

**OPERATIVE EXTENSION  
UNIVERSITY OF CALIFORNIA**

Department of Agronomy and Range Science Extension

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To: Chip Sundstrom and the CTC  
From: Steve Temple, UC Davis

April 29, 1999



Re: Request to release Line 9623

I am providing the following as supporting evidence for my request to release line 9623 as a Flor de Mayo drybean variety for the State of California. The Flor de Mayo is an interesting and very tasty bean class that is widely grown and consumed in areas of Northwest and Westcentral Mexico. There are quite a number of Flor de Mayo grain types, plant types, maturities, and adaptive ranges represented within the drybean germplasm, but the class is most typically known for an off-white or cream "ground" color, upon which is superimposed an irregular splattering of red, pink, or purple flecks and dots in a non-uniform ("Easter egg") manner. Some colleagues who have studied bean marketing report that the popularity of classes like the Flor de Mayo is due in part to the "after-darkening" gene that makes the harvested bean, with increasing age, temperature, moisture, and sunlight, turn from a soft cream to a light brown, and then to an orange-ish or dark brown color. The overall effect is that this allows bean dealers and consumers to know something of the age and harvest/storage conditions of the beans they are purchasing.

At any rate, we are told that many of the Hispanic consumers in California that currently buy an increasing volume of drybeans (many are pinks and pintos from out of state), would prefer a Flor de Mayo to the pintos that are commonly marketed to this ethnic purchasing group. As a result, the UCD Grain Legume Breeding Program in 1989 initiated a few crosses to develop high-quality, disease-resistant Flor de Mayos for production in California. Line 9623, and several other promising lines, are the result of that effort.

NO — **Origin and Breeding History:**

Line 9623 is a selection from the 1989 greenhouse cross of UCD pink variety Yolano, to an improved Flor de Mayo line from CIAT, referred to as BAT 1763. BAT 1763 (also known as CIAT 83 VEF#867), is a Flor de Mayo carrying I-gene resistance to Bean Common Mosaic Virus, and was developed in the CIAT breeding program of Steve Temple, and brought to Davis by Temple in 1988. The F2 population was planted in the 1990 UCD nursery, and mass selected for podset, grain type, and architecture (strong stems and pods/branches elevated off

the ground). Original emphasis was on improving pink types, but some Flor de Mayo grain types were also carried forward.

25 individual F3 plants were selected in 1991 for similar plant and seed characteristics, and 12 seeds per plant were greenhouse-tested by Bob Gilbertson and Pablo Guzman, inoculating with the NL 3 strain of BCMNV to test for the presence of I hypersensitive gene. A number of F4 single plant selections were made at UCD in 1992 to continue the purification. As soon as they were true-breeding for BCMNV, the F4/F5 families were evaluated in UCD in 1993 and 1994, using pedigree selection to obtain lines true-breeding for grain type, plant type, architecture, and maturity. Beginning in 1991, the precursors to 9623 were selected in alternating seasons at Chico and UCD. Line 9623 emerged from the 1994 harvest at UCD, the mass selection of 10 plants from the F6 family, and was entered into yield testing in 1995 (see below).

The 1995 testing included evaluations for Lygus and heat at Kearney Ag Center and the WSREC, and Preliminary Yield Trials at Stockton and UCD. In those trials it became very clear that the entire group of Flor de Mayo selections were, as a group, very superior to both the Yolano (pink) check and/or the Ruffus/UI 35 (red Mexican) checks. This has held true for the set of Flor de Mayo lines for 4 seasons, and in every location and planting date tested. A recent small red selection from the National Dry Bean Nursery, UI 239 is competitive with Flor 9623 yields. In fact, we are disappointed at not identifying pink nor red Mexican progenies with similar yield advantage from these crosses.

**Description:** (see also the USDA form) Phaseolus vulgaris

Line 9623 is an indeterminate (vine) growth type that has a very strong mainstem, and secondary branches and petioles are strongly geotropic in a way that consistently elevates filled and drying pods above the soil and results in very high seed quality, even in locations and planting dates where the vegetative "factory" is highly developed and row cover is complete early in the season. In some evaluations the plant is sufficiently erect at harvest, and the pods sufficiently elevated, that direct harvest would be possible. Under other conditions (damp soil and late-season winds) the weight of the developing pods leads to root/ stem lodging that would render consistent direct harvesting problematical. Nonetheless, the plant generally has little or no giude development, which facillitates cutting and management in the windrow. I have also observed that the root systems of the Flor de Mayo lines are much stronger and more resistant to manual pulling than are those of our Yolano check.

