Pest Management Update

Pest Management Update

Bob Curtis

Almond Board of California

CEU Credits

Continuing Education Units are available for most sessions.

Please check in at the CEU desk in the East Lobby for details and instructions

Pest Management Update

Bob Curtis

Almond Board of California

Navel Orangeworm: New materials; renewed focus on spray efficacy

Joel P. Siegel, Research Entomologist, USDA/ARS

Many Players Now

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UC: Davis, Riverside

UCCE

CSU: Chico, Fresno

USDA/ARS: Albany, Parlier

Industry Chemical

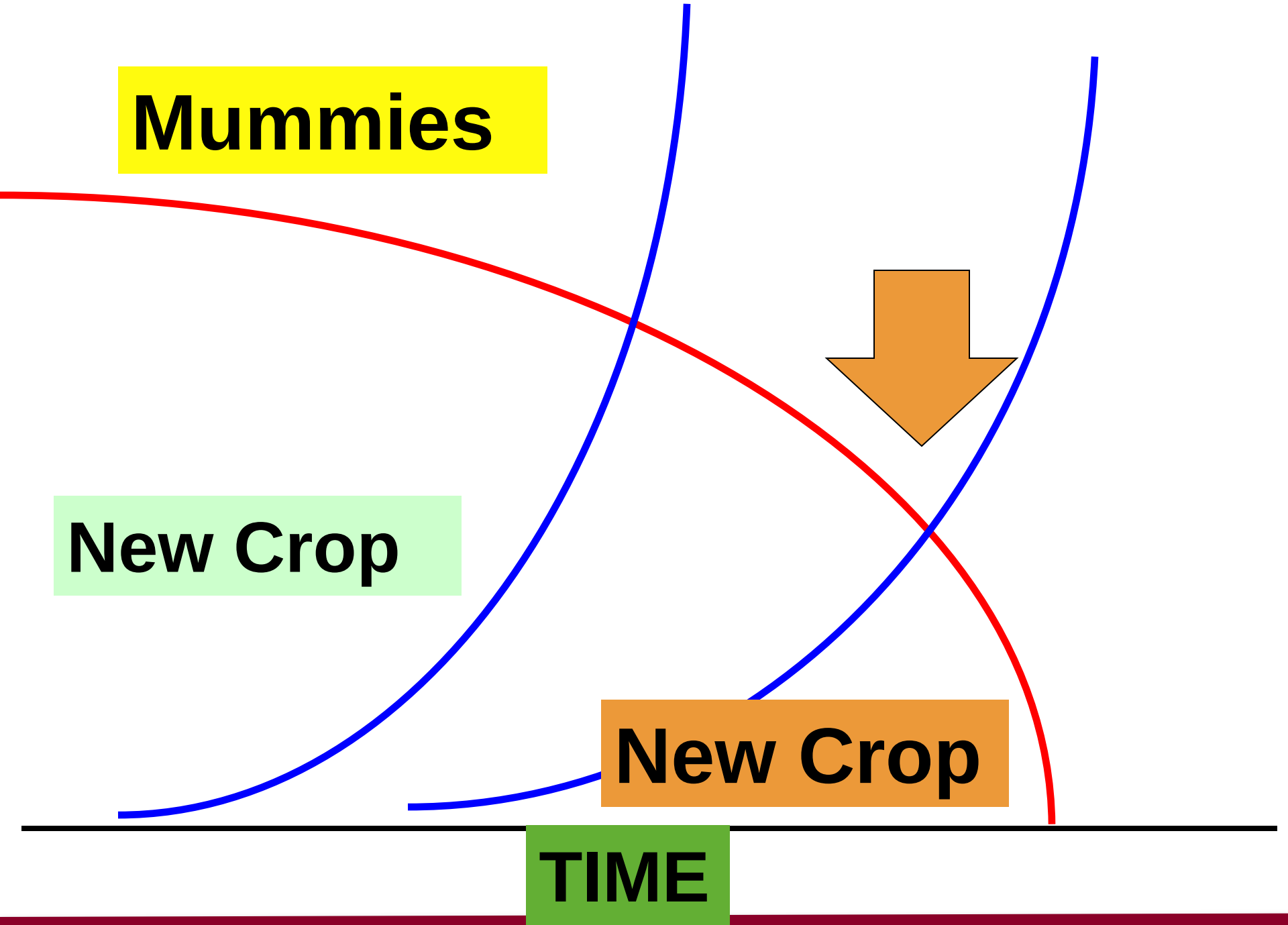
Industry Mating Disruption

Paramount Farming

PCAs

What I hope to cover:

- Review Population Dynamics: Bridge between mummies and new crop nuts
- Overwintering carryover, Heat Unit Accumulation
- Relationship among neighbors, pressure
- New insecticide chemistries: Unadvertised benefits


Mummies
New Crop
New Crop
TIME

Development

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Mummies:

1,050 DD

New Almonds:

700 DD

New Pistachios:

500-600 DD

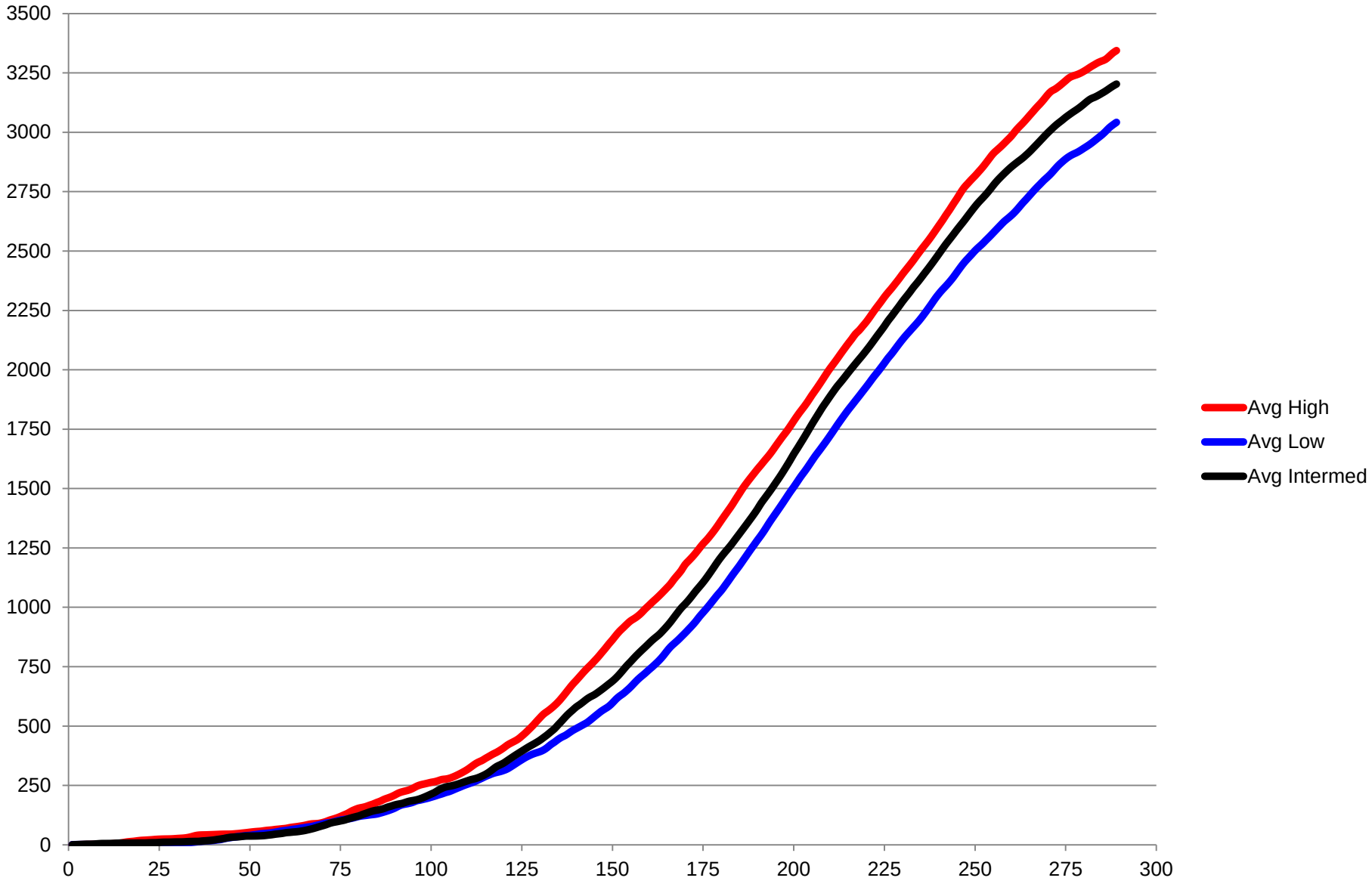
Almonds: Overwintering

Date	Infestation	Nuts
DEC. 13	29.14%	3,688
DEC. 20	13.17%	3,819
JAN. 5	25.34%	2,829
JAN. 27	17.33%	6,367
MAR. 3	12.65%	2,165

