

Palmer Amaranth – Weed of the Year

Palmer amaranth (*Amaranthus palmeri*) is a pigweed species that is not native to North Dakota or to the northern United States. It is well established in the southern U.S. It has not been identified in ND but has been identified in the northern latitude of the U.S. demonstrating it could survive in the northern plains. It was introduced in MI through the spread of manure from dairy cows that were fed cotton by-products as a feed supplement. The weed could easily establish in ND through custom combines moving north into ND and several other ways of weed seed dissemination.

Palmer amaranth was chosen as weed-of-the-year as a proactive approach to increase awareness of its extreme noxious and pernicious capability, to aid in identification, to encourage land owners to keep a vigilant watch and kill all plants that may arise. Below are some reasons why it is being called “Satan” and why growers should destroy any plants found.

1. Populations of this weed are resistant to glyphosate and ALS-inhibiting herbicides, leaving very few herbicide options available for management.
2. One of the fastest weed growth rates known - over 2 inches/day.
3. Long emergence pattern from mid-May through August.
4. Can exploit even slight canopy openings.
5. Produces over 1 million seeds/plant.
6. Seed is short-lived and only 2% of seed is viable after 6 years but the sheer number of seeds produced by a female plant makes eradication difficult once established.
7. Female plants can grow to over 10 feet tall with a 5-6 inch stem girth and seed heads over 1 foot in length. Male plants are small and whimpy.
8. Pulled plants can re-root and produce seed.
9. Cause 78% yield loss in soybean and 91% in corn.
10. Biotypes have become resistant to one or more of the following herbicide mode of action groups: ALS (Group 2), Atrazine (Group 5), glyphosate (Group 9), and HPPD inhibitors (Group 27).

Palmer amaranth’s ability to emerge throughout the growing season, rapid growth rate, prolific seed production, and propensity to evolve herbicide resistance quickly makes this the biggest weed threat that ND farmers have ever faced.

Keys to successful management in soybean:

Palmer amaranth is one of the most difficult weeds to manage in soybean. Proper identification and early detection of Palmer amaranth will improve the opportunity for successful management. The following steps out-line the strategies for the best management of herbicide-resistant Palmer amaranth in soybean.

- Stem and leaf surfaces with no/few hairs
- Leaves have a symmetrical (poinsettia) arrangement
- Petioles are as long or longer than the leaf blades
- Male and female flowers are on separate plants

Step 1. Start clean. Use tillage or an effective burndown herbicide, i.e., Gramoxone or Liberty, prior to planting soybean.

Step 2. Always use a PRE herbicide. Apply a full-rate of effective soil-residual herbicides, including those that contain the active ingredients of Valor (flumioxazin), example Fierce, and Authority (sulfentrazone), rates of sulfentrazone need to be equivalent to 8 fl oz/A of Spartan (0.25 lb ai/A). Adding metribuzin to Valor or Authority products (where allowed) will provide additional residual control.

Step 3. Effective POST herbicides (Flexstar, Cobra, Ultra Blazer or Liberty in LL soybean) must be applied before Palmer amaranth is 3-inches tall. Full rates and high spray coverage is essential for all contact herbicides. Plants over 3" tall will survive these herbicides.

Step 4. Add residual herbicides (Dual, Warrant, Outlook, or Zidua) with the POST herbicides. The residual PRE product is essential to reduce other flushes after weed kill from the POST herbicide.

Step 5. Successive POST herbicide applications may be needed. Apply to plants 3-inches or less. If Flexstar was used in the first POST application, Cobra or Ultra Blazer are the only herbicide options remaining. MSO adjuvant will enhance herbicide activity the most but significant contact burn to soybean may result.

Step 6. Additional cultural control measures, such as hand-weeding, should be implemented to prevent any remaining plants from going to seed in the field or surviving around field edges, or along ditch banks.

Keys to successful management in corn:

Grass crops provide the best opportunity for management but due to the species’ propensity to evolve herbicide resistance do not rely solely on one herbicide site of action. Following these steps for management in corn.

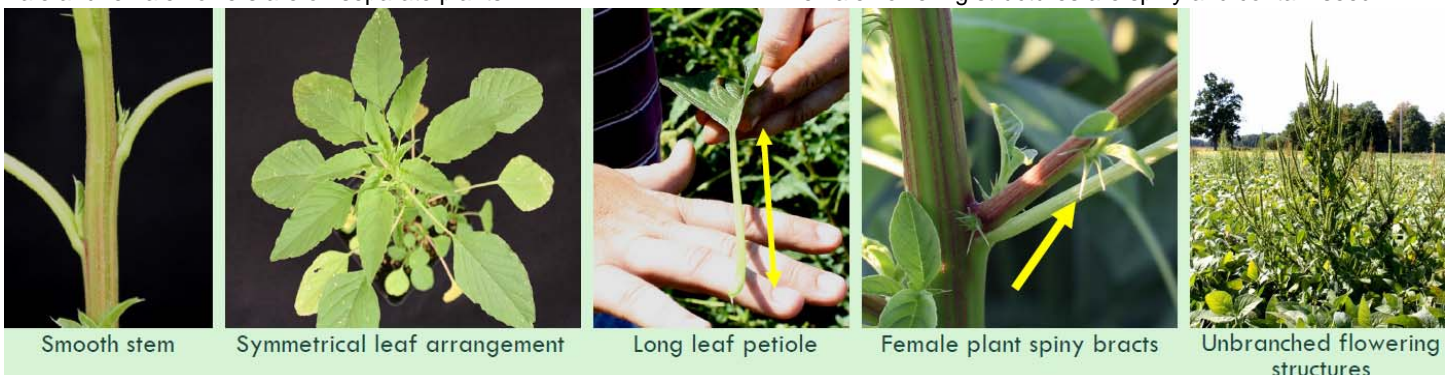
1. PRE - two-pass (sequential) herbicide program is required. Full labeled rates of a minimum of 2 effective herbicide sites of action are required.

POST: At least 2 effective POST herbicide sites of action are required and must be applied before 3 inches tall. A group 15 herbicide may also be tank-mixed for additional residual control.

2. Hand-weed to eliminate any remaining plants.

Identifying characteristics:

- Spiny bracts are at leaf axils on female plants
- Flowering structures are unbranched, and 1 to 2 feet long
- Male flowering structures are soft and spread pollen
- Female flowering structures are spiny and contain seed



Smooth stem

Symmetrical leaf arrangement

Long leaf petiole

Female plant spiny bracts

Unbranched flowering structures