Registration of A/BTx639, A/BTx640 and A/BTx641 Midge-Resistant Sorghum Inbred Lines

Three grain sorghum [Sorghum bicolor (L.) Moench] inbred parental A/B-line pairs were released by the Texas Agricultural Experiment Station, Texas A&M University Agricultural Research and Extension Center, Lubbock, TX in 1997. ATx639 (Reg. No. PL-283, PI 642788), BTx639 (Reg. No. PL-284, PI 642789), ATx640 (Reg. No. PL-285, PI 642790), BTx640 (Reg. No. PL-286, PI 642791), ATx641 (Reg. No. PL-287, PI 642792), and BTx641 (Reg. No. PL-288, PI 642793) were developed for resistance to damage caused by sorghum midge [Stenopeltopsis sorghicola (Coquillett)]. The parental lines are suitable for use as seed parents for sorghum midge-resistant grain sorghum hybrids and as breeding germplasm to produce additional parental lines with midge-resistance.

The lines were developed by the pedigree breeding method. Selection among segregating populations for midge-resistance was conducted at Corpus Christi and College Station, TX (high and moderate sorghum midge abundance, respectively). The lines were evaluated for midge-resistance in replicated field plots at Corpus Christi and College Station, TX, and at Tifton, GA. The lines expressed consistent and higher levels of midge-resistance and better agronomic traits than previously released sorghum midge-resistant female (A-) lines. Hybrids with the lines as the female seed parent were evaluated for grain yield and midge-resistance at Corpus Christi and College Station, TX, for midge-resistance at Tifton, GA, and for grain yield at Lubbock, TX. Under moderate to high sorghum midge abundance these lines as the female seed parent produced hybrids with excellent midge-resistance and superior grain yield. Sterilization of the lines (A1 cytoplasm) was done at Lubbock, TX and Isabela, Puerto Rico. Reaction in other sterility systems is not known, although the lines contain no known genes for fertility restoration.

Sorghum midge resistance of Tx639 is derived from AF28 and IS12666C (SC175-14) through Tx2782 (Peterson et al., 1984). The source of sorghum midge resistance of Tx640 and Tx641 is derived from TP6B(D), a random-mating population composed of lines originally from Uganda, through Tx2754 and Tx2755 (Peterson et al., 1984). Sorghum midge damage was rated on a scale of 1 = 0–10% non-developed kernels, 2 = 11–20% non-developed kernels, up to 9 = 81–100% non-developed kernels. All lines exhibit a high level of resistance under low sorghum midge population density [BTx639 = 1.7, BTx640 = 1.0, and BTx641 = 1.3, LSD (0.05) = 1.0]; high to moderate resistance under moderate pest density [BTx639 = 3.0, BTx640 = 1.3, and BTx641 = 2.3, LSD (0.05) = 0.9]; and moderate resistance under high pest density [BTx639 = 4.7, BTx640 = 4.3, and BTx641 = 3.7, LSD (0.05) = 1.2].

The pedigree of BTx639 is Tx2782*Tx3042. The pedigree of BTx640 and BTx641 is (Tx3042*(Tx2754*(Tx3197*SC170-6))*Tx2755). The sorghum lines have purple plant color (PP___), red pericarp (RRYY), thick mesocarp (zz), no awns (AA), no testa (b) (b) (b) (b), and black glumes (Schertz and Schaffert). 

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