Integrated Weed Management Tactics for Improved Control in Fruit

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New York State Integrated Pest Management

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Outline

- Basics
- Weed management trials
- Future outlook

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Herbicides

- Pre-emergence vs Post-emergence
- Broad-Spectrum vs Selective
- Contact vs Systemic

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Different Species Respond Differently to Management

Active ingredient (Trade name)	HRAC code	Alfalfa *Medicago sativus*	Amaranth, Palmer *Amaranthus palmeri*	Amaranth, Powell *Amaranthus powellii*	Amaranth, spiny *Amaranth spinosus*	Aster *Aster spp.*	Barley, volunteer; wild *Hordeum spp.*	Barnyardgrass *Echinochloa crus-galli*	Bedstraw, catchweed *Gallium aparine*	Beggarticks *Bidens spp.*
Weed type		BL	BL	BL	BL	BL	G	G	BL	BL
Weed habit		P	A	A	A	P	A	A	A	A
Control Efficacy										
2, 4-D (Amine 4, Formula 40 etc.)	4	C								C
ammonium nonanoate (Axxe)	M									
carfentrazone-ethyl (Aim EC)	14		C		C				C	
***clethodim** (Arrow EC, Select Max)	1						C	C		
***†clopyralid** (Stinger)	4	C								
***†DCPA** (Dacthal W75,F)	3							C		
dichlobenil (Casoron 4G, CS)							C	C	C	C

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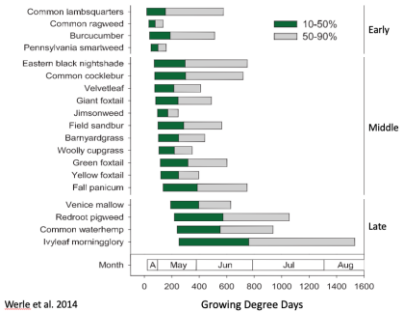
Different Species Respond Differently to Management



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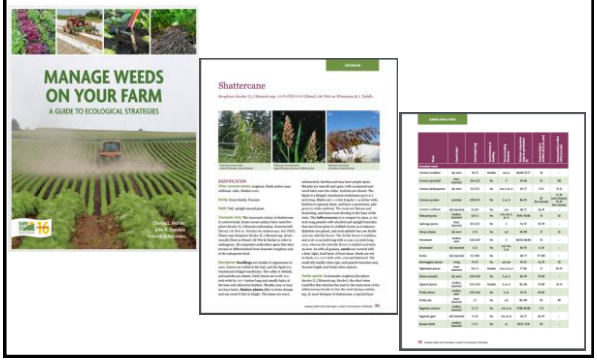
New book! Free PDF on SARE website



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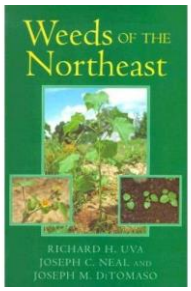
Accurate Identification is Key to Management



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Weed ID Apps

- PictureThis
- PI@antNet
- iNaturalist

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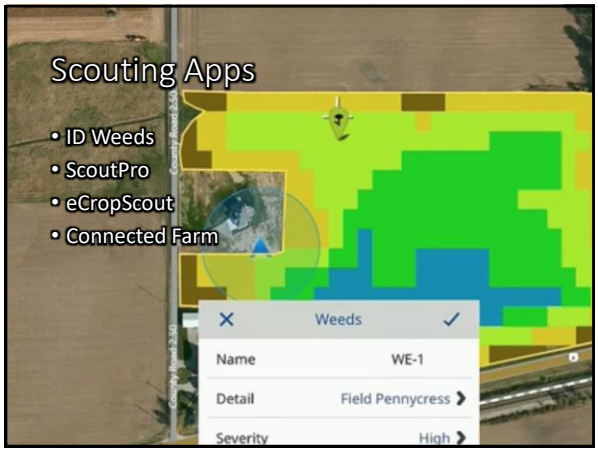

