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WEED MANAGEMENT IN YOUNG ORCHARDS

Weed science program efforts

- Weed control efficacy questions
- Crop safety and injury concerns
- New weeds
- Herbicide resistance
- Pesticide-related regulations
- MRL issues

Effective weed control

- Correctly identify the weed problem(s)
- Select registered herbicide(s) with activity on your weed spectrum
- Properly apply the material
  - Calibrated equipment
  - Good timing
  - Appropriate growth stage

Online weed ID tool
and other good weed info

Weed Research and Information Center
http://wric.ucdavis.edu

Weed challenges in orchards

- Old favorites:
  - Normal mix of annual grasses and broadleaves
  - Challenge with perennial weeds, especially in new orchards or crops with fewer herbicide options
- New weed problems
  - Most of the "new" issues seem to be related to glyphosate resistance and/or shifting populations to tolerant species
- Changing control options
  - Less tillage, some new herbicides, water issues

Extra challenges in young orchards

- Crop less competitive with weeds
- Greater sensitivity to weed competition
- Greater sensitivity to injury from weed control tactics
- Fewer herbicides registered on new plantings

New plantings not very competitive with weeds

But are quite sensitive to competition from weeds

Plenty of sunlight and water

Can increase potential for vertebrate pest damage

Think about orchard weeds before planting a new orchard

Weed spectrum highly influenced by previous crop in the first few years of a new orchard!

Covercrops and intercrops?

- Tempting (for $, cover, and weed comp.)
- Crops can be just as competitive as weeds (or more).
  - Need to manage accordingly
- Winter vs summer?

Early problems can have long-term consequences!

Sensitivity to injury

- Most T&V herbicides "can" injury trees, safety is primarily due to placement

- Smaller canopy
- Lower branches
- Lots of new growth
- Small root systems
- Shallow roots
- Loose packed soil / cracks?

