

Managing the Nasty Weeds of Lawn Care
 Roch Gaussoin, Extension Turfgrass Specialist, University of Nebraska

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Yellow nutsedge

- A perennial weed found in both cool- and warm-season turfgrasses
- Tolerates close mowing and competes for water and nutrients
- Fast growing

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Tubers

- Control is difficult as a result of intensive system of rhizomes & tubers and tolerance to many common herbicides
- Tuber production in yellow nutsedge is highly prolific

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- Viable tubers may remain dormant in the soil for multiple years and may sprout repeatedly
- Results of herbicide control of yellow nutsedge are often inconsistent

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Interference Between Kentucky Bluegrass (*Poa pratensis*) and Yellow Nutsedge (*Cyperus esculentus*) in a Home Lawn

Luqi Li and Roch Gaussoin
 University of Nebraska-Lincoln

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Treatments

Three irrigation levels:

- No Irrigation
- 80% total ET replacement per week
- Irrigate 2 inch /plot/week regardless of precipitation

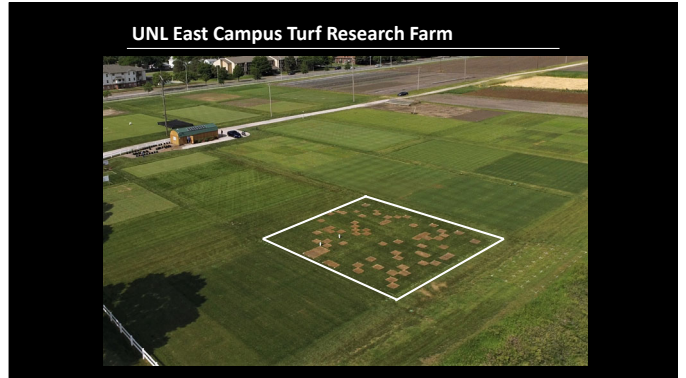
Three fertility levels:

- No additional fertility
- 2 lbs N/M/year
- 4 lbs N/M/year

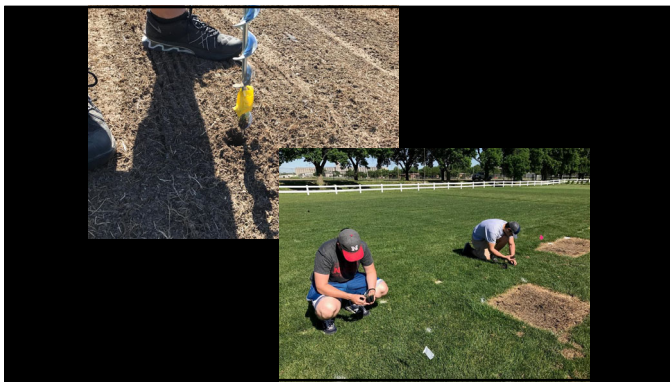
Two plot types: **Mowed at 3 inch weekly**

- Polyculture - Yellow nutsedge within Kentucky bluegrass
- Monoculture – Yellow nutsedge in bare soil