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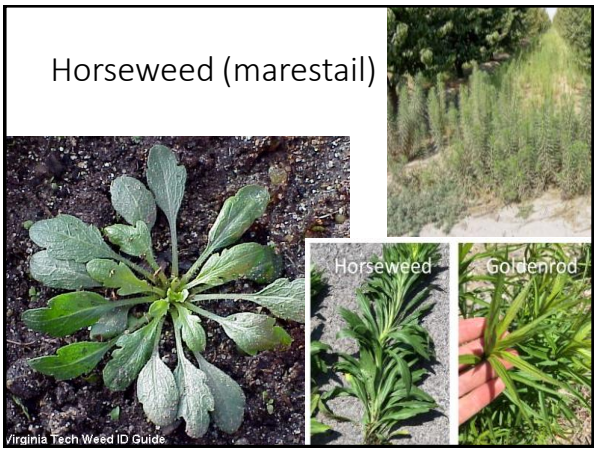

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Horseweed (marestail)

- Herbicides ineffective if plants larger than 4". Winter cover crops can be used to keep fall-emerging plants small enough to be controlled in the spring.
- Achilles' heel: Tiny seeds need to be in top 0.1" of soil to emerge. 75% die after one year. Spring tillage or residue mulch are very effective. Susceptible to glufosinate.

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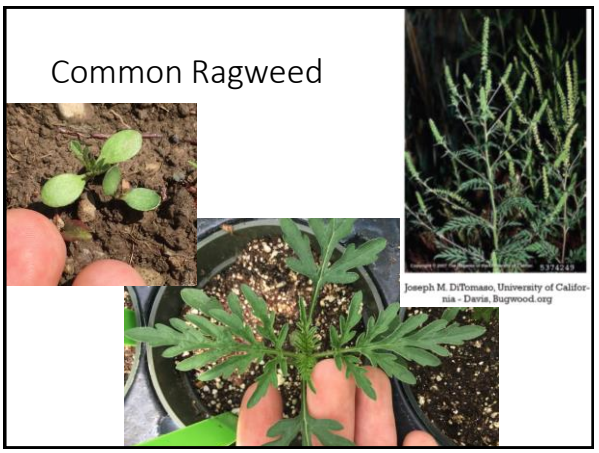

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Common Ragweed

- One of the earliest emerging weeds in New York.
- Achilles' heel: Won't emerge after June 1.

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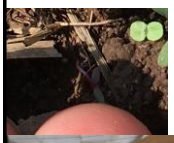
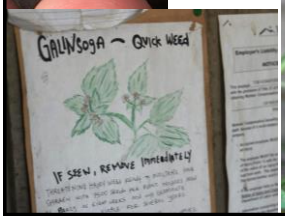
Hairy Galinsoga





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Hairy Galinsoga

- Rapid growth rate and ability to flower throughout the growing season. Seeds lack dormancy and may emerge throughout the season.
- Achilles' heel: No seed dormancy! Very susceptible to stale seedbed.

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Pigweeds

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Canada Thistle

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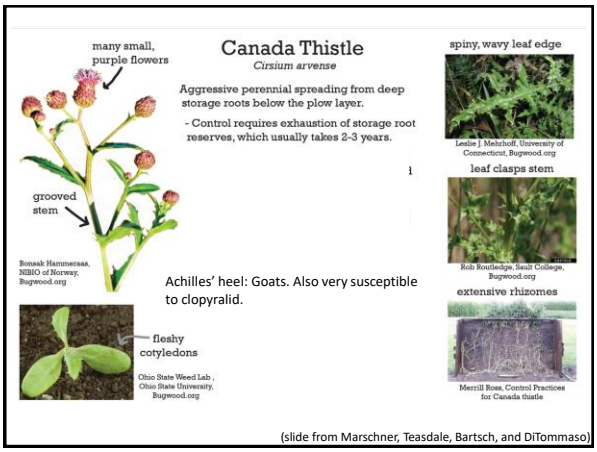

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Yellow Nutsedge

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Quackgrass

"Clasping auricles"

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Hedge bindweed

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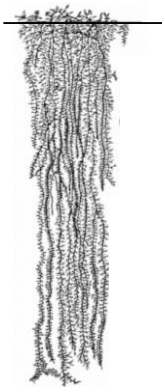
Field bindweed



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Trial 1: Bindweed in *vinifera* Grapes

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Treatments at Site 1

Treatment	Approximate application timing		
	June 1	July 1	August 1
untreated			
hoeing	x	x	x
rimsulfuron (Matrix SG, 2 oz/A + AMS at 2.5% v/v)	x	x	
glyphosate (Makaze, 2.5 qt/A)	x	x	x

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Methods

- Sprayed undervine with a hooded backpack sprayer
- Hoeing by hand, but simulated tractor
- Weed biomass weighed in late-September

