

caryopses; awned, awnleted and hooded lemmas; white and blue aleurone; rough and smooth awns; black and white lemmas and paleas; winter, facultative and spring growth habit; and a wide range of maturity dates and spike densities. Seed is available in 1 to 2 kg lots from any of the authors. Composite Cross XXXIV seed may be planted in the fall or the spring, depending on local conditions. Possible uses of composite crosses have been reviewed (6, 9), and a suggested list of methods for using this cross will be sent to each person requesting seed.

As new sources of Al/acid soil tolerance become available, they will be crossed onto male sterile segregates from three of the six tolerant cultivars and increases from these will be incorporated into planting stocks for future seed increases and considered a part of CC XXXIV. Seed of the composite will be maintained jointly by the Arizona Agric. Exp. Stn. and the USDA.

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REGISTRATION OF C-20 ZIGZAG CLOVER

GERMPLASM¹

(Reg. No. GP 28)

Noel Faust and Heinz Gasser²

C-20 zigzag clover (*Trifolium medium* L.) germplasm pool was developed by six cycles of recurrent selection on material originating from Canada, Yugoslavia, and the USSR. Fertility, as measured by the percentage of florets setting seed, was increased from 7 to 15%. C-20 is winterhardy and intermediate in maturity. By the 2nd year of growth average spread and height of spaced plants was 0.66 m² and 24 cm, respectively. Over 94% of the plants were semi-erect for growth habit. Average forage yield over 11 station-years was 4,781 kg/ha of dry matter. Protein and total digestible nutrients averaged 15 and 65%, respectively. C-20 flowers profusely and flower color ranges from pale to dark red. Cuttings from the 50 best ecotypes were used to establish a seed nursery of 400 plants. The bumble bee (*Bombus* spp.) was the principal pollinator. Plants with a seed yield of 9 g or greater were composited to form the pool. Seed is available in 20-g lots from the Station de Recherche Agricole, 3300, rue Sicotte, C.P. 480 St-Hyacinthe, Quebec J2S 7B8, Canada.

¹Registered by Crop Sci. Soc. Am. Publication No. 266 of the Direction Generale de la Recherche et de l'Enseignement, Min. Agric. Alim. du Quebec. Accepted 26 Dec. 1979.

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REGISTRATION OF DES-146-C COTTON GERMPLASM¹

(Reg. No. GP 155)

Vesta G. Meyer²

DES-146-C is a cotton (*G. hirsutum* L.) germplasm line developed at the Delta Branch of the Mississippi Agric. and Forestry Exp. Stn.

DES-146-C possesses a strong fertility-restorer gene that may be useful for producing hybrid cotton based on the *G. harknessii* Brandegee cytoplasmic male sterility.

DES-146-C is derived from a cross in which the male parent was an F₁ hybrid between *G. hirsutum* 'M8' and *G. aridum* (Rose and Standley) Skovsted, and the female parent had *G. harknessii* cytoplasm and a complex pedigree that includes backcrosses to Upland cotton (*G. hirsutum*), interspersed with selfs and with test-crosses to male-sterile lines with *G. harknessii* cytoplasm. It was selected on the basis of its test-cross performance in restoring fertility with several male-sterile lines. In addition to the previously identified fertility-restorer factor from *G. harknessii*, DES-146-C possesses a second strong fertility-restorer gene which appears to be stable under environmental stress. Seed for the present release is from F₂ (1979) progeny rows from individual plants in 1978, row 146. In test-crosses grown in 1979, it produced ratios of 3 fertile: 1 male-sterile. The rows are segregating also for nectariless, glandless, occasional male-sterile plants, yellow petal from *G. harknessii*, and degrees of plant hairiness. Due to the present interest in producing hybrid cotton, this stock is being released with considerable genetic variability. Other plant and fiber characteristics of row 146 did not differ strikingly from those of Upland cultivars grown in the Mississippi Delta. For male-fertile plants, seed index ranged from 11.3 to 14.5 g, lint index from 4.5 to 8.5 g; lint % from 31.9 to 42.1; 2.5% span fiber length from 25.9 to 28.7 mm; 50% span fiber length from 10.6 to 12.7 mm; T₁ fiber strength from 180 to 210 m N/tex; E₁ elongation from 5.0 to 7.1%; and micronaire from 3.1 to 4.65 units.

Probably the simplest means for maintaining high levels of fertility restoration during further transfer of the new restorer to Upland cotton cultivars would be to use test crosses of the most fertile plants in each generation to cytoplasmic male sterile lines from that cultivar. This would minimize the chance of separating the two genes for fertility during the breeding process.

Limited quantities of seed will be available upon written request for breeding or other research purposes after December 1979 from Robert R. Bridge, Delta Branch Exp. Stn., Stoneville, MS 38776.

