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Registration of Germplasms

REGISTRATION OF UC 123 AND UC 143 ALFALFA GERMPLASMS (Reg. No. GP 124 and GP 125)[1]

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UC 123 (GP 124) and UC 143 (GP 125) alfalfa [*Medicago sativa* L.] germplasms were released by the Department of Agronomy and Range Science, University of California, Davis; Department of Plant Pathology, Kansas State University, Manhattan; and the USDA-ARS, Forage Insects Research Laboratory, Tucson, Ariz., in October and November 1980. They are nondormant germplasms (derived from 'CUF 101') with more resistance than CUF 101 to downy mildew caused by *Peronospora trifoliorum* d By. CUF 101 has high levels of resistance to the spotted alfalfa aphid [*Therioaphis maculata* (Buckton)] and pea aphid [*Acyrthosiphon pisum* (Harris)].

UC 123 was derived by screening 7370 CUF 101 seedlings and selecting 1479 with resistance to isolates I5 and I7 (mixed) of the downy mildew fungus. These plants were screened for resistance to anthracnose caused by *Colletotrichum trifolii* Bain and the 60 survivors were transplanted in the field and pollinated by honey bees. The resulting seed was bulked to produce UC 123.

UC 143 was selected from a population of 13 476 UC 123 plants for resistance to isolate I8 of the downy mildew fungus. I8 was isolated from alfalfa from El Centro, Calif., and is virulent to some nondormant cultivars heretofore considered highly resistant to downy mildew. The 550 selected plants were planted in the field at El Centro, Calif. About 8% of these plants were discarded because they supported populations of the blue alfalfa aphid [*Acyrthosiphon kondi* Shinji]. Selected plants were interpollinated by honey bees in a field cage to produce Syn 1 seed.

Mean percentages of seedlings free of mildew after inoculation with isolates I5 and I7 (mixed) and I8, respectively, were CUF 101, 28 and 2; UC 123, 66 and 5; UC 143, 63 and 67; 'Caliverde', 15 and 2, 'Saranac' (resistant), 18 and 51; and 'Kanza' (susceptible) 0 and 0. On a scale of 1=least to 5=most, blue alfalfa aphid damage at Tucson was 1.7, 1.0, and 5.0, respectively, for UC 143, BAA 15 (highly resistant), and Caliverde.

Resistance evaluation tests for Phytophthora root rot caused by *Phytophthora megasperma* Drechs. f. sp. *medicaginis* Kuan and Erwin and bacterial wilt caused by *Corynebacterium insidiosum* (McCull.) H. L. Jens. were conducted at St. Paul, MN. Mean percentages of plants resistant to Phytophthora root rot were UC 143, 28; 'Agate' (resistant), 58; and Saranac (susceptible), 3. Percentages of plants resistant to bacterial wilt were UC 143, 2; 'Ranger' (resistant), 30; and 'Narragansett' (susceptible), 0. Anthracnose resistance of UC 123 and UC 143 was not determined but probably is low since a population derived from UC 143 by 1 cycle of selection for resistance had 12% of plants resistant to *C. trifolii* (Race 1) compared with 76% for 'Arc' (resistant) and 5% for Saranac (susceptible) in a test at Oxford, N.C.

Ten grams of seed of UC 123 and UC 143 will be distributed upon written request and agreement to make appropriate recognition of its source as a matter of open record when this germplasm contributes to the development of a new cultivar, hybrid, or germplasm. Requests for seed should be directed to Dr. W. F. Lehman, Univ. of California, 1004 E. Holton Road, El Centro, CA 92243.

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REGISTRATION OF EIGHT GERMPLASM LINES OF COTTON[1] (Reg. Nos. GP 210 to GP 217)

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EIGHT semigametic virescent-7 cotton (*Gossypium* sp.) lines were developed and released by the USDA-ARS and the Mississippi Agricultural and Forestry Experiment Station (Table 1).

The semigametic trait has been documented in Pima (*G. barbadense* L.) as a method by which haploids with paternal genomes and *G. barbadense* cytoplasm were derived at will in one generation of breeding[3].