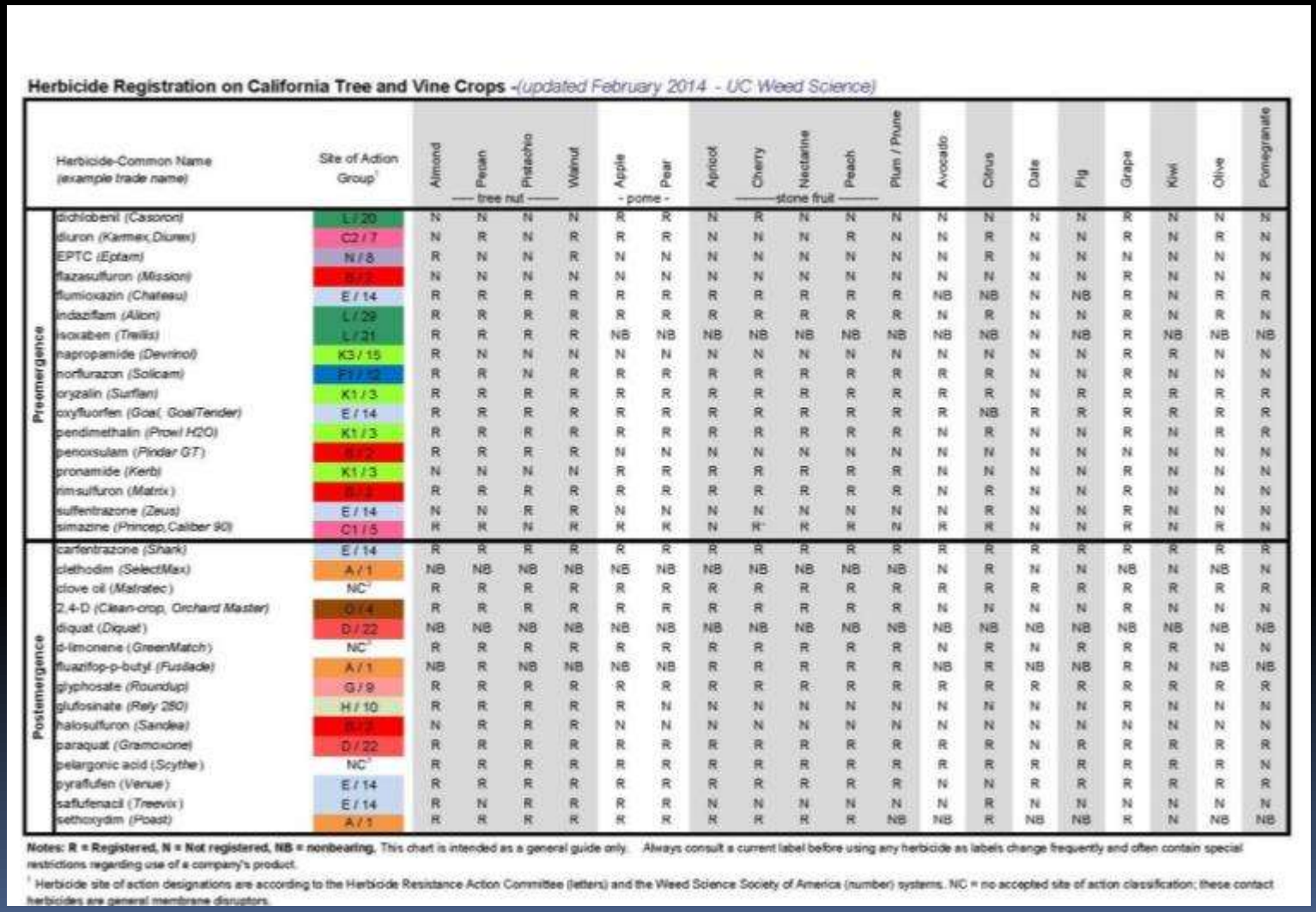
Suckers sprayed directly

Prior year exposure

Replants

Resistance management

T&V herbicide registrations



Herbicide Registration on California Tree and Vine Crops -*(updated February 2014 - UC Weed Science)*

