

Movement of Glyphosate-Resistant Palmer Amaranth Pollen Under Field Conditions.

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Summary

Palmer amaranth is one of the most troublesome weeds of cotton and other Southern row crops. In addition to being a strong competitor, Palmer amaranth has developed resistance to several important agricultural herbicides, including glyphosate. The objective of this study was to determine if the glyphosate resistance trait can be transferred via pollen movement from a glyphosate-resistant (GR) Palmer amaranth population to a glyphosate-susceptible (GS) population. In 2006, a GR Palmer amaranth pollen source population was planted in the center of a 30 Ha field. Nine GS plants were planted in plots located at distances of 1, 5, 10, 25, 50, 75, 100, 150, and 200 m from the edge of the source in each of eight directions (N, NE, E, SE, S, SW, W, and NW). In 2007, 15 GS plants were planted in plots at distances of 5, 50, 250, 200, 250, and 300 m from the GR source in the same eight directions. Except for the GR source population, the interior of the field and surrounding acreage (300 m from the field edge) were kept free of Palmer amaranth by chemical and physical means. Seed was harvested from 249 and 301 mature females in October 2006 and 2007, respectively. Offspring from each GS mother plant were treated with 0.5 kg ae/Ha glyphosate when the plants were 5-7 cm tall and evaluated 7 and 14 DAT. At 14 DT, the GR and GS standards were controlled by glyphosate 4% and 100%, respectively. Resistant offspring were observed at each distance from the GR source in each direction, although the percentage of resistant individuals decreased with increased distance from the pollen source. Approximately 50-60% of the offspring at the 1 m and 5 m distance were resistant to glyphosate; approximately 20-40% of the offspring were resistant at 250 m and 300 m. An integrated approach to herbicide resistance management should require that suspected resistant individuals are controlled prior to reaching reproductive maturity to prevent both seed and pollen from dispersing the resistance trait.

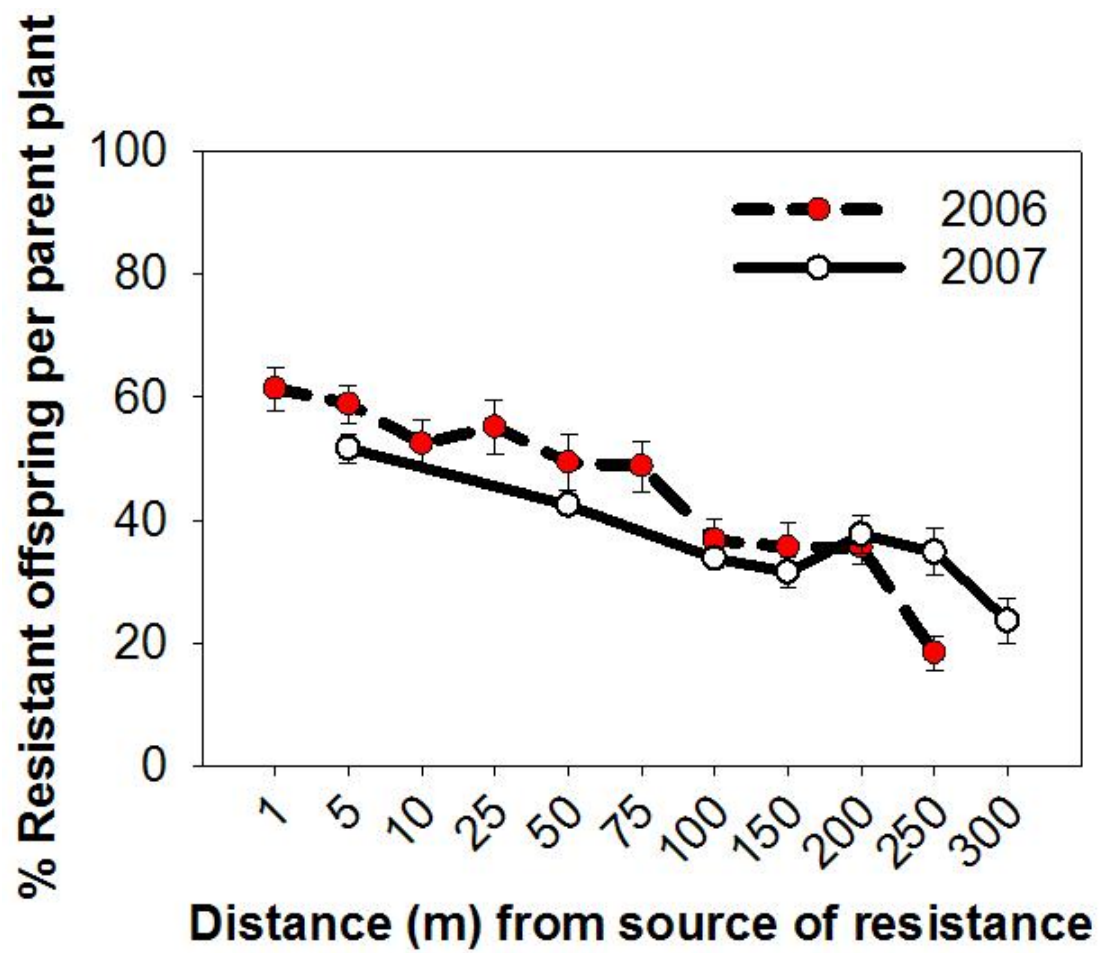


Figure 2. Relationship between distance from source of resistance and resistant offspring.