

MANAGING WEEDS IN AGRONOMIC CROP ROTATIONS

2017 Alfalfa and Forage Field Day
UC KARE

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How do you like your deer prepared?



Rare



Medium



Well Done



Cotton



Alfalfa



Corn



Trees and Vines



Why similar weed issues?

- Hairy fleabane
- Horseweed
- Purslane
- Palmer amaranth
- Junglerice
- Sprangletop
- Sowthistle

- ⇒ Generally less cultivation in RR systems
- ⇒ Reliance on burn-down sprays (timing and effectiveness)
- ⇒ Lots of glyphosate used (resistant and tolerant species)
- ⇒ Border-area management (weed seed reservoir)

Glyphosate

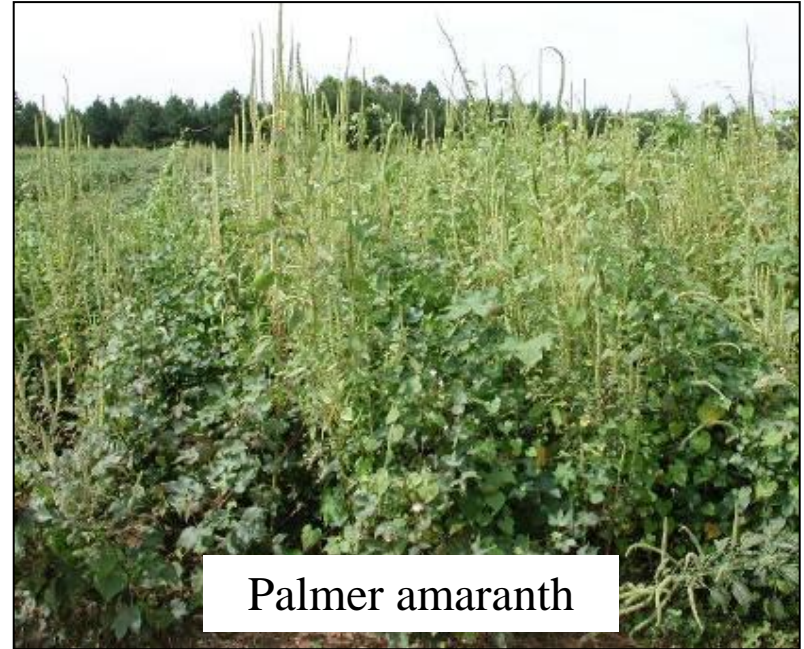
- **First registered for use in the U.S. in 1974**
- **800+ product containing glyphosate for sale & most widely used in the U.S**
- **Broad-spectrum, non-selective systemic herbicide**
- **~ 80% corn, 50% alfalfa, and 85% cotton in CA is Roundup Ready**



