

REGISTRATION OF GERMPLASMS

REGISTRATION OF UC 193 ALFALFA GERMPLASM WITH HIGH RESISTANCE TO DOWNY MILDEW AND FUSARIUM WILT

UC 193 (Reg. no. GP-202) (PI 512289) alfalfa (*Medicago sativa* L.) germplasm was released by the Department of Agronomy and Range Science, University of California, Davis, and the Department of Plant Pathology, Kansas State University, Manhattan, in July 1987. UC 193 is a nondormant germplasm with high resistance to downy mildew (caused by *Peronospora trifoliorum* d By.) and Fusarium wilt (caused by *Fusarium oxysporum* Schlecht. f. sp. *medicaginis* (Weimer) Snyder and Hans.), and low resistance to anthracnose (incited by *Colletotrichum trifolii* Bain).

UC 193 was selected from UC 143 (2) for resistance to downy mildew isolate I-7 from Kansas, isolate I-8 from El Centro, CA, and a virulent mixed culture from Thomas County, KS. UC 143 parentage traces to UC 123 (2), which was selected from 'CUF 101' (1). At the seedling stage, 20 138 UC 143 plants were screened for resistance to downy mildew. The survivors were then selected for resistance to anthracnose race 1. The 216 plants that were resistant to both diseases were placed in a cage at El Centro, CA, and pollinated by honeybees (*Apis mellifera* L.) to produce Syn 1 seed of UC 193.

Mean percentages of seedlings free of mildew after inoculation with downy mildew isolates I-7 and I-8, respectively, were UC 193, 73.2 and 75.0; 'Saranac' (resistant), 18.2 and 46.2; and 'Kanza' (susceptible), 2.0 and 1.5. Mean percentages of plants resistant to anthracnose (race 1) were UC 193, 12.1; 'Arc' (resistant), 75.6; and Saranac (susceptible), 3.7 (3).

Resistance evaluation tests for Phytophthora root rot (caused by *Phytophthora megasperma* Drechs. f. sp. *medi-*

caginis Kuan and Erwin) and Fusarium wilt were conducted at St. Paul, MN (4). Mean percentages of plants resistant to Phytophthora root rot were UC 193, 11.6; 'Agate' (resistant), 35.4; and Saranac (susceptible), 4.9. Mean percentages of plants resistant to Fusarium wilt were UC 193, 94.7; 'Moapa' (resistant), 89.6; and 'Naragansett' (susceptible), 38.6. In hay production tests, UC 193 produced 84% of CUF 101 at El Centro, CA, in a 2-yr test, and 115% of CUF 101 at Five Points, CA, in a 5-yr test. Resistance to the blue alfalfa aphid (*Acyrtosiphon kondoi* Shinji) is similar to CUF 101 (1).

Five grams of seed of UC 193 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, University of California, 1004 E. Holton Road, El Centro, CA 92243.

W. F. LEHMAN,* D. L. STUTEVILLE, AND V. L. MARBLE (5)

References and Notes

1. Lehman, W.F., M.W. Nielson, V.L. Marble, and E.H. Stanford. 1983. Registration of CUF 101 alfalfa. *Crop Sci.* 23:398.
2. ———, D.L. Stuteville, M.W. Nielson, and V.L. Marble. 1983. Registration of UC 123 and UC 143 alfalfa germplasms. *Crop Sci.* 23:403.
3. Evaluation by R.E. Welty, Oregon State Univ., Corvallis, OR.
4. Evaluation by D.K. Barnes and F.I. Frosheiser, Univ. of Minnesota, St. Paul, MN.
5. W.F. Lehman, Dep. of Agronomy and Range Science, Univ. of California, Davis (P.O. 1004 E. Holton Rd., El Centro, 92243); D.L. Stuteville, Dep. of Plant Pathology, Kansas State Univ., Manhattan, KS 66506; and V.L. Marble, Dep. of Agronomy and Range Science, Univ. of California, Davis, CA 95616. Contribution no. 88-9-J, Kansas Agric. Exp. Stn., Kansas State Univ., Manhattan. Registration by CSSA. Accepted 30 Nov. 1987. *Corresponding author.

