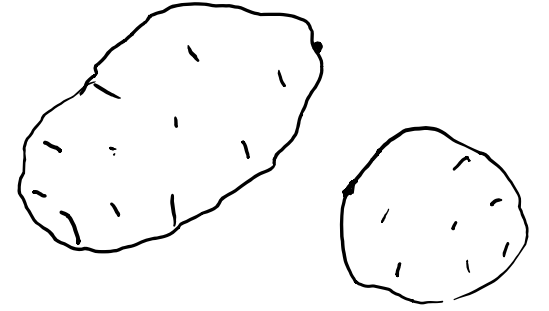


Weeds and Herbicides in Potato Production

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NDSU

EXTENSION

Topics

- Herbicides and timings
- Hard to control weeds
- Clethodim tank mixtures
- New herbicide: Zidua
- Case studies



Topics

- Herbicides and timings
- Hard to control weeds
- Clethodim tank mixtures
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Integrated Pest Management

Integrated Weed Management is defined as the use of a range of control techniques, embracing physical, chemical and biological methods in an integrated fashion without excessive reliance on any one method (Powles and Matthews, 1992).



Weed control methods (the toolbox)

- Prevention
- Cultural
- Mechanical / physical
- Chemical
- Biological



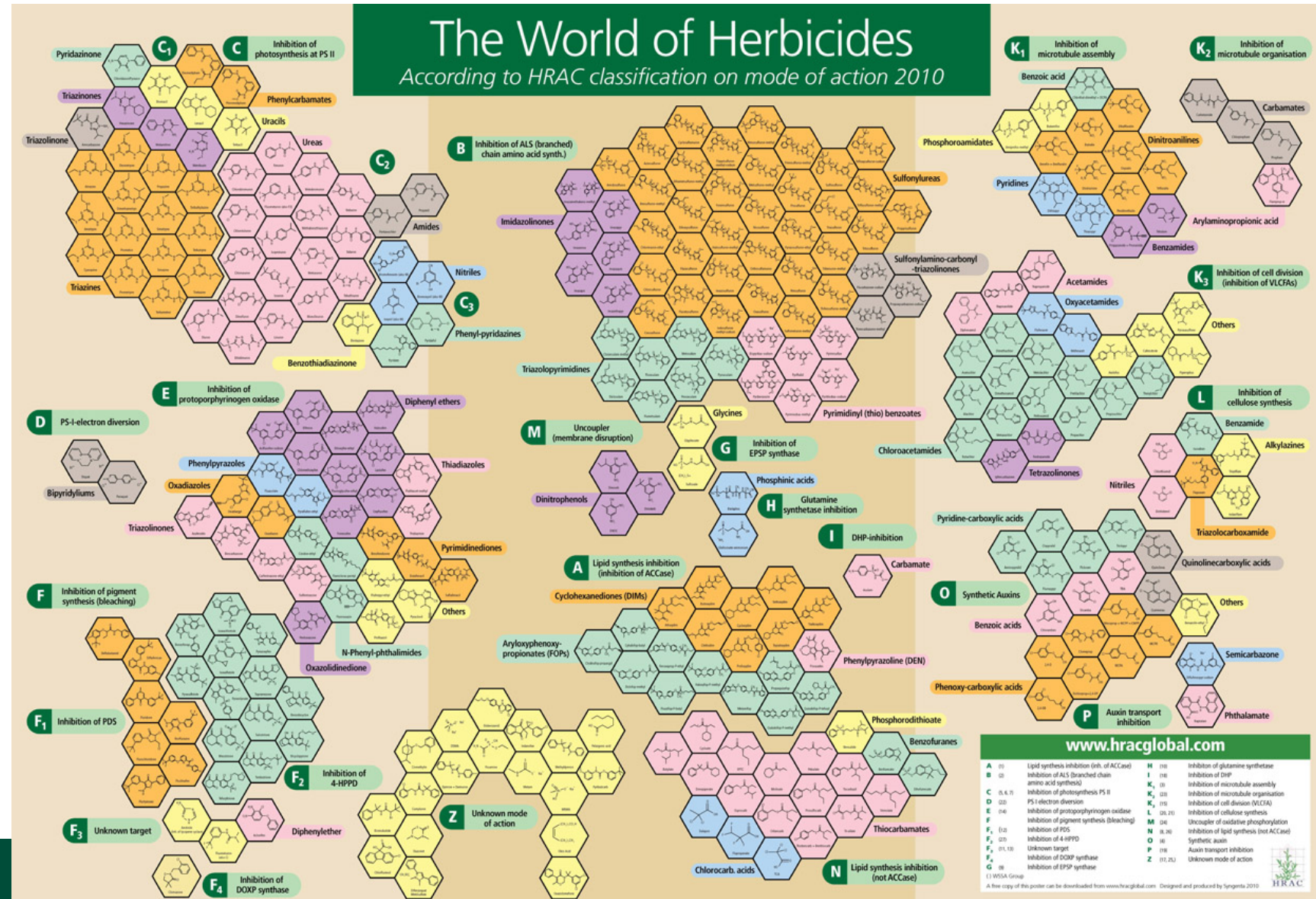
Prevention and cultural management

- Crop rotation
- Planting configuration
- Removing debris and soil from equipment
- Proper watering and fertilizing of crop
- Growing competitive plants



What's the herbicide situation?

- Many herbicides, but limited for potato
- So what does this mean?



Preemergence modes of action

Mode of Action	Group	Herbicide(s)	Year reported or registered	Water solubility (mg/L)	Half life (days)
Lipid synthesis inhibition	1 / A	clethodim / Select sethoxydim / Poast	1987 1978	- 257	- -
ALS inhibitors	2 / B	rimsulfuron / Matrix	1992	<10	3
Microtubule assembly inhibition	3 / K1	trifluralin / Treflan ethalfluralin / Sonalan pendimethalin / Prowl	1960 1974 1974	0.3 0.3 0.3	164 34 44
Lipid synthesis inhibition	8 / N	EPTC / Eptam	1957	370	9
PS II inhibitors	5 / C1 C2	metribuzin / Metribuzin linuron / Linex	1964 1962	1100 75	21 60