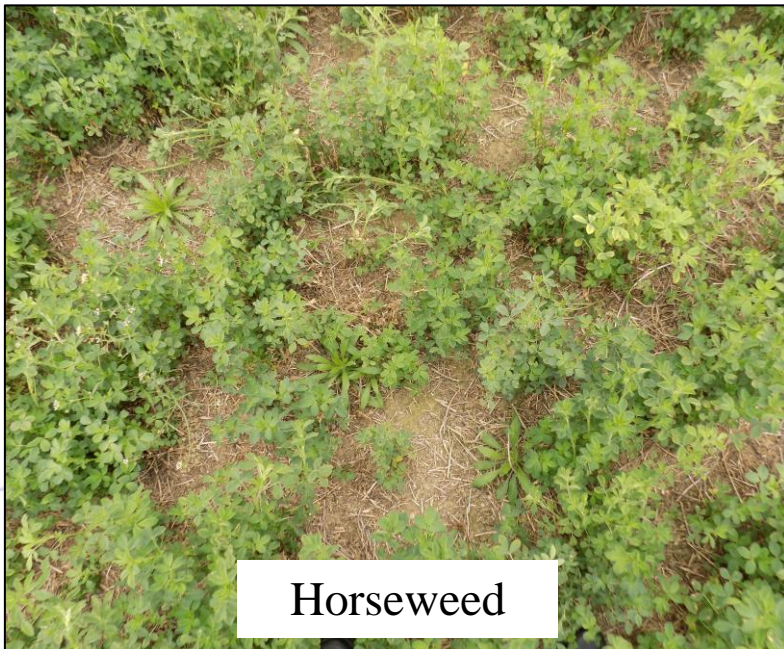
Glyphosate-resistant weeds



Junglerice



Palmer amaranth

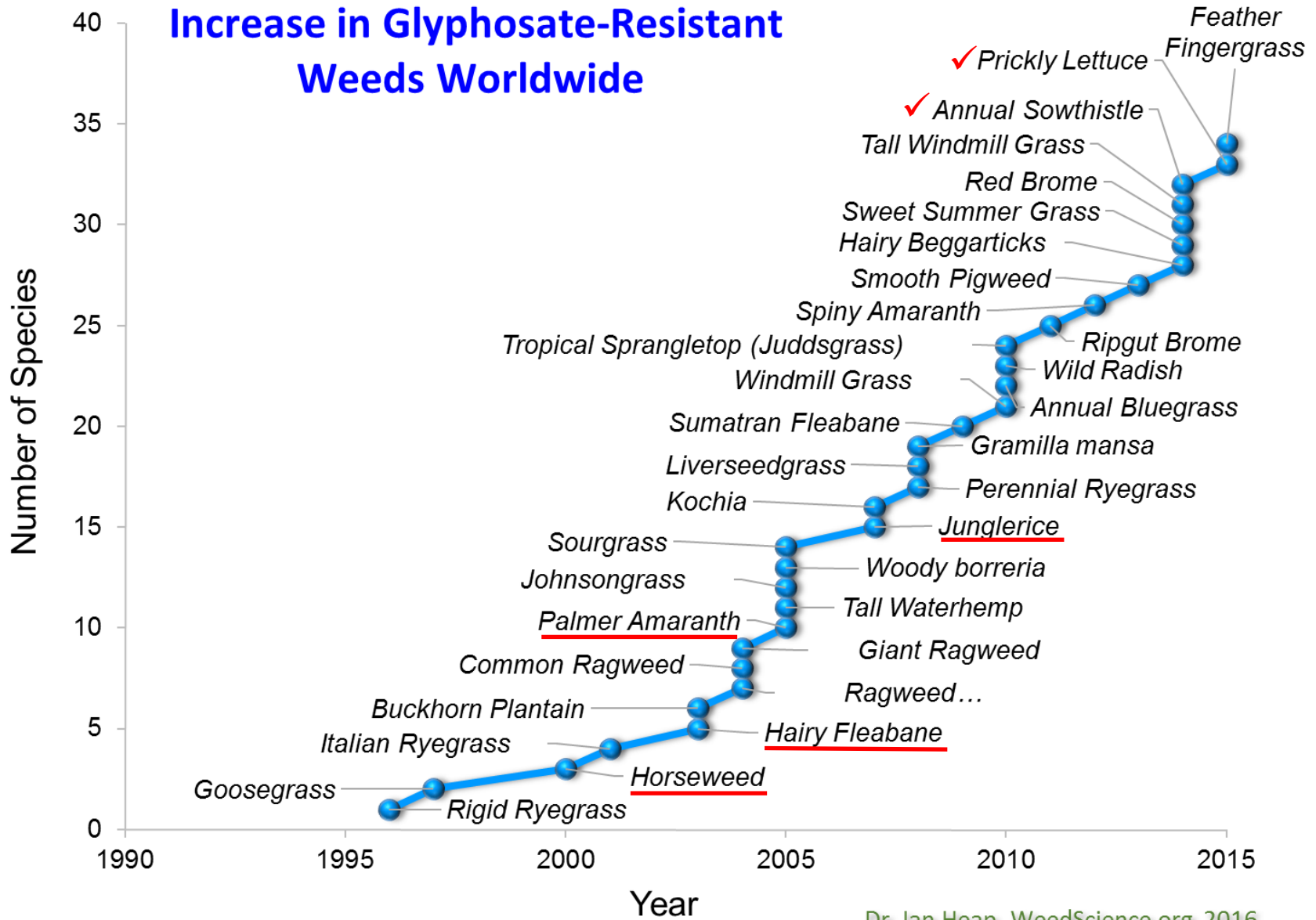


Horseweed



Hairy fleabane

Increase in Glyphosate-Resistant Weeds Worldwide



Dr. Ian Heap, WeedScience.org 2016



Sprangletop in alfalfa



Lambsquarters in cotton



Morningglory in dry beans



Weed control with preemergents

	Caparol (5)	Chateau (14)	Direx (7)	Dual (15)	Eptam (8)	Prowl H2O (3)	Pursuit (2)
Horseweed (GR)	Green	Yellow	Yellow	Red	Green	Red	Red
Hairy fleabane (GR)	Green	Yellow	Yellow	Red	Green	Red	Red
Junglerice (GR)	Green	Red	Green	Green	Green	Yellow	Yellow
Palmer amaranth (GR)	Green	Green	Green	Green	Green	Green	Green
Annual morningglory	Green	Yellow	Green	Red	Green	Yellow	Yellow
Lambsquarters	Green	Green	Green	Yellow	Green	Green	Yellow
Purslane	Green	Green	Green	Green	Green	Green	Green
Sprangletop	Green	Green	Red	Green	Green	Yellow	Red
Field bindweed (seed)	Yellow	Red	Green	Red	Red	Yellow	Red
Field bindweed (est)	Red	Red	Red	Red	Red	Yellow	Red
Nutsedge, purple	Red	Red	Red	Red	Yellow	Red	Yellow
Nutsedge, yellow	Red	Red	Red	Yellow	Yellow	Red	Yellow

Weed control with postemergents

	Buctril (6)	ET (14)	Goal (14)	Rely 280 (10)	Roundup (9)	SelectMax (1)	Sharpen (14)	Butyrac (4)