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REGISTRATION OF FOURTEEN COTTON GERMPLASM LINES

FOURTEEN cotton (*Gossypium hirsutum* L.) germplasm lines (Reg. no. GP-319 to GP-332; PI 513383 to PI 513396) were released by the Texas Agricultural Experiment Station in

March 1987. These lines were developed in the cotton breeding research program of the Department of Soil and Crop Sciences, and exhibit various genetic combinations of growth pattern, fruiting habit, plant type, boll conformation, maturity, fiber properties, and glandedness.

All of the germplasm lines can be considered as short-

Table 1. Germplasm lines and pedigrees.

Release designation	PI no.	Registration no.	Pedigree
<u>Short season</u>			
CS-8601	513383	GP-319	TAMCOT CAMD-E × (AET-5 × 6M-10)
CS-8602	513384	GP-320	TAMCOT CAMD-E × Arkugo 4
CS-8603	513385	GP-321	TAMCOT SP-21S × (CA491 × 6M-10)
CS-8604	513386	GP-322	TAMCOT SP-21S × (LDA-77 × Lankart 3840)
CS-8605	513387	GP-323	TAMCOT SP-21S × (LDA-77 × Lankart 3840)
CS-8606	513388	GP-324	TAMCOT SP-21S × 1209-619
CS-8607	513389	GP-325	[(Gregg × Fox 4) × Lankart 3840] × (EMW × Lankart 57)
<u>Glandless</u>			
CS-8608	513390	GP-326	(DSR 6-19 × CA998) × NM-g541
CS-8609	513391	GP-327	(DSR 6-19 × CA998) × Lankart Glandless
CS-8610	513392	GP-328	1209-619-7 × NM-g1301
CS-8611	513393	GP-329	1209-619-7 × NM-g1301
<u>Improved fiber strength</u>			
CS-8612	513394	GP-330	PD-9232 × (77-3840 × 21-17-6)
CS-8613	513395	GP-331	PD-0109 × (77-3840 × 21-17-6)
CS-8614	513396	GP-332	FJA-347 × (77-3840 × 21-17-6)

season types in that they are more determinate and diminutive than most of the cultivars presently grown in central and southern Texas. Lint yields of several lines (CS-8603, CS-8608, and CS-8610) compared favorably with full-season 'Stoneville 213', while all lines equalled or exceeded the yield of 'TAMCOT SP-37H', the short-season check.

These lines, designated CS-8601 through CS-8614, were divided into three groups, mainly on the basis of general phenotype and potential utilization by breeders interested in developing cultivars (Table 1). Lines CS-8601 through CS-8607 are more determinate in fruiting pattern and are more compact than Stoneville 213 or TAMCOT SP-37H. These lines have a rapid rate of blooming, early maturity, and produce medium to large bolls similar to Stoneville 213 with storm resistance equal to that of TAMCOT SP-37H.

Lines CS-8608 through CS-8611 are glandless. These germplasm lines resulted from efforts to combine rapid fruiting, relatively compact plant types suitable for stripper harvest with the glandless trait.

Lines CS-8612 through CS-8614 combine early maturity with improved fiber characteristics, especially increased fiber strength. These lines represent the first cycle of selection for early-maturing, compact plant types with improved fiber strength.

C. WAYNE SMITH* AND G. A. NILES (1)

References and Notes

1. Dep. of Soil and Crop Science, Texas A&M Univ., College Station, TX 77843. Registration by CSSA. Accepted 30 Dec. 1987. *Corresponding author.

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REGISTRATION OF FOUR FLAX GERMPLASM LINES

FOUR FLAX (*Linum usitatissimum* L.) germplasm lines (Reg. no. GP-1 through GP-4), (PI 512292 through PI 512295) jointly developed by the USDA-ARS Oilseeds Research Unit and the Agricultural Experiment Station, North Dakota State University, at Fargo, ND, were released in February 1987. 'Culbert M3P3', 'Linott M3P3', 'Wishek M3P3', and 'Nored M3P3' were developed for use in flax breeding and research programs.

