


Planning for Weed Management in Vegetables

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- Weed management goals
 - Basic strategies
 - Information needed
 - Thinking through plans for a pumpkin crop
 - Preparing equipment and people
- January 2007 2

- ## Weed Management Goals
- Minimize interference with crop
 - Reduce future weed problems
- AND**
- Maintain or improve
 - profitability
 - environmental quality
 - quality of life
- January 2007 3



- ## Reduce Future Weed Problems
- Weed seed numbers in the soil decrease measurably over time if no new seed is added
 - Reducing weed seed inputs this year can make a difference next year
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Years to Reduce Soil Seed Number by 50% and 99%

Weed Species	50%	99%
G. Foxtail, G. Ragweed, Kochia	< 1	2
C. Ragweed, Lg. Crabgrass, Ivy Leaf Morningglory	1 - 2	8 - 11
RR Pigweed, C. Waterhemp, Chickweed	2 - 3	14 - 20
P. Smartweed, Yellow Foxtail, C. Cocklebur	4 - 6	25-40
C. Lambsquarters, Velvetleaf	> 7	> 50

January 2007 6
[Integrated Weed Management MSUE Bull. E-2931](#)

Purdue Seedbank Research

Mayen and Weller

Split-split plot
main: crop
sub: weed management
sub-sub: weed control intensity

Crop

Fresh Market Tomatoes
2001cv - Mountain Spring
2002cv - Prime Time

Roundup Ready Soybeans

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Experimental Design

Mayen & Weller

Weed Control Intensity

Split-split plot
main: crop
sub: weed management
sub-sub: weed control intensity

Early season weed-free + No Seed

- weed free after 4 weeks
- no seed production

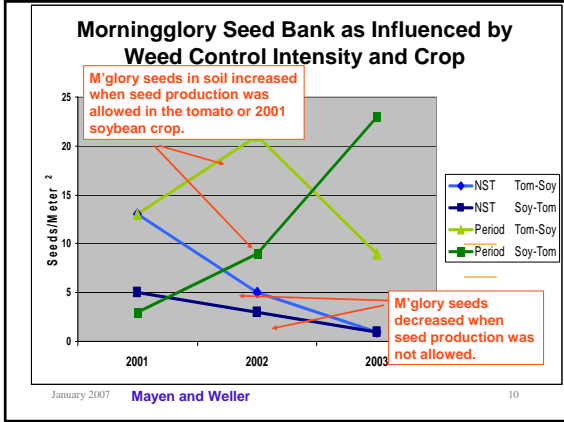
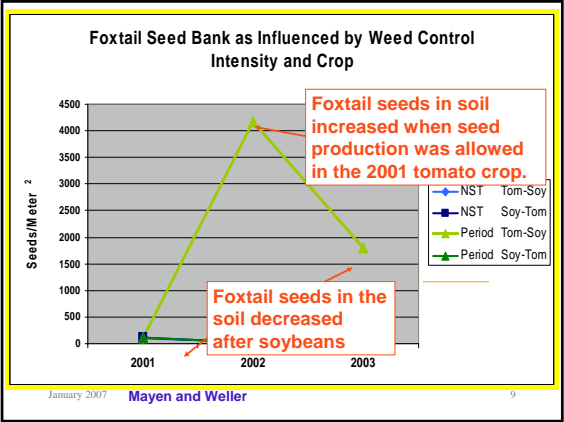
Early season weed-free

- weeds allowed after 4 weeks
- weed seed production allowed

4 weeks after planting

Planting Weed control Harvest

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Effects of Weed Control Intensity on Yield

Mayen and Weller

Tomato (lbs/20 plants)

	2001	2002	2003
No seed	126	81	238 a
Early season weed-free	113	81	169 b

Soybean (lbs/ Ha)

