

Palmer Amaranth (Pigweed)

By Tim Fine

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Montana is ranked on some popular lists. The people of the state take pride in some lists and others are things that need to be addressed. One list to boast about is being one of only nine states in the continental United States that has yet to have a confirmed infestation of Palmer amaranth.

Palmer amaranth (*Amaranthus palmeri*) is a weed in the pigweed family that is native to the southwestern U.S. Agricultural producers there and in Mexico have been dealing with the plant for some time, and it has recently begun to spread. It is now considered a significant weed pest for many row crop producers. It has steadily marched across the U.S. and the only states without known infestations (as of the date of publication) are in the extreme northwest and northeast.

Biology

When the weed first emerges, it can be difficult to distinguish from other common pigweed family weeds. Palmer amaranth, however, grows quickly and gets taller than most other weeds in the same family. Several traits have allowed this highly invasive weed to grow well in agricultural operations.

- The plant is dioecious, meaning it produces both male and female plants. This forces the plant to outcross and genetically diversify very quickly. This is a concern because this trait allows the plant to quickly develop herbicide resistance. Many Palmer amaranth infestations in the U.S. are known to be resistant to multiple herbicide Modes of Action.
- It is a prolific seed producer. In areas where Palmer amaranth has competition (when growing in crop fields), the plant is known to produce up to 100,000 seeds. Where there is no competition, seed production can jump to 500,000 seeds per plant. These seeds are very small and very hard to clean out of grain crops, such as millet, that also produce smaller seeds.
- It develops very rapidly. Under ideal conditions, Palmer amaranth can grow two to three inches a day. This means that even if plants are not herbicide resistant, delaying an application may allow the plant to simply “outgrow” treatment options. At one site, Palmer amaranth grew to more than six feet tall in a span of two months. In the corn belt region of the U.S., it has been shown to reduce corn yield by as much as 91 percent (Massinga et al.), and as much as 79 percent (Bensch, et al.) in soybeans.
- There is no real discernible period of emergence. Many weeds that agricultural producers currently try to control have specific, defined periods of emergence. This is not the case with Palmer amaranth. It can emerge at any point, which means mitigation methods must be applied throughout the growing season, and season-long scouting is a must.

Identifying the Weed

Because Palmer amaranth is almost indistinguishable from other pigweed species, scouting and identification is critical. Some characteristics specific to this weed should be noted when scouting:

- The absence of hair. Redroot pigweed and smooth pigweed both have fine hairs on their stems and leaf surfaces, Palmer amaranth does not.
- Petiole length. The petiole is the stem that connects the leaf blade to the main stem. In Palmer amaranth, the petiole will be longer than the leaf blade itself. Pull the petiole and leaf from the plant, fold the petiole from the base of the leaf, if the petiole extends longer than the leaf blade, it is Palmer amaranth.
- Palmer amaranth will have a rosette appearance when looking down at the plant. Palmer amaranth's growth pattern has been described as looking like a poinsettia as opposed to the more stalk-like structure of other weeds in the family.
- Seed head structures. Waiting until a Palmer amaranth female has produced seed is not recommended. However, where there are escapes and/or infestations that were previously unnoticed, the structure of the seed head can be a distinguishable characteristic. Palmer amaranth seed heads can reach to three feet long and have stiff, sharp bracts that make them prickly to the touch.

This highly invasive and very destructive weed has caused some agricultural producers in parts of the U.S. to give up crop production all together. This has been especially true in cotton-producing areas. The most concerning infestations to Montana have been found in nearby North Dakota in 2018 and 2019. The most important aspect of these infestations is how the weed established there. In 2018, North Dakota confirmed the weed in five counties, and in 2019, in an additional three counties. Alarmingly, the 2018 infestations were confirmed to have come from mundane sources: migratory birds carrying seed; a used combine that was purchased out-of-state and brought to North Dakota; an alternative out-of-state feed source for livestock; custom combining; and grain cleaned out of railroad cars. All the 2019 infestations, however, were confirmed to have come from small grain seed that was unknowingly contaminated with Palmer amaranth and seeded into crop ground.

While Palmer amaranth has yet to rear its ugly head in Montana, it is probably just a matter of time before it arrives. It is imperative that everyone be on the lookout. The adaptive nature of the plant and its ability to out-compete any vegetation make it a potentially disastrous plant. ■

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(Left) From left, inflorescences of Palmer, Powell, redroot, smooth, and waterhemp. (Right) A Palmer amaranth petiole bent back over the leaf blade, demonstrating the length of its petiole.

