

Growers cautioned to be on the lookout for invasive pigweeds

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Dwight Lingenfelter, weed science extension associate in the College of Agricultural Sciences, stands next to a Palmer amaranth plant in a corn field. The weed can grow to as high as 8 feet. Credit: Penn State

The battle against invasive species is never-ending for agricultural producers, and the latest example is a pair of weeds that threaten to cause significant damage to crop yields across Pennsylvania.

Researchers and extension specialists in Penn State's College of Agricultural Sciences are warning growers to be on the lookout for Palmer amaranth and waterhemp, two species of pigweed that are gaining a foothold in the state.

"Palmer amaranth is a pigweed species that is relatively new to Pennsylvania," said Dwight Lingenfelter, weed science extension associate. "It's native to the southwestern desert regions of the United States, and it's a common problem in the Southern cotton belt to western Kansas. It has spread to the Delmarva Peninsula in the last five years, as well as into areas of the Midwest."

Lingenfelter noted that the weed may have come to the Northeast in cottonseed meal for dairy rations, in other types of crop seed, with used equipment, or with shipments of hay. "Locally, seeds can spread from one field to the next by combining operations," he said.

First detected in Pennsylvania in 2013, Palmer amaranth has been found growing in soybeans, corn and alfalfa, as well as in noncrop areas and at field edges, in at least 14 counties. Experts suspect that it is present in more counties, but that has yet to be documented. Isolated populations of waterhemp, which is a serious problem in the Midwest, have been in Pennsylvania for several years.

What makes Palmer amaranth and waterhemp such a threat is their aggressive growth habit, prolific seed production and the lack of effective control measures, according to Bill Curran, professor of weed science.



The leaf clusters of young Palmer amaranth plants can have a poinsettia-like appearance. Credit: R. Hartzler, Iowa State University

"These [plants](#) can grow 1 to 2 inches per day," Curran said. "Each plant can produce 300,000 or more seeds, and new plants can emerge throughout the growing season. Most will start to emerge in late April or early May, but it's not uncommon to have plants emerging into July.

"In addition, Palmer amaranth and waterhemp have shown widespread resistance to common herbicides such as glyphosate and what are called Group 2 or ALS-inhibitor herbicides, and they tolerate both tillage and no-till practices."

Research has shown that these annual weeds are capable of significantly reducing [crop yields](#). In a Tennessee study, Palmer amaranth and waterhemp decreased soybean yields by 78 percent and 56 percent, respectively. High densities of Palmer amaranth have been shown to reduce corn yields by up to 91 percent. Experts say the two weeds also are likely to cause serious problems in vegetable and small-fruit production.

Lingenfelter and Curran emphasize that scouting and proper identification is the first line of defense against these weeds. Palmer amaranth has smooth stem and leaves, with leaf petioles (the leaf stem that attaches it to the main stalk) that are longer than the blade. Leaf blades occasionally have a v-shaped, white or dark-red patch or "watermark," and a single hair sometimes can be found on the leaf tip. Flowering [female plants](#) have "prickly" flower bracts, and seed heads often are 1 to 2 feet long. Young plants can have a poinsettia-like appearance, and mature plants can reach up to 8 feet tall.

Waterhemp can vary in appearance. Generally, waterhemp plants have no hairs on the stem or leaves, and the leaves often are glossy and more elongated than those on Palmer amaranth. Stem color of waterhemp can vary from light green to dark red, with multiple shades sometimes on the same plant.

Both waterhemp and Palmer amaranth are dioecious, meaning they produce separate male and female plants. This means that the pollen from the male plants travels with the wind to pollenate the females. If the male plant is herbicide resistant, then the seeds that the female produces will also have some resistance.

Penn State Extension offers the following tips to manage Palmer amaranth and waterhemp:

—Prevent seed production and spread. "Prevention is preferable to eradication," Lingenfelter said. "Do whatever it takes to not allow new infestations to set seed." He also recommends harvesting infested fields last to prevent spread via combine. Integrating cultural control tactics—such as including cover crops in the cropping system—may help to keep these weeds from becoming established.

—Use multiple and effective modes of action. "Current strategies are based heavily on herbicides," Curran explained, "but the chance for increased herbicide resistance is very high." He said growers must use a two-pass system of herbicide application for effective control, and he warned that annual herbicide costs will at least double if Palmer amaranth becomes established.

—Control "escapes." Aim for complete control of Palmer amaranth and do not allow escapes. Curran and Lingenfelter cautioned that even a few plants setting seed can cause profound negative impacts.

Provided by Pennsylvania State University

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