Pistachios: Overwintering

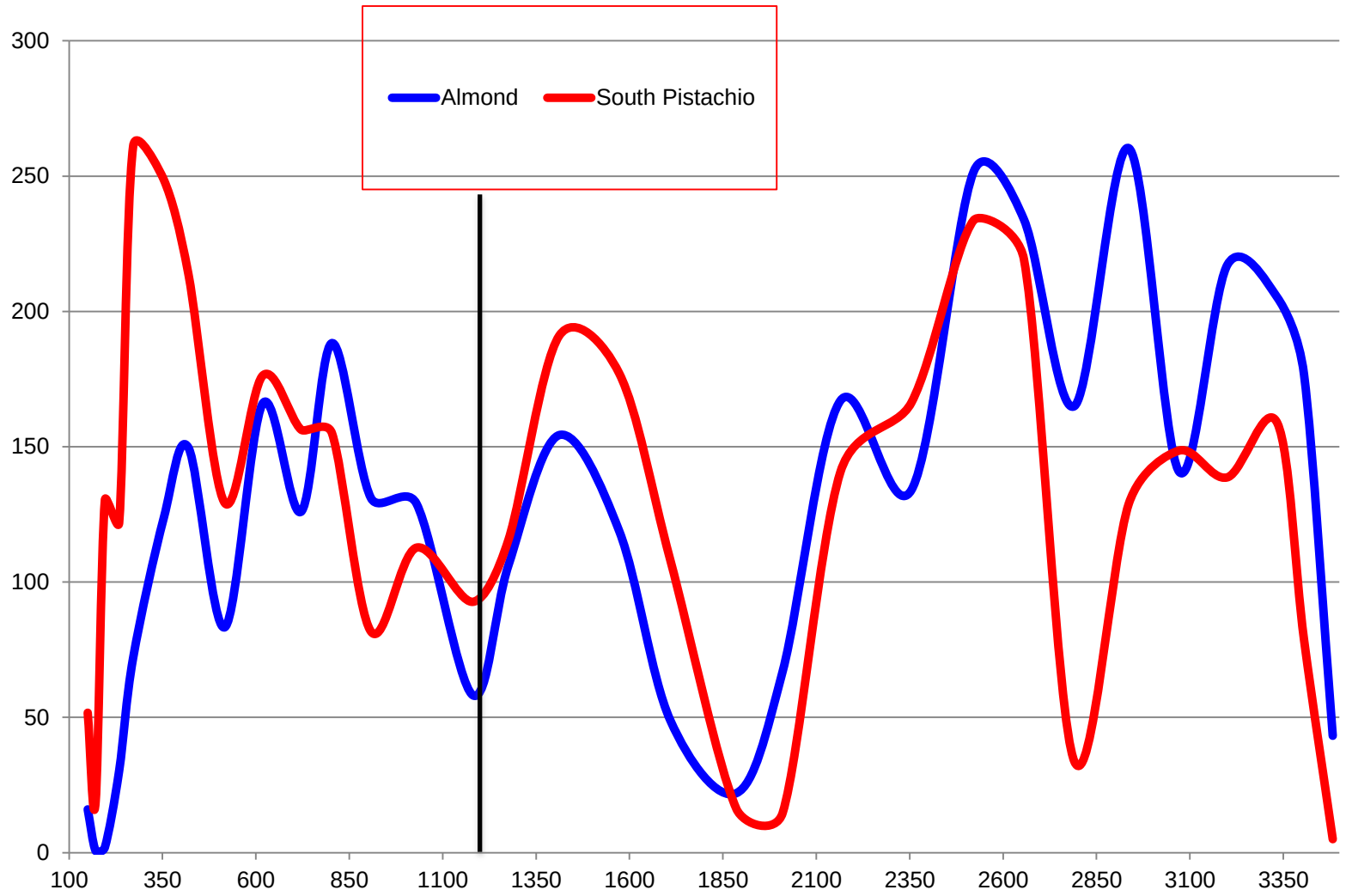
Date	Infestation	Nuts
MAR 7	12.9%	1,8598
MAY 31	75.10%	3219
JUN 7	113.00%	476
JUN 13	120.00%	371
JUN 20	98.60%	293

Navel Orangeworm Degree Day Comparisons



Degree Day Comparisons

Year	Feb 1	June 21	Sept 15
2007	18.8	1,250.6	3,004.1
2010	13.5	866.9	2,559
2012	30.0	1,180.5	2,982


Almond
South Pistachio
300
250
200
150
100
50
0
100
350
600
850
1100
1350
1600
1850
2100
2350
2600
2850
3100
3350

Adult Activity

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Dow AgroSciences 2011

Treatment	Mortality	Adults
Control	0%	132
Delegate 6.4 oz	88.89%	108
Delegate 3.2 oz + Intrepid 12.8 oz	49.59%	123
Altacor 4 oz	16.67%	138

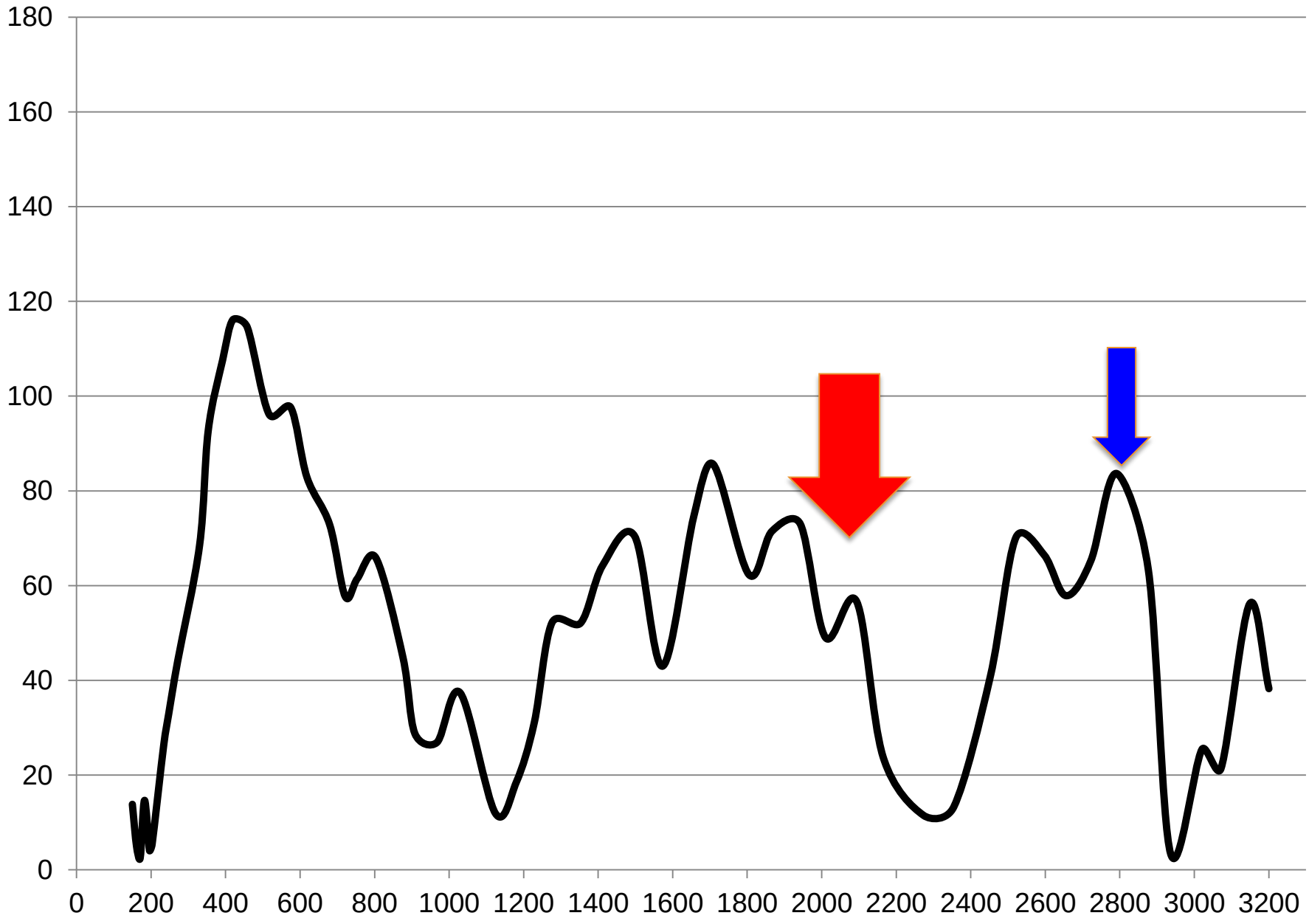
June 2012

Treatment	Time	Mortality	Adults
Altacor (4.0 oz)	24	79.63%	108
Control	24	3.09%	121
Delegate (6.2 oz)	24	77.48%	48

Treatment	Hours	Mortality	Adults
Altacor (3.5oz)	24	32.46%	114
	48	46.67%	120
	72	65.83%	120
Control		32.00%	121
Delegate (6.2 oz)	24	66.67%	123
	48	83.33%	120
	72	98.33%	120

Evidence from Production?

YES


180
160
140
120
100
80
60
40
20
0
0
200
400
600
800
1000
1200
1400
1600
1800
2000
2200
2400
2600
2800
3000
3200