PPO inhibitors	14 / E	flumioxazin / Chateau fomesafen / Reflex Sulfentrazone	1989 1983 1998	2 50 780	15 100 211
Inhibition of VLCFAs	15 / K3	dimethenamid / Outlook metolachlor / Dual Pyroxasulfone / Zidua	1993 1972 2019	1174 488 3.5	20 40 16-26

Postemergence modes of action

Mode of Action	Group	Herbicide(s)
Lipid synthesis inhibition	1 / A	clethodim / Select sethoxydim / Poast
ALS inhibitors	2 / B	rimsulfuron / Matrix
PS II inhibitors	5 / C1, C2	metribuzin / Sencor
Microtubule assembly inhibition	3 / K1	pendimethalin / Prowl
Inhibition of VLCFAs	15 / K3	metolachlor / Dual
Lipid synthesis inhibition	8 / N	EPTC / Eptam

Selection herbicides

- Variety sensitivity
 - Minituber/NFT sensitivity
- Weed spectrum
- Timing
- Cost of herbicide and application
- Rotation restrictions



Preemergence weed control (p.114-115)

SOIL- APPLIED HERBICIDES*	Mode of Action**	Grasses							Broadleaves				
		Barnyardgrass	Brome, Downy	Foxtail, Green	Foxtail, Yellow	Quackgrass	Volunteer Cereals	Wild Oat	Buckwheat, Wild	Cocklebur, Common	Horseweed (Marestail)	Kochia	Lambsquarters
Boundary* (Pre)	5,15	F-G	-	F-E	F-E	N	P	P	F-G	P	F	F-G	G
Chateau* (Pre)	14	N	F-G	P	P	N	N	N	P-F	N	F-E	F-G	G-E
Dual* (PPI/Pre)	15	P-E	P-F	F-E	F-E	N	P	P-F	N-P	N	N	N-P	P-F
Linex* (Pre)	7	F	-	F	F	P	P	P	G	P	-	F	E
Rimsulfuron (Pre)	2	G	-	G	F-G	N	G	F	P	F	P ¹	G ¹	F
Metribuzin* (PPI/Pre)	5	P-F	F-G	P-F	P-F	N-P	P-G	N	F-G	P-F	F	F-G	P-F
Outlook* (PPI/Pre)	15	G-E	P-G	G-E	G-E	N	F-G	P	N	N	N	N	F-G
Prowl* (PPI)	3	E	F-G	G-E ¹	E	N	N	P-F	P	N	N	P	F-G
Reflex* (PRE)	14	P-F	-	P	P	N	N	N	P	P	-	F	F
Sonalan (PPI)	3	E	F	E ¹	E	N	P	P	P	P	N	P	G
Treflan* (PPI)	3	E	F-G	E ¹	E	N	N	P-F	N	N	N	P	F-G
Zidua (PRE)	15	E	F-G	G-E	G-E	N	N	F-E	P	P	N-P	F	P

Preemergence weed control (p.114-115)