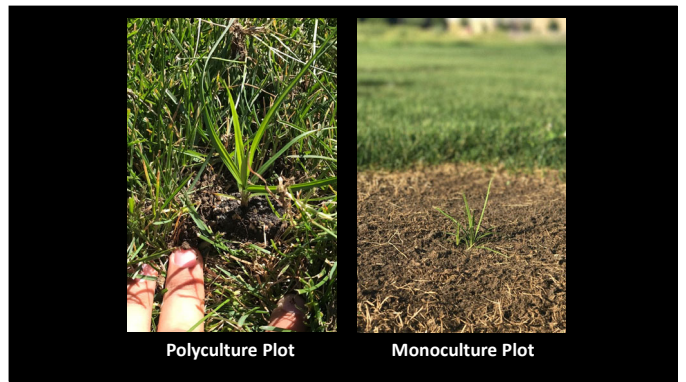
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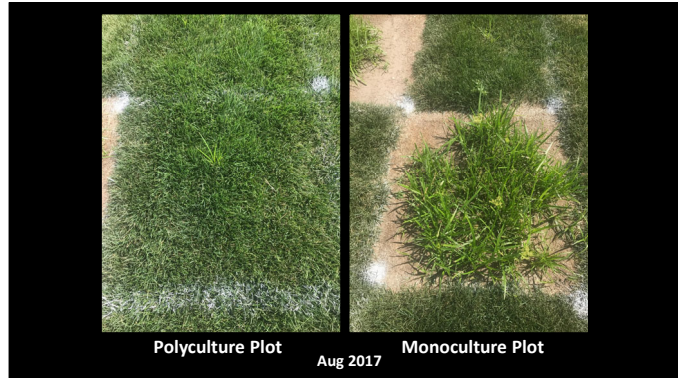
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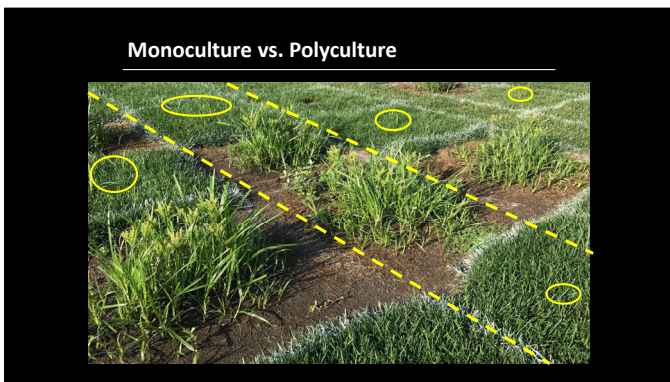
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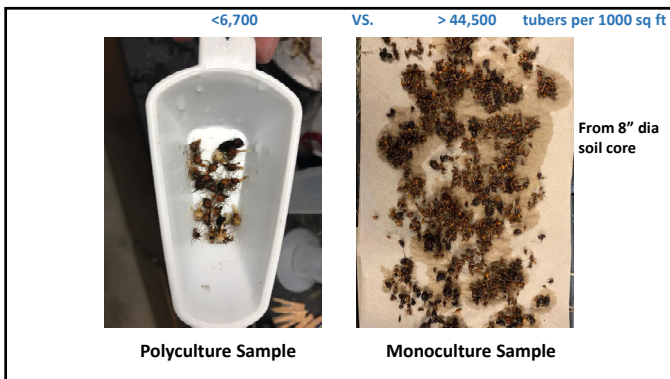
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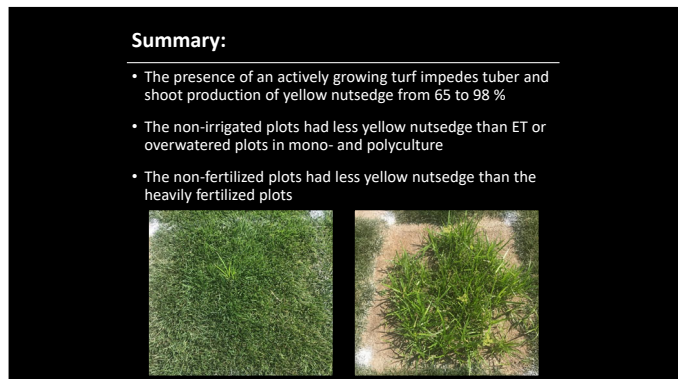
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Chemical Strategies

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Sulfentrazone

- *Dismiss* is the primary postemergence herbicide with sulfentrazone, although *SUREPYC* and *Solitare* (sulfentrazone + quinclorac) have a similar amount
- *Dismiss* may also provide preemergence with postemergence control; only *Echelon* (proflam + sulfentrazone) is labeled for preemergence control
- *Q4 Plus*, *Surge*, *SureZone* and *TZONE* all contain sulfentrazone; labeled for yellow nutsedge suppression, not control
- Injury will appear within a few days of application. Rate will affect the level of control but not the speed of activity
- Surfactant is not required, nor recommended

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Halosulfuron

- *SedgeHammer*, *ProSedge*, *SedgeMaster* and others
- Many formulations require a surfactant
- *SedgeHammer+* formulation already includes surfactant
- Injury will appear in about two weeks following application

