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<u>Abstract</u>

Alternaria leaf spot (caused by *Alternaria* spp.) is one of the most common foliar diseases of cotton (*Gossypium* spp.) and occurs in most cotton-growing regions of the world. The principle causal fungal agent of the disease is *A. macrospora*, while the less virulent *A. alternata* is also commonly observed. In New Mexico, Alternaria leaf spot is predominantly caused by *A. alternata*, and it is becoming prevalent due to favorable weather conditions in the fall. The objective of this study was to evaluate commercial cotton cultivars and advanced breeding lines for resistance to *A. alternata* under naturally infected field conditions. A total of 160 Upland cotton genotypes were divided into six replicated tests each with 32 entries and 3-4 replications, together with 8 Pima cotton cultivars and lines with 4 replications. The analysis of variance showed that there was significant genotypic variation (P<0.05) among Upland cotton genotypes in all of the field tests except for one replicated test, while no statistically significant differences (P>0.05) were detected among the Pima cotton genotypes. Depending on genotypes, the overall disease incidence was between 90 and 100%, indicating a uniform natural infection. However, the average disease severity index (DSI) ranged from 26.7% to 92%, showing significant genotypic differences. Of several Upland genotypes tested in two or more tests, two glandless cotton genotypes (NuMex COT 15 GLS and NM 13P1117), three commercial cultivars (FM 1830GLT, FM 2484B2F, and PHY 444 WRF) are most resistant. Overall, Pima cotton tested did not show higher levels of susceptibility to *A. alternata* than Upland cotton.