Maturity of 9623 varies with planting date, season, and location, but 9623 has demonstrated relatively limited phototemperature sensitivity, and proven to be

one of our very best lines under the high temperatures that devastated other lines the last two seasons. The overall maturity is Medium-late (generally 90-105 days from planting to maturity) and we intend that this line be PVP-protected to guarantee competitiveness of the California industry that supported its development (it could be easily used in other bean-growing areas, and its wide adaptation would thus be a problem for our State's bean industry). Commercial seed companies have been cooperatively testing 9623 in the Sacramento Valley and other production environments, and are eager for its commercial release.

**1995 Yield Data:** (cwt/acre)

<u>Variety</u>	<u>Mat</u>	<u>Stockton</u>	<u>Davis</u>	<u>Chico</u>	<u>KAC</u>	<u>WSREC</u>
9623	M	32.5	14.4	20.0	fair	good
UI 35	VL	24.9	No Hvt (too late)	12.7	poor	no hvst
cv		Nn-rpltd	2 reps	33.7(ns)	obsvn	obsvn

**1996 Yield Data** (cwt/acre):

<u>Variety</u>	<u>Mat</u>	<u>Chico AYT</u>
9623	ME	28.1 a
Ruffus	VL	19.5 d
cv		10.7

**1997 Yield Data** (cwt/acre) :

<u>Variety</u>	<u>Chico early</u>	<u>Chico late</u>	<u>Stockton</u>	<u>UCD strip</u>
9623	28.2 ab	23.1 bc	29.5 a	25.7
UI 239	30.7 a	27.3 a	30.1 a	
Yolano		23.0 ab	Not Pltd	
cv	10.2	8.6	10.1	

**1998 Yield Data** (cwt/acre):

<u>Variety</u>	<u>UCD strip</u>	<u>Chico strip</u>	<u>Chico AYT</u>
9623	27.9	28.4	28.2 d
UI 239	14.5	27.4	32.3 abc
Yolano	24.4	22.8	28.0 d
cv	No reps	No reps	7.9

A limited amount of breeder seed will be maintained by the UCD Grain legume Breeding Program, and a small amount of Foundation Seed should be adequate during the early stages of testing and production in the Sacramento Valley. The recessive nature of the grain type and color pattern, plus the I gene resistance to BCMV, make 9623 very easy to maintain genetic and phytosanitary purity.

**Anticipated demand/ marketing:** It appears that a limited demand will exist in the early stages of release and production, and most of that will be from private seed interests. Because the Flor de Mayo class will in effect be competing directly with Pintos and Pinks and Red Mexicans in the national and international bean market. If the production costs are low (continued high yields) and the quality/preference is that reported, 9623 could make a significant inroad into the canned/ refried bean and ethnic product market. The beans are extremely attractive, and we anticipate that small farmers that direct market (and some of which grow organically) will be interested in this heirloom-type bean. This is important to UC, because this is a "research product" that is of direct use to small farmers, and to those attempting to grow beans with reduced chemical weed control (the seedling and vegetative development are very vigorous, and thus completely shade the row quickly and outcompete late-season and within-row weeds).

OBJECTIVE DESCRIPTION OF VARIETY  
 Dry Edible Bean (*Phaseolus vulgaris* L.)

NAME OF APPLICANT(S) <b>Steven R. Temple</b>	EXPERIMENTAL NAME <b>UCD 9623</b>	VARIETY NAME <b>Flor 9623</b>
ADDRESS (Street and No. or R.F.D. No., City, State, ZIP) <b>Agronomy + RS, Univ. Calif, One Shields Av. Davis CA 95616</b>		FOR OFFICIAL USE ONLY PVPO NO.

Provide data for all characters unless indicated as "optional." Place numbers in the boxes for the characters or numerical values which best describe this variety. Measured data should be the mean of an appropriate number of well spaced (15-20 cm) plants. The Royal Horticulture Society or any recognized color standard may be used to determine plant color. Designate the color system used below.

COLOR SYSTEM USED	LOCATION OF THE TEST(S) TO EVALUATE THIS VARIETY <b>Davis, Chico, Stockton, Fresno, Coalinga</b>
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MARKET CLASS

CLASS	CHECK
1 = Navy (Pea)	Seafarer
2 = Small White	Aurora
3 = Black	Midnight
4 = Pinto	UI-114
5 = Great Northern	UI-59
6 = Small Red	NW-59
7 = Pink	Viva
8 = Cranberry	UI-50
9 = Dark Red Kidney	Montcalm
10 = Light Red Kidney	Redcloud
11 = Yellow Eye	Steuben
12 = Other (specify)	

**1 2** **Flor de Mayo/UI 239**

2. MATURITY

**2** 1 = Early (80-90 days); 2 = Medium (90-100 days); 3 = Late (>100 days)

**1 0 0** Days from planting to harvest maturity

**1 1 5** Days from planting to harvest maturity of check variety (use check appropriate to market class shown in item 1)