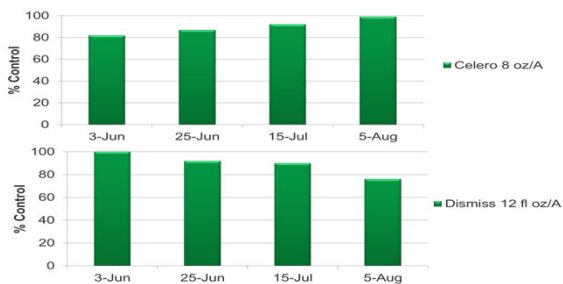
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Imazosulfuron

- *Celero*
- Add NIS at 0.25% (v/v)
- Repeat application 21 days after the initial application if needed
- Do not apply to moist or wet turf
- Do not apply to golf course putting greens

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UNL DATA



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Mesotrione

- *Tenacity*
- Causes a bleaching effect on susceptible weeds
- Surfactant recommended
- Not labeled for creeping bentgrass
- Repeat applications recommended
- Safe at seeding

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Bentazon

• *Basagran T/O*

- Four- to six-leaf stage of nutsedge growth
- Apply when the temperature is at least 75°F
- Add crop oil or a nonionic surfactant for best results
- Complete spray coverage is essential
- Repeat applications recommended

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Pyrimisulfan

• *Vexis*

- Cool and warm season, including bentgrass, >½"
- Slow response (21-28 days)
- Granular (shake and bake)
 - Spot treating

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Vexis Testing at UNL-2020



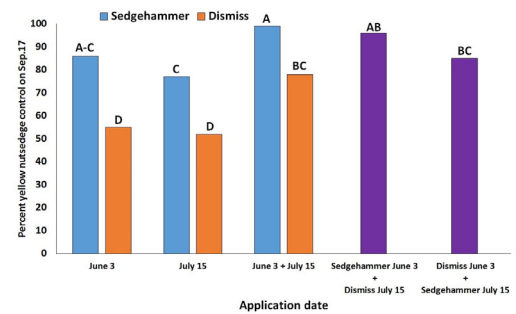
Control

1 app 3 tiller 40 dait

2X app 3 tiller 40dait 10dat (2nd)

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Effect of application timing on yellow nutsedge control when Sedgehammer (1 oz/A) and/or Dismiss (4 oz/A) was applied on June 3 and/or July 15.



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Rotating MOA's for Resistance Management

- Resistance in yellow nutsedge has been reported (Tehranchian et al., 2015)
- Rotate halosulfuron, imazosulfuron or pyrimisulfan (**Group 2**) with mesotrione (**Group 27**) or sulfentrazone (**Group 14**) or bentazon (**Group 8**) for postemergence yellow nutsedge control

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When to control yellow nutsedge:

- Yellow nutsedge herbicide control programs must be implemented early in the season and in consecutive years
- As early as it is visible
- Tubers are immature
 - Controls/suppresses tuber formation
 - Herbicides are more readily translocated to roots, rhizomes and tubers
- Sequential application
 - Make a second application 3 or 6 weeks after the initial application
 - Sequential application works better than single app for most herbicides
 - Rotate modes of action

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Prostrate knotweed

- Summer annual....sort of
- ultimate indicator weed for compacted, low O₂ soils
 - *alleviate problem, minimize weed opportunity*
- early germination and grass-like seedling stage confuse ID and control
- post germination growth rate increases exponentially, creating a dense mat of residue
- dead wire-like stems persist through winter
- Once established, control is very difficult

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Preemergence Control

- Late fall (November or December) applications of isoxaben (Gallery, Isoxaben 75WG)
- Other preemergence herbicides will work, but less effective than isoxaben
- Late winter apps work, but spraying conditions may be unfavorable
 - *dead wire-like stems persist through winter to ID hot spots*
- It is difficult to predict exactly when prostrate knotweed might germinate, usually Feb/March in the central US.



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Postemergence Control

- 2,4-D by itself will provide only fair control of prostrate knotweed
- 2,4-D + triclopyr (Turflon Ester, Ultra or Triclopyr 4) or dicamba (Banvel, Vanquish) provide excellent control. Other products that contain 2,4-D and triclopyr include 4-Speed XT, Chaser, Chaser 2 Amine, Momentum FX2, Sure Power, Turflon II amine, and TZONE
- Combination products that contain 2,4-D and dicamba (Trimec 992 and SpeedZone) provide good control
- **Hit it hard and hit it early**

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Change-Up (MCPA, fluroxypyr and Dicamba) Efficacy on Prostrate Knotweed

Spring and Summer, 2019

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Visual percent control of prostrate knotweed following treatment with Change-Up. Initiated April 20, 2019.