Horseweed (GR)	Yellow	Yellow	Yellow	Green	Red	Red	Green	Green
Hairy fleabane (GR)	Yellow	Yellow	Yellow	Yellow	Red	Red	Yellow	Green
Junglerice (GR)	Red	Red	Yellow	Yellow	Red	2X	Red	Red
Palmer amaranth (GR)	Yellow	Green	Green	Green	Red	Red	Green	Yellow
Annual morningglory	Green	Green	Yellow	Green	Yellow	Red	Green	Yellow
Lambsquarters	Green	Green	Green	Green	Yellow	Red	Green	Green
Purslane	Red	Yellow	Green	Green	Yellow	Red	Green	Yellow
Sprangletop	Red	Red	Yellow	Yellow	2X	2X	Red	Red
Field bindweed (seed)	Yellow	Green	Red	Green	Green	Red	Green	Yellow
Field bindweed (est)	Red	Yellow	Red	Yellow	Yellow	Red	Yellow	Yellow
Nutsedge, purple	Red	Red	Red	Yellow	Yellow	Red	Red	Red
Nutsedge, yellow	Red	Red	Red	Yellow	Yellow	Red	Red	Red

Sale, use and distribution of this product in Nassau and Suffolk Counties in the State of New York is prohibited.

PULL HERE TO OPEN ►

GROUP 9 HERBICIDE

Dual II Magnum®

syngenta.

Herbicide

For weed control in beans, peas, and lentils; corn; cotton; grasses grown for seed; horseradish; peanuts; potatoes; pumpkin; rhubarb; safflowers; sweet, grain, or forage sorghum; soybeans; soybeans, immature seed; sugar beets; sunflowers; and tomatoes

Active Ingredient:
S-metolachlor (CAS No. 87392-12-9) 82.4%

Other Ingredients:

Total:

Dual II Magnum contains 7.64 lbs.

