

Polk County Feedlot News

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Palmer Amaranth in Manure: What can you do?

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The Minnesota Department of Agriculture has identified manure as a pathway of introduction for Palmer amaranth. Specifically, Palmer amaranth seeds that contaminated sunflower screenings were fed to cattle. Some of those seeds survived digestion, and when that manure was spread onto cropland, those seeds germinated.

As a newly-identified problem in this state, it is worth taking a moment to examine seed viability in manure and what this might mean for Minnesota livestock and crop producers. Note that this article's focus is manure and it will not delve into the specifics of Palmer amaranth and the challenges it presents. In short, this is an Eradicate Prohibited Noxious Weed, meaning the goal is to entirely eradicate this weed; and it is illegal for this seed to be transported or sold. UMN Extension has more information, and MDA has put out a press release about this problematic weed.

Reducing Palmer amaranth seed in feed

Don't assume animal digestion will kill all of the seeds

Though it will reduce weed seed viability, simply feeding the contaminated material to livestock will not eliminate all Palmer amaranth seed. Grass and soft-coated broadleaf seeds are more easily destroyed in digestion than hard-coated seeds – such as Palmer amaranth. In rumen animals, such as cattle, 27% of amaranth seed remained viable after digestion (Blackshaw and Rode 1991). The gizzard digestive system of poultry is highly effective at destroying weed seeds, and only 3.5% of Palmer amaranth seeds fed to ducks were recovered and found viable (Farmer et al. 2017).

Ensile the feed (if appropriate for the feed type)

The fermentation and heat generated during ensiling is quite effective for killing weed seeds. Just one month after contaminated alfalfa haylage was stored, amaranth seed viability dropped by 41%; and in corn silage, the drop was even greater at 60% (Simard and Lambert-Beaudet 2016). Logically, seed viability continues to decrease as silage storage time increases. Eight weeks of ensiling killed up to 87% of viable amaranth seed; and when feed went through both ensiling and rumen digestion, the seed mortality increased to 89% (Blackshaw and Rode 1991).

Reducing Palmer amaranth seed in manure

Compost solid manure

Internal heat generated by properly composting manure will kill most weed seeds – even the hard-seeded Palmer amaranth. The key word here is “properly.” Aged manure is not composted manure. Proper composting requires active management and must be monitored and aerated for correct weed-killing conditions to develop.

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Control Agency

MPCA

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Temperature and moisture are the two most crucial elements for seed mortality in compost. For Palmer amaranth, Wiese et al. (1998) found that sustaining the compost at 140°F for three days will virtually eliminate seed viability, so long as a minimum of 35% moisture is maintained. To account for temperature and moisture uniformity issues that are prevalent in composting, exceeding these minimums and composting at 160°F for four days with 50% moisture is recommended. Another study found that it took between 21 and 50 days of composting with proper management to eliminate amaranth seed (Larney and Blackshaw 2003).

However, research by Wiese et al. (1998), Larney and Blackshaw (2003) reached 0% viable weed seeds under the best compost management practices possible in a very controlled environment. In contrast, Cudney et al. (1992) surveyed actual on-farm composting sites and found that while composting did reduce weed seed viability 90-98% over six to eight weeks, there was still potential for seed survival; with varying levels of mortality escape based on operation and weed species. It is theorized that this mortality escape is due to cooler pockets that do not sustain high temperatures for long enough (Grundy et al. 1998). Therefore, just because manure has been composted does not necessarily mean it is weed seed free.

Don't rely on anaerobic digestion

Though anaerobic digestion of manure may reduce seed viability of some weeds, it has not been found to affect amaranth germination beyond the benefits of animal digestion alone (Eckford et al. 2012; Katovich and Becker 2004).

Field application of contaminated manure

Have manure you think is contaminated?

Transport it to nearby fields that can be easily and frequently scouted. Even if the feed was ensiled and the manure was composted before spreading, it's still possible for weed seeds to remain viable. A 98% reduction in viability seems sufficient, but even low seed survival rates can be problematic. A survey of fresh dairy manure in New York found an average of 75,000 viable seeds per ton and a range of 0 to 400,000 seeds (Mt. Pleasant and Schlather 1994). 2% survival of 75,000 would leave 1,500 viable seeds remaining per ton. Applied at 8 tons per acre, that would increase the weed seedbank by 12,000 seeds per acre. This "numbers game" is especially precarious in the case of Palmer amaranth since Minnesota hopes to entirely eradicate it, as it would be fairly easy for just one or two seeds to slip through to the field. Apply the highest rates of manure (according to MN Pollution Control Agency guidelines) to the fewest number of fields as possible to minimize the spread of the seed. If these fields can be planted to more competitive crops such as alfalfa, grass pasture, or small grains that could also help by smothering the weed.