**UI 239**

PLANT HABIT

**3** TYPE

1 = Ia Bush-determinate, strong and erect stem and branches  
 2 = Ib Bush-determinate, weak stem and branches  
 3 = IIa Erect growth habit-indeterminate, guides (runners) short or not developed  
 4 = IIb Erect growth habit-indeterminate, guides medium to long, with no ability to climb  
 5 = IIIa Vine-indeterminate, short guides with no ability to climb  
 6 = IIIb Vine-indeterminate, long guides with ability to climb  
 7 = IVa Indeterminate climbing, pods distributed throughout the plant  
 8 = IVb Indeterminate climbing, pods concentrated on the upper part of the plant

**5 4** Average height of mature plant, in cm.

**4 5** Average height of check variety, in cm. (use same check as above)

**3** Pod Position: 1 = Low (lower pods touching soil surface)  
 2 = High (lower pods not touching soil surface)  
 3 = Scattered (not concentrated high or low)

**2** Adaptability to machine harvest: 1 = Adapted 2 = Not Adapted

**1** Lodging resistance: 1 = Good 2 = Fair 3 = Poor

LEAFLET MORPHOLOGY (Use terminal leaflet of a fully expanded trifoliolate)

1 = Smooth; 2 = Wrinkled

1 = Dull; 2 = Glossy; 3 = Semiglossy; 4 = Variable

SHAPE:

1 = Ovate 2 = Lanceolate 3 = Deltoid 4 = Cordate 5 = Rhomboid

APEX OF LEAFLET:

1 = Acute 2 = Acuminate 3 = Cuspidate 4 = Obtuse

BASE OF LEAFLET:

1 = Obtuse 2 = Oblique 3 = Cordate 4 = Cuneate 5 = Attenuate

POD COLOR AND DAYS TO BLOOM





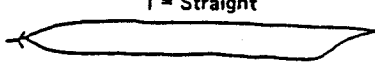
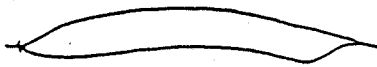


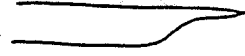

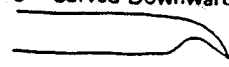
COLOR OF STANDARD: 1 = White; 2 = Cream; 3 = Pink; 4 = Blue; 5 = Purple

COLOR OF KEEL: 1 = White; 2 = Cream; 3 = Pink; 4 = Blue; 5 = Purple

COLOR OF WINGS: 1 = White; 2 = Cream; 3 = Pink; 4 = Blue; 5 = Purple

Days to 50% bloom

POD MORPHOLOGY (Green pod morphology optional)






<input type="checkbox"/>	<input type="checkbox"/>	<b>Green</b>	<b>Mature</b>			
<input type="checkbox"/>	<input type="checkbox"/>	COLOR PATTERN: 1 = Solid; 2 = Striped; 3 = Blotched; 4 = Mottled; 5 = Other _____				
<input type="checkbox"/>	<input type="checkbox"/>	PRIMARY COLOR: 1 = Purple; 2 = Red; 3 = Green; 4 = Yellow; 5 = Tan; 6 = Brown; 7 = Other _____				
<input type="checkbox"/>	<input type="checkbox"/>	COLOR MODIFIER: 1 = Light; 2 = Light Medium; 3 = Medium; 4 = Medium Dark; 5 = Dark				
<input type="checkbox"/>	<input type="checkbox"/>	SECONDARY COLOR: 1 = Purple; 2 = Red; 3 = Green; 4 = Yellow; 5 = Tan; 6 = Brown; 7 = Other _____				
<input type="checkbox"/>	<input type="checkbox"/>	CROSS SECTION SHAPE:	1 = Flat	2 = Pear	3 = Round	4 = Figure Eight
						
<input type="checkbox"/>	<input type="checkbox"/>	POD CURVATURE:	1 = Straight	2 = Slightly Curved	3 = Curved	4 = Recurved
						
<input type="checkbox"/>	<input type="checkbox"/>	POD BEAK ORIENTATION:	1 = Straight	2 = Curved Upward	3 = Curved Downward	4 = Variable
						Average beak length, in cm. _____
<input type="checkbox"/>	<input type="checkbox"/>	CONSTRICTIONS:	1 = None; 2 = Slight; 3 = Deep			
<input type="checkbox"/>	<input type="checkbox"/>	Average number of seeds per pod				