A stock of semigametic and virescent (v_7v_7) *G. barbadense* material was obtained from E. L. Turcotte (UDSA-ARS, Phoenix, Ariz.). Strains with *G. hirsutum* nuclear genes from a Yugoslav breeding line and cytoplasms from *G. hirsutum, G. tomentosum, G. barbadense, G. herbaceum, G. arboreum, G. anomalum, G. longicalyx,* and male sterile *G. harknessii* were obtained from Vesta Meyer (Mississippi Agriculture and Forestry Experiment Station, Stoneville, Miss.). The cytoplasms from several of these species have been reported to influence agronomic and host plant resistance traits. The strains with species cytoplasms were backcrossed two to three times with the semigametic, v_7v_7 *G. barbadense* matterial serving as the male, recurrent parent. Following each backcross, progency were rigorously selected for early, prolific fruiting types.

Each semigametic cytoplasm line was developed by compositing seed from plants which produced high frequencies of chimeral seedlings (4 to 12%) in testcrosses. Testcross results and approximate days to first blooms for the germplasm lines are shown in Table 2. Although the lines have been extensively selected for early, prolific fruiting types, sufficient variation exists to allow further selection. These lines are homozygous for the semigamy trait and should produce about 50% haploids in their selfed progenies. Each line has tetraploid nuclear genes primarily from the *G. barbadense* recurrent parent; however, three have cytoplasms from tetraploid species and five have cytoplasms from diploid species of *Gossypium.*

To obtain a cultivar in one of these cytoplasms, cross the semigametic, v_7v_7 cytoplasm line as female with the cultivar. Three to five percent of the plants from F_1 seed should be green virescent

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[3] Turcotte, E.L., and C.V. Feaster. 1974. Methods of producing haploids: semigametic production of cotton haploids. p. 53–64. *In* K.J. Kasha (ed.) Haploids in higher plants—advances and potential. Univ. of Guelph, Guelph, Ontario, Canada.

[4] Meyer, V.G. 1975. Male sterility from *Gossypium harknessii.* J. Hered. 66:23–27.

Table 1. Semigametic virescent-7 cotton (*Gossypium* sp.) lines developed and released by USDA-ARS and Mississippi Agricultural and Forestry Experiment Station.

Registration no.	Identification	Cytoplasm
GP 210	M-HIR-SG	*G. hirsutum* L.
GP 211	M-TOM-SG	*G. tomentosum* Seem.
GP 212	M-BARB-SG	*G. barbadense* L.
GP 213	M-HERB-SG	*G. herbaceum* L.
GP 214	M-ARB-SG	*G. arboreum* L.
GP 215	M-ANOM-SG	*G. anomalum* Wawr. & Peyr.
GP 216	M-LONG-SG	*G. longicalyx* Hutch. & Lee
GP 217	M-HAMS-SG	*G. harknessii* Brandag.

Table 2. Testcross evaluations and days to first bloom of semigametic cytoplasm lines.

Line	Generation	No. testcross seed evaluated	Chimerals produced		Days to first bloom†
			No.	%	
Tetraploid cytoplasms					
M-HIR-SG	BC_3F_4	717	40	5.58	60
M-TOM-SG	BC_2F_3	231	18	7.79	58
M-BARB-SG	BC_3F_3	65	8	12.31	64
Diploid cytoplasms					
M-HERB-SG	$BC_3(F_3\&F_4)$	329	15	4.56	63
M-ARB-SG	BC_3F_3	319	13	4.08	60
M-ANOM-SG	$BC_3(F_3\&F_4)$	150	13	8.67	63
M-LONG-SG	BC_2F_2	73	7	9.59	64
Diploid male sterile					
M-HAMS-SG	$BC_3 \times BC_3$[2]	196	11	5.61	56

† Days to first bloom on 10 June 1981 planting.

chimeral seedlings. The virescent tissue would then be cut away and the green tissue allowed to grow. This green tissue, if haploid, would have paternal cultivar genes in the female cytoplasm. Subsequent doubling with the alkaloid colchicine would produce a doubled haploid of the paternal cultivar in the maternal cytoplasm in one generation.

The cytoplasm from *G. harknessii* results in male sterility[4]. Here, the doubled haploid blooms remain male-sterile due to the cytoplasmic male-sterile cytoplasm. Seed is obtained by pollinating these male-sterile blooms with the original male cultivar.

A fertile maintainer (M-HIR-SG) is utilized as a pollinator line for the purpose of maintaining and increasing seed of the male-sterile (M-HAMS-SG) breeding line. The maintainer does not have fertility restorer genes. The *G. harknessii* male-sterile breeding line must be crossed as female with the fertile maintainer in order to obtain seed and maintain semigamy and virescence in a homozygous condition. The fertile maintainer is selfed to maintain seed.