GROUP 1 HERBICIDE



SELECTMAX®

HERBICIDE
WITH INSIDE TECHNOLOGY™

Active Ingredient	By Wt.
*Clethodim.....	12.6%
Other Ingredients.....	87.4%
Total.....	100.0%

Contains Petroleum Distillates

*(E)-2-[1-[[[3-chloro-2-propenyl)oxy]imino]propyl]5-[2-(ethylthio)propyl]-3-hydroxy-2-cyclohexen-1-one

Contains 0.97 lbs clethodim per gal

Information on Weed Resistance:

GROUP 9 HERBICIDE

Glyphosate, the active ingredient in this product, is a Group 9 herbicide. Target site resistance to Group 9 herbicides is rare. Although rare in occurrence, any weed population may contain plants naturally resistant to Group 9 herbicides. Weed species resistant to Group 9 herbicides may be effectively managed utilizing another herbicide from a different Group or using other cultural practices.

Resistance management recommendations for Group 9 herbicides are:

• For optimum weed control by making applications at the right time (correct weed population) and utilizing the recommended label rate for the most difficult to control weed in field.

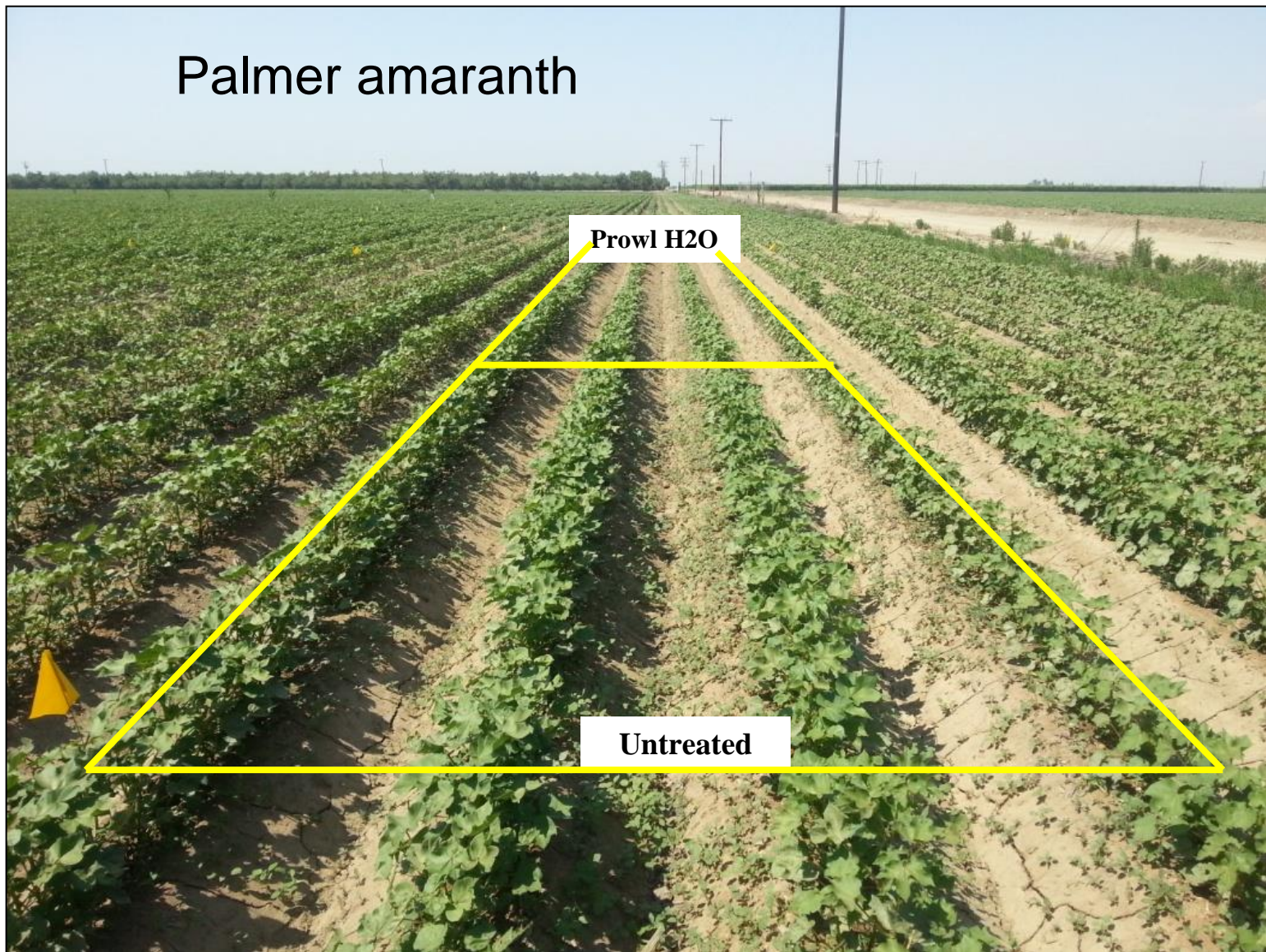
• Make decisions on local needs and use the tool(s) necessary to obtain optimum weed control and minimize weed escapes.