7. SEED COLOR

<input type="checkbox"/>	<input type="checkbox"/>	1 = Shiny; 2 = Dull; 3 = Semishiny; 4 = Variable	<input type="checkbox"/>	<input type="checkbox"/>	1 = Monochrome; 2 = Polychrome
<input type="checkbox"/>	<input type="checkbox"/>	PRIMARY COLOR: 1 = White; 2 = Yellow; 3 = Buff; 4 = Tan; 5 = Brown; 6 = Pink; 7 = Red; 8 = Purple; 9 = Blue; 10 = Black; 11 = Other _____	<input type="checkbox"/>	<input type="checkbox"/>	SECONDARY COLOR: 1 = White; 2 = Yellow; 3 = Buff; 4 = Tan; 5 = Brown; 6 = Pink; 7 = Red; 8 = Purple; 9 = Blue; 10 = Black; 11 = Other _____
<input type="checkbox"/>	<input type="checkbox"/>	COLOR PATTERN: 1 = Solid; 2 = Splashed; 3 = Mottled; 4 = Striped; 5 = Flecked; 6 = Dotted	<input type="checkbox"/>	<input type="checkbox"/>	HILAR RING: 1 = Absent; 2 = Present
<input type="checkbox"/>	<input type="checkbox"/>	HILAR RING COLOR: 1 = White; 2 = Yellow; 3 = Buff; 4 = Tan; 5 = Brown; 6 = Pink; 7 = Red; 8 = Purple; 9 = Blue; 10 = Black; 11 = Other _____			

8. SEED SHAPE AND WEIGHT

SHAPE OF SEED TAKEN FROM MIDDLE OF POD:

1 = Round	2 = Oval	3 = Cuboid	4 = Kidney	5 = Truncate Fastigiate
				

Dry seed weight in g/100g seeds (adjusted to 12% moisture)

**YANIN PIGMENTATION**

ABSENT	<input type="checkbox"/> Flowers	<input type="checkbox"/> Stems	<input type="checkbox"/> Pods	<input type="checkbox"/> Seeds
PRESENT	<input type="checkbox"/> Leaves	<input type="checkbox"/> Petioles	<input type="checkbox"/> Peduncles	<input type="checkbox"/> Nodes

**KNOWN DISEASE REACTION**

DISEASES - COMMON NAME: Anthracnose, Rust, Powdery mildew, Fusarium root rot, Pythium root rot, Rhizoctonia root rot, Pythium wilt, Sclerotinia white mold, Angular leaf spot, Bacterial wilt, Halo blight, Fuscous blight, Common bacterial blight, Red node virus, Pod mottle virus, Bean common mosaic virus, Bean yellow mosaic virus, Curly top virus, Bacterial brown spot, Bean southern mosaic virus, Other (specify) \_\_\_\_\_

REACTION: 1 = Susceptible; 2 = Resistant; 3 = Tolerant; 4 = Avoidance

(Give the common name (CN), scientific name (SN), and race(s), where applicable)

DISEASE: CN Bean Common Mosaic Virus; SN \_\_\_\_\_; Race(s) \_\_\_\_\_

DISEASE: CN Bean Common Mosaic; SN Necrotic Virus; Race(s) \_\_\_\_\_

DISEASE: CN \_\_\_\_\_; SN \_\_\_\_\_; Race(s) \_\_\_\_\_

DISEASE: CN \_\_\_\_\_; SN \_\_\_\_\_; Race(s) \_\_\_\_\_

DISEASE: CN \_\_\_\_\_; SN \_\_\_\_\_; Race(s) \_\_\_\_\_

DISEASE: CN \_\_\_\_\_; SN \_\_\_\_\_; Race(s) \_\_\_\_\_

**11. KNOWN INSECT/NEMATODE RESISTANCE**

PESTS - COMMON NAME: Aphids, Bean pod weevil, Bruchid beetle, Corn earworm, Flea beetle, Leaf hopper, Lesion nematode, Lygus, Mexican bean beetle, Root knot nematode, Corn seed maggot, Spider mites, Thrips, Weevils, Western bean cutworm, Other (specify) \_\_\_\_\_

REACTION: 1 = Susceptible; 2 = Resistant; 3 = Tolerant; 4 = Avoidance

(Give the common name (CN), scientific name (SN), and biotype, where applicable)

PEST: CN lygus; SN lygus hesperus; Biotype \_\_\_\_\_

PEST: CN \_\_\_\_\_; SN \_\_\_\_\_; Biotype \_\_\_\_\_

PEST: CN \_\_\_\_\_; SN \_\_\_\_\_; Biotype \_\_\_\_\_

**12. KNOWN PHYSIOLOGICAL STRESS REACTION**

1 = Susceptible; 2 = Resistant; 3 = Tolerant; 4 = Avoidance

Heat  Cold  Drought  Air Pollution

Nutrient toxicity or deficiency (specify nutrient) \_\_\_\_\_

Other \_\_\_\_\_

**COMMENTS**