Is Palmer amaranth developing traits that make it harder to control?

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One of the plants that come from a population that apparently adapted to taller

crops and is GR and another that comes from a population adapted to smaller crops and is GS. Additionally, below you can see a few examples of the great diversity in morphology that we found among Palmer amaranth populations. Credit: Ramon Leon

Palmer amaranth is widely considered to be one of the most damaging and difficult to control agricultural weeds in North America. A lot of time and attention has been devoted to herbicide-resistant Palmer amaranth and the significant yield losses it can produce. Research featured in the journal *Weed Science*, though, shows other "life history" traits may be contributing to crop losses by making Palmer amaranth more aggressive and difficult to control.

Researchers from the University of Florida collected samples of Palmer amaranth from 10 fields in Florida and Georgia. The sites had widely divergent cropping histories - from short-statured vegetables and peanut crops to tall corn and cotton crops. The fields also varied in herbicide use. Some were devoted to organic production, while others had a history of intensive herbicide use.

Significant differences were observed in the traits of the Palmer amaranth from the various fields, such as fresh and dry weight, days to flowering, plant height, leaf shape and canopy. Researchers say these differences could not be explained by whether the Palmer amaranth population was glyphosate resistant or glyphosate susceptible. Instead, crop rotation and crop canopy better explained the many variations found. For example, the tallest populations of Palmer amaranth came from corn fields, while the shortest came from fields planted with the shortest crops.

"It appears Palmer amaranth can evolve life-history traits that increase

its potential to grow and reproduce in various cropping systems," says Ramon Leon, Ph.D., a member of the research team. "To avoid the development of more aggressive weed biotypes, it is important to consider these evolutionary consequences when designing crop rotation systems and weed management strategies."

More information: Washington Bravo et al, Differentiation of Life-History Traits among Palmer Amaranth Populations (Amaranthus palmeri) and Its Relation to Cropping Systems and Glyphosate Sensitivity, *Weed Science* (2017). DOI: 10.1017/wsc.2017.14