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Average weed control in late-September, over 2 years

treatment	hedge bindweed control (%)	other weed control (%)
hoeing (3x)	96	83
rimsulfuron (2x)	96	82
glyphosate (3x)	100	96

- "Other weeds" mostly annual grasses

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Visible injury from glyphosate but not rimsulfuron

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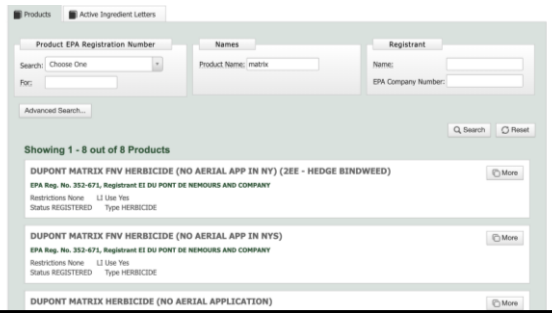
We received 2(ee) status for most rimsulfuron products in NY

- NYSPAD



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Treatments at Site 2

Treatment	Approximate application timing			
	May 1	June 1	July 1	August 1
untreated				
hoeing		x	x	x
rimsulfuron (Matrix SG, 2 oz/A + AMS at 2.5% v/v)		x	x	
glyphosate (Makaze, 2.5 qt/A)		x	x	x
hoeing, glyphosate, and rimsulfuron (4 oz/A)		x	x	x
dichlobenil (Casoron CS, 1.4 gal/A in 2019, 2.8 gal/A in 2020)	x			

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Average weed control in late-September, over 2 years

treatment	field bindweed control (%)	other weed control (%)
hoeing (3x)	66	89
rimsulfuron (2x)	12	41
glyphosate (3x)	100	84
hoeing, glyphosate, rimsulfuron	93	95
dichlobenil	24	53

- "Other weeds" mostly ground ivy, clovers, and smartweeds

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Partial budget costs ($USD/acre)

Treatment	Labor	Equipment	Herbicide	Total
hoeing (3x)	207	144	0	351
rimsulfuron (2x)	120	59	46	224
glyphosate (3x)	179	89	43	311
hoeing, glyphosate, rimsulfuron	189	107	37	333
dichlobenil	60	30	225	314

Based on: Davis T, Gómez M, Moss R, Walter-Peterson H (2020). COST OF ESTABLISHMENT AND PRODUCTION OF V. VINIFERA GRAPES IN THE FINGER LAKES REGION OF NEW YORK-2020. Cornell University. Ithaca, NY.

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Trial 2: Residual Herbicide Timing in Apples

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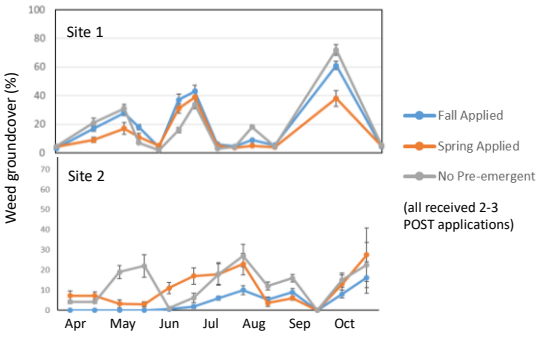
Prowl H2O(4qt) +Chateau(12oz) +glufosinate(48oz)



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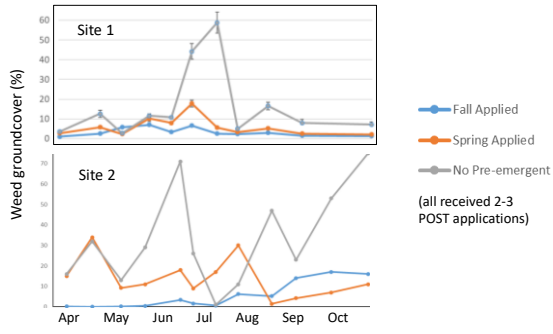
Year 2: Alion (5 fl oz) + glufosinate (48 fl oz)



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Can we prevent spray from reaching trunks?