	Mode of Action**	Broadleaves											Crop Safety***
		Lanceleaf Sage	Mustard, Wild	Mustard, Winter Annual	Nightshade, E Black	Nightshade, Hairy	Pigweed, Redroot	Waterhemp (ALS-R)	Prickly Lettuce	Ragweed, Common	Smartweed, Annual	Thistle, Russian	
SOIL- APPLIED HERBICIDES*													
Boundary* (Pre)	5,15	F	G-E	G-E	P	P	G-E	G-E	G-E	P-F	G	G-E	S-M
Chateau* (Pre)	14	N	G	G	E	G-E	G-E	G-E	F-G	N-P	F	F-G	S-M
Dual* (PPI/Pre)	15	N	N	-	N	N	F-G	F-G	N	N	N	P	S-M
Linex* (Pre)	7	-	E	-	F-G	F-G	E	G	-	G-E	G-E	F	N-S
Rimsulfuron (Pre)	2	N	F	-	P	P	E	N	-	F	P	P	N-S
Metribuzin* (PPI/Pre)	5	F	G-E	G-E	P	P	G-E	F-G	G-E	P-F	G	G-E	N-S
Outlook* (PPI/Pre)	15	N	P-F	-	F-G	F-G	G-E	G	-	N	N	P-F	S-M
Prowl* (PPI)	3	N	N	P	N	N	G-E	G	N	N	P	F-G	N-S
Reflex* (PRE)	14	-	F	-	G	F	E	E	-	G	F-G	P	S
Sonalan (PPI)	3	N	N	P	P	P	E	G-E	P	N	P	G-E	S
Treflan* (PPI)	3	N	N	P	N	N	E	G-E	N	N	P	G	N-S
Zidua (PRE)	15	-	-	P	F-G	F-G	G	G	-	P-F	F	F	N-S

Postemergence weed control (p. 116-119)

	Mode of Action**	Grasses							Broadleaves				
		Barnyardgrass	Brome, Downy	Foxtail, Green	Foxtail, Yellow	Quackgrass	Volunteer Cereals	Wild Oat	Buckwheat, Wild	Cocklebur, Common	Horseweed (Marestail)	Kochia	Lambsquarters
POST - APPLIED HERBICIDES*													
Rimsulfuron	2	G-E	-	G-E	G-E	G-E	G-E	G-E	N	N	N	E ¹	F
Metribuzin*	5	F	N	F	F	P	P	-	G	P	F-G	F-G	E
Poast	1	E	P-G	E	E	F	G-E	G-E ¹	N	N	N	N	N
Select* / Select Max	1	E	P-E	E	E	G-E	E	E	N	N	N	N	N
	Mode of Action**	Broadleaves											
		Lanceleaf Sage	Mustard, Wild	Mustard, Winter Annual	Nightshade, E Black	Nightshade, Hairy	Pigweed, Redroot	Waterhemp (ALS-R)	Prickly Lettuce	Ragweed, Common	Smartweed, Annual	Thistle, Russian	Crop Safety***
POST- APPLIED HERBICIDES*													
Rimsulfuron	2	-	E	E	G/N	P-F	E	N	-	P	F	P ¹	N-S
Metribuzin*	5	-	E	E	P	P	G	P-G	G-E	E	E	-	N-M
Poast	1	N	N	N	N	N	N	N	N	N	N	N	N
Select* / Select Max	1	N	N	N	N	N	N	N	N	N	N	N	N

Tips for maximum efficacy

- Incorporate (tillage or water)
- Timing
 - PRE: prior to emergence (follow label)
 - POST: small weeds, <1 inch tall is ideal
- Use adjuvants with POST herbicides
- Tank mix herbicides to improve weed control spectrum



Soil factors for preemergence herbicides

- pH
- Organic matter
- Soil texture
- Soil moisture



Timing of herbicides

- 3 to 5 week window for PREs
- Program could include:
 - Tillage / field preparation
 - Planting
 - Hilling
 - Herbicide prior to emergence
 - Postemergence herbicide



How to optimize weed control?

- Use an integrated weed management approach with many tools.
 - Tillage
 - Best herbicides at right time
 - Cultural management practices
 - Do not encourage herbicide resistance



Outlook

- Inhibit proper cell division
- Very water soluble = quickly available
- Provide good to excellent control of
 - Common lambsquarters
 - Pigweed species
 - Nightshade species



Metribuzin activity

- More active in soils with:
 1. pH > 7.5
 2. Low organic matter
 3. Stressed plants
- Foliar: symptoms can be severe when metribuzin is applied when plant metabolism is slowed, or within 3 days after periods of cool, wet, or cloudy weather.