Nothing is improved by time

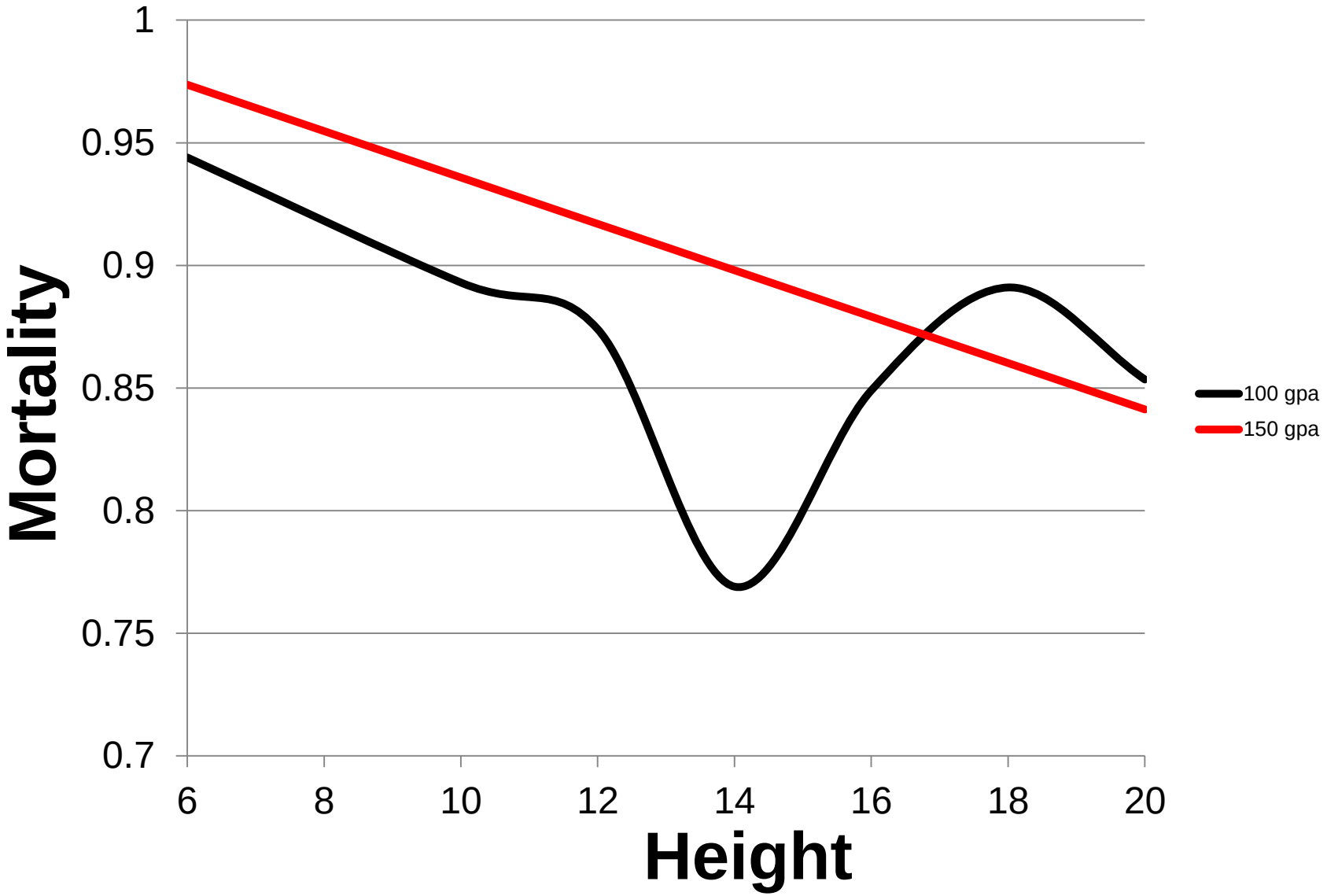
DAY 1

Treatment	Mortality	Eggs	Nuts
Intrepid 16 oz	99.78% A	920	92
Altacor 4 oz	99.80% A	500	50
Delegate 6.2 oz	99.20% A	250	50

DAY 14

Treatment	Mortality	Eggs	Nuts
Intrepid 16 oz	99.25% A	2,000	200
Altacor 4 oz	97.50% B	2,000	200
Delegate 6.2 oz	90.85% C	2,000	200

Gallons per Acre Matters



THANKS

Orchard Weed Management Update

Brad Hanson

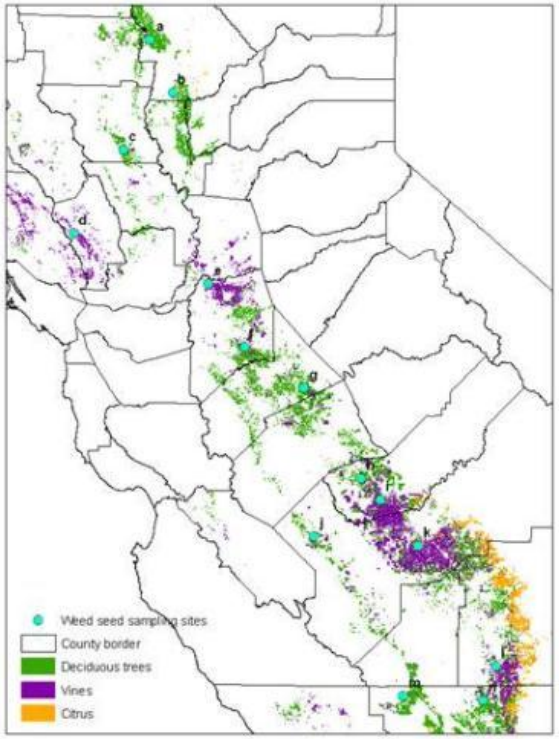
Extension Weed Specialist

UC Davis

T&V weed science program focus

Almond research centers on:

- Weed control efficacy
- Herbicide resistant weeds
- Crop safety and herbicide injury
- Fumigant and non-fumigant alternatives



- ***Significant support of the California Almond Board and other commodity groups and industries***

T&V herbicide registrations

California Herbicide Registration on Horticultural Tree and Vine Crops - (updated January 2012) - UC Cooperative Extension

	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
	flumioxazin (Chateau)	E / 14	R	NB	R	R	R	R	R	R	R	R	R	NB	NB	N	NB	R	N	NB	NB
	indaziflam (Alion)	L / 29	R	R	R	R	R	R	R	R	R	R	R	N	R	N	N	N	N	N	N
	isoxaben *(Trellis)*	L / 21	R	NB	NB	NB	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, Farm Saver)*	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 H_2O)*	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, Mana)*	B / 2	R	R	R	R	R	R	R	R	R	R	R	N	R	N	N	R	N	N	N
	simazine *(Princep,Caliber 90)*	C1 / 5	R	R	N	R	R	R	N	R[2]	R	R	N	R	R	N	N	R	N	R	N
	thiazopyr *(Visor)*	K1 / 3	NB	N	NB	NB	N	N	NB	NB	NB	NB	NB	N	R[2]	N	N	NB	N	N	N
Postemergence	carfentrazone (Shark, Rage)	E / 14	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
	clethodim *(Prism)*	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[3]	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[3]	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	NB	NB	NB	NB	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 Inteon)*	D / 22	R	R	R	R	R	R	R	R	R	R	R	R	R	N	R	R	R	R	N
	pelargonic acid *(Scythe)*	NC[3]	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

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

CA almond herbicide use

	Top 10 active ingredients	2009 treated acreage
1	glyphosate	1,300,394
2	oxyfluorfen (Goal, Goaltender)	723,524
3	glufosinate (Rely)	271,135
4	paraquat (Gramoxone Inteon)	250,156
5	pendimethalin (Prowl)	167,689
6	2,4-D	152,455
7	oryzalin (Surflan, etc)	99,220
8	simazine (Princep, etc)	92,220
9	flumioxazin (Chateau)	90,718
10	carfentrazone (Shark)	68,360
11	rimsulfuron (Matrix)	52,577

740,000 A bearing almond (2010)

Confirmed glyphosate resistance

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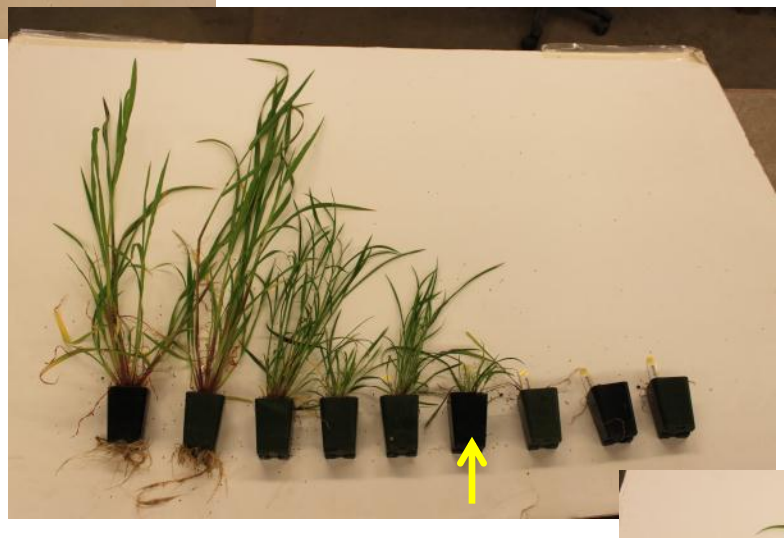
(grouped by genus)	USA	CA	WA	OR
Palmer amaranth and com. waterhemp	☑ ☑			
Giant and common ragweed	☑ ☑			
Australian fingergrass				
Hairy fleabane and horseweed	☑ ☑	☑ ☑		
Sourgrass				
Junglerice	☑	☑		
Goosegrass				
Wild poinsettia				
Italian and rigid ryegrass	☑ ☑	☑ ☑		☑
Ragweed parthenium				
Buckhorn plantain				
Johnsongrass	☑			
Liverseedgrass				

SJV junglerice



Greenhouse dose response

- 0.75 lb ae/A use rate
- Up to 4x
- Photos taken 21 DAT

Other species of concern - goosegrass

Eleusine spp.