• Avoid tank mixtures that reduce this product's efficacy (through antagonism) or which require application rates of this product below the label recommendations.

• Do not treat weed populations for escapes 2 to 4 weeks after application.

• Report any incidence of repeated non-performance of this product on a particular weed to the local retailer, county extension agent, or Monsanto representative.

Palmer amaranth



Steve Wright, Tulare County



Table 1. Density of junglerice plants in the different treatments.

Junglerice^a				
Treatments	Rate/A	May	June	July
1. Pendimethalin	4 pts	0 a	3 ab	4 ab
2. Trifluralin	2 pts	0 a	3 ab	5 bc
3. S-metolachlor	1.33 pts	0 a	5 b	8 c
4. Glyphosate + Glufosinate	32 floz + 29 floz	5 b	0 a	1 a
5. UTC	-----	9 c	14 c	16 d
LSD		3.46	3.17	3.81

Steve Wright, Tulare County

Junglerice control in corn (Fresno County 2017)





Mid-season dodder control in seed alfalfa (Fresno County 2010)

Treatment timing is critical for burn-downs



4TL, 1" or less



>5 TL and >1"



Weed control in RR cotton (Kings County 2016)

Table 4. Roundup Ready cotton adjuvant trial 2016-3 crop injury and weed efficacy on 7/18/16 (28 DAT)