Topics

- Herbicides and timings
- **Hard to control weeds**
- Clethodim tank mixtures
- New herbicide: Zidua
- Case studies



Understand the enemy



“If you know your enemies and know yourself, you will not be imperiled in a hundred battles; if you do not know your enemies but do know yourself, you will win one and lose one; if you do not know your enemies nor yourself, you will be imperiled in every single battle.” -Sun Tzu

Why are some weeds hard to control?

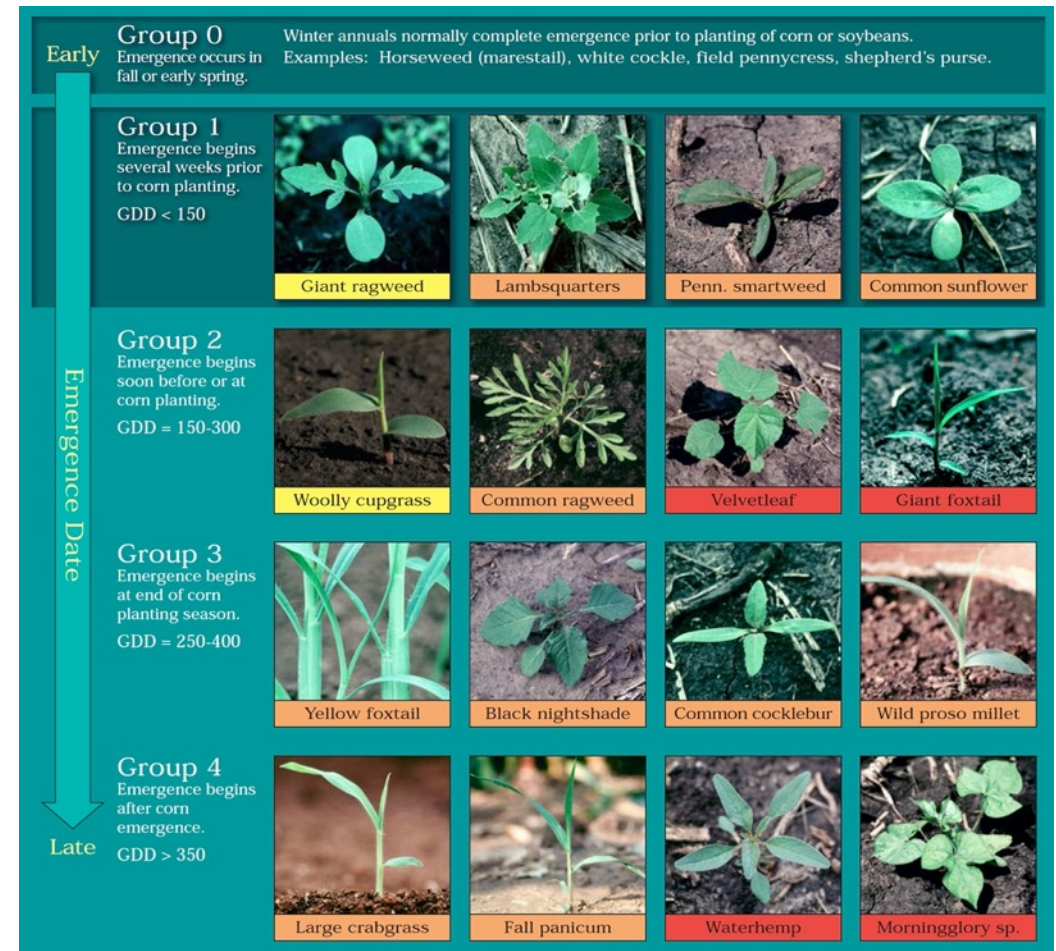


What tools can you use here?



Weed emergence and control

- Use growing degree days (GDD) to estimate weed control timing.
- Proper timing of weed control methods.
- Scouting for weeds.
- Sometimes herbicides don't fit the situation.



https://lib.dr.iastate.edu/cgi/viewcontent.cgi?article=1215&context=extension_ag_pubs