	13 DAA May 3	26 DAA May 16	41 DAA May 31	55 DAA June 14	68 DAA June 27
Change-Up ²	42.5 A	81.3 A	81.3 A	77.5 A	72.5 A

1. Retraz applied at 0.72 oz/A
2. Change-Up applied at 3.00A
3. Means with a different letter are significantly different at P ≤ 0.05

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Table 2. Percent control of prostrate knotweed following treatment with Change-Up applied at 3 pt/A . Initiated July 12, 2019.

	14 DAA July 25	22 DAA August 2	36 DAA August 16	42 DAA August 22	49 DAA August 29	64 DAA September 13
Change-Up ²	92.5 A	100 A	100 A	100 A	100 A	100 A

1. Reslar applied at 0.72 oz/A
2. Change-Up applied at 3 pt/A
3. Treatments with a different letter are significantly different at P < 0.05.

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Summary

- **Spring:** Change-Up reduced prostrate knotweed populations up to 41 DAA
 - Change-up provided >70% control
 - Make multiple applications if applying early in the spring to compensate for germination post application
- **Summer:** Knotweed control was increased when applied in the summer
 - Change-Up provided 100% control

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Is crabgrass a nasty weed?

- WSSA – most “common” weed -Crabgrass spp. (large, smooth and southern crabgrass)
- Resistance issues with long used chemistries (smooth; DNA’s)

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At least you haven't had to mow much
April 12, 2018

It's not a secret, spring is way behind this year. The good news, many haven't had to mow yet and it's still too early to apply those pre-emergence herbicides. The bad news, spring seeding will be much more difficult this year. The cold weather has slowed germination and is compressing the spring seeding window. That means there may not be a sufficient period of time for the seeds to germinate and mature before the summer stress ramps up. For homeowners, we don't want to force green up with a lot of nitrogen fertilizer and we need to hold off aggressive cultivation until the turf resumes normal growth.

Another issue we are seeing on golf courses is winterkill. While it isn't as widespread as 2014 and 2015, there are patches and areas of dead turf. It's been tough to tell for sure because it's been so cold. Is the turf really dead or just slow to wake up? To definitively know, bring plugs inside and watch for green up. I'm sure some areas will be dead and others will just be slow. It is good to know, especially with the shortened seeding window.

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Soils slow to warm in 2018, don't be in a hurry to apply preemergence herbicides
April 12, 2018

Spring 2018 has moved at a snail's pace and even the slightest warming trend has consumers and professionals ready to get going. One management practice that is closely linked with soil temperature is the application of preemergence herbicides. Summer annual grasses such as crabgrass require optimal soil temperature and moisture to germinate and persist. Crabgrass and foxtail germination will occur when soil temperatures in a lawn at the 0-2 inch depth are consistently between 60 and 70 F. For preemergence herbicides to be most effective, they must be applied before the soils reach this optimum temperature range. A soil temperature of 55 F (daily average) for several consecutive days is a reasonable based estimate for preemergence application timing. You can monitor soil temperature yourself with a thermometer but, in my opinion, a far easier and more precise measurement of soil temperature across Nebraska can be found at:

<https://cropwatch.unl.edu/cropwatchsoiltemperature>

Left: One-day average soil temperatures. Right: Seven-day average soil temperatures.

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Preemergence herbicide failure
September 6, 2018

The growing season in 2018 up until now has been challenging. Looking back on this summer, lawn care applicators and homeowners were mentioning "failure" of preemergence herbicides at a frequency greater than what I have seen in most years. I do not see this as herbicide failure as much as strange early season weather. Research indicates that crabgrass begins to germinate when the average daily soil temperatures reach 57 to 64 F at a one-inch depth. That said, the greatest flush of crabgrass germination will not start until soil temperatures increase to 73 F or above at a one-inch depth (Fidanza et al., 1996) and will continue until soil temperatures reach 95 F. In my estimation, a relatively cool spring was good for herbicide degradation in the soil but not good for crabgrass germination. Then soils warmed up later than "normal", resulting in the largest flush of germination occurring as the concentration of herbicide was declining. I believe that is why we saw a larger than normal flush of crabgrass later in the season. To avoid this in future years, consider tracking soil temperatures and delaying preemergence applications in the spring until temperatures are optimal for crabgrass germination. This will be much easier for single location consumers than lawn care operators who deal with a significantly greater number of locations. If products must be applied earlier than optimal due to client needs, then consider using a longer residual product containing proflinane.