- 10-inch tall Tyvek trunk guards
- Placed on ½ of trees in research block

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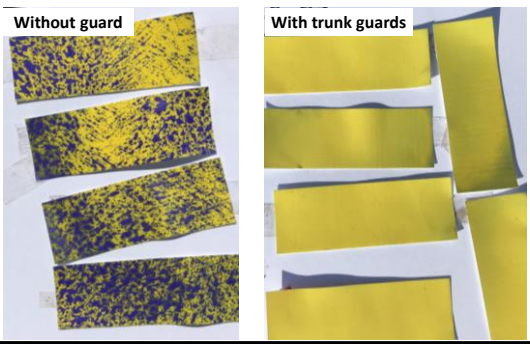
Trunk guards prevent spray deposition.



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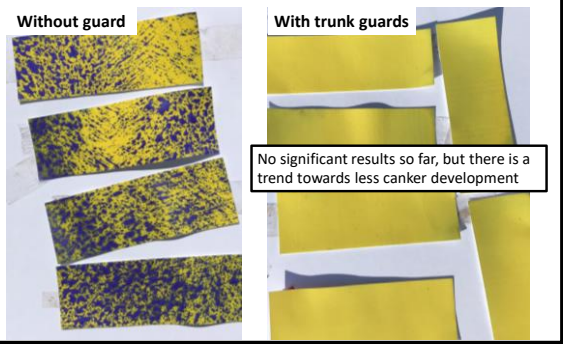
Trunk guards prevent spray deposition.



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Trial 3: Strawberries at Shenk Berry Farm, Pennsylvania

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Shenk Strawberry Rotation

- Year 1. Sweet Corn
- Year 2. Alfalfa.
- Year 3. Alfalfa. Fall planted Winter Rye
- Year 4. Cut the Winter Rye for mulch at flowering in May. Plant Sorghum Sudangrass hybrid, mow in August
- Year 5. Cultipack the winterkilled Sorghum Sudangrass while ground is frozen. Transplant strawberries
- Year 6. Strawberries
- Year 7. Strawberries
- Year 8. Strawberries

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Month	Planting year	Fruiting year
April	Weeds suppressed by residue	Remove mulch, Devrinol (15)
May	Chateau (14), planting	
June		Harvest
July	Scouting, wait to cultivate until Prowl wears off, Dacthal (3)	2,4-D (4), renovate, Sinbar (5), Prowl H2O (3)
August	Hand-weeding in-row, Sinbar (5), Devrinol (15)	
September		Scouting, wait to cultivate until PREs wear off
October	Cultivate, Stinger (4)	Cultivate, Stinger (4)
November	Chateau (14), mulch	Chateau (14), mulch

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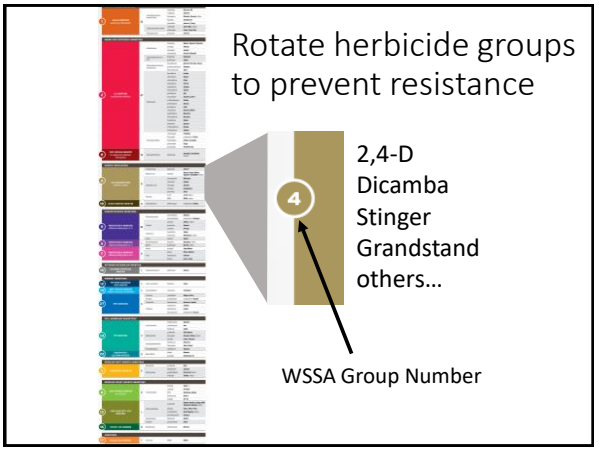

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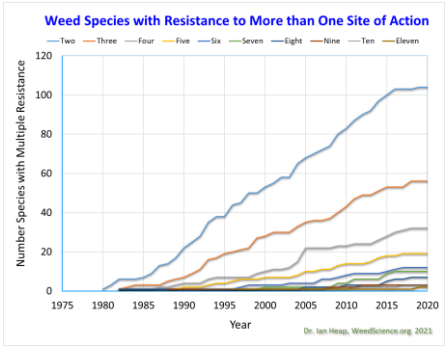
Future Outlook



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Future Outlook

- Mulch, cultivation, or cover crops can suppress annual weeds

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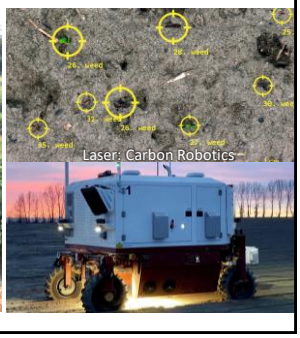
Future Outlook



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- New York Wine & Grape Foundation

For more information, check out the New York State IPM website!

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