EVALUATING AN INTEGRATED APPROACH TO PALMER AMARANTH MANAGEMENT IN SOUTHERN US COTTON

Sarah E. Kezar
Texas A&M University
College Station, TX
Kyle Russell
Texas Tech University
Texas A&M AgriLife Research and Extension Service
Lubbock, TX
Michael Houston
University of Arkansas
Fayetteville, AR
Fernando Oreja
North Carolina State University
Raleigh, NC
Delaney C. Foster
Texas Tech University
Texas A&M AgriLife Research and Extension Service
Lubbock, TX
Daniel Hathcoat
Texas A&M University
College Station, TX
Peter A. Dotray
Texas Tech University
Texas A&M AgriLife Research and Extension Service
Lubbock, TX
Jason K Norsworthy
University of Arkansas
Fayetteville, AR
Ramon G. Leon
North Carolina State University
Raleigh, NC
Gaylon Morgan
Cotton Incorporated
Cary, NC
Muthukumar V Bagavathiannan
Texas A&M University
College Station, TX

Abstract

Herbicide-resistant Palmer amaranth (*Amaranthus palmeri*) is a serious concern in cotton, with direct impact on production and profitability. Each year, uncontrolled Palmer amaranth escapes contribute to the soil seedbank. Even at low densities, Palmer amaranth escapes can add large quantities of seed to the soil seedbank, resulting in population persistence. The present study is centered around seedbank management as a key aspect of herbicide-resistant weed management, by exploring integrated management tactics implemented throughout the growing season. This multi-state study was conducted in 2020 and 2021 in Raleigh-North Carolina, Marianna-Arkansas, College Station-Texas, and Lubbock-Texas. The XtendFlex® cotton was planted in a Randomized Complete Block Design with four replications. A number of tactics were evaluated as part of management programs for their impact on minimizing Palmer amaranth population size over time. The treatments allowed for: evaluation of weed suppression with cereal rye as a cover crop, comparison of programs with and without the use of residual herbicides, testing the benefit of a dual-purpose harvest aid or early desiccant application, and the effectiveness of precision spot-spraying or hand weeding after the layby timing. A standard herbicide program was included for comparison in each location. Across the site-years, there were differences in cotton yield, with Marianna-Arkansas being the highest yielding location. Overall, treatments that contained residual PPI/PRE herbicides consistently yielded higher. The greatest amount of Palmer amaranth biomass was recorded in treatments that did not include a residual herbicide at PPI/PRE or MPOST

timings irrespective of the location. Greater Palmer amaranth densities were recorded in Marianna-Arkansas and College Station-Texas compared to the other two locations, with 93,021 and 43,346 plants/ha respectively, in the treatment that didn't contain a residual herbicide at PPI/PRE or MPOST. Results so far demonstrate the value of integrating residual herbicides and targeting weed escapes in the late season in minimizing seedbank inputs. This is an ongoing experiment with two remaining years (8 site-years). We will continue to evaluate long-term influence of these treatments on Palmer amaranth population dynamics. Findings are expected to help develop regionally suitable integrated management programs for reducing Palmer amaranth infestations in the long run.