¹Registered by the Mississippi Agric. and Forestry Exp. Stn. Journal article No. 5011. Accepted 11 Feb. 1980.

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REGISTRATION OF THREE GERMPLASM LINES OF COTTON¹

(Reg. No. GP 156 to GP 158)

R. R. Bridge²

THREE breeding lines of cotton (*Gossypium hirsutum* L.), DES 04-6 (GP 156), DES 04-11 (GP 157) and DES 04-606 (GP 158) with glyphosate tolerance were developed at the Delta Branch, Mississippi Agric. and Forestry Exp. Stn.

In 1975 a noncommercial stock designated as DES 21326-04 was released because of its potential value in cotton breeding programs emphasizing earliness. DES 21326-04 originated from a 1965 cross, PD62-164 × 'Stoneville 213', which was the same cross that produced DES 56 cotton (Reg. No. 70).³ The F₂ population of this cross was intercrossed at random in 1966 and DES 21326-04 was from a single plant selection in the F₂ generation of the intercross population and subsequent reselection in the F₇ generation. DES 21326-04 pro-

¹Registered by the Crop Sci. Soc. Am. Published as Journal Paper 5053 of the Mississippi Agric. and Forestry Exp. Stn. Accepted 20 Feb. 1980.

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³Bridge, R. R., and J. F. Chism. 1978. Registration of DES 56 cotton (Reg. No. 70). *Crop Sci.* 18:524.

duces comparable yields with 'Deltapine 16', matures 10 to 14 days earlier and has longer and stronger fiber. DES 21326-04 has shown a potential for reducing the probability of lower yield from late plantings.⁴

Subsequent reselection of DES 21326-04 resulted in several strains of which three were designated as DES 04-6, DES 04-11, and DES 04-606. In 1974 these strains were included in the evaluation of 405 genotypes for tolerance to the herbicide glyphosate [N(phosphonomethyl)glycine] applied over-the-top of cotton in the early bloom stage. These three strains were selected as having glyphosate tolerance. In 1975, 1976, and 1977 these strains were evaluated for tolerance when glyphosate was applied over-the-top. In an additional study in 1977, the genotypes were treated with repeated directed applications of glyphosate.⁵ When the herbicide was directed to the base of the plant, cotton injury was 10% or less compared to 65-80% injury for over-the-top applications. Yield of these strains was not significantly reduced from untreated controls when one or two separate applications of glyphosate were directed to the base of the cotton plants.

These three genotypes (DES 04-6, DES 04-11, and DES 04-606) have the earliness of DES 21326-04 and have shown measurable tolerance to directed applications of glyphosate. They may have value in the development of commercial cotton cultivars with increased tolerance to glyphosate.

Seed (25 g) of these breeding lines may be obtained from R. R. Bridge, Delta Branch, Mississippi Agric. and Forestry Exp. Stn., Stoneville, MS 38776.

⁴Tupper, G. R., R. R. Bridge, and W. I. Spurgeon. 1979. Influence of late planting dates on early maturing cotton. MAFES Res. Rep. 4:14.

⁵Jordan, T. N., and R. R. Bridge. 1979. Tolerance of cotton to the herbicide glyphosate. Agron. J. 71:927-928.

REGISTRATION OF VIRGINIA SYNTHETIC A CROWN VETCH GERMLASM¹

(Reg. No. GP 29)

John D. Miller²

VIRGINIA Synthetic A germplasm of crownvetch, *Coronilla varia* L., released by AR-SEA-USDA and Virginia Polytechnic Institute and State Univ., is the first known synthetic selected for tolerance to acid soils. This synthetic traces to five sources—'Chemung', 'Emerald', 'Penngift', Maryland Hay and Maryland Pasture. The first three of these are released cultivars but Maryland Hay and Maryland Pasture are experimental synthetics developed by AR-SEA at Beltsville, Maryland. About 1,400 plants of each of these strains were grown in the greenhouse at six lime levels ranging from 2.24 to 13.44 metric tons/ha applied to extremely acid mine spoil (pH of 3.4). The spoil material ranged from pH 3.8 to pH 5.6 depending on amount of lime added. Superior plants were selected from all lime levels and increased as clones. One-hundred sixty-seven clones were transplanted into a relatively acid mine spoil area with pH of 5.2 at White Oak, West Virginia, in the spring of 1973. Forty-seven superior clones were identified and propagated to establish the source nursery for Virginia Synthetic A. Ten of these clones came from Chemung, 17 came from Emerald with six each from Penngift and Maryland Hay. Maryland Pasture contributed eight clones. Bulk seed was harvested from all clones.

Clones comprising this germplasm pool are variable for many characters. Most clones are semierect but a few are either erect or prostrate for growth habit. Flower color is generally pink but somewhat variable. Maturity varies from early to late. Leaf size and color varies with some clones having light green leaves and others appearing distinctly dark green. Leaf width varies from narrow to wide. Stems are predominately coarse but a few are rather fine in size. Most clones are vigorous with high forage and seed production.