Small amounts of seed of these lines are available for distribution to cotton breeders and other research workers until the present supply is exhausted. Written requests should be addressed to: Johnie N. Jenkins, Crop Science Res. Lab., P. O. Box 5367, Mississippi State, MS 39762.

REGISTRATION OF PENNLO AND PENNLINE 6571 OAT GERMPLASM LINES[1] (Reg. Nos. GP23 and GP24)

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TWO spring oat (*Avena sativa* L.) germplsam lines, 'PENNLO' (Reg. No. GP23) and 'PENNLINE 6571' (Reg. No. GP24) were released in 1982 by ARS-USDA and The Pennsylvania Agric. Exp. Stn. The primary reason for release of both lines was short, semidwarf plant height which contributed to their excellent lodging resistance. The lines may be useful as parents to produce commercial cultivars with these traits.

Pennlo was derived from an 'Egdolon 26'/'Otee' cross (XM74G1) made in 1974. A single panicle was selected from the F_2 bulk in 1975. The resulting line was grown in 1976 and 1977, and subjected to reselection in 1977, and Pennlo traces to panicle row 9925 grown in 1978. It was tested in multiple experiments in Pennsylvania in 1980 and 1981 as PA 7836-9925, and was included in the Uniform Early Oat Performance Nursery (UEOPN) in 1981. Pennlo averaged 23 and 18 cm shorter than 'Lang' cultivar in Pennsylvania and UEOPN tests, respectively. The line was similar to Lang for maturity and bushel weight, but 9% and 18% lower yielding in the Pennsylvania and UEOPN tests, respectively. It was slightly higher yielding than 'Noble' cultivar in Pennsylvania tests. Pennlo has relatively high groat protein in UEOPN tests (19% compared to 19.2% for 'Otee' and 16.5% for Lang), and ranked first for lodging resistance.

Pennlo is an early, lodging resistant, semidwarf, spring oat. Juvenile plants are erect. The leaves are very sparsely ciliate near the base. Ligules are present. The culms are short, mid-sized, and glabrous. The panicle is equilateral, midbroad and midlong with short ascending to spreading branches. The rachis is straight or slightly flexous, and many short hairs are present on the rachis branches. A false node is absent. The lemma is short, yellow, and glabrous. The glumes also are glabrous. Several short basal hairs are present. Spikelets, most of which set two fertile florets, separate by semi-abscission. Floret separation is by disarticulation. The kernels are mid-plump and have a basal scar. Awns are common on the basal floret of spikelets near the ends of rachis branches. These awns vary from mid-long twisted and subgeniculate with dark coloration on the lower part to short and nontwisted without dark coloration.

Pennline 6571 was derived from an 'Asto'/'Noble' cross (XW74G55) made in 1974. It traces to a panicle selection made from the F_4 bulk population. The resulting line (PA 7836-6571) was grown in one test in 1979 and at two locations in Pennsylvania during 1980 and 1981. It was included in the Uniform Midseason Oat Performance nursery (UMOPN) in 1981. Pennline 6571 was about 20 cm shorter than Noble under Pennsylvania conditions, and 19.5 cm shorter than 'Ogle' cultivar in the UMOPN tests. It ranked first for lodging resistance. In Pennsylvania, the line was similar to Noble for yield and bushel weight and a day or two earlier in maturity.

Pennline 6571 is an early maturing, loding resistant, semidwarf, spring oat. Juvenile plants are erect. The leaves are sparsely ciliate near the base with ligules present. The short, mid-sized culms are glabrous. The panicle is equilateral, midboard and midlong, with short ascending to spreading branches. The rachis is slightly flexous, and its branches have many short hairs. A false node is absent. The lemma is short, yellow, and glabrous. The glumes also are glabrous. A few short basal hairs are present on some kernels. Spikelet separation is by semi-abscission. Most spikelets have two fertile florets. Floret separation occurs by disarticulation. The secondary floret rachilla segment is mid-long and glabrous. The kernels are plump, have a basal scar, and a few awns are present. Awns are short and may be twisted and subgeniculate or nontwisted.

Breeder seed of Pennlo and Pennline 6571 will be maintained by The Pennsylvania Agricultural Experiment Station. A limited quantity of seed will be sent to breeders who request it from the Dep. of Agronomy, Tyson Building, The Pennsylvania State University, University Park, PA 16802.

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