WHEN THE AUXINS GET TOUGH, THE PALMER GETS GOING

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Abstract

Reports of Palmer amaranth (*Amaranthus palmeri*) escapes in auxin-based cropping systems became notably more prevalent in Tennessee in 2019 and 2020. It was determined that in many cases, dicamba or 2,4-D were applied timely to small (<10cm) plants. In 2020 and 2021, greenhouse studies were conducted at Texas Tech University to confirm resistance of Palmer amaranth populations obtained from Tennessee. Results from 2020 showed that Palmer amaranth sourced from Lubbock, TX was 90% controlled at 22 fl oz Xtendimax ac^{-1}, while 67% of a Palmer amaranth population from Tipton County, TN and <40% of a population from Bedford County, TN were controlled. Similar results were collected from 2,4-D greenhouse screenings. It is important to survey populations from reported herbicide failures and determine the mechanism of resistance. In 2021, field experiments were conducted at the West TN AgResearch and Extension Center and two growers' fields in Madison County, TN and Lauderdale County, TN where reports of Palmer amaranth escapes in previous years were prevalent to determine the level of resistance of these populations to dicamba and 2,4-D. Malathion insecticide (a cytochrome p-450 inhibitor) was investigated to indicate if resistance could be due to enhanced metabolism of the herbicides. Experiments were also conducted to determine the best herbicide programs to control resistant Palmer amaranth populations to make recommendations to Tennessee growers. Preliminary results indicate that in the field, only 40-60% of Palmer amaranth <10 cm tall were controlled using 22 fl oz Xtendimax ac^{-1} and 45-65% were controlled with 32 fl oz Enlist One ac^{-1}. Malathion did not increase control with dicamba, regardless of application timing; the tank mix of malathion and 2,4-D increased control compared with 2,4-D alone on <10 cm Palmer amaranth. This result might indicate metabolic resistance is in part a cause for the loss of control. Results on management suggest that the best option for growers will be sequential applications of dicamba or 2,4-D with glufosinate 7-10 days apart with no preference on order of herbicides applied.