Registration of Seven Multi-Adversity Resistant (MAR-5) Germplasm Lines of Upland Cotton

Seven multi-adversity resistant (MAR) germplasm lines of upland cotton (Gossypium hirsutum L.) from the MAR-5 germplasm pool were released by the Texas Agricultural Experiment Station (TAES) in December 1995. These lines, designated as CABCBUS-2-86 (Reg. no. GP-456, PI 595758), BLCABBAS-3-86 (Reg. no. GP-457, PI 595759), LBBCHUS1-87 (Reg. no. GP-458, PI 595760), LBBCHUS2-87 (Reg. no. GP-459, PI 595761), C5HUG2BES-2-87 (Reg. no. GP-460, PI 595762), CDP37HPIH-1-86 (Reg. no. GP-461, PI 595763), and LBBDCD3H-1-87 (Reg. no. GP-462, PI 595764), were developed by the TAES-MAR Cotton Genetic Improvement Program utilizing specific, 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 (3,6).

Performance evaluations were conducted over 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), and for improved lint yield, earliness, boll size, gin turnout, lint percentage, and fiber properties. Levels of resistance to pests were determined in comparison with lines and cultivars of known levels of resistance and susceptibility to those pests. The lines also were compared with 'Tamcot CAMD-E' (1), 'Tamcot CAB-CS' (4), 'Tamcot CD3H' (5), and 'Tamcot HQ95' (7) for lint yield, earliness, boll size, gin turnout, lint percentage, and fiber quality traits.

The MAR-5 lines have significantly higher levels of broad-spectrum resistance than the earlier released MAR germplasm to insects: thrips (Thrips and Franklinella spp.), flea hopper [Pseudatomoscelis seriata (Reuter)], boll weevil (Anthonomus grandis Boheman), tobacco budworm [Heliothis virescens (F.)], and boll worm [Helicoverpa zea (Boddie)]; to pathogens causing disease: seedling disease complex (Pythium ultimum Trow and Rhizoctonia solani Kühn), bacterial blight [Xanthomonas campestris pv. malvacearum (Smith) Dye], verticillium wilt (Verticillium dahliae Kleb.), phymatotrichum root rot (Phymatotrichum omnivorum Duggar), and leaf spots (spp. of Alternaria, Aschochyta, Phomopsis and other genera); and to fusarium wilt–root–knot nematode complex [Fusarium oxysporum Schlechtend. Fr. f. sp. vasinfectum (Adk.) W.C. Snyder & H.H. Nast–Meloidogyne incognita (Kofoid & White) Chitwood]. Five of the lines are glabrous (CABCHUS-2-86, BLLEBOS-1-83 x CABCS-1-81, C5HUG2BES-2-87, LBBCHUS3-86, and LBBDCD3H-1-87), two previously released lines (C4HUGBES-1-84 x CAHUGS-1-84, C5HUG2BES-2-87), and one released as Tamcot CD3H. It has the presence of some higher levels of resistance to verticillium wilt than the other lines. Fiber length is significantly longer than the previously released Tamcot cultivars, except Tamcot HQ95.

These germplasm lines should be useful to commercial cotton breeders in the development of cultivars with broader and higher levels of resistance to pests equal to the other Tamcot cultivars with higher seed-seeding disease resistance. BBLCLABS-3-86 is a glabrous, glabrous type from the cross BBLLEBOS-1-83 x CABCS-1-81 (released as Tamcot CAB-CS). BBLLEBOS-1-83 originated from a cross between LEBO-3 (Lewis and Bonham germplasm) and BL2CS-2. It has the B2B2B7 genes for resistance to bacterial blight. This line has the highest level of resistance to the fusarium wilt–root–knot nematode complex and phymatotrichum root rot than the other lines. LBBDCD3H-1-87 is a glabrous, glabrous type from the cross LBBLCABS-3-86 x CABCS-1-84, two previously released MAR germplasm lines. It has the B2B2B7 genes for resistance to fungal and bacterial blight. Levels of resistance to pests is equal to previous released MAR germplasm with above-average resistance to the fusarium wilt–root–knot nematode complex.

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