SS-AGR-336

UF UNIVERSITY of FLORIDA
IFAS Extension

Amaranthus palmeri "Palmer amaranth"[1]

Sergio Morichetti and Jason Ferrell[2]

Introduction

Palmer amaranth is a fast-growing C4 summer annual weed that can grow up to 10 feet in height (Figure 1). One of the group known commonly as "pigweeds," Palmer amaranth is a dioecious plant (plants are either male only or female only) that produces an enormous amount of seed. Some plants are capable of producing more than 500,000 seeds. Palmer amaranth has become one of the most troublesome weeds in the Southeast because of its fast growth rate, high seed production, and development of herbicide resistance. Different populations of this weed have developed resistance to the "Photosystem II inhibitors" herbicides (Atrazine, Diuron, etc.), to the "Dinitroanilines" herbicides (Pendimethalin, Trifluralin, etc.), to the "ALS inhibitors" herbicides (Imidazolinones, Sulfonylureas, etc.), and to the "Glycines" herbicides (Glyphosate). No current populations of Palmer amaranth contain plants resistant to all these herbicides, but there are some populations with plants resistant to two of the four, and, given time and improper management, Palmer amaranth has proven its potential to become resistant to any herbicide that is repeatedly used.

Figure 1. Palmer amaranth in Suwannee County, FL.

Palmer amaranth is spreading in Florida, and so is herbicide resistance. The purpose of this

1. This document is SS-AGR-336, one of a series of the Agronomy Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Original publication date August 2010. Visit the EDIS website at http://edis.ifas.ufl.edu.
2. Sergio Morichetti, graduate assistant, Department of Agronomy; and Jason Ferrell, associate professor, Department of Agronomy, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, FL.

publication is to demonstrate how to accurately identify this weed so that it can be properly managed before the population grows to such a degree that effective control becomes impossible or prohibitively expensive.

Seedling

Hypocotyls (portions of the stem below the cotyledons) are smooth or slightly hairy. Cotyledons are narrow and green to reddish on the upper surface, and reddish underneath (Figure 2). The first true leaves are alternate and ovate (Figure 3).

Figure 2. Palmer amaranth seedlings with reddish color in the lower surface of cotyledons.

Leaves

Leaves continue to be roughly oval with petioles as long as or longer than the leaf blade. The leaves are hairless with prominent white veins on the underside (Figure 4). Older leaves may or may not have watermarks (white or red v-shaped variegation) (Figure 5).

Figure 3. First true leaves are roughly oval and have a slight notch or indention at the end.

Figure 4. Palmer amaranth leaf with white veins and petiole longer than the leaf.

Roots

The plant has a fibrous root system extending from a well-developed taproot that may or may not be reddish in color (Figure 6).

Figure 5. Watermarks on Palmer amaranth leaf, which may or may not occur on every plant across the field.

Stems

Palmer amaranth has one central stem from which several branches arise (Figure 6).

Figure 6. Lateral branches arise from the main stem. Note the vigorous root system.

Flower

The flowers are terminal spikes that can grow to lengths of almost 2 feet. Plants have either all female flowers or all male; both types never occur on the same plant (Figure 7). Female flowers are prickly to the touch because of the presence of stiff bracts (Figures 9 and 10). Male flowers are soft and will often release pollen if shaken (Figures 8 and 11). (It is important to know the female flower from the male in case a population proves to be resistant to herbicide and hand weeding is necessary.)

Figure 7. Female plant (left) and male plant (right)

Key Characteristics that Differentiate Palmer Amaranth from Other Pigweeds

- Petioles as long as or longer than the leaf blade.
- Long terminal inflorescences.
- Prominent white veins on the lower surface of the leaf.

Figure 8. Male inflorescence

Figure 9. Female inflorescence

Figure 10. Prickly bracts in the female inflorescence

- Hairless leaves.
- Faster growth than other pigweeds.

If Palmer amaranth in your field survives a glyphosate application, you must hand-weed as quickly as possible to remove the female plants (target the female plants first, since they produce the seeds). Because each female plant is capable of producing 500,000 seeds, even if just a few plants survive one year, there will be thousands the next year. Palmer amaranth is among the most difficult-to-manage weeds that we have ever encountered in the deep South, but it is not impossible to contain. Scout your fields and watch your weed control program closely so that you can correct a problem before the population gets out of control. Proper identification, scouting, and diligence are the keys to victory over this weed.

Figure 11. Soft male inflorescence

Figure 12. Levy County field infested with ALS-resistant Palmer amaranth