Reasons for reduced efficacy in preemergence herbicides were discussed in earlier Turf iNfo's posted on March 26, 2018 and April 16, 2018.

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Why was 2018 an issue.....

50 yr Mean 2018

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Chemical Control

- Preemergence
 - Apply before weeds germinate
 - Very effective on annual weeds
- Postemergence
 - Apply to actively growing weeds
 - Contact
 - Systemic

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When to apply preemergence herbicides

- Soil temperatures exceed 50-55 ° F
- Max emergence occurs at 70°+
- Occurs first:
 - In landscape beds
 - Thinned turfgrass
 - Near sidewalks
 - Usually, around April 15 (NE)
- Most turf stands
 - Around May 1-15 (NE)
 - Better to apply early than late

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Crabgrass control on July 15 from PRE's applied on 6 different dates in fall/spring. (Averaged over three years, UNL 2013)

% Control (July following app)

Legend: Dimension 2EW 0.5 lbs ai/A, Barricade 4 FL 0.75 lbs ai/A, Pendulum AQ 3.0 lbs ai/A

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Preemergence Herbicide "efficacy"



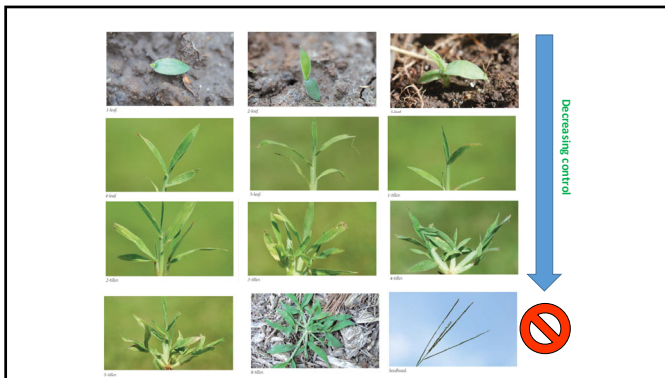
- Less than adequate control
- Application rates are correct, so...?
- Reasons for "failure"
 - Poor turf conditions
 - Tough weeds
 - High rainfall/irrigation
 - Non-Uniform application
 - Climate variability

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Crabgrass Postemergence Weed Control

- Herbicide uptake and translocation vary
- Death of the weed may be slow
- Mature weeds may not be controlled completely
- Hit them hard and early

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Weed Control Options During Establishment

- Major focus on seedling safety
 - Newer herbicides available to use at seeding
 - Tenacity (mesotrione), Drive XLR8 (quinclorac), SquareOne (quinclorac+carfentrazone), Quicksilver (carfentrazone)
- Sooner the better
 - Lack of emphasis on weed control
 - Interspecific weed and grass competition
 - Herbicide efficacy may be more important than safety
 - Even though damage to young seedlings occurs, overall turf cover may be increased compared to no treatment

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Weed Control Options in Seedlings

- **Start Early Be Aggressive**
- Tenacity (Mesotrione)
 - PRE on bare soil
 - Post over turfed areas
 - Crab + Broadleaves + Nutsedge
- Drive XLR8 (Quinclorac)
 - Anytime on TF
 - 7 days prior and Post 28 days after emergence on KBG
 - Crab + broadleaves
- SquareOne (Quinclorac + Carfentrazone)
 - Post 7 DAE
 - Crab + Broadleaves
- Quicksilver (Carfentrazone)
 - Post
 - Broadleaves

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Organic/natural weed control options

- Preemergence
 - Corn gluten meal
 - Distiller grains
- Postemergence
 - multiple
- Non-selective
 - multiple

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Selective postemergence trial

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Materials and Methods

Spring Applications: May 4 and May 31, 2018 (4 weeks after initial treatment)
Fall Applications: September 13 and October 5, 2018