Non-treated vs herbicide



Texas panicum

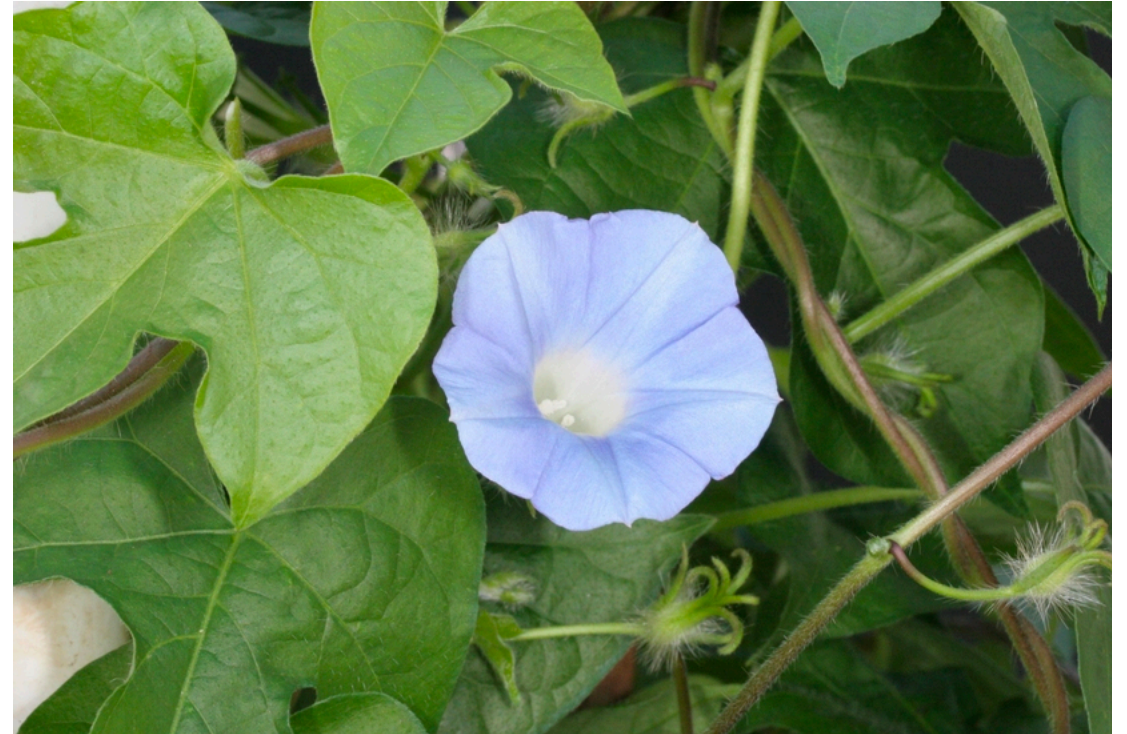
- Prowl H₂O
- Treflan
- Outlook (partial control)
- Eptam
- Graminicides (clethodim)



https://weedid.missouri.edu/weedinfo.cfm?weed_id=200
<https://www.uaex.edu/publications/pdf/mp44/mp44.pdf>
http://publications.tamu.edu/WEEDS_HERBICIDES/WeedControl-TexasCorn-2017.pdf

Morningglory spp.

- Fe⁺⁺
- Glyphosate or glufosinate as burndown
- Non-potato years
 - Plant growth regulators
 - Glyphosate
 - Glufosinate
 - PPO inhibitors



https://weeds.missouri.edu/publications/FactSheet_MorningGlory.pdf
<https://weedid.missouri.edu/>

Burcucumber

- Glyphosate as burndown
- Fe⁺⁺
- Non-potato years
 - Atrazine
 - Dicamba
 - Glyphosate



<https://weedid.missouri.edu/>

Giant Ragweed

- Paraquat or glyphosate as burndown
- Non-potato years
 - Group 2 and 14
 - 2,4-D & dicamba
 - Glyphosate
 - Paraquat
 - Glufosinate



<https://weedid.missouri.edu/>
https://weedscience.missouri.edu/publications/FactSheet_GiantRagweed.pdf

Horsenettle

- Fe⁺⁺
- Non-potato years
 - Dicamba + 2,4-D
 - atrazine
 - Others with long residual
 - 3-year program for 90+% control



https://www.pubs.ext.vt.edu/content/dam/pubs_ext_vt_edu/450/450-142/450-142_pdf.pdf
<https://extension.tennessee.edu/publications/Documents/W264.pdf>
<https://weedid.missouri.edu/>

Alligator weed

- Chateau (flumioxazin)
- Non-potato years
 - Glyphosate
 - Others, but have long residual



<https://weedid.missouri.edu/>
<https://www.lsuagcenter.com/~media/system/5/2/7/0/5270a6dcca10ea56b9f4b0f2fc392369/pub3007sweetpotatoweedmanagementhghres.pdf>
<https://www.gri.msstate.edu/research/ipams/FactSheets/Alligatorweed.pdf>
<https://content.ces.ncsu.edu/corn-production-guide/weed-management-in-corn>
<https://www.uaex.edu/publications/pdf/mp44/mp44.pdf>