- Goosegrass and threespike goosegrass

C190-05

C190-07

Other species of concern - pigweeds

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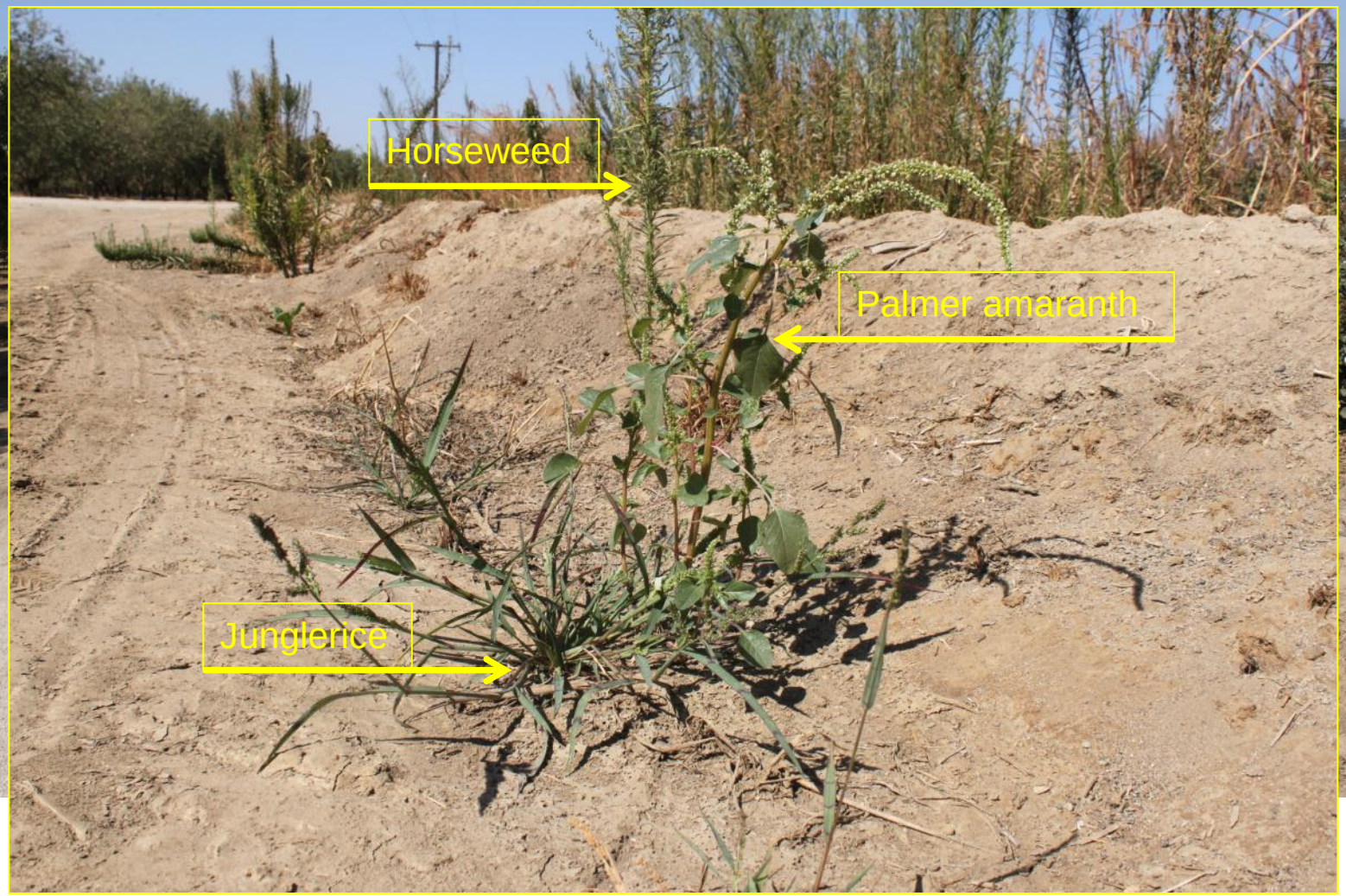
e.g. Palmer amaranth

What might we be in for?



2011-12 GR weed training sessions

7 workshops in CA, OR, and WA

- University, Extension, and USDA-ARS presenters

Resulted in a series of UC IPM publications

- ***Selection Pressure, Shifting Populations, and Herbicide Resistance and Tolerance***
- ***Glyphosate Stewardship: Keeping an Effective Herbicide Effective***
- ***Preventing and Managing Glyphosate-Resistant Weeds in Orchards and Vineyards***
- ***Managing Glyphosate-Resistant Weeds in Glyphosate-Resistant Crops***

http://www.ipm.ucdavis.edu/IPMPROJECT/glyphosateresistance.html

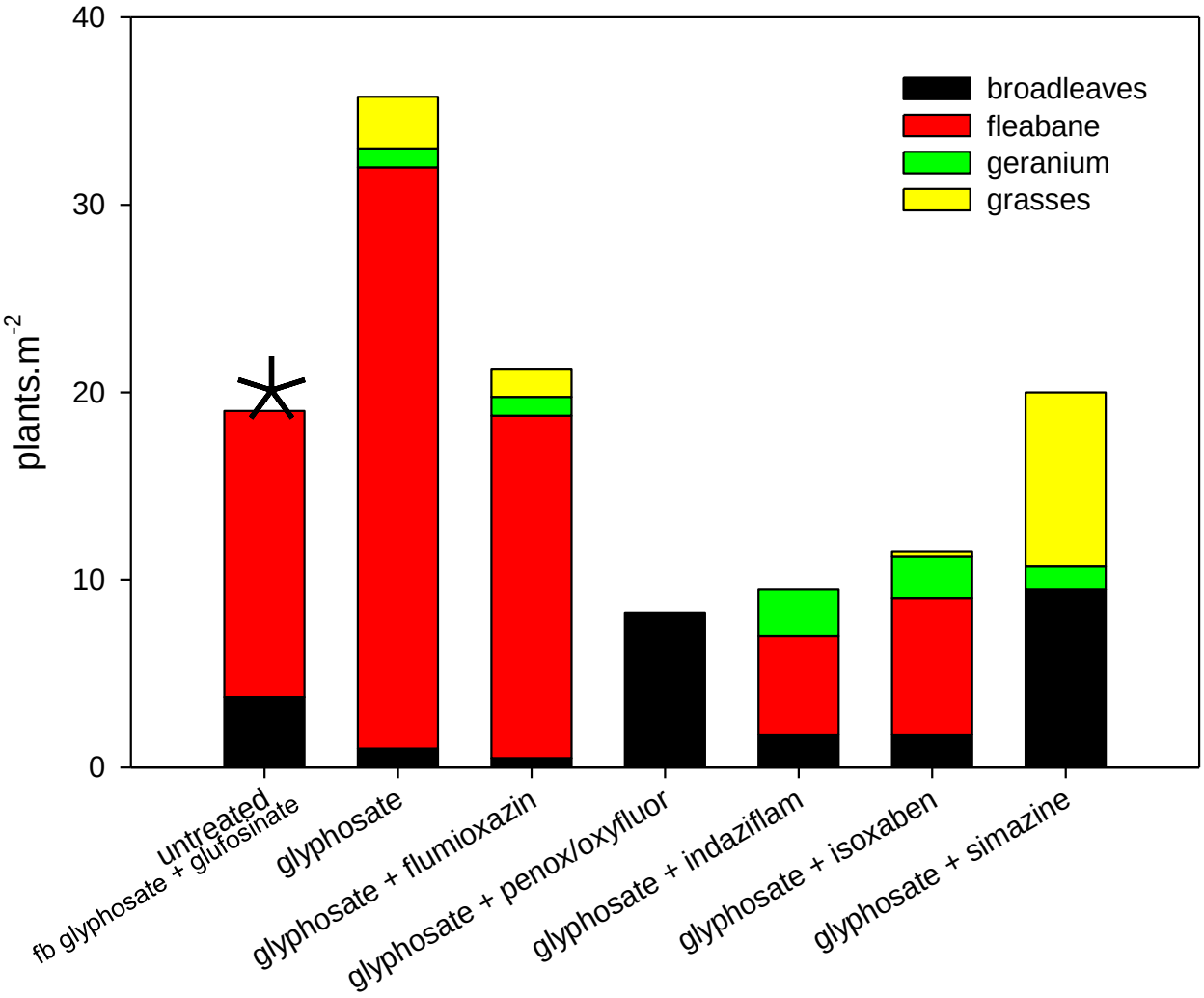
Herbicide evaluations

Recent focus on residual herbicides

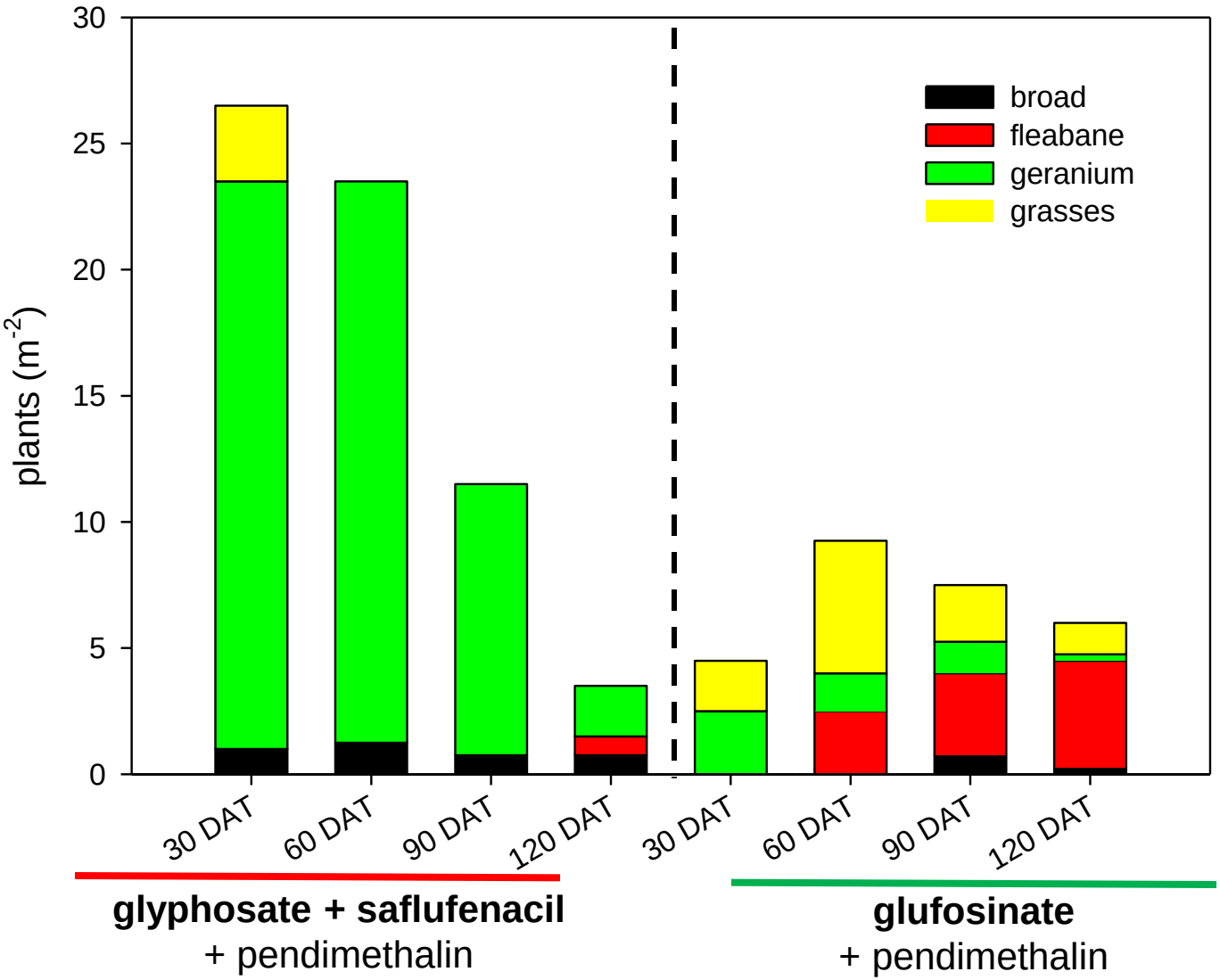
- Several new products
  - Additional MOA for resistance management
- Tank mixes and sequential applications
- Also burn down partner comparisons