Treatment	Lb ae/ac	Cotton injury ¹	Junglerice ²	Barnyardgrass ²	Purslane ²	Pigweed ²
Untreated	0.0	0.0	0.0 c	0.0 d	0.0 c	0.0 c
Roundup Powermax	1.1	0.0	52.5b	71.3c	93.8b	96.0b
Roundup Powermax + Kicker Pro	1.1 + 0.75% v/v	0.0	75.0 a	80.0 ab	98.3 a	99.0 a
Roundup Powermax+ Border Xtra	1.1 + 1.5% v/v	0.0	73.8 a	78.8 b	98.0 a	99.5 a
Roundup Powermax+ Border Xtra	1.1 + 2.0% v/v	0.0	73.8 a	78.8 b	98.0 a	98.8 a
Roundup Powermax + Border Xtra	1.1 + 2.5% v/v	0.0	73.8 a	78.8 b	97.8 a	99.0 a
Roundup Powermax + Border Max	1.1 + 1.0% v/v	0.0	72.5 a	81.3 ab	98.3 a	98.8 a
Roundup Powermax + Border Max	1.1 + 1.25% v/v	0.0	72.5 a	80.0 ab	98.3 a	99.0 a
Roundup Powermax + Border Max	1.1 + 1.5% v/v	0.0	75.0 a	82.5 ab	98.3 a	98.3 a
Roundup Powermax + Intact	1.1 + 0.25% v/v	0.0	73.8 a	80.0 ab	98.3 a	98.5 a
Roundup Powermax + Intact	1.1 + 0.5% v/v	0.0	75.0 a	81.3 ab	98.3 a	98.5 a
Roundup Powermax + Intact	1.1 + 1.0% v/v	0.0	75.0 a	82.5 ab	98.5 a	99.5 a
Roundup Powermax + Intact Xtra	1.1 + 1.0% v/v	0.0	75.0 a	82.5 ab	97.8 a	99.8 a
Roundup Powermax + Intact Xtra	1.1 + 1.25% v/v	0.0	73.8 a	81.3 ab	98.0 a	99.3 a
Roundup Powermax + Intact Xtra	1.1 + 1.5% v/v	0.0	73.8 a	83.8 a	98.5 a	99.3 a
Statistical notation	CV (%)	0.00	5.24	4.45	1.04	1.11
	LSD (p=0.05)	n.s.	5.06	4.76	1.35	1.46

DAT = days after treatment

¹Injury based on a visual rating of 0-10; 0 = no injury and 10 = 100% necrosis or dead plants.

²Weed control based on a visual rating of 0-100; 0 = no control and 100 = all weeds killed



RU + SelectMax(2X)

RU (1X)

Follow-up control of weed escapes, including borders, edges, and ditches.







Wright et. al.



2014 Preliminary greenhouse studies





**6-14 leaf stage
½ - 3 in tall**



**** 7 Day difference ****



**30+ leaf stage
1 – 2.4 FEET tall**



2nd Growth Stage- Outside Pot study



3rd Growth Stage- Outside Pot study



3 growth stages timings: 2-4, 6-8, and 10-16 leaf stage, respectively

Their conclusions:

- Application of glyphosate during summer conditions in the SJV (14 hour day length, high light intensities) caused regrowth of Palmer amaranth. Further study is needed.
- Control of Palmer amaranth was reduced when glyphosate was applied at the 15 to 30 leaf stage in field trials.
- Based of the findings:
 - 1) timely apps (before summer) is likely important
 - 2) Importance of tank mixing?
 - 3) switching modes of action

Basic checklist:

- Field history
- Residual herbicides
- Timing of burn-down sprays
- Tank-mixing MOA's
- Sprayer, nozzles, and coverage
- Skilled and observant applicator
- Follow-up on escapes
- Cultivation

Adjuvant study for deep well nasty water (cotton, corn and alfalfa trials in 2017)

	Date	Time	EC	Ca	Mg	Na	SAR	Adj SAR	Cl	CO ₃ +HCO ₃	SO ₄	B	NO ₃ -N	Fe	Mn	pH	L.I.	TDS
	Sampled	Sampled	dS/m	meq/L	meq/L	meq/L			meq/L	meq/L	meq/L	mg/L	mg/L	mg/L	mg/L	unit	Calc	mg/L
RL-->			0.01	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.05	0.1	0.10	0.02	1.0 to 14.0	-2.0 to 2.0	10.0
SM-->			2510 B				Calc	Calc		2320 B						4500H B	2330 B	2540 C
EPA-->				200.7	200.7	200.7			300.0		300.0	200.7	300.0	200.7	200.7			
Analysis Date:			6/21/17	6/21/17	6/21/17	6/21/17	6/21/17	6/27/17	6/20/17	6/21/17	6/22/17	6/21/17	6/20/17	6/21/17	6/21/17	6/21/17	6/27/17	
Analysis Time:			12:41	10:38	10:38	10:38	10:38		12:34	12:41	13:07	10:38	12:34	10:38	10:38	12:41		