Sicklepod

- Glyphosate and paraquat (burndown)
- Linuron (pre)
- Boundary (metribuzin + Dual) (pre)
 - Followed by metribuzin (post)



<https://weedid.missouri.edu/>
<https://www.uaex.edu/publications/pdf/mp44/mp44.pdf>

Florida pusley

- Fe⁺⁺
- Non-potato years
 - 2,4-D
 - Dicamba
 - Others with long carryover



<https://weedid.missouri.edu/>
<https://edis.ifas.ufl.edu/pdffiles/AG/AG32000.pdf>

MI Potato weed control

<https://www.canr.msu.edu/weeds/extension/weed-control-guide/2018WG-potato.pdf>

	SITE OF ACTION	CROP TOLERANCE**	ANNUAL BROADLEAVES										ANNUAL GRASSES						PERENNIALS									
			COCKLEBUR	JIMSONWEED	LAMBSQUARTERS	NIGHTSHADE (E. BLACK)	PIGWEEED	RAGWEED (COMMON)	SMARTWEED	VELVETLEAF	WILD MUSTARD	WILD BUCKWHEAT	BARNYARDGRASS	CRABGRASS	GIANT FOXTAIL	GREEN FOXTAIL	YELLOW FOXTAIL	FALL PANICUM	WITCHGRASS	SANDBUR	BINDWEED (FIELD)	BINDWEED (HEDGE)	CANADA THISTLE	QUACKGRASS	YELLOW NUTSEDGE			
<i>Preplant Incorporated</i>																												
EPTAM	8	1	P	P	G	F	F	F	F	F	F	F	P	F	F	F	F	F	F	F	F	F	G	N	N	N	F	F
<i>Preemergence</i>																												
BOUNDARY	5/15	2	F	F	F	F	F	G	F	G	F	G	F	F	F	F	F	F	G	G	F	N	N	N	N	G		
DUAL MAGNUM/PARALLEL/OTHERS	15	2	N	N	P	F	G	P	P	N	P	P	F	F	F	F	F	G	G	F	N	N	N	N	G			
LOROX/LINEX	7	1	P	P	G	F	F	G	G	F	G	F	F	F	F	F	F	F	F	P	N	N	N	N	N			
MATRIX	2	1	G	F	F	P	F	F	F	F	F	F	G	F	G	G	G	F	F	P	N	N	P	P	P			
METRIBUZIN	5	2	F	F	F	N	F	G	F	G	F	G	P	F	G	G	G	F	F	P	N	N	N	N	N			
OUTLOOK ^a	15	2	N	N	P	G	G	P	P	N	P	P	F	F	F	F	F	G	G	P	N	N	N	N	F			
PROWL H ₂ O/PROWL	3	1	N	N	G	P	F	P	P	F	P	P	G	G	G	G	G	G	G	G	N	N	N	N	N			
REFLEX	14	2	P	F	P	G	F	G	P	P	F	N	N	N	N	N	N	N	N	N	N	N	N	N	N			
SEQUENCE	9/15	2	N	N	P	F	G	P	P	N	P	P	F	F	F	F	F	G	G	F	N	N	N	N	G			
<i>Postemergence</i>																												
MATRIX ^a	2	1	G	P	F	F	F	F	F	F	F	G	G	G	G	G	G	G	G	G	N	N	F	F	F			
METRIBUZIN	5	2	G	F	F	N	G	F	F	G	F	F	P	P	F	F	F	F	F	P	N	N	N	N	N			
POAST	1	1	N	N	N	N	N	N	N	N	N	N	F	G	F	F	F	F	F	F	N	N	N	F	N			
SELECT MAX/																												
SELECT/ARROW	1	1	N	N	N	N	N	N	N	N	N	N	F	G	F	F	F	F	F	F	N	N	N	G	N			

Herbicide Site of Action: The site of action key is located on pages 15-16.

