

Characteristics of Progeny from Crosses Between Waterhemp and Monoecious *Amaranthus* Species. Mary S. Gumz* and Stephen C. Weller, Graduate Research Assistant and Professor. Purdue University, West Lafayette, IN 47907.

Amaranthus species (the “pigweeds”) have become the most difficult weed to control in Indiana peppermint production fields and greatly reduce crop growth through competition. Pigweeds not only reduce crop growth, but also contaminate the peppermint hay and during hay distillation reduce the oil quality through imparting off-flavors and colors, rendering the oil unmarketable. Peppermint growers in Indiana have reported that in the past 10 years, pigweeds have not only become harder to control in their fields, but the incidence of escapes from labeled herbicide applications and the incidence of “off-type” pigweeds has increased. In addition, where the primary pigweed species present in Indiana were formerly redroot pigweed and powell amaranth, the incidence of waterhemp has increased dramatically. We have considered the possibility that hybridization between monoecious and dioecious *Amaranthus* species is occurring in Indiana and may account for the increased variability in phenotype and herbicide response observed in Indiana peppermint fields.

In these experiments, female waterhemp plants were fertilized with pollen from redroot pigweed, smooth pigweed, and powell amaranth. Viable F1 progeny was obtained from all three crosses. In all cases, the progeny were dioecious with near 1:1 male and female plants. The progeny were fertile and male F1 hybrids were backcrossed to female waterhemp plants and also crossed with female F1 hybrids. Progeny from the second set of crosses were all dioecious with near 1:1 male and female plants. Progeny from all three crosses showed waterhemp morphology.

Wild-type plants, offspring from the original crosses, and offspring from the backcrosses between the F1 males and waterhemp were sprayed with standard rates of terbacil, pyridate, and imazethapyr. All plants, wild types and hybrids, were susceptible to terbacil and pyridate. Only the monoecious wild type parents were susceptible to imazethapyr. All hybrids had the ALS resistance of the dioecious parent.

While evidence of field hybridization of *Amaranthus* species is limited, hybridization is possible. Although, peppermint growers are currently able to control mixed dioecious and monoecious *Amaranthus* populations with terbacil and pyridate, growers in other crops will need to reevaluate herbicide use in controlling mixed *Amaranthus* populations.