Glyphosate + penoxsulam/oxyfluorfen

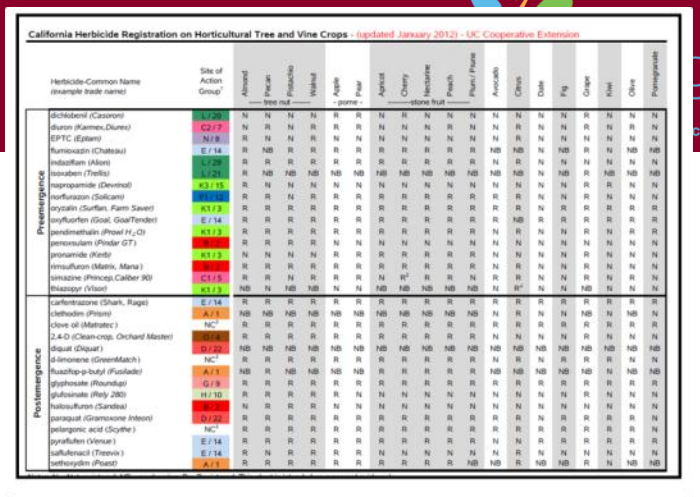
Weed density 120 DAT



Glyphosate vs glufosinate (w/resid)



New (er) herbicides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			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	R	N	N	N
	flumioxazin (Chateau)	E / 14	R	NB	R	R	R	R	R	R	R	R	R	NB	NB	N	NB	R	N	NB	NB
	indaziflam (Alion)	L / 29	R	R	R	R	R	R	R	R	R	R	R	N	R	N	N	N	N	N	N
	isoxaben (Trellis)	L / 21	R	NB	NB	NB	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, Farm Saver)	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 H_2O)	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, Mana)	B / 2	R	R	R	R	R	R	R	R	R	R	R	N	R	N	N	R	N	N	N
	simazine (Princep,Caliber 90)	C1 / 5	R	R	N	R	R	R	N	R^2	R	R	N	R	N	N	N	R	N	N	N
	thiazopyr (Visor)	K1 / 3	NB	N	NB	NB	N	N	NB	NB	NB	NB	NB	N	R^2	N	N	NB	N	N	N
Postemergence	carfentrazone (Shark, Rage)	E / 14	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
	clethodim (Prism)	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^3	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)	D / 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^3	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	NB	NB	NB	NB	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	N	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 Inteon)	D / 22	R	R	R	R	R	R	R	R	R	R	R	R	R	N	R	R	R	R	N
	pelargonic acid (Scythe)	NC^3	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

- PRE
  - Indaziflam
  - Penoxsulam
  - Rimsulfuron
  - Isoxaben
- POST
  - Glufosinate
  - Saflufenacil
  - Pyraflufen

Herbicide injury research

- Addressing Farm Advisor and industry questions
- Training tools for herbicide injury symptoms

Other weed management issues

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VOC regulations

- **EC formulations of oxyfluorfen**

Crop safety of newer herbicides or use patterns

Glufosinate shortfall in 2013 (and 2014?)

What else? Questions? Comments?

T&V weed science team

Brad Hanson - Cooperative Extension Weed Specialist

- Chemical weed control, herbicide resistance, herbicide fate, methyl bromide alts

Lynn Sosnoskie, Ph.D. (Project Scientist)

- Weed biology, ecology and resistance management

Sorkel Kadir, Ph.D. (Visiting Scientist)

- Herbicide fate in plants and soil

Seth Watkins, B.Sc. . (Research Technician)

- Orchard and vineyard herbicide efficacy and crop safety evaluations

Marcelo Moretti, M.Sc. (PhD Student)

- Mechanisms of resistance in glyphosate- and paraquat-resistant Conyza, herbicide field performance, control of herbicide resistant biotypes

Andrew (Bob) Johnson, B.Sc. (MS Student)

- Non-fumigant approaches for orchard re-plant issues, herbicide performance

UCCE and industry cooperators

Thanks!

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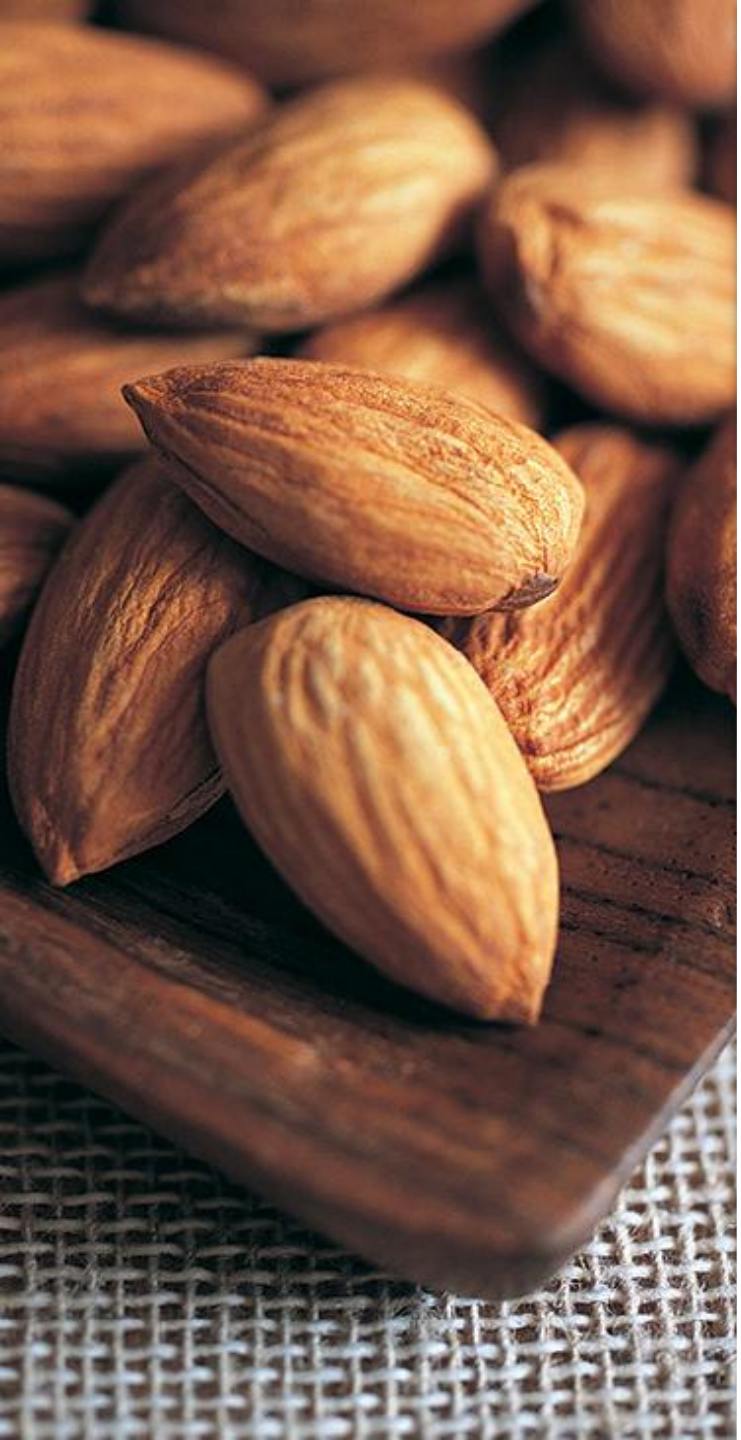
UC Davis Weed Research and Information Center
http://wric.ucdavis.edu/
http://ucanr.org/blogs/UCDWeedScience/

UC Davis Statewide Integrated Pest Management Program
http://www.ipm.ucdavis.edu/

Biology and Management of Almond Diseases

J.E. Adaskaveg
University of California, Riverside



Currently registered and new fungicides for almond production in California

Single-fungicides - Inorganics and Conventional Synthetics

Inorganics
Copper, Sulfur
M1&2
1960s

Dithiocarbamates
Ziram, (Maneb)
M3
1940s

Phthalimides
Captan
M4
1950s

Isophthalonitriles
Bravo, Echo, Equus
M5
1960s

Guanidines
Syllit
M6
1960s

Benzimidazoles
Topsin-M, T-Methyl
1
1970s

Hydroxyanilides
Elevate
17
1990s

Sterol inhibitors (DMIs)
Rally, Laredo, Tilt, Indar, Quash, Bumper, Inspire
3
1970s - 1980s

