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Troublesome Palmer Amaranth Expanding Its Range

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Abstract

Many people are aware of the problems Palmer amaranth is causing farmers in the mid-south and southeast United States. Palmer amaranth is a close relative to Iowa's number one weed problem – waterhemp. Like waterhemp, Palmer amaranth is a species with a propensity to evolve herbicide resistance. Glyphosate resistant Palmer amaranth devastated the cotton industry, which has fewer chemical options than available in corn and soybean. This article will describe Palmer amaranth and the risk of it appearing in Iowa.

Keywords

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Troublesome Palmer Amaranth Expanding Its Range

By Bob Hartzler and Mike Owen, Department of Agronomy

Many people are aware of the problems Palmer amaranth is causing farmers in the mid-south and southeast United States. Palmer amaranth is a close relative to Iowa's number one weed problem – waterhemp. Like waterhemp, Palmer amaranth is a species with a propensity to evolve herbicide resistance. Glyphosate resistant Palmer amaranth devastated the cotton industry, which has fewer chemical options than available in corn and soybean. This article will describe Palmer amaranth and the risk of it appearing in Iowa.

The most common *Amaranthus* (pigweed) species in Iowa are waterhemp, smooth pigweed and redroot pigweed. Smooth and redroot pigweed are monoecious species (both male and female flowers on the same plant), whereas waterhemp and Palmer amaranth are dioecious (separate male and female plants). Historically, Palmer amaranth has been a weed of the southern United States, but in recent years its range has expanded northward. A defining characteristic of Palmer amaranth is its rapid growth rate and high level of competitiveness. The rapid growth rate complicates management because it results in a narrower application window for postemergence herbicides than with waterhemp.

Knowing how to differentiate the pigweeds is the key to reducing the likelihood of Palmer amaranth becoming established and spreading throughout Iowa. The easiest way to tell smooth and redroot pigweed from Palmer amaranth and waterhemp is that smooth and redroot pigweeds have hairy stems, whereas both Palmer amaranth and waterhemp have hairless stems. Differentiating vegetative Palmer amaranth from waterhemp is more difficult because plants of both species are highly variable. The leaf shapes of the two weeds are similar, although many leaves of Palmer amaranth have a petiole that is longer than the leaf blade. Some, but not all, Palmer amaranth plants have leaves with a silver spot (watermark). Waterhemp plants tend to have a leggy, open canopy, whereas many Palmer amaranth plants have a dense canopy. A cluster of leaves is often found at the terminal apex of Palmer amaranth.

Differentiating the two species is easier once plants enter reproductive stages. The inflorescences of waterhemp are slender (<0.3 inch diameter) and individual branches typically are less than 6 inches long. Palmer amaranth has thicker and longer branches on its inflorescences; the terminal branch may be more than 2 feet long. Female Palmer amaranth plants have sharp bracts on the seedhead that can puncture skin when handled.

Currently, there are no known infestations of Palmer amaranth in Iowa. However, it is established in Nebraska, Kansas, Missouri, Illinois, Wisconsin, Indiana, Ohio and Michigan. Thus, if Palmer amaranth is not here yet, it likely will show up in the near future. While seeds of Palmer amaranth do not have any specific long-distance dispersal mechanisms,

their small size and the transport of equipment, animal feed, manure and bedding provide ample opportunities for the spread of this weed into and across Iowa.

While Palmer amaranth could appear anywhere in the state, there are certain areas of Iowa that are at a higher risk of invasion than others.

- The southern tiers of counties are more prone to invasion because they are closest to current Palmer amaranth infestations.
- Farms where by-products of cotton production (gin trash, cotton seed, etc.) are fed to animals are at risk. It is a common practice to include gin trash in the ration of dairy cattle. Due to the prevalence of Palmer amaranth in cotton-producing regions in the southeast, there is a good possibility that these feed sources could be contaminated with weed seed. Gin trash has a much higher risk of being contaminated with Palmer amaranth seed than cotton seed because cotton seed is typically cleaned at the gin. While most weed seed are killed by the digestion process or during composting of manure, usually a few survive. It only takes a few seeds to start an infestation of any weed, including Palmer amaranth. Fields adjacent to feeding operations or where manure from these operations is distributed are potential sites of Palmer amaranth infestations.
- Farms that bring equipment in from areas of the country with Palmer amaranth would be at a high risk of invasion. Due to the small seed size, it is impossible to completely eliminate Palmer amaranth seed from equipment using standard, thorough cleaning procedures.

In summary, Palmer amaranth is a troublesome weed that is rapidly expanding its range. At this time, it has not been confirmed in Iowa, but due to its proximity to the state its arrival is imminent. Eradication of a weed is only feasible if it is identified during the initial phase of invasion. This means Palmer amaranth must be identified in the first year or two of being introduced in a field to prevent establishment of a permanent seed bank. Due to the potential increase in weed management costs following establishment of Palmer amaranth, a thorough monitoring program is a wise investment. Closely examine any *Amaranthus* plants that look different than the species that are common to Iowa.

We are willing to aid in identifying any plants suspected of being Palmer amaranth. In most cases digital images will be insufficient to differentiate vegetative Palmer amaranth and waterhemp. Contact us via e-mail or phone to determine how to proceed in confirming the identification of any suspected Palmer amaranth.

Bob Hartzler and Micheal Owen are professors of agronomy and weed science extension specialists with responsibilities in weed management and herbicide use. Hartzler can be reached at hartzler@iastate.edu or 515-294-1164. Owen can be reached at mdownen@iastate.edu or 515-294-5936.

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