Scout fields after application

It is crucial to scout early and often for Palmer amaranth in fields that have received possibly contaminated manure. Since this weed has an extended emergence period ranging from May through July, it is important to continually monitor fields.

If you find a suspected Palmer amaranth plant

Don't transport it

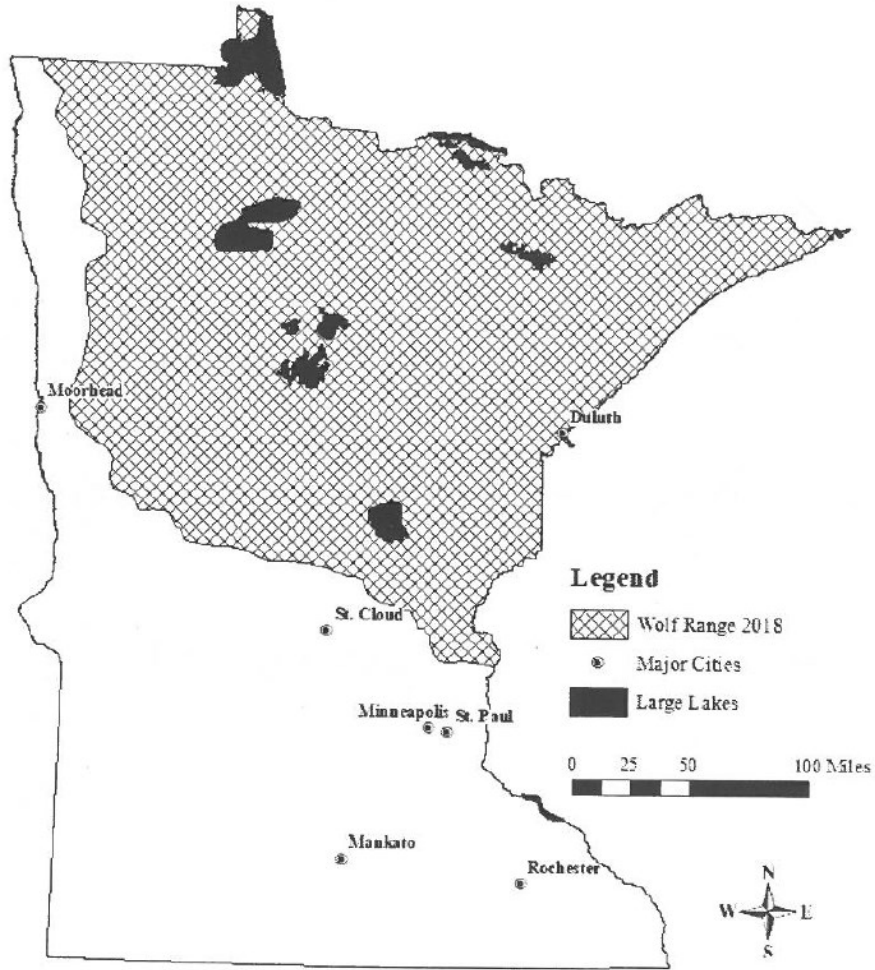
Palmer amaranth is an eradicate prohibited noxious weed, meaning it can't be transported even if it's just to town to get an expert's opinion. Instead, take photos or bring the expert to the suspected plant.

Contact MDA or UMN Extension

To report a suspected Palmer amaranth plant, call the MDA Arrest the Pest line at **1-888-545-6684** or email arrest.the.pest@state.mn.us and provide the following: Your location, description of where plant was found, contact information, seed source (if known), and three to six photos targeting three portions of the plant (entire plant, petiole (where the leaf connects to the stem), and inflorescence (seed head)).

After photographing and reporting, carefully destroy the plant!

Minnesota Department of Natural Resources Wolf Range



Wolves in Minnesota

A cooperative study is being conducted by the University of Minnesota for the Minnesota Department of Natural Resources. These surveys were mailed out to livestock producers identified by the Minnesota Board of Animal Health. If you received this survey your response will help inform the Minnesota Wolf Management Plan update.

Current Range: Wolves can be found in most of the northern half of the state. The figure above shows the geographic distribution of wolves. More wolves are found in the northeast part of the state than other areas within the range.

Population: The DNR conducted a survey of wolves in the winter of 2017/18. It was estimated that there were 2,655 (between 1,995 and 3,400) wolves living in the state at the time of the survey. This number goes up and down throughout the year as some animals are born or die.

More information on the range and population of wolves in MN can be found here:

<https://files.dnr.state.mn.us/wilflife/wolves/2018/survey-wolf.pdf>

More information on wolf management can be found in the current MN wolf management plan: https://files.dnr.state.mn.us/natural_resources/animals/wolves/wolfplan.pdf

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