Product	Active Ingredient	Rate
Untreated Check	N/A	N/A
Iron X	26.52% Iron HEDTA	25.2 oz/M
A.D.I.O.S.	Sodium chloride + NIS	1 lb product/gallon
ICT Halo	Eugenol, Clove Oil	10 oz/M
Fiesta Weed Killer	26.52% Iron HEDTA	12.6 fl oz/M or 25.2 fl oz/M
Fiesta Weed Killer + Xiameter OFX-0309	26.52% Iron HEDTA and Silicon Adjuvant	12.6 oz/M
Natria Lawn Weed and Disease Control	26.52% Iron HEDTA	25.2 fl oz/M
Trimec Classic	2,4-D	4 pt/A
Borax	Boric Acid	Spray to runoff
EcoSmart Weed & Grass Killer	Rosemary Oil	Spray to runoff
AgraLawn Weed and Crab Killer	Cinnamon	Shake on foliage

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Materials and Methods

Spring Applications: May 4 and May 31, 2018 (4 weeks after initial treatment)
Fall Applications: September 13 and October 5, 2018

Product	Active Ingredient	Rate
Untreated Check	N/A	N/A
Iron X	26.52% Iron HEDTA	25.2 oz/M
A.D.I.O.S.	Sodium chloride + NIS	1 lb product
ICT Halo	Eugenol, Clove Oil	10 oz/M
Fiesta Weed Killer	26.52% Iron HEDTA	25.2 fl oz/M
Fiesta Weed Killer + Xiameter OFX-0309	26.52% Iron HEDTA and Silicon Adjuvant	12.6 oz/M
Natria Lawn Weed and Disease Control	26.52% Iron HEDTA	25.2 fl oz/M
Trimec Classic	2,4-D	4 pt/A
Borax	Boric Acid	Spray to runoff
EcoSmart Weed & Grass Killer	Rosemary Oil	Spray to runoff
AgraLawn Weed and Crab Killer	Cinnamon	Shake on foliage
Fiesta Weed Killer	26.52% Iron HEDTA	12.6 fl oz/M

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Conclusions

- Trimec Classic was always numerically the top performer for both trials
- Products containing iron HEDTA and ICT Halo often were statistically as effective as Trimec Classic
 - Iron X
 - Fiesta Weed Killer (full rate or w/ Xiameter)
 - Natria Lawn Weed and Disease Control
- When using most organics, multiple applications will be required
 - Unpublished UNL study showed significantly diminished effectiveness if no reapplication is made

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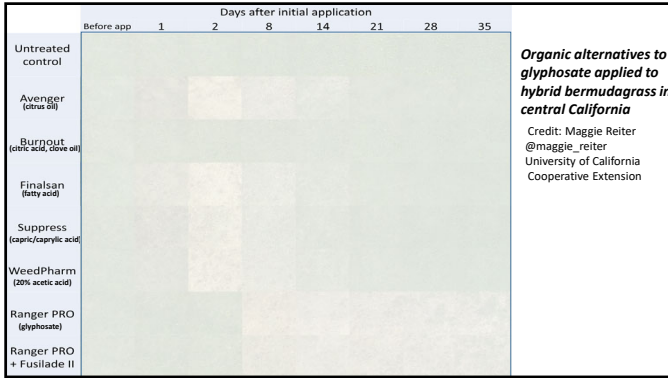
Cost Analysis

Product	Rate	Cost per 1000 sq. ft.
Untreated Check	N/A	--
Iron X	25.2 oz/M	\$102.00
A.D.I.O.S.	1 lb product/gallon	\$202.74
ICT Halo (name changed to Branch Creek Weed Shield)	10 oz/M	\$6.58
Fiesta Weed Killer	25.2/12.6 fl oz/M	\$16.73/\$8.37
Fiesta Weed Killer + Xiameter OFX-0309	12.6 oz/M	\$38.78
Natria Lawn Weed and Disease Control	25.2 fl oz/M	\$17.85
Trimec Classic	4 pt/A	\$0.61
Borax	Spray to runoff	\$5.00/ 64 oz
EcoSmart Weed & Grass Killer	Spray to runoff	\$25/ 64 oz
AgraLawn Weed and Crab Killer	Shake on foliage	\$23/ 2 lb
Fiesta Weed Killer	12.6 fl oz/M	\$8.37

