RESISTANCE/TOLERANCE TO FUSARIUM WILT RACE 4 (FOV4) IN UPLAND (GOSSYPIUM HIRSUTUM L.) COTTON FOR GERMPLASM PUBLIC RELEASE

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Abstract

With Fusarium wilt (*Fusarium oxysporum* f. sp. *vasinfectum*) race 4 (FOV4), a soil-borne and seed-borne fungal pathogen, formally identified in the El Paso, TX area in proximity to the largest Upland (*Gossypium hirsutum* L.) cotton producing region in the U.S. - the High Plains of West Texas, the need for Upland cotton cultivars resistant or tolerant to FOV4 has become urgent. So far, only host-plant resistance has proven effective to manage FOV4 which adversely impacts cotton production causing plant wilt and death. The search for resistant Upland cotton has been difficult and different compared to the effort in Pima (*G. barbadense* L.) cotton. After evaluation of more than 6,000 accessions from the USDA-ARS Cotton Germplasm Collection, Regional Breeding Testing Network (RBTN) germplasm, and developed progeny, two sources (NM12Y1004 - NM12Y1005 and SA-3208) were identified with tolerance to FOV4 and used in multiple cross-combinations to introgress and increase resistance. Pedigree information from other parental lines used to develop progeny revealed their sources to be exotic and wild Upland germplasm. The best highly resistant/tolerant developed breeding lines included the following cross-combinations of obsolete SA germplasm: SA-3208 x NM12Y1004, SA-1148 ('Auburn M') x NM12Y1004, SA-1643 ('DES 920') x NM12Y1004, double crosses (F1 x F4), plus others. Evaluations of developed F_4 and F_5 breeding lines were performed in 2018, 2019 and 2020 in California and Texas FOV4 field sites. These highly resistant/tolerant Upland breeding lines will be publicly released to reduce the vulnerability of the cotton industry to this pathogen.