1 = truncate ends 2 = rounded ends

[3][5] gm/100 seed

[ ][ ] gm/100 seed lighter than ..... [ ]

gm/100 seed same as .... [8] comparison variety from page one

[ ][ ] gm/100 seed heavier than ..... [ ]

9. ANTHOCYANIN: (1 = absent 2 = present)

[1] Flowers [1] Stems [1] Pods [1] Seeds [1] Leaves

10. DISEASE RESISTANCE (0 = not tested 1 = susceptible 2 = resistant):

[0] Anthracnose (specify race below) _____

[0] Rust (specify race below) _____

[0] Powdery mildew

[0] Fusarium root rot

[0] Pythium root rot

[0] Rhizoctonia root rot

[0] Pythium wilt

[0] Angular leaf spot

[0] Bacterial wilt

[0] Halo blight (specify race below) _____

[0] Fuscous blight

[0] Red node virus

[0] Pod mottle virus

[0] Bean common mosaic virus (specify strain below) _____

[0] Mosaic mottle

[0] Black root

[0] Bean yellow mosaic virus

[0] Curly top

[0] Other (specify below) _____

11. INSECT RESISTANCE: (0 = not tested 1 = susceptible 2 = resistant)

[0] Aphids

[0] Leaf hopper

[0] Lygus

[0] Pod borer

[0] Root knot nematode

[0] Seed corn maggot

[0] Thrips

[0] Weavils

[0] Other (specify below) _____

12. PHYSIOLOGICAL RESISTANCE: (0 = not tested 1 = susceptible 2 = resistant)

[0] Heat [0] Cold [0] Drought [0] Air pollution

13. COMMENTS:

"SURFING F"

Exhibit D

Botanical Description of the Variety

"SURFING F" is bush green bean cultivar with pods oval in cross section and the pod characteristics are similar to "SHIN EDOGAWA" that is one of leading varieties in Japan but the exterior green color is darker, the constrictions are deeper than this cultivar, and the suture string is absent, the color of seeds is white and the side view of seeds is reniform. Besides, the color of flowers is white like "SURFING" derived from the same cross line "MONEL" x "LONGJOHN", the constrictions of pods are slighter and the exterior green color is paler than "SURFING", and the variety has almost same maturity as "SURFING". On the other hand the leaf color is paler than "SHIN EDOGAWA" and the plant characteristics are similar to the "MONEL" parent but the flower number is more than this cultivar. The yields of pods with good quality are higher than both parents and "SHIN EDOGAWA".

The pods are usually stringless as described above but the suture string is formed slightly in about more than 16cm length.

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