Breeder seed will be maintained by AR-SEA-USDA through 1979 or later at its present location at Blacksburg, Virginia, on the Virginia Agric. Exp. Stn. depending on interest in seed of the synthetic. Small quantities (up to 10 g) will be made available to public or private agencies on request to the author.

¹Registered by the Crop Sci. Soc. of Am. Cooperative investigations of the Research Division, Virginia Polytechnic Institute and State Univ., and AR-SEA-USDA, Blacksburg, VA 24061. Accepted 16 Jan. 1980.

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REGISTRATION OF Mp703 GERMLASM LINE OF MAIZE¹

(Reg. No. GP 83)

W. Paul Williams and Frank M. Davis²

Mp703 is a yellow dent inbred line of maize (*Zea mays* L.) developed cooperatively by the Mississippi Agric. and Forestry Exp. Stn. and AR-SEA-USDA. Breeder seed is maintained and distributed by the Agronomy Dep., Mississippi State Univ. This line was released as a source of leaf-feeding resistance to the southwestern corn borer, *Diatraea grandiosella* (Dyar), and the fall armyworm, *Spodoptera frugiperda* (J. E. Smith), and as a source of resistance to southern corn rust caused by *Puccinia polysora* Underw.

Mp703 was developed through eight generations of selfing and selection for resistance to leaf feeding by the southwestern corn borer within a cross between an S₂ from Antigua Gpo. 1 and an S₈ from Antigua Gpo. 2. This line has a higher level of resistance to leaf feeding by both the southwestern corn borer and the fall armyworm than Mp496, which has an intermediate level of resistance to both insects. When evaluated at Mississippi State for leaf-feeding damage by the southwestern corn borer, Mp703 and Mp496 rated 4.4 and 6.3 in 1978 and 6.0 and 7.6 in 1979, respectively. When evaluated for damage by the fall armyworm in 1979, they rated 4.0 and 5.5. Damage by both insects was rated on a scale of 0 (no damage) to 9 (extensive damage).

Mp703 is a medium-tall line which flowers 10 to 14 days later than Mp496. It is generally a good pollen producer, but ear shoot development is poor under drouthy conditions. It has not been evaluated for combining ability.

¹Registered by the Crop Sci. Soc. of Am. Contribution of the Crop Science and Engineering Research Laboratory. AR-SEA-USDA and the Mississippi Agric. and Forestry Exp. Stn., Mississippi State, MS. Published as Paper No. 5059 of the Mississippi Agric. and Forestry Exp. Stn. Accepted 27 Feb. 1980.

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REGISTRATION OF MAIZE GERMLASM¹

(Reg. No. GP 84 and GP 85)

H. Z. Cross²

Two maize (*Zea mays* L.) breeding populations developed at the Agric. Exp. Stn., North Dakota State Univ. were released in 1979 for breeding programs for extremely short growing season areas. Breeder seedstocks are maintained by the North Dakota Agric. Exp. Stn. and can be obtained in germplasm quantities from the author.

NDSA (Reg. No. GP 84) is a yellow endosperm maize synthetic developed by intercrossing eight elite lines of approximate AES300 maturity. The lines were chosen for good general combining ability for yield and are not closely related. This population was then random mated for two generations and mass selected for prolificacy for one generation. The eight parental lines were ND478, ND474, W153R, SD10, ND376, NDB8, A90, and MS1334. NDSA plants are tall with a high ear placement. Ears average 17 to 18 rows of average depth kernels. Under favorable growing conditions NDSA plants have averaged slightly more than one ear per plant. When tested in a diallel with four other early synthetics, NDSA demonstrated high general combining ability (GCA) effects for yield, kernel weight, and kernels per ear. Maturity is AES300.

NDSB (Reg. No. GP 85) is a yellow endosperm maize synthetic developed concurrently with NDSA from an intercross of six inbreds and one open pollinated variety. The parents were generally about AES200 maturity and were not related to lines used in developing NDSA. This synthetic also was random mated for two generations and then mass selected for prolificacy for one cycle. Parents included ND363, MS142, ND405, ND33, CO303, CV3, and 'Zapalote Chico'. NDSB plants are shorter than NDSA plants and have a lower ear placement. Ears average 16 to 17 rows of kernels which are slightly smaller than those of NDSA. This synthetic is slightly more prolific than NDSA. In diallel tests NDSB had high GCA effects for yield and ears per plant. Maturity is AES200.

¹Registered by the Crop Sci. Soc. of Am. Published with the approval of the Director of the North Dakota Agric. Exp. Stn. as journal article No. 1030. Accepted 20 Feb. 1980.

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