	2001	2002	2003
No seed	5871	6002	6781
Early season weed-free	5871	5490	6512

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Soybeans Plots in 2022 Following Tomatoes

weed-free early

no seed
Conventional

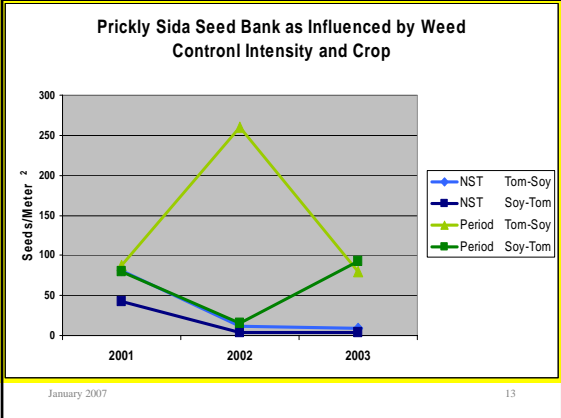
No-till

Rye Cover Crop

Increased weed density in threshold plots

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Planning for Weed Management in Vegetables, Weller and Maynard



Weed	Number of seeds produced per plant
yellow foxtail	6,300
stalliongrass	2,000
germ foxtail	300
common burdock	72,500
common ragweed	5,300
plant ragweed	10,300
smartweed	18,500
cocklebur	900
eastern black nightshade	10,000
winterweed	7,800
Canada thistle	680,000
common milkweed	223,200
common purslane	52,500
common chickweed	25,000
common sunflower	7,200
dandelion	15,000
redtop pigweed	117,400
shepherd's-purse	38,500
hairywood sorrel	201,000
hardhack	31,600

Integrated Weed Management MSUE Bull. E-2931

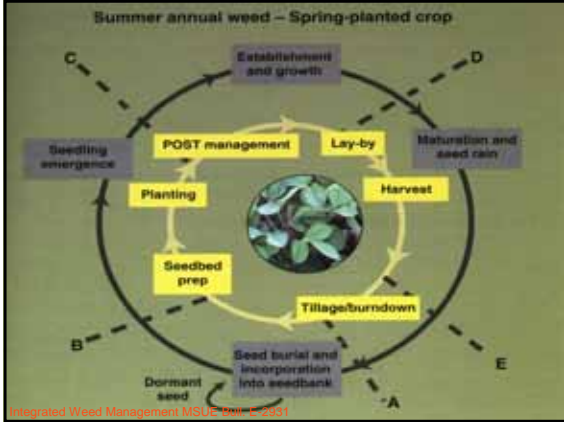
Weed Seed Fate

- Predation
- Decay
- Off-site movement
- Death
- Dormancy*
- Germination/Death
- Germination/ Survival

Figure 10. Weed seed fates. Source: Cavigelli et al., 2000.

January 2007 15

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Integrated Weed Management

- Throughout crop production cycle
- Across entire farm
- Variety of practices, techniques, tools - don't rely on only one tactic
- Use knowledge of weed biology

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Planning for Weed Management in Pumpkins

- Gather Information
 - Field
 - Crop
 - Available Equipment, Herbicides
- Make Plans
- Prepare supplies, equipment and people
- Implement
- Review and Evaluate

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Field Information

- **Major weeds**
 - lambsquarters**, pigweeds, morningglory, nightshade (increasing), some velvetleaf, ragweed, giant foxtail
- **Distribution in field**
 - fairly uniform
- **Potential new weeds**
 - hairy galinsoga

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19

Field Information, cont.

- **Conditions that influence crop or weed growth**
 - a few compacted strips, compaction due to traffic
- **Conditions that influence herbicide or cultivation effectiveness**



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20

Field Information, cont.

- **Crop rotation**
 - soybeans '06 followed by wheat cover; corn in '08, mixed vegetables in '09
- **Herbicide history**
 - glyphosate '06, atrazine/s-metolachlor and buctril '05

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21

Crop Information

Rapid canopy cover will reduce weed growth

- **Requirements for good growth**
 - warm season crop, temp > 60
 - use soil test and ID-56 for nutrient
- **Competitive varieties**
 - variety with full vigorous vines

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22

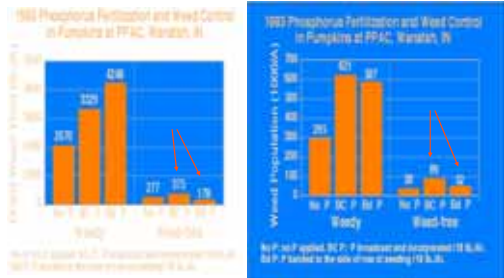
Crop Information, cont.