The four germplasm lines carry the $M^3M^3P^3P^3$ multiple-gene resistance to flax rust [caused by *Malampsora lini* (Ehrenb.) Lev.]. Both genes convey resistance to presently known races of flax rust in North America. The lines are blue-flowered, brown-seeded selections derived by the backcross method of breeding with 'Culbert', 'Linott', 'Wishek', and 'Nored' used as recurrent parents. The $M^3M^3P^3P^3$ genes were derived from the nonrecurrent parent, CI 2506 $M^3M^3P^3P^3$, a line developed by H.H. Flor with multiple-gene resistance to flax rust. Nored and Culbert were developed in Minnesota and released as cultivars in 1968 and 1975, respectively. Linott was developed in Canada and released as a cultivar in 1966. Wishek was developed in North Dakota and released as a cultivar in 1979. All cultivars have been grown on substantial acreage in areas of North Dakota, Minnesota, South Dakota, and/or Canada. Each line is a single plant selection from the BC_4F_4 generation. Single plant selections were made after each backcross, and seedlings from these selections were inoculated with the rust cultures 218-S48 and X36, developed by G.D. Statler (1). These two cultures are virulent on flax lines carrying rust resistant genes, other than

M^3 and P^3 , and were used to identify the combination of these two genes even if other genes were present. Single plants selected in the BC_4F_2 , BC_4F_3 , and BC_4F_4 generations were tested for resistance. A single resistant plant from the BC_4F_4 generation from each cross was increased and grown in paired comparison trials with the recurrent parent to test for agronomic and morphologic similarity. Three replications of 50 seedlings were inoculated to verify that each line was homozygous resistant to the two races. One line from each backcross program was selected for release.

Culbert M3P3, Linott M3P3, Wishek M3P3, and Nored M3P3 flowered 50, 49, 51, and 55 d after sowing; were 61, 60, 62, and 67 cm in height; and had oil percentages of 40.6, 40.7, 40.2, and 40.6, respectively, when grown in trials at Fargo, ND; Morden, Manitoba; and Brookings, SD, in 1986. Culbert, Linott, Wishek, and Nored cultivars flowered 49, 49, 51, and 55 d after sowing; were 60, 59, 62, and 67 cm in height; and had oil percentages of 40.6, 40.6, 40.4, and 40.0, respectively, in the same trials.

The intent of the registration of the four lines is that breeders can utilize the germplasm in crosses with other cultivars or introductions that possess the same $M^3M^3P^3P^3$ multiple-gene resistance. The germplasm lines provide protection against a major rust development in the natural rust population, a highly unlikely event that would require spontaneous mutations for two genes in the pathogen.

Limited quantities of seed of each germplasm source are available from the USDA Flax Collection maintained by J.F. Miller, USDA-ARS, and J.J. Hammond, Agronomy Department, North Dakota State University, Fargo, ND 58105.

J. F. MILLER,* J. J. HAMMOND, AND G. D. STATLER (2)

References and Notes

1. Statler, G.D., J.J. Hammond, and D.E. Zimmer. 1981. Hybridization of *Malampsora lini* to identify rust resistance in flax. Crop Sci. 21:219-221.
2. J.F. Miller, USDA-ARS, Oilseeds Res., J.J. Hammond, Dep. of Agronomy, and G.D. Statler, Dep. of Plant Pathology, North Dakota State Univ., Fargo, ND 58105. Cooperative investigations between the USDA-ARS and the North Dakota Agric. Exp. Stn., Fargo, ND 58105. Published with the approval of the director of the North Dakota Agric. Exp. Stn. as Journal Article no. 1613. Registration by CSSA. Accepted 30 Nov. 1987. *Corresponding author.

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REGISTRATION OF FOLIAR NEAR ISOLINE GERMPLASMS OF *af*, *st*, AND *tl* IN THREE CULTIVARS AND ONE BREEDING LINE OF WINTER PEA

EIGHT combinations of the three genes *af*, *st*, and *tl* were backcrossed into three cultivars and one breeding line of pea (*Pisum sativum* L.) (Reg. no. GP-37 through GP-68) (PI 512056 through PI 512087). The resulting near isolines were released by the University of Idaho Agricultural Experiment Station in September of 1987. In the homozygous recessive condition, the genes *af*, *st*, and *tl* modify the pea canopy into seven different foliage types (3). The *af* gene replaces leaflets with tendrils, producing the afila phenotype; *st* reduces stipule size; and *tl* replaces tendrils with leaflets, producing the acacia phenotype. Plants homozygous recessive for both *af* and *st* (*afaf stst*) result in a plant with small stipules and a proliferation of tendrils but no leaflets. The interaction of *af* with *tl* (*afaf tl tl*) results in a plant with highly branched petioles and many small leaflets. When *st* and *tl* are combined (*stst tl tl*) the plant has small stipules, and the tendrils are