SDHIs
Xemium, Luna Privilege, Fontelis
7
1960s

Anilinopyrimidines
Vangard, Scala
9
1990s

Dicarboximides
Rovral, Iprodione, Nevado, Meteor
2
1980s

QoIs
Abound, Gem, Headline, picoxystrobin
11
1990s

Polyoxins
Ph-D
19
1960s

In development: picoxystrobin - FG11; several numbered compounds - unassigned to class
Newly registered: Fontelis, Luna Sensation,
Pending: Syllit, Bravo – new PHI and rate.
Exempt Status: Polyoxin-D

FRAC group

Multi-site mode of action

Single site mode of action

Reduced risk fungicides

Conventional Synthetic Fungicides – Pre-mixtures

Inspire Super
3+9

Adament,
Quadris Top,
Quilt Xcel
3+11

Pristine,
Luna Sensation,
Merivon, Q8Y78
7+11

FRAC group

- 3 DMIs
- 7 SDHIs
- 9 Anilinopyrimidines
- 11 QoIs

Natural Products and Biocontrols

Regalia,
Cerebrocide,
Polyoxin-D organic,
Actinovate
19

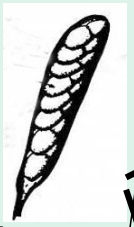
- Natural products/biocontrols for organic almond production.
- **Polyoxin-D received an exempt status!**

Update on management of selected diseases of almond

Update on Scab Control –

growing ADVANTAGE
The Almond Conference

Disease cycle



Ascus with ascospores

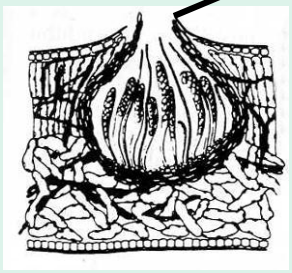
Overwintering twig lesions

Dormant treatments

Conidia (asexual stage) production in the spring and throughout season

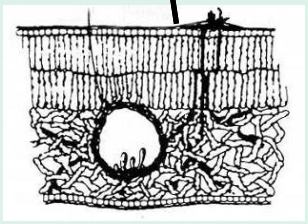
Petal fall treatments

Infection of twigs (<1 year old), fruit, leaves



Mature ascoma with asci and ascospores

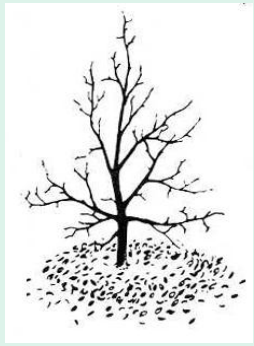
Sexual stage in California?



Development of sexual fruiting bodies

Healthy twig

Survival on fallen leaves over winter?



Defoliation and weakening of trees during severe outbreaks

Update on Scab Control –
Dormant treatments to reduce inoculum in the spring

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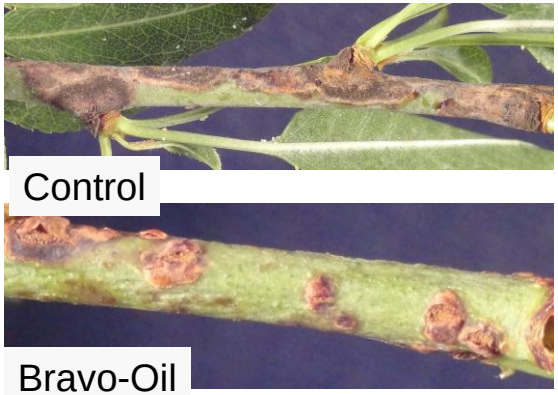
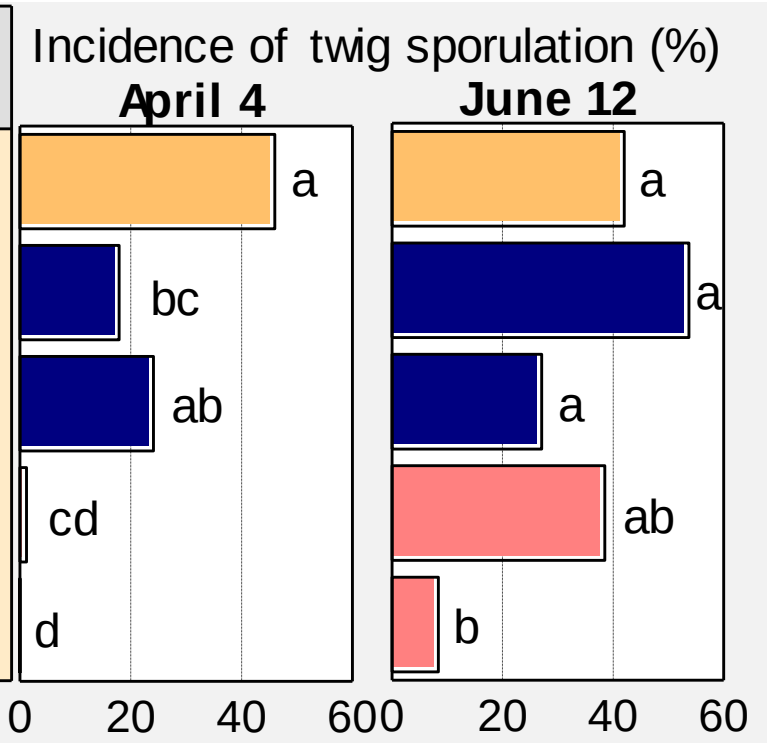
Bravo WeatherStik
cv. Carmel, Butte Co.



Fung. rate	Oil	Timing
---	-	-
4 pt	-	Jan. 2012
6 pt	-	Jan. 2012
4 pt	+	Jan. 2012
6 pt	+	Jan. 2012



- **The 6-pt rate was more effective than the 4-pt rate.**
- **In combination with 4% oil, the efficacy of was greatly improved and was extended into late spring.**

Update on Scab Control –
Dormant treatments to reduce inoculum in the spring

- **In October of 2012, Bravo WeatherStik received a Section 2(ee) registration for dormant application between Dec. 1 and Jan. 10, 2013 or before bud swell using the 4-pt rate.**
- **Full registration is planned through IR-4 to change PHI to 60 days and rate to 6 pts/A.**
- **<u>Goal:</u>**

ALMOND - Treatment timing for scab and Alternaria

Disease	Dormant	Bloom			Spring		Summer	
		Pink bud	Full bloom	Petal fall	Two week	Five week	May	June
Scab	++	-	-	+	+++	+++	+/-	+/-
Scab Dormant chlorothalonil	++	-	-	-	-	+++	+++	+/-
Alternaria	-	-	-	-	-	+++	+++	+++

Update on Scab Control – New Usage

syngenta

FIFRA

Section 2(ee) Recommendation

Date: October 25, 2012

Products: Bravo Weather Stik®
EPA Reg. No.50534-188-100

Use: For tank mix with agricultural oil for use on almond and additional scab control

States: California

This is a recommendation of FIFRA Section 2(ee) as it relates to the use of Bravo WeatherStik for the control in a tank mixture with agricultural oil on almond at the recommended rates in California.

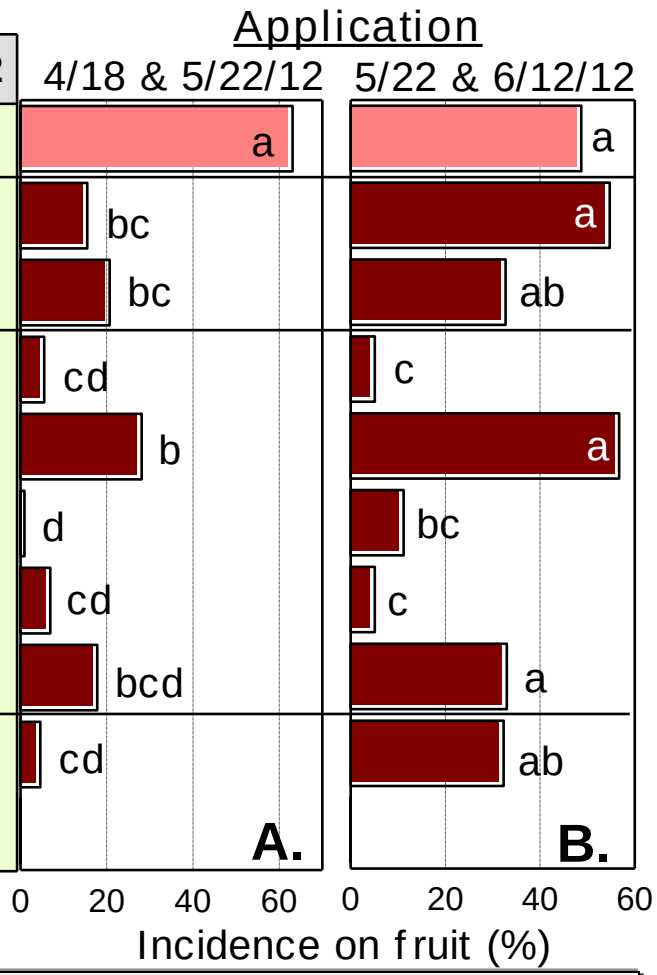
DIRECTIONS FOR USE

For dormant application from December 1st through January 10th or before bud swell. Apply Bravo Weather Stik at the rate of 4 pints product (64 fluid ounces/100 gal/A - concentrate application) in a tank mixture with 4 gal agricultural oil per acre. For dilute applications, use 1.33 pints product and 1 gal oil/100 gal (maximum of 300 gals/A).

