DEVELOPMENT OF HYBRID COTTON (*GOSSYPIUM* SPP.) USING HONEY BEES AS POLLINATORS AND ROUNDUP READY AS AN INDICATOR TRAIT

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Abstract

The use of hybrid cotton (*Gossypium hirsutum*) in the US has been limited due to seed cost production. The objective of this study was to investigate a novel method for the production of F_2 cotton hybrids using honey bees as pollinators and Roundup Ready® gene as selection trait. This research was conducted from 2005-2007 in Louisiana. Crosses between non-transgenic and transgenic varieties were made in 2005 to obtain F_1 cottonseeds using honey bees. In 2006, F_2 cottonseed was obtained. In 2007, F_1, F_2, and parents were field tested using a randomized complete block design with 3 replications in two locations. Data analysis was conducted using the SAS PROC MIXED procedure. Results indicate that all crosses exhibited heterosis in the F_1 hybrid populations relative to the best parent. The crosses LA1110023/PHY410R and ARKRM24-12-04/PHY410R exhibited a higher degree of heterosis for yield averaging 33.1% and 20.6%, respectively, across locations. Yield heterosis in the F_2 population was of 20.9% and 19.5%, respectively, and statistically different from the best parent. The ARK9506-40-05/PHY410R cross had yield heterosis averaging 15.6% in the F_1 population and 13.5% in the F_2 population; however, these were not significantly different from the best parent. Fiber quality descriptors from the crosses did not have a significant heterosis in the F_2 population relative to the best parent. In summary, the use of herbicide resistant varieties as males and Roundup Ready® gene as selection trait, conventional varieties as females and honey bees as pollinators, was shown to be a viable method for developing F_2 hybrid varieties. Further variety testing will be required to determine the best combination of parents.

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