How do manure and compost influence weeds on your farm?

Erin Taylor and Karen Renner
Integrated Weed Management: Fine Tuning the System

- Released December 2008
- Complements 2005 bulletin

Integrated Weed Management: One Year’s Seeding
“One Year’s Seeding…”

1. Weed life cycles and seedbank dynamics
2. Soil properties
3. Soil organic amendments
4. Tillage
5. Integrated crop & weed management
6. Crop rotation
7. Physical weed management
8. Herbicide management
9. Biological weed management
10. Prevention: a key to long-term management

Appendices. Weed Profiles, IWM on 4 Mich. Farms…
Fine Tuning the System

1. Diverse Crop Rotations
2. Cover Crop Systems
3. Manure and Compost
4. Flaming for Weed Management
5. Grazing and Other Biological Controls
6. Thresholds: How Many Weeds Are Too Many?
7. On-farm Weed Management Trials

Appendix. Weed Profile: The Second Dirty Dozen
Do you use manure on your farm?
Do you use compost on your farm?
1) If I spread manure or compost will weed problems increase?

2) Will new weed species “show up”?

3) Will weeds be more competitive with the crop?
It depends **on the animal**

Weed seeds remaining viable after digestion

<table>
<thead>
<tr>
<th>Animal</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cattle</td>
<td>25%</td>
</tr>
<tr>
<td>Hogs</td>
<td>25%</td>
</tr>
<tr>
<td>Horses</td>
<td>10-12%</td>
</tr>
<tr>
<td>Sheep</td>
<td>10-12%</td>
</tr>
<tr>
<td>Chickens</td>
<td>2%</td>
</tr>
</tbody>
</table>
It depends on what the livestock is fed

• Very few weed seeds survive in pelletized feed products

• Weedy feed = potentially weedy manure
Weed seeds in manure

- New York dairy study
  - 40 weed seeds/lb

- Therefore...
  - 15 tons of manure/acre = +28 weed seeds / ft²
Is 28 seeds/ft$^2$ each year a lot? Depends on how large the weed seedbank is…

Weed seedbank = all viable weed seed in the soil

+ Seed production

- Germination
- Decay
- Predation
It depends on the weed species in the feed.

- Small, hard weed seeds are more likely to survive digestion.
Table 1. Average percentage of viable (alive) seed remaining after fermentation in a silo, rumen digestion or both.

<table>
<thead>
<tr>
<th>Seed Type</th>
<th>Ensiling in a silo</th>
<th>Rumen digestion</th>
<th>Silo + rumen digestion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Redroot pigweed</td>
<td>6</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>C. lambsquarters</td>
<td>3</td>
<td>52</td>
<td>2</td>
</tr>
<tr>
<td>Wild buckwheat</td>
<td>30</td>
<td>56</td>
<td>16</td>
</tr>
<tr>
<td>Round-leaved mallow</td>
<td>23</td>
<td>57</td>
<td>17</td>
</tr>
<tr>
<td>Field pennycress</td>
<td>10</td>
<td>68</td>
<td>10</td>
</tr>
</tbody>
</table>

Adapted from Blackshaw and Rode (1991).

Ensiling helps

Ensiling for 8 weeks
Summary: Manure and Weed Seeds

- Poultry manure has the fewest weed seeds
- Feed dairy “weed-free” feed
- Ensiling reduces weed seed in feed
Summary: Manure and Weed Seeds

• Storing manure reduces weed seed viability

• Some weeds are worse than others:
  – New species not desirable (at 28 seeds/sq ft)
  – Hard, small seeds survive digestion ex. Lambsquarters, buckwheat
Does composting help?

High temperatures in compost kill weed seeds
Table 4. Weed species vary in the temperature and duration of the temperature required to make weed seeds nonviable (dead). Weed species are grouped into three categories: easy, moderate and difficult to kill with composting.

<table>
<thead>
<tr>
<th>Easy 7 days at 130 F</th>
<th>Moderate 14 days at 130 F</th>
<th>Difficult 30 days or more at 145 F</th>
</tr>
</thead>
<tbody>
<tr>
<td>shepherd’s-purse</td>
<td>wild proso millet</td>
<td>common groundsel</td>
</tr>
<tr>
<td>cleavers</td>
<td>foxtail barley</td>
<td>birdeye speedwell</td>
</tr>
<tr>
<td>scentless chamomile</td>
<td>wild oats</td>
<td>round leaved mallow</td>
</tr>
<tr>
<td>wild mustard</td>
<td>Canada thistle</td>
<td>common lambsquarters</td>
</tr>
<tr>
<td>tansy mustard</td>
<td></td>
<td>spiny sowthistle</td>
</tr>
<tr>
<td>barnyardgrass</td>
<td></td>
<td>ladysthumb</td>
</tr>
<tr>
<td>green foxtail</td>
<td></td>
<td></td>
</tr>
<tr>
<td>johnsongrass</td>
<td></td>
<td></td>
</tr>
<tr>
<td>downy brome</td>
<td></td>
<td>wild buckwheat*</td>
</tr>
<tr>
<td>kochia</td>
<td></td>
<td>field bindweed*</td>
</tr>
<tr>
<td>pigweeds</td>
<td></td>
<td>broadleaf dock*</td>
</tr>
</tbody>
</table>

*Most difficult to kill composting; may require warmer temperatures.

Keys to Composting Weed Seeds

- Turn the piles so all seeds are exposed to high temperatures
- Do not let weeds grow on the compost piles
Manure and Compost Questions

1) If I spread manure or compost will weed problems increase?

2) Will new weed species “show up”?

   Yes if you have weedy feed, especially with some manures
Manure and Compost Questions

1) If I spread manure or compost will weed problems increase?

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3) Will weeds be more competitive with the crop?
Weed growth in manured and composted fields: an important consideration

- Nutrients in manure and compost can increase the growth of weeds just as it promotes crop growth.

- Manure and compost should be applied to fields at rates based on their nutrient composition.

Giant ragweed in soybeans
Univ. of Illinois photo
<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
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<tr>
<td>1) If I spread manure or compost will weed problems increase?</td>
<td>Yes, but proper placement can favor the crops instead</td>
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<td>2) Will new weed species “show up”?</td>
<td></td>
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<tr>
<td>3) Will weeds be more competitive with the crop?</td>
<td>Yes, but proper placement can favor the crops instead</td>
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Nutrient placement helps

- Delaying application reduces early season weed competition and placement below the soil surface is best for crop use (and not weeds)
Manure and Compost Questions

Should I use manure and compost to build soil quality and provide nitrogen and other nutrients to the crop?

Yes, but you need to scout fields for new infestations and practice timely management.
Where can I get the IWM bulletin?

MSU Extension Bulletin Office
- Web: www.emdc.msue.msu.edu
- Phone: (517) 353-6740
- Reference E-3065

Info @
www.msuweeds.com

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