Herbicide Effectiveness: P = Poor; F = Fair; **G** = Good; **F** = Excellent; N = None; - = Not enough information to rank

PNW potato weed control

<https://pnwhandbooks.org/sites/pnwhandbooks/files/weed/contentpdf/pdfs/potato-effectiveness-table.pdf>

Weeds	dimethenamid-P (Outlook)	EPTC (Eptam)	flumioxazin (Chateau)	fomesafen (Reflex)	linuron (Linex)	metribuzin (Several brands)	S-metolachlor (Dual Magnum)	pendimethalin (Prowl 3.3 or H ₂ O)	ethafluralin (Sonalan HFP)	trifluralin (Treflan or others)	rim sulfuron (Matrix or preemergence)	rim sulfuron (Matrix or others) postemergence	clethodim (Select)	sethoxydim (Poast Plus)
Barley, volunteer	F-G	F-G	N	S	S	P	—	—	P	P	G	G	G	G
Barnyardgrass	G	G	N	S	F	F	G	G	G	G	G	G	G	G
Bindweed, field	P	P	—	N	N	P	—	P	—	P	—	P	N	N
Buckwheat, wild	—	F	—	N	G	F	—	—	F-G	F	P	P	N	N
Cocklebur, common	—	P	—	P	S	F	—	—	P	P	F	F	N	N
Crabgrass	G	G	—	S	F	F	G	G	G	G	F	G	G	—
Foxtail spp.	G	G	N	S	F	F	G	G	G	G	G	G	G	G
Knotweed, prostrate	—	G	—	—	—	G	—	G	—	G	N	—	N	N
Kochia	P-F	P-F	S	—	G	G	F	F-G	F-G	F-G	G	G	N	N
Lambsquarters, common	P-F	G	S	P-F	G-E	G	F	F-G	F-G	F-G	F-G	P-F	N	N
Mallow, common	—	P	—	—	—	G	F	F	—	P	—	—	N	N
Mustard spp.	—	P	S	G-E	G-E	G	—	—	P	P	G	G	N	N
Nightshade, cutleaf	F-G	F-G	S	F	—	P	F-G	P-F	—	P	N	N	N	N
Nightshade, black	G	G	G	G	F-G	P-F	F	P-F	F	P	G	G	N	N
Nightshade, Eastern black	G	G	G	G	F-G	P-F	F	P-F	F	P	G	G	N	N
Nightshade, hairy	G	G	S	F-G	F-G	F	F	P-F	F	P	F-G	G	N	N
Nutsedge, yellow	F	F	—	S	—	P	F-G	P	—	P	—	F	N	N
Oat, volunteer	F-G	F-G	N	S	G	F-G	—	—	G	G	F-G	G	G	G
Oat, wild	F-G	F-G	N	S	G	F-G	P-F	P-F	F-G	F	F	G	G	G
Pigweed spp.	G	F-G	S	G	G-E	G	G	F-G	G	G	G	G	N	N
Purslane, common	G	G	—	G	G	G	G	G	G	G	—	F	N	N
Quackgrass	—	F-G	N	N	P	P-F	—	—	P	P	N	G	F-G	F
Sandbur, field	P-F	G	N	N	P	P	G	—	G	G	—	—	G	G
Smartweed spp. (annual)	—	P	—	P	G-E	F	P	F	—	P-F	—	F	N	N
Sowthistle, annual	—	F	—	—	P	G	—	P	—	P	—	—	N	N
Sunflower, wild	—	P	—	—	—	F	P	P	—	P	G	F-G	N	N
Thistle, Canada	—	P	N	N	P	F	—	—	—	P	—	F	N	N
Thistle, Russian	—	P	—	—	—	G	P	G	F-G	F-G	P	P	N	N
Wheat, volunteer	F-G	F-G	N	S	S	P	—	—	F	F	G	G	G	G

G = good F = fair P = poor N = none S = suppression only — = no information available

Response of weeds to any of the listed herbicides may be altered by growing conditions, weed populations, type of irrigation, genetic variations, soil type, pH, organic matter, time of application, and application rate. Ratings may vary from season to season and from site to site. Weed control generally decreases as the season progresses.

Topics

- Herbicides and timings
- Hard to control weeds
- **Clethodim tank mixtures**
- New herbicide: Zidua
- Case studies



Clethodim antagonism

- Select (clethodim) typically is not mixed with Matrix (rimsulfuron) or metribuzin.
- Clethodim has been shown to be antagonized by many group 2 and sulfonyleurea herbicides, Basagran (bentazon) and Blazer (acifluorfen-Na).
- EC formulation of clethodim may act as an adjuvant and enhance lipophilic herbicides.
- Apply the grass herbicide 1 day before or 7 days after the broadleaf herbicide.