	Herbicide-Common Name *(example trade name)*	Site of Action Group[1]	Almond	Pecan	Pistachio	Walnut	Apple	Pear	Apricot	Cherry	Nectarine	Peach	Plum / Prune	Avocado	Citrus	Date	Fig	Grape	Kiwi	Olive	Pomegranate
			— tree nut —				- pome -		——— stone fruit ———												
Preemergence	dichlobenil *(Casoron)*	L / 20	N	N	N	N	R	R	N	R	N	N	N	N	N	N	N	R	N	N	N
	diuron *(Karmex,Diurex)*	C2 / 7	N	R	N	R	R	R	N	N	N	R	N	N	R	N	N	R	N	R	N
	EPTC *(Eptam)*	N / 8	R	N	N	R	N	N	N	N	N	N	N	N	R	N	N	N	N	N	N
	flazasulfuron *(Mission)*	B / 2	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	R	N	N	N
	flumioxazin *(Chateau)*	E / 14	R	R	R	R	R	R	R	R	R	R	R	NB	NB	N	NB	R	N	R	R
	indaziflam *(Alion)*	L / 29	R	R	R	R	R	R	R	R	R	R	R	N	R	N	N	R	N	R	N
	isoxaben *(Trellis)*	L / 21	R	R	R	R	NB	NB	NB	NB	NB	NB	NB	NB	NB	N	NB	R	NB	NB	NB
	napropamide *(Devrinol)*	K3 / 15	R	N	N	N	N	N	N	N	N	N	N	N	N	N	N	R	R	N	N
	norflurazon *(Solicam)*	F1 / 12	R	R	N	R	R	R	R	R	R	R	R	R	R	N	N	R	N	N	N
	oryzalin *(Surflan)*	K1 / 3	R	R	R	R	R	R	R	R	R	R	R	R	R	N	R	R	R	R	R
	oxyfluorfen *(Goal, GoalTender)*	E / 14	R	R	R	R	R	R	R	R	R	R	R	R	NB	R	R	R	R	R	R
	pendimethalin *(Prowl H2O)*	K1 / 3	R	R	R	R	R	R	R	R	R	R	R	N	R	N	N	R	N	R	R
	penoxsulam *(Pindar GT)*	B / 2	R	R	R	R	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
	pronamide *(Kerb)*	K1 / 3	N	N	N	N	R	R	R	R	R	R	R	N	N	N	N	R	N	N	N
	rimsulfuron *(Matrix)*	B / 2	R	R	R	R	R	R	R	R	R	R	R	N	R	N	N	R	N	N	N
	sulfentrazone *(Zeus)*	E / 14	N	N	R	R	N	N	N	N	N	N	N	N	R	N	N	R	N	N	N
	simazine *(Princep,Caliber 90)*	C1 / 5	R	R	N	R	R	R	N	R*	R	R	N	R	R	N	N	R	N	R	N
Postemergence	carfentrazone *(Shark)*	E / 14	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
	clethodim *(SelectMax)*	A / 1	NB	NB	NB	NB	NB	NB	NB	NB	NB	NB	NB	N	R	N	N	NB	N	NB	N
	clove oil *(Matratec)*	NC[2]	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
	2,4-D *(Clean-crop, Orchard Master)*	O / 4	R	R	R	R	R	R	R	R	R	R	R	N	N	N	N	R	N	N	N
	diquat *(Diquat)*	D / 22	NB	NB	NB	NB	NB	NB	NB	NB	NB	NB	NB	NB	NB	NB	NB	NB	NB	NB	NB
	d-limonene *(GreenMatch)*	NC[2]	R	R	R	R	R	R	R	R	R	R	R	N	R	N	R	R	R	N	N
	fluazifop-p-butyl *(Fusilade)*	A / 1	NB	R	NB	NB	NB	NB	R	R	R	R	R	NB	R	NB	NB	R	N	NB	NB
	glyphosate *(Roundup)*	G / 9	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
	glufosinate *(Rely 280)*	H / 10	R	R	R	R	R	N	N	N	N	N	N	N	N	N	N	R	N	N	N
	halosulfuron *(Sandea)*	B / 2	N	R	R	R	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
	paraquat *(Gramoxone)*	D / 22	R	R	R	R	R	R	R	R	R	R	R	R	R	N	R	R	R	R	R
	pelargonic acid *(Scythe)*	NC[2]	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	N
	pyraflufen *(Venue)*	E / 14	R	R	R	R	R	R	R	R	R	R	R	N	N	R	R	R	R	R	R
	saflufenacil *(Treevix)*	E / 14	R	N	R	R	R	R	N	N	N	N	N	N	R	N	N	N	N	N	N
	sethoxydim *(Poast)*	A / 1	R	R	R	R	R	R	R	R	R	R	NB	NB	R	NB	NB	R	N	NB	NB

Notes: R = Registered, N = Not registered, NB = nonbearing. This chart is intended as a general guide only. Always consult a current label before using any herbicide as labels change frequently and often contain special restrictions regarding use of a company's product.

[1] Herbicide site of action designations are according to the Herbicide Resistance Action Committee (letters) and the Weed Science Society of America (number) systems. NC = no accepted site of action classification; these contact herbicides are general membrane disruptors.

Updated annually. Available online - easiest way is to find it is on the UC Weed Science blog

Herbicides for <2 yr tree nuts

PRE

- EPTC (well-established)
- Chateau (1yr need carton)
- Alion (1yr)
- Trellis
- Solicam (18 mo)
- Goal
- Prowl
- Surflan
- PindarGT (9 or 15 mo)
- Matrix (1 season)

POST

- Shark (not green bark)
- Select (NB only)
- Dri-Clean (1 yr)
- Diquat (NB only)
- Fusilade (NB on some)
- Glyphosate
- Rely (not green bark)
- Gramoxone (not green bark)
- Venue (not green bark)
- Treevix (not green bark)
- Poast

Check current labels – not all products registered on all crops

Herbicide updates

- **Glufosinate** herbicides
  - Have be short in recent years, now off-patent
- **Rely 280, Reckon 280, Glufosinate 280SL, Forfeit 280, Refer 280SL, Lifeline**, (**Cheetah** – pending DPR)
  - Mostly same registrations as Rely 280 – minor exceptions due to differences between master/package label
    - Similar recommendations for adjuvants/surfactant
  - Group 10 herbicide. POST activity only. Broadleaf and grass activity. Small amount of translocation.