1 Well 5/9/17 8:00 **2.60** **11.34** **13.09** **12.50** 3.60 **7.80** **6.50** 1.70 28.40 **0.86** **15.9** <0.10 <0.02 8.1 0.9

Field and Row Crops	Total Salts	Calcium	Magnesium	Sodium	Sodium Abs. Ratio		Carbonates & Sulfate					Iron	Manganese*	pH	Langgeller Index	
					SAR	Adjusted	Chloride	Bicarbonates	Sulfate	Boron	Nitrate-N					
Generalized Levels																
Low	<0.40	<4.00	-	-	-	-	-	-	-	-	-	-	-	-	<6.5	<-0.5
Normal	0.50-1.50	5.00-10.00	1.1-5.0	<4.0	0.1-4.0	0.1-4.0	0.1-1.5	0.1-2.5	0.1-5.0	0.01-0.4C	0.1-5.0	<0.20	<0.20	6.8-7.9	-0.3 - 0.5	
High for Sensitive Crops	1.51-2.20	>10.00	>5.0	4.1-7.0	4.1-9.0	4.1-9.0	1.6-3.5	2.5-3.5	-	0.41-0.5E	5.1-7.0	0.21-0.40	0.21-0.40	8.0-8.4	0.6-0.7	
High for Tolerant Crops	>2.20	-	-	>7.0	>9.0	>9.0	>3.5	>3.5	-	>0.60	>7.0	>0.40*	>0.40*	>8.4	>0.9*	

Many of the above parameters need specific adjustment for crops, uses, irrigation procedures, etc. Check report for specifics.

LI 0.4+ Problematic for drip system deposits. LI < -0.3 corrosive to plumbing

*= High levels can cause plumbing deposits.

When sodium is greater than calcium (or high SAR), the water is considered sodic or "alkali".

Note: High & Low levels are based on consultant interpretation of the situation, including plant varieties, age, soil type, irrigation system, etc., when information is available.

Notes:	Black = Normal
Red = High	Green = Sl. Low
Purple = Sl. High	Blue = Low

Please note: These water results alone do not satisfy the new "Irrigated Lands Program" in the Central Valley.

If you would like to speak with someone about Irrigated Lands, and its Nitrogen Management Plan, please call the Laboratory at (800) 228-9896.

What's wrong with this picture?



The screenshot shows the website for the University of California Cooperative Extension Fresno County. The header includes the UC logo and the text "University of California Cooperative Extension Fresno County". Below the header is a navigation bar with "UCCE Fresno" and "Contact Us". A sidebar on the left lists menu items: Home, Powerpoint Presentations, Website Links, Weed Identification, Weed and Herbicide Topics, Weed Herbicide Charts, and Research Reports. The main content area is titled "Weed Management" and includes a sub-section "About my Program". This section contains text about the impact of weeds on crop production and land values, and a paragraph about the importance of integrated weed management. A photograph of Kurt Hembree is shown on the left, and a photograph of a field with weeds is on the right. The page also features "EMAIL" and "PRINT" icons in the top right corner.

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Weed Management

About my Program

Crop and non-crop areas alike are impacted by weed growth to one degree or another. Weeds affect crop production in several ways; weeds delay or reduce stand establishment, affect crop growth and development, reduce food quality and yield, compete for resources like water and soil nutrients, reduce irrigation uniformity and efficiency, harbor rodents and other destructive pests, increase the risk of frost hazard in temperature sensitive crops, and increase the cost of production. In non-crop settings, weeds may be poisonous to people and livestock, interfere with water recreation and water transport, cause potential traffic hazards, pose a fire hazard, are unsightly, and reduce land values.

To effectively manage weeds, one must be able to correctly identify the weeds present, develop a broad understanding of weed growth and survival, become familiar with the tools (both chemical and non-chemical) available, and implement a strategy that is both economically and environmentally sound. This is sometimes referred to as "Integrated Weed Management".



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