Clethodim antagonism enhanced by

- Stressed grasses
- Grass size is outside of label directions
- Unfavorable application conditions
- Unfavorable conditions for active plant growth



Research needed to quantify antagonism

- What should we look at?
- Mixtures
 - Herbicides
 - Adjuvants
- Weeds
 - Species
 - size

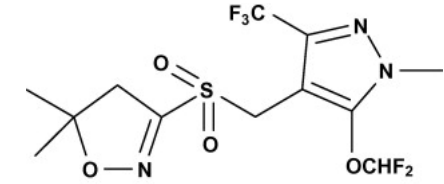


Topics

- Herbicides and timings
- Hard to control weeds
- Clethodim tank mixtures
- **New herbicide: Zidua**
- Case studies



Zidua (Pyroxasulfone)



- Now has potato label
- Mode of action: Inhibits biosynthesis of very-long-chain fatty acids
 - Same MOA as Outlook (dimethenamid) and Dual (metolachlor)
- Half life is 16-26 days
- Low leaching potential
- Absorbed by emerging shoots and roots (preemergent herbicide)

(Tanetani et al., 2009;
Vencill, 2014)

Weed spectrum

- Selective grasses
 - Italian ryegrass
 - Barnyardgrass
 - Foxtail spp.
 - crabgrasses
- Small-seeded broadleaves
 - Palmer amaranth
 - Common waterhemp
 - Nightshade spp.



Results – Crop injury

- Crop injury ranged from 0 to 1% on average.



Yield Results 2018



Treatment	Rate oz/a	Cultivar	Total yield	Total Marketable	>6 oz
			----- cwt/a -----	----- cwt/a -----	--- % ---
Non-treated		Bannock	398	354	70
Zidua	3.5	Bannock	477	441	78
Zidua	7	Bannock	471	438	79
Non-treated		Clearwater	458	316	37
Zidua	3.5	Clearwater	467	327	35
Zidua	7	Clearwater	460	354	45
Non-treated		Proprietary variety	438	398	70
Zidua	3.5	Proprietary variety	479	451	82
Zidua	7	Proprietary variety	471	442	80
Non-treated		Lamoka	543	490	75
Zidua	3.5	Lamoka	555	490	70
Zidua	7	Lamoka	526	484	78
Non-treated		Russet Burbank	594	522	66
Zidua	3.5	Russet Burbank	594	531	72
Zidua	7	Russet Burbank	518	441	64
Non-treated		Russet Norkotah	542	477	70
Zidua	3.5	Russet Norkotah	570	511	72
Zidua	7	Russet Norkotah	573	524	78
Non-treated		Shepody	497	452	73
Zidua	3.5	Shepody	502	466	78
Zidua	7	Shepody	496	452	77
Non-treated		Umatilla	534	465	66
Zidua	3.5	Umatilla	633	550	66
Zidua	7	Umatilla	577	496	66
LSD $p=0.05$			67	68	10

Weed control (tank mixes) 2018



Yield Results 2018



	Treatment	Rate	Total yield	Total	>6 oz
			cwt/a	Marketable	%
1	Non-treated check		346	205	18
2	Zidua	3.5FL OZ/A	523	431	55
3	Zidua Matrix	3.5FL OZ/A 1.5OZ/A	582	493	59
4	Zidua Outlook	3.5FL OZ/A 21OZ/A	501	425	56
5	Zidua Metribuzin	3.5FL OZ/A 0.5LB/A	491	417	57
6	Zidua Metribuzin	3.5FL OZ/A 0.33LB/A	482	405	53
7	Zidua Metribuzin Prowl H20	3.5FL OZ/A 0.33LB/A 2PT/A	524	450	58
8	Zidua Metribuzin Outlook	3.5FL OZ/A 0.33LB/A 16OZ/A	528	452	54
9	Zidua Dual EC	3.5FL OZ/A 1PT/A	585	491	54
10	Metribuzin Dual EC Reflex	0.5LB/A 1PT/A 12OZ/A	543	452	54
11	Sulfentrazone	2OZ/A	484	416	56
<i>LSD at p=0.05</i>			<i>ns</i>	84	8

Take Home

- Crop injury was not an issue at the 3.5 oz/a rate of Zidua.
- Potato crop safety to pyroxasulfone was good when treatments were applied with shoots at 3 to 4 inches below the top of the hill.
- Zidua is not a stand-alone herbicide, it must be tank mixed.
- Good option to improve pigweed spp. And small broadleaf weeds.

Topics

- Herbicides and timings
- Hard to control weeds
- Clethodim tank mixtures
- New herbicide: Zidua
- **Case studies**



Case Study 1

- Red Norland potato (irrigated)
- Major weeds: Crab grass, giant ragweed, and sicklepod
- What would you do for a PRE and POST herbicide program?

Case Study 2

- Atlantic (irrigated)
- Major weeds: Common lambsquarters, waterhemp, red root pigweed and nutsedge
- What would you do for a PRE and POST herbicide program?

Future of weed control...

