## EVALUATION OF NEW GLANDLESS COTTON LINES FOR THRIPS AND VERTICILLIUM WILT RESISTANCE

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## **Abstract**

The potential of glandless cotton as food and feed was never realized before the 1990s, due to high insect and rodent pressure, and low lint yield. However, the ecological system of cotton production has been changed since the commercialization of transgenic Bt cotton. For example, tobacco budworm (Heliothis virescens), American bollworm (Helicoverpa armigera), and pink bollworm (Pectinophora gossypiella) are no longer a problem, while other various lepidopterous insects, such as bollworm (Helicoverpa zea), are less serious or under effective control. Therefore, there could be a niche production area for glandless cotton. However, the following questions should be addressed: What is the yield gap between the current commercial cotton and obsolete glandless cotton? If yes, can selection and breeding close the yield gap? And is glandless cotton more susceptible to thrips, one of the most important early season insects? How about Verticillium wilt disease? Our prior studies showed that: (1) there was a 20-40% yield gap between the existing obsolete glandless cotton germplasm lines and current commercial cotton cultivars; (2) Five replicated field studies showed that glandless cotton lines received similar or less thrips damage than glanded cotton; and (3) selection from exotic glandless lines and cross breeding significantly improved the yield potential of glandless cotton. To further validate the field results on thrips response and evaluate glandless cotton for Verticillium wilt tolerance, a greenhouse study and a field study were conducted to evaluate the performance of glandless cotton. In six replicated tests each with 32 entries and 3 replications in the greenhouse, a non-choice environment was created to evaluate thrips damage on cotton. The results showed that glandless cotton lines had overall similar responses to thrips infestations to glanded cotton, confirming the results obtained in the field. In a field study with 32 entries and 3 replications, the percentage of plants infected with Verticillium wilt, VW (Verticillium dahliae) was evaluated on individual plants based on vascular discoloration before harvest. As compared with the glanded Acala 1517-08, six glandless lines tested had similar VW incidence. In conclusion, glandless cotton free of toxic gossypol has similar responses to thrips and Verticillium wilt to glanded cotton.