

Integrated Weed Management: Fine Tuning the System

A New Extension Bulletin



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Introduction

"Integrated Weed Management: Fine Tuning the System" (E-3065) is the follow up bulletin to "Integrated Weed Management: One Year's Seeding..." (E-2931) which was released in February 2005. Feedback from an extensive grower survey of "One Year's Seeding..." determined that there were many questions remaining regarding weed management in sustainable farming systems. "Fine Tuning the System" was written to further address specific areas of interest in weed management.

Similar to "One Year's Seeding..." this guide does not provide detailed management plans. Each chapter looks at how different cultural management practices affect weeds. Our goal was to include written information from researchers and extension personnel and input from experienced growers.

Chapter 1: Diverse Crop Rotations

Strategies for optimizing rotation effects on weed suppression:

- Alternate early and late season vegetables/field crops
- Use weed suppressive cover crops
- Use 'cleaning crops' (e.g. potato) where weeds can be easily managed prior to planting crops in which it is difficult to control weeds (e.g. carrot)

This chapter features diverse four to nine year rotations from field crop and vegetable farms around the North Central Region.



Chapter 2: Cover Crop Systems

Benefits of Cover Crops:

- Cover crops reduce light reaching the soil surface
- Some cover crops release chemicals known to inhibit the germination and growth of small weed seedlings
- Some cover crops act as "biofumigants"
- Cover crops improve soil quality and crop growth
- Cover crops can act as nitrogen scavengers or producers

Several monoculture and polyculture cover crop ideas for weed management are discussed in addition to seeding rates and dates, control options, innovative practices and rotation issues.



Chapter 3: Manure and Compost

Table 1. Average percentage of viable (alive) seed remaining after fermentation in a silo, rumen digestion or both.

	% viable seed		
	Ensilng in a silo	Rumen digestion	Silo + rumen digestion
Redroot pigweed	6	4	4
C. lambsquarters	3	52	2
Wild buckwheat	30	56	16
Round-leaved mallow	23	57	17
Field pennycress	10	68	10

Adapted from Blackshaw and Rode (1991).



Chapter 4: Flaming for Weed Management

Table 2. Sensitivity of weeds to flaming.

Sensitive to flaming	Moderate	Tolerant to flaming
common lambsquarters	common purslane	annual bluegrass
common chickweed	ladysthumb	foxtail species
pigweed species	common groundsel	crabgrasses
velvetleaf		common ragweed
		pineapple-weed
		mustards

Sources: Ascard 1995, on-farm trials (i.e. unpublished data), Gene Vogel.



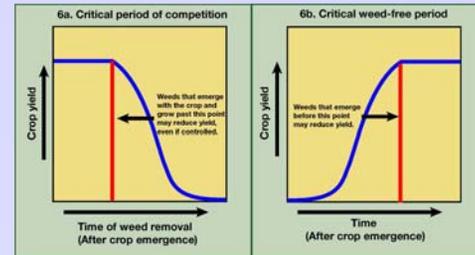
Chapter 5: Grazing and Other Biological Controls

Table 1. Characteristics of weeds that influence susceptibility to grazing pressure (Figure 2).

Less likely to survive	More likely to survive
Upright growth	Prostrate growth
Growing points up off the ground	Growing point near or below soil surface
Few growing points	Several growing points
Limited flowering time	Continuous flowering
Few flowers, rhizomes or stolons	Many flower, rhizomes or stolons
Palatable to grazer	Presence of spines or thorns
High nutritional value	Low nutritional value
	High in secondary metabolites
	Seed can survive digestion



Chapter 6: Thresholds: How Many Weeds are Too Many?



Chapter 7: On-farm Weed Management Trials Across the North Central Region

Ten grower-designed on-farm weed management trials were conducted across the North Central Region in 2006 and 2007.

- Effect of corn planting time on weeds (Good Hope, IL)
- Intercropping for weed control in corn (Alma, MI)
- Intercropping buckwheat and oats in corn (North Branch, MI)
- Cover crops for Canada thistle suppression (Maple Park, IL)
- Mulches for common purslane control in tomato (Urbana, IL)
- Ridge-till vs. conventional-till in soybean (Harlan, IA)
- Cultivator comparisons for weed control (Schoolcraft, MI)
- Flaming and rotary hoeing in corn (Creston, IA)
- Flaming and rotary hoeing in soybean (Alma, MI)
- Organic herbicide for soybean weed control (West Bend, WI)



Appendix: The 2nd Dirty Dozen (+ 2)

Knowing your enemy is the key to weed management. With that in mind, fourteen of the North Central Region's worst weeds have been profiled in "Fine Tuning the System" to complement the original 12 profiled in "One Year's Seeding..." Profiles cover known lifecycle and management information. Weeds discussed include Canada thistle, common pokeweed, curly dock, fall panicum, henbit, horsenettle, jimsonweed, perennial sowthistle, purple deadnettle, quackgrass, white campion, wild carrot, wild mustard and yellow nutsedge.



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