Registration of Five Glabrous Multi-Adversity Resistant (MAR-6) Germplasm Lines of Upland Cotton

Five glabrous multi-adversity resistant (MAR) germplasm lines of upland cotton (Gossypium hirsutum L.) from the MAR-6 germplasm pool were released by the Texas Agricultural Experiment Station (TAES) in April 1997. These lines are designated as CAHUGLBBCS-1-88 (Reg. no. GP-679, PL 603005), LBBCC4HUGS-1-89 (Reg. no. GP-680, PL 603006), CABD3SHP3S-1-90 (Reg. no. GP-681, PL 603007), BLCABPD86S-1-90 (Reg. no. GP-682, PL 603008), and MAR5PD208S-4-90 (Reg. no. GP-683, PL 603009). These lines were developed by the TAES-MAR Cotton Genetic Improvement Program using specific seed, seedling, and plant selection procedures and techniques for the simultaneous genetic improvement of resistance to pests (insects and plant pathogens) and abiotic stresses in addition to increased yield potential, earliness, and fiber and seed quality (1,4).

Performance evaluations were conducted over 2 to 3 yr in eight nurseries in Texas (Weslaco, Corpus Christi, College Station, Temple, McGregor, Munday, Chillicothe, and Halfway) to determine levels of resistance to adversities (insects, plant pathogens, and drought). In addition, the lines were tested in the Coastal Bend region of Texas (Nueces and San Patricio counties). Levels of resistance to pests were determined in comparisons with cotton lines and cultivars having known levels of resistance and susceptibility to those pests. The lines also were compared with ‘Tamcot CAB-CS’ (2), ‘Tamcot HQ95’ (5), and ‘Tamcot Sphinx’ (6) for lint yield, earliness, boll size, gin turnout, lint percentage, and fiber quality traits.

These glabrous lines have similar levels of resistance to insects and pathogens as the MAR-pubescent germplasm (8). The MAR-6 lines have significantly higher levels of broad-spectrum resistance than the earlier-released MAR germplasm to insects [thrips, Thrips and Frankliniella spp.; cotton fleahopper, Pseudatomoscelis seriatus (Reuter); boll weevil, Anthonomus grandis Boheman; tobacco budworm, Heliothis virescens (F.); and bollworm, Helicoverpa zea (Boddie)] and to multiple pathogens: Pythium ultimum Trow and Rhizoctonia solani Kühn, causing seed–seedling disease; Xanthomonas campestris pv. malvacearum (Smith) Dye, causing bacterial blight; Verticillium dahliae Kleb., causing verticillium wilt; Fusarium oxysporum Schlechtend. f. sp. vasinfectum (Atk.) Snyder & Hans.–Meloidogyne incognita (Kofoid & White) Chitwood, the fusarium wilt–root-knot nematode complex; Phymatotrichium omnivorum (Shear) Dug., causing phymatotrichium root rot; Alternaria, Ascochyta, and Phomopsis spp., causing leaf spots. All five germplasm lines are highly resistant to the bacterial blight pathogen. The glabrous trait reduces fiber trash content, egg laying and subsequent damage from tobacco budworm and bollworm, and damage from sweetpotato whitefly [Bemisia tabaci (Genn.)]. These lines have longer and stronger fiber than the glabrous Tamcot CAB-CS cultivar. All are glanded and nectaried, and have normal bract and leaf types.

for bacterial blight resistance and a high level of resistance to verticillium wilt. LBBCC4HUGS-1-89 is significantly superior to Tamcot CAB-CS and Tamcot Sphinx, and is similar to Tamcot HQ95. It has improved fiber fineness (micronaire reading), with a fiber length of 28.6 mm and a strength of 26.7 kN m kg⁻¹. Tamcot CAB-CS and Tamcot Sphinx lines have average length of 28.2 mm and strength of 22.6 kN m kg⁻¹.

CABD3SHP3S-1-90 originated from a cross between CD3H-1-86 [Tamcot HQ95 (5)] and Shepherd (USDA-ARS) developed by R.L. Shepherd (USDA-ARS) for bacterial blight resistance. CABD3SHP3S-1-90 is a highly resistant line with a similar maturity to Tamcot Sphinx. It has significantly longer fiber length, uniformity, and strength than that of Tamcot HQ95. Tamcot Sphinx. Its fiber fineness is similar to that of Tamcot Sphinx.

MAR5PD208S-4-90 is a selection from PD6208 (3) that has been screened and evaluated using MAR procedures for two cycles. It is resistant to U.S. races of the bacterial blight pathogen. It has high yielding ability, and its maturity is between Tamcot Sphinx and Tamcot Cab-CS. Fiber length is significantly longer than that of Tamcot Sphinx. These lines should be useful to commercial cotton breeders in the development of glabrous cultivars with improved levels of resistance to insects and pathogens. They also have high yielding ability and fiber quality. Small quantities of seed (25 g) of these lines are available upon written request to the address provided.

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References and Notes