

# Manure and Weed Seeds

**Manure Sense**  
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Manure is a very beneficial resource in crop production systems, but many non-livestock farmers hesitate to apply manure to their fields because they are worried about weeds. If a farmer spreads manure on his or her fields, will the potential for weed problems in these fields increase? The answer to this question lies in four areas of the livestock system: the feed source, the type of animal, the weed species and the manure handling system.

## **The feed source**

When feed is ground and pelletized, very few weed seeds survive. The few weed seeds that do survive in the feed pellets, however, may become the start of a new weed problem in the field.

If forages or grains are bought from another farm operation and fed to livestock, there is the potential to introduce a new weed species to the farm fields where the manure is spread. Why do I mention new weed species? Fields contain some weed seeds already, and a few more common lambsquarters seeds would never be noticed in most farm fields. However, a few seeds of a new, uncommon weed species could be the start of a new weed problem. The ensiling process reduces weed seed numbers dramatically. For example, after four weeks of ensiling, the number of lambsquarters weed seeds will be near zero. Most ensiled feed is fed through a rumen digestive system. Very few seeds of most weed species, including redroot pigweed and common lambsquarters, will survive passing through both the ensiling process and the rumen.

## **The type of animal**

Chickens destroy 98 percent or more of the weed seeds in feed because of the grinding action of their gizzards. About 25 percent of the weed seeds fed to cattle and hogs were recovered intact in the manure; 10 to 12 percent of the weed seeds were found intact in horse and sheep manure. Digestion in all livestock species destroys most

weed seeds, but some weed seeds survive the trip through most livestock and are present intact in the fresh manure.

## **The weed species**

Weeds with soft seed coats don't survive digestion by livestock. Weed seeds with soft seed coats include foxtails and other grass species, sweet clover and pepperweed. Weeds with small, hard seeds, such as common lambsquarters and the pigweeds, pass easily through most animals and are excreted intact and ready to start future weed problems.

## **The manure handling system**

The composition of manure varies with the livestock type and age, the livestock feed, and the housing and bedding materials used. A survey of fresh manure from 20 New York dairy farms found an average of 40 weed seeds per pound of manure. If a farmer spread 20 tons/acre of this manure, it would be equal to adding 40 weed seeds per square foot to his or her fields. Is this a lot of weed seed? It depends on the field. If a field has fewer than 100 seeds per square foot, 40 would be a lot of weed seeds to add; if a field has 10,000 seeds per square foot, this would be less than a 1 percent addition to the weed seed bank.

Across the north central region of the United States, farm fields vary in the number of seeds in the weed seed bank. Remember that one velvetleaf plant seeding out in a corn or soybean field produces 800 or more seeds, so spreading 20 tons of dairy manure with velvetleaf seeds will be less of a problem than a scattering of velvetleaf plants going to seed across the field.

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One way to reduce weed seed numbers in manure is to store the manure before spreading. Storing manure reduces weed seed viability (seeds are no longer capable of germinating). Stockpiling manure for three months was shown to decrease weed seed viability by 60 percent or more. The warm temperatures and the ammonia gas and uric acid generated in the stack contribute to weed seed decay over time. Similarly, high temperatures in compost piles kill weed seeds. Seeds of some weed species will be killed after seven days at 130 degrees F; seeds of some tougher weed species require 30 days at 145 degrees F or more to be killed. Weed seeds will survive in any cool spots in the compost pile. This is why compost must be turned periodically to break down the organic materials and to expose weed seeds to high temperatures.

Manure and compost applications provide many benefits to the soil and to the crop. Feed is pelleted or ensiled, feed passes through livestock digestive systems, and there are various manure storage regimes. All of these steps take a toll on weed seed viability. Managing weeds in manured and composted fields requires timely weed control tactics, just as it does in non-manured fields. Always monitor manured fields for new weed species, especially when livestock feed is brought in from out of the area. Good weed management by the farmer will prevent weeds from competing with the crop, and the crop will benefit from the additional nutrients and improved soil quality provided by the manure.

In the North Central region, one square foot of soil can contain anywhere from 56 weed seeds to 15,000 weed seeds in the soil seed bank.

Michigan State University recently published a 112-page Extension bulletin titled "Integrated Weed Management: Fine Tuning the System" (E-3065). For ordering information, visit the publications section of the Web site ([www.MSUweeds.com](http://www.MSUweeds.com)) or contact the MSU Extension bulletin office at [www.emdc.msue.msu.edu](http://www.emdc.msue.msu.edu). One chapter of this bulletin is devoted to manure and compost in integrated weed management systems. Weed scientists and farmers from across the north central region of the United States contributed their expertise to this chapter and other chapters of the new IWM bulletin.

## References

For a complete list of references please see pp. 125-126 in Taylor, E., K. Renner and C. Sprague. 2008. Integrated Weed Management: Fine Tuning the System. Extension bulletin E-3065. East Lansing, Mich.: Michigan State University.

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