- **Cultural practices that increase crop competitiveness**
 - narrower rows, more space between plants in the row
 - start from transplants
 - supply water and nutrients near crop
 - drip irrigation
 - band dry fertilizer, or supply in drip irrigation
 - nutrients in sync with crop needs
 - sidedressing, periodic fertigation

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23

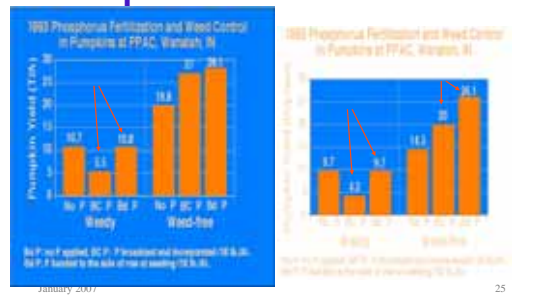
Banding Fertilizer Effect on Weed Biomass and Number



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24

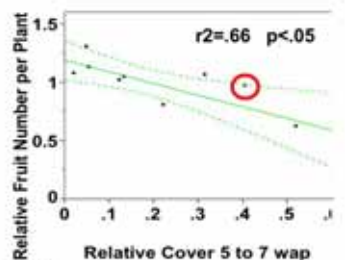
Banding Fertilizer Effect on Pumpkin Yield and Number



Crop Information, cont.

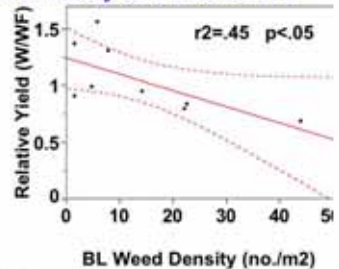
- Potential for herbicide injury
- Critical period for weed control
- Potential yield loss
 - based on leaf area of weeds and pumpkins 5 to 7 wap, about 10% yield loss for each 10% of leaf area contributed by weeds
 - about 10% yield loss for each 10 weed/m2 present at harvest

Relative number of pumpkins per plant vs. relative broadleaf weed cover 5 to 7 wap.



Relative Fruit Number per Plant (W/WF) = $1.1884791 - 0.998901$ Relative Cover 5 to 7 wap
 Maynard, 2002 28

Relative pumpkin yield vs. broadleaf and sedge weed density at end of season.



Relative Yield (W/WF) = $1.2444087 - 0.0144276$ BL Weed Density (no./m2)
 Maynard, 2002 29

Equipment

- Chisel plow
- Disc
- Field cultivator
- Rotary tiller
- Mini-Bervac
- Cultivator
- 15' Herbicide spray boom
- Hoes: standard, scuffle, colinear



Making Plans

- Overall goals
 - add organic matter
 - reduce compaction
 - improve soil quality

Making Plans

Tillage

- No-till into killed wheat?
- Kill wheat and disk?
- Spreading seed/perennials?



Seedbed Prep

- Stale seedbed?
- Minimize traffic?

Planting and Crop Management

- Transplant?
- Pre or post herbicides?
- Cultivation, hand weeding, flaming?



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Making Plans

Pre-harvest

Roguing?

Harvest and Post Harvest

- Spreading seed/perennials?
- Habitat for seed predators?
- Tillage?
 - Stimulate annual germination
 - Bury new seed
- Cover crop?
- Perennial management?
- Weed ID and maps?
- Field margins?



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32

Optimize Practices

- **Weed control practices**
 - Set-up and calibrate sprayer
 - Adjust, clean, sharpen cultivation equipment
 - Train employees in proper equipment use
- **Production practices**
 - Healthy transplants, fertilization, irrigation, etc.

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33

Review and Evaluate

- What worked?
- What didn't?
- Plan for next year based on critical assessment of production practices.

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34