Update on Scab Control –
In-season applications after start of twig sporulation

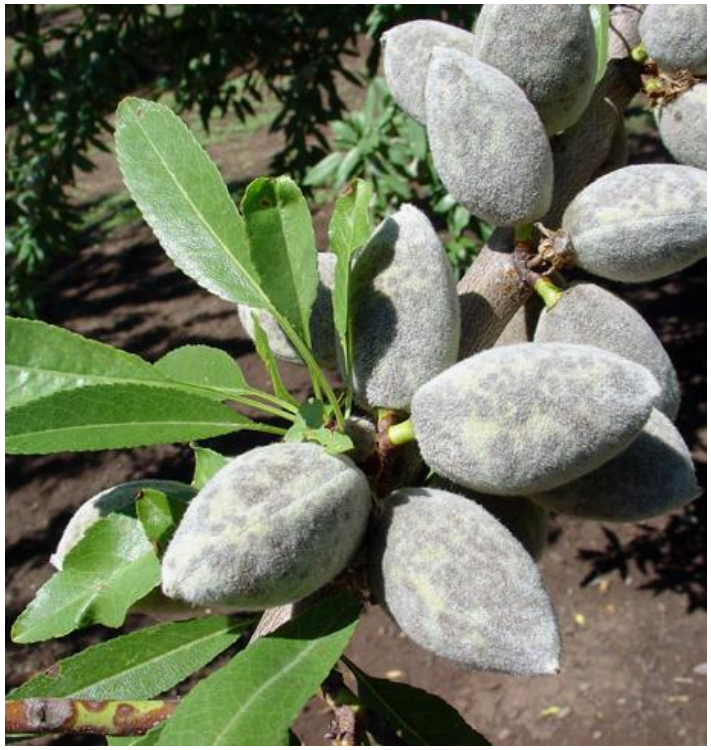
cv. Carmel
Butte Co., 2012

Treatment	Rate (/A)	4-18	5-22
Control	---	---	---
Bravo	4 pts/A	@	@
Fontelis	14 fl oz	@	@
Quash + Ph-D*	3.5 oz + 6.2 oz	@	@
Luna Sensation	5 fl oz	@	@
Inspire Super + Surf.	20 fl oz	@	@
Quadris Top	14 fl oz	@	@
Merivon	6.5 fl oz	@	@
Syllit	32 oz	@	---
Bumper	4 fl oz	---	@



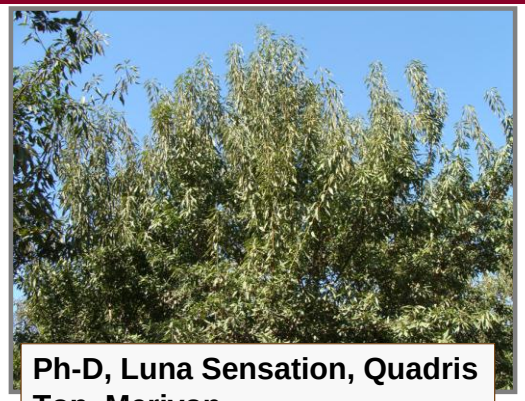
The first in-season scab application has to be timed at beginning of twig lesion sporulation for best efficacy. For most fungicides, programs starting early (A) were more effective than starting later (B).

Update on Scab Control – Summary



- An effective 3-spray program includes dormant and two applications after twig infection sporulation.
- Multi-site fungicides with low resistance potential (chlorothalonil, possibly mancozeb, captan, ziram) should be in rotations with the newer single-site and pre-mix fungicides.
- Syllit is a new scab material and should be used at 32 oz/A.
- **Single-site fungicides should not be applied once disease is developing.**

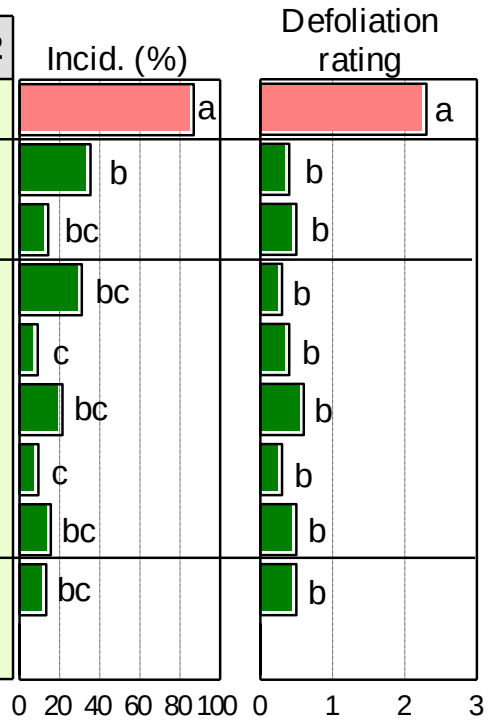
Update on Alternaria Leaf Spot Control
Field trials 2012



Ph-D, Luna Sensation, Quadris Top, Merivon

Control

	Treatment	Rate (/A)	4-18	5-22
	Control	---	---	---
Single	Bravo	4 pts/A	@	@
Single	Fontelis	14 fl oz	@	@
Tank & pre-mixtures	Quash + Ph-D*	3.5 oz + 6.2 oz	@	@
Tank & pre-mixtures	Luna Sensation	5 fl oz	@	@
Tank & pre-mixtures	Inspire Super + Surf.	20 fl oz	@	@
Tank & pre-mixtures	Quadris Top	14 fl oz	@	@
Tank & pre-mixtures	Merivon	6.5 fl oz	@	@
Rotation	Syllit	32 oz	@	---
Rotation	Bumper	4 fl oz	---	@



cv. Carmel, Butte Co.

Most effective :

- **Mixtures of FG 19 - Ph-D (polyoxin-D) and FG 3 fungicides (i.e., Inspire, Quash).**
- **FG 7 - Fontelis (but high resistance potential when used alone)**
- **Pre-mixtures: FG 3/11 - Adament, Quilt Excel, Quadris Top,**
  FG 7/11 - Luna Sensation, Merivon
- **Chlorothalonil: multi-site MOA. Label will be modified for 6 qt/A / 60 days PHI.**

Update on Hull Rot Control

- Caused by *Rhizopus stolonifer* or by *Monilinia fructicola*
- Both pathogens infect fruit and cause dieback

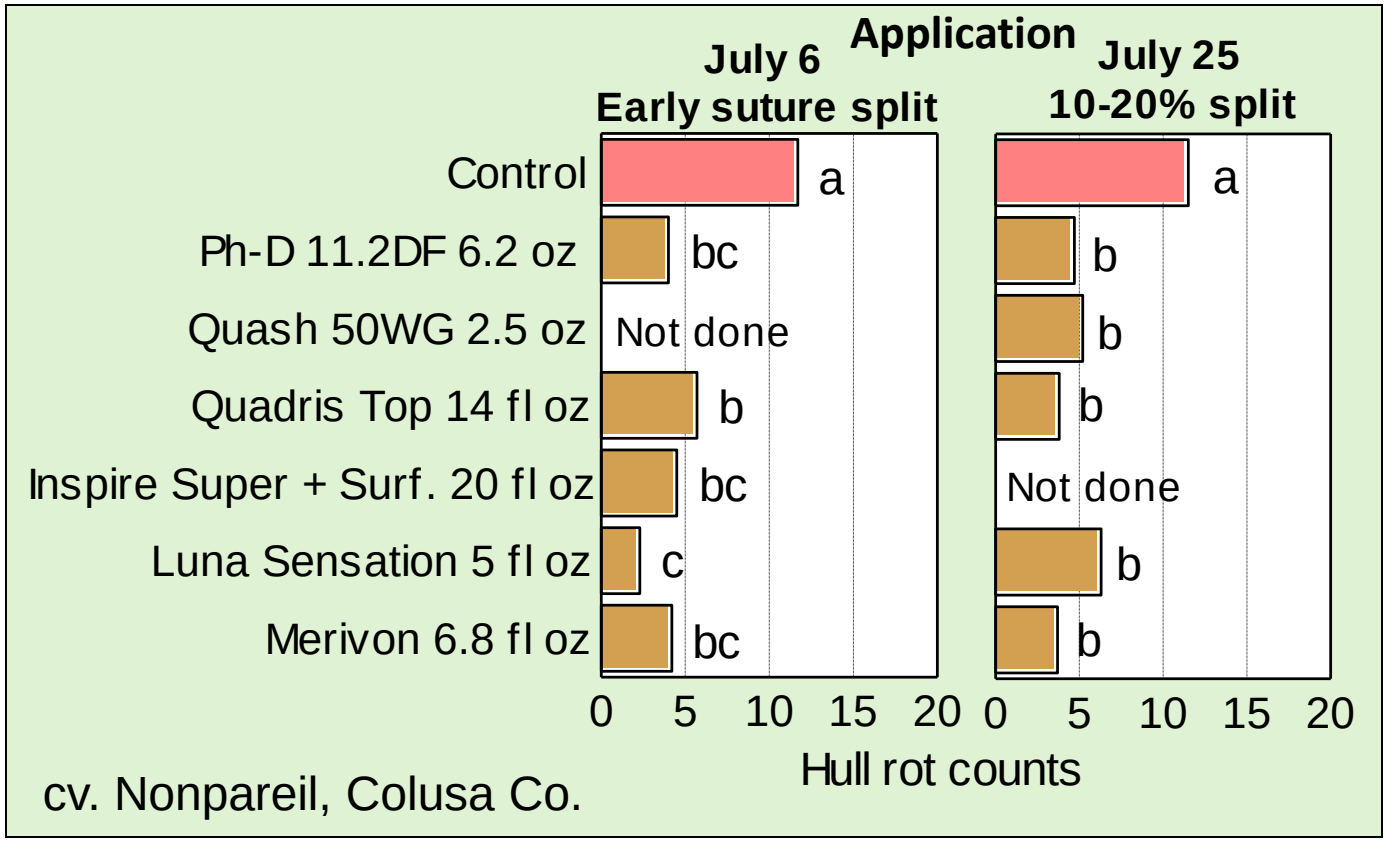
Rhizopus stolonifer

Monilinia fructicola

- Inoculum of *Rhizopus stolonifer* is omnipresent (soil)
- Inoculum of *Monilinia fructicola* originates from other stone fruits (peaches, cherries) or almond. Blossom blight can be caused by *M. laxa* (North) and *M. fructicola* (South regions).