Herbicide updates

- **Sulfentrazone (Zeus)**
  - Group 14 herbicide. PPO inhibitor
    - PRE and POST activity
  - Registered in early 2014 in CA
    - Grape, lemon, orange, pistachio, walnut (3 yrs or older)
  - Recommended rate 10-12 fl oz/A
  - Primarily broadleaf weed control, good suppression of nutsedge
    - Good efficacy on GR conyza in a Parlier trial
    - Suppression of nutsedge 6 MAT in an Atwater trial
  - Best as part of a integrated program

Herbicide updates

- **Flazasulfuron (Mission)**
  - Group 2 herbicide, ALS inhibitor
- CA registrations on grape (3 yrs), citrus (5 yrs)
  - PRE and POST activity
  - Rate range 2.14-2.85 oz/A. Needs NIS for POST
  - Activity on some grasses and some broadleaves. Good suppression of sedges and kyllinga

Herbicide updates

- Broadworks (mesotrione)
- New product (anticipated late 2015)
- New mode of action for T&V - HPPD inhibitor
- Full use pattern not available yet
  - (pending EPA review)

T&V label changes

- **Rely 280** – several tree crops pending (olive, pear). Some of the generics have these crops already.
- **Venue**
  - Pre-bloom in bearing date, fig, and kiwi. Any time in most other tree crops
- **Fusilade** – now has bearing label in citrus
- **Chateau** – now has a supplemental label for bearing olive and pomegranate

T&V label changes

- **Alion** – several key changes
  - Modified use pattern in tree nuts, grape, stonefruit, pome fruit, olive
    - Citrus label not changed
  - Do not use in flood-irrigated systems
  - Age changes: almond/walnut/pistachio (1yr), grape (5yr), pome/stone/olive (3yr), citrus (1yr)
  - Soil OM rate restriction
    - <1% - max rate 3.5 fl oz/A
    - 1-3% - rate 3.5 to 5 fl oz/A (*5 oz max for grape if above 1%*)
    - >3% - rate 5 to 6.5 fl oz/A
  - Avoid spring applications for best performance

Important use change

- VOC regulations will affect use of **Goal 2XL** and similar herbicides in summer
  - Several high VOC pesticides have been under consideration for additional regulation during the summer (May-Oct) "ozone" season
  - The trigger was hit in 2014 so additional restrictions will be implemented
  - Max use rate of EC formulations of oxyfluorfen will be limited to 0.125 lb ai/A (1 pt of a 2lb product)
    - Does not affect rates Nov-April
    - Does not affect SC formulations (eg GoalTender)

Weed management in new orchards

- Think and plan over several years
  - Weeds will be an extra challenge in young orchards and will need extra management effort (and possibly cost)

Closing (random) thoughts

- Think about your glyphosate formulations/rates Consider PRE herbicide programs and mixes
- Consider sequential applications to extend control into summer
- Think about weed control over several seasons - integrated weed management

T&V weed science team

- Brad Hanson – Weed Extension Specialist
  - Chemical weed control, herbicide resistance, herbicide fate
- Lynn Sosnoskie - Project Scientist
  - Weed biology, ecology and resistance management
- Bahar Kutman – Postdoctoral Researcher
  - Glyphosate and micronutrient interactions
- Sarah Morran– Postdoctoral Researcher
  - Genetics and physiology of glyphosate resistance
- Seth Watkins – Staff Research Associate
  - Orchard and vineyard herbicide efficacy and crop safety evaluations
- Marcelo Moretti - PhD Student
  - Mechanisms of resistance in glyphosate- and paraquat-resistant Conyza
- Caio Brunharo – PhD Student
  - Glyphosate and glufosinate resistance in ryegrass
- Mariano Galla – PhD Student
  - Herbicide drift injury on walnut and other crops
- Oscar Morales – undergrad lab assistant
- UCCE and Industry collaborators

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