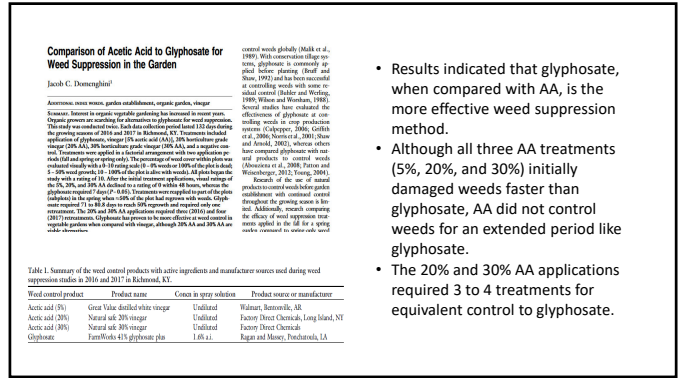
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Organic glyphosate alternatives (non-selective)

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- Results indicated that glyphosate, when compared with AA, is the more effective weed suppression method.
- Although all three AA treatments (5%, 20%, and 30%) initially damaged weeds faster than glyphosate, AA did not control weeds for an extended period like glyphosate.
- The 20% and 30% AA applications required 3 to 4 treatments for equivalent control to glyphosate.

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Organic weed control synopsis

<ul style="list-style-type: none"> Pro's <ul style="list-style-type: none"> Viable options available, with research ongoing Market or regulatory niche products 	<ul style="list-style-type: none"> Con's <ul style="list-style-type: none"> Product cost Labor cost Contact vs systemic More applications Selectivity Efficacy
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Turfgrass Weed Control for Professionals

https://mdc.itap.purdue.edu/Item.asp?Item_Number=TURF-100

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Sedge Control Herbicides

From - Turfgrass Weed Control for Professionals

Sedge Control and Turfgrass Tolerance Ratings

Herbicide	Sedge Control					Turf Tolerance						
	annual sedge	blue-green hygras	purple nutgrass	yellow nutgrass	annual bluegrass	creeping bentgrass	perennial ryegrass	tall fescue	bermudagrass	buffalograss	stypagrostis	
2,4-D + Fluroxypyr + triclopyr + sulfentrazone (Momentum 4-Score)	P	P	P	F	S	S	S	S	S	NR	NR	NR
2,4-D + MCPA + dicamba + sulfentrazone (Triad SFZ Select)	P	P	P	F	S	S	S	S	S	S	S	S
2,4-D + quinclorac + dicamba + sulfentrazone (24 Plus)	P	P	P	F	S	NR	S	S	S	S	NR	S
2,4-D + triclopyr + dicamba + sulfentrazone (Foundation)	P	P	P	F	S	NR	S	S	S	NR	NR	NR
bentazone (Basagran T/O)	G	F-G	P	F	S	S	S	S	S	S	S	S
dimethenamid (laser)	G	G	F	F-G	NR	NR	NR	NR	NR	NR	S	S
dimethenamid + pendimethalin (Friesland)	G	G	F	F-G	NR	NR	NR	NR	NR	NR	S	S
flazasulfuron (Katsina)	G	G	G-E	G-E	NR	NR	NR	NR	NR	NR	S	S
halosulfuron (SedgeHammer)	G	F	G	G-E	NR	S	S	S	S	S	S	S
halosulfuron + dicamba (Yukon)	G	F	G	G-E	NR	S	S	S	S	S	S+1	S
imazapic (Plateau)	F	F	F	F	NR	NR	NR	NR	NR	NR	S	S
imazaquin (Image 700G)	G	G-E	G	F	NR	NR	NR	NR	NR	NR	S	NR
imazosulfuron (Eternity)	G	F	G-E	G-E	NR	S	S	S	S	S	NR	S
mesotrione (Tenacity)	P	P	F	G	NR	NR	S	S	S	S	NR	S
trifluralin (Dismor MAGNUM)	G	F	F	F	NR	NR	NR	NR	NR	NR	NR	S

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Other resources:

- <http://www.mobileweedmanual.com/> Jim Brosnan, Ph.D.



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Contact Information

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Thank you!



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