Update on Hull Rot Control

Field trials 2012



Hull rot caused by *R. stolonifer* can be managed with early hull split applications of selected fungicides. Typically, 70% reduction with a single application.

Update on Hull Rot Control
Field trials 2012

Applications with Luna Experience

4-4	4-25	6-6	7-13	
---	---	---	---	ab
---	---	---	@	a
@	---	---	---	bc
---	@	---	---	bc
---	---	@	---	c
@	@	@	---	c

0 10 20 30 40

Hull rot counts

cv. Nonpareil, Stanislaus Co.

Hull rot caused by *M. fructicola* or by both pathogens is managed by late-spring applications. This study will be repeated in 2013 using different fungicides.

Update on Hull Rot Control - Summary

- **Knowledge on the management of hull rot is accumulating.**
- **Fungicide treatments can be effective in reducing hull rot caused by *R. stolonifer* and by *M. fructicola*.**
  - **For *Rhizopus* hull rot, early hull split applications when susceptibility is high should be done. Fungicides are applied most effectively with NOW applications.**
  - **For *Monilinia* hull rot, applications should be done earlier (late spring). *This needs further evaluation*.**
- **For the most effective integrated management of hull rot, hull split should be induced simultaneously with proper water management (i.e., deficit irrigation).**

Update on Fungicide Resistance

- **QoIs (FRAC 11):**
  - **Resistance continues to be widespread in populations of the scab and Alternaria pathogen populations**
- **SDHIs (FRAC 7):**
  - **Resistance in *Alternaria* spp. at some locations**

Cross-resistance among sub-groups

Cross resistance type	FG 7G (boscalid	FG 7F (fluxapyroxad, penthiopyrad)	FG 7B (fluopyram)
1	R	S	S
2	R	MR	S
3	R	R	MR

S= Sensitive
R= Resistance (EC50 values > 10x of baseline, >1 ppm
MR = Moderate resistance (EC50 values 3-<10 x of baseline, <1 ppm)

- **APs (FRAC 9):**
  - **Resistance found in *Monilinia laxa* at one location in 2012 – first report**

Statewide IPM Program
www.ipm.ucdavis.edu

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EFFICACY AND TIMING OF FUNGICIDES, BACTERICIDES, AND BIOLOGICALS FOR DECIDUOUS TREE FRUIT, NUT, STRAWBERRY, AND VINE CROPS 2013

ALMOND
APPLE AND PEAR
APRICOT
CHERRY
GRAPE
KIWIFRUIT
PEACH
PISTACHIO
PLUM
PRUNE
STRAWBERRY
WALNUT

Jim Adaskaveg
Professor
University of California, Riverside

Doug Gubler
Extension Plant Pathologist
University of California Davis

Themis Michailides
Plant Pathologist
University of California, Davis /Kearney Agricultural Center

UC Davis, Dept. of Plant Pathology
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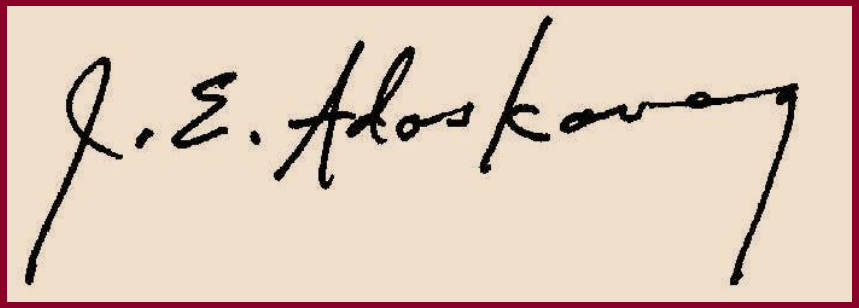
Come visit the Posters for more information!

Thank you!



Vertebrate Pest Management: What's new?

Roger A. Baldwin
Wildlife Pest Management Advisor
UCCE Statewide IPM Program

Field-Use Rodenticides

- 1st gen anticoagulants used extensively.
- As of spring 2011, now restricted use.
- New labels may have implications for perimeter baiting.
- Zinc phosphide still the same.

Structural Rodenticides

- 2nd gen anticoagulants more difficult to obtain but not restricted use.
- Can be used up to 50 feet from structures in bait stations.
- Secondary toxicity risks:
  - 1st generation—limited
    - e.g., 1 of 96 raptors collected exhibited 1st gen exposure
    - e.g., 2 of 30 kit foxes exhibited 1st gen exposure
  - 2nd generation—more likely
    - e.g., 82 of 96 raptors exhibited exposure
    - e.g., 27 of 30 kit foxes exhibited exposure

Structural Rodenticides

- **Bromethalin more available now.**
- **Cholecalciferol is certified organic.**
- **Research into cholecalciferol + diphacinone for voles is promising.**

Aluminum Phosphide Changes

- **Buffer zones extended from 15 to 100 feet.**
- **Application sites now are to be posted.**
- **Fumigation Management Plan is still required.**
- **Contact local Ag Comm. office for details.**

Current Status of Gas Cartridges

- **Used for ground squirrel.**
- **Is not a restricted-use material.**
- **U.S. EPA moving to expand endangered species delineations.**
- **This would eliminate its use throughout most of Central Valley.**

Carbon Monoxide Machines

- **Recently legalized in CA.**
- **Cheetah was ineffective against CA ground squirrels.**
- **PERC has exhibited varying efficacy for pocket gophers (56%) and Belding's ground squirrel (76%).**
- **Not registered as a pesticide.**

Repellents

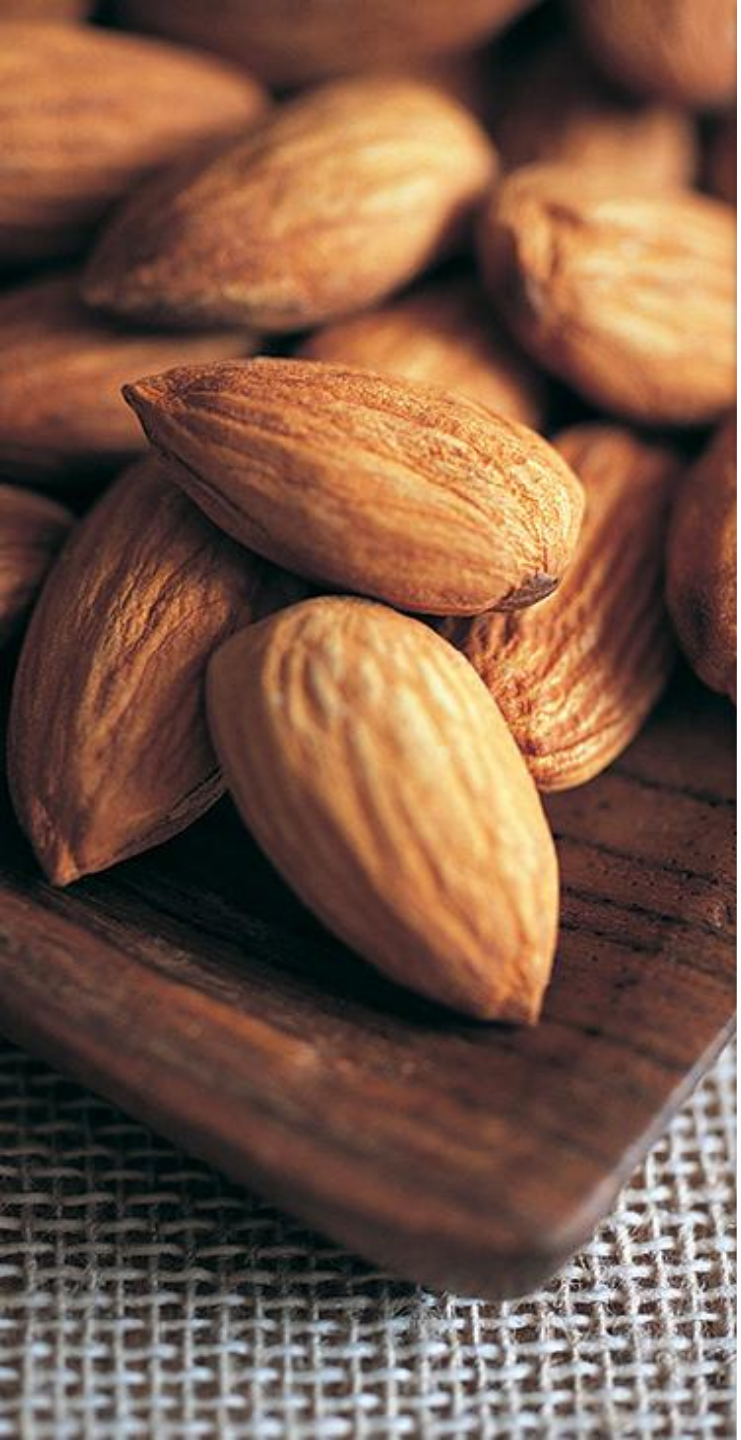
- **Anthraquinone is a post-ingestive repellent currently used for repelling bird consumption of crops such as rice and sunflowers in some states.**
- **Initial lab trials suggest it could be effective for nut crops.**
- **Field trials are anticipated in the future to further test this material.**

Field-Use Rodenticides

- **Recent study showed 0.005% diphacinone grain effective (90%) against roof rats in almonds.**
- **Must be used during non-bearing season.**
- **Also highly effective on deer mice (99%), but not currently on label for use in bait stations.**

Field-Use Rodenticides

- **Vertebrate pest management is getting more complicated and challenging.**
- **When in doubt, contact local CE office or county Ag Comm. Office for up-to-date information on available control options.**



Questions