New Herbicides for Orchard Weed Management and the Role of the Utah IR-4 Program

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Outline

1) What the IR-4 Program is and how it benefits Utah Fruit production

2) Herbicides for weed control in tree fruit and highlight of some newer products



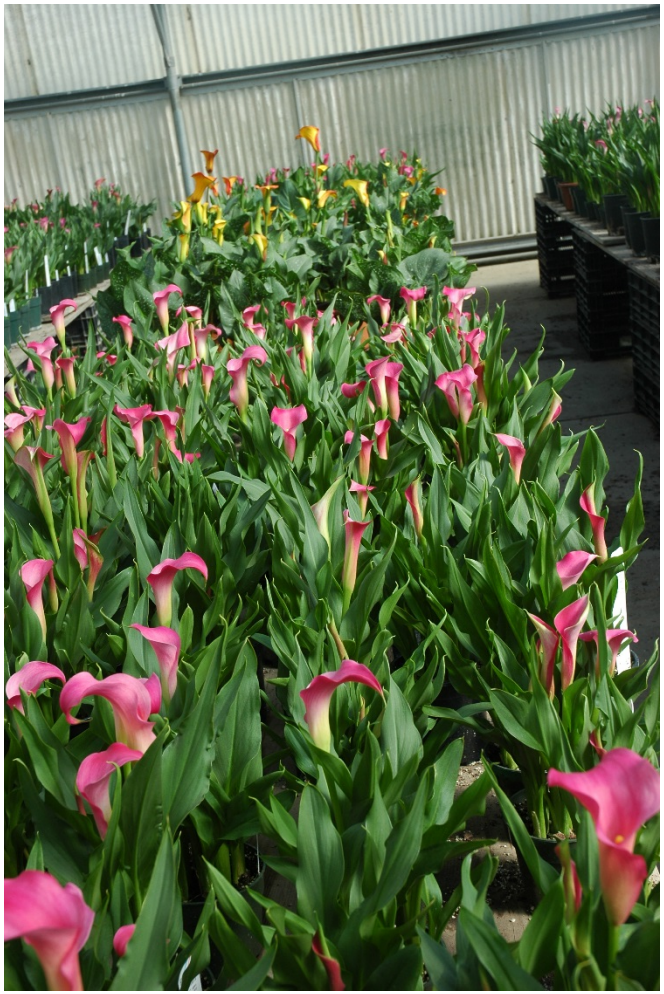
Fruit Production

- High value crops
- Plenty of pest problems
- High inputs
- Limited acreage compared to agronomic crops can limit pesticide registrations
- Yield loss due to pest s reduces economic viability



The IR-4 Program

Mission: To Facilitate Registration of Sustainable Pest Management Technology for Specialty Crops and Minor Uses



http://ir4.rutgers.edu/

The IR-4 Program

- IR-4
  - Interregional Research Project No. 4
  - Began in 1963
  - Generates data to support new EPA tolerances and labeled product uses
- Areas
  - Food Crops
  - Ornamental Horticulture
  - Biopesticides and Organic Support
  - Public Health
- Funding
  - USDA-NIFA, ARS, FAS, and APHIS
  - Support from State Agricultural Experiment Stations



The IR-4 Program in the West

- IR-4 Regional Field Offices
  - North Central, Northeast, Southern, Western
- Western IR-4
  - Regional Field Office
    - Regional Field Coordinator
    - Staff
  - Laboratory
    - Director
    - Staff
  - Field Research Centers
    - Many Universities
  - State Liaison Representatives
    - All 13 Western States
  - Commodity Liaison Committee
    - California Specialty Crops Council, Western Growers Association, USA Dry Peas and Lentil Council, etc



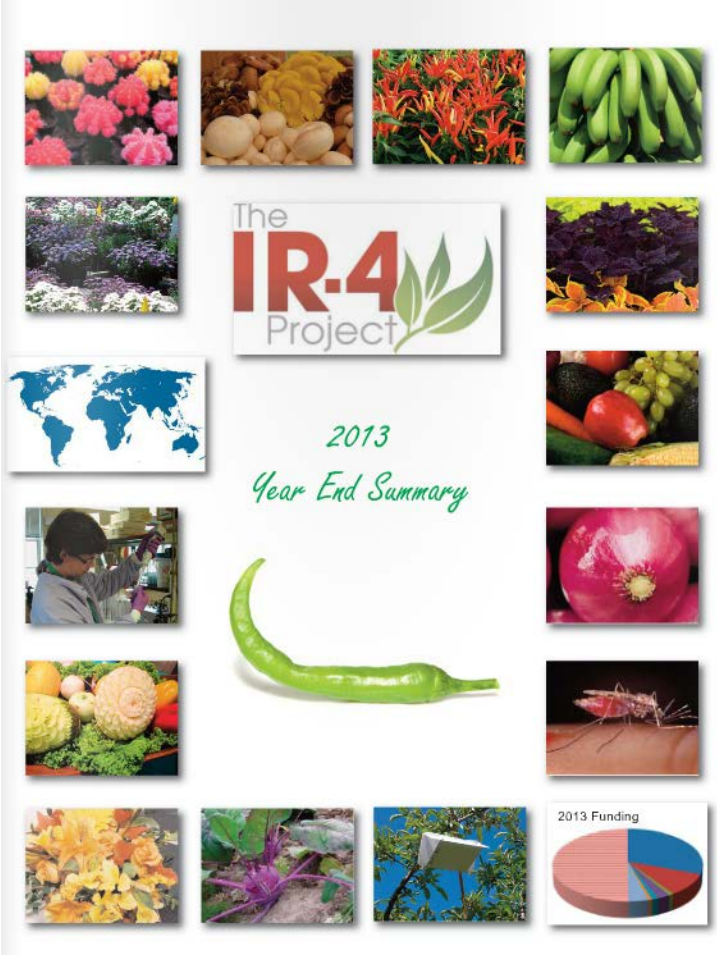
IR-4 Process

- New Project Requests – Project Clearance Request
  - Information about pesticide and commodity
  - Sent to all state liaisons
    - State Extension Specialists
    - Me Too Requests
- Western Region Priorities
- National Priorities
- Protocols developed and research completed



What Does IR-4 Do for You?

- In 2013, result of IR-4 submissions led to establishment of 187 tolerances, supporting 1032 new specialty crop uses.
- Almost 16,000 food uses since beginning.
- Examples for Utah requests:
  - Novaluron (Rimon) – Peach
  - Acetamiprid (Assail)
  - Dinotefuran (Scorpion)
  - Abamectiin (Solera) – Cherry
  - Acequinocyl (Kanemite)
  - Etoxazole (Zeal)
  - Imicloprid (Provado)



http://issuu.com/snovack/docs/2013yes

Vegetation Management in Production Orchards

- Functional purposes
  - Traffic in alleys
  - Reduce interference with harvest
  - Reduce interference with irrigation
  - Equipment issues – dandelion seed
- Reduce competition with weeds
  - Increase nutrient and water use efficiency
  - Increased tree growth
  - Increased yields
  - Increased profits
- Reduce occurrence of other pests
  - Insect
  - Rodent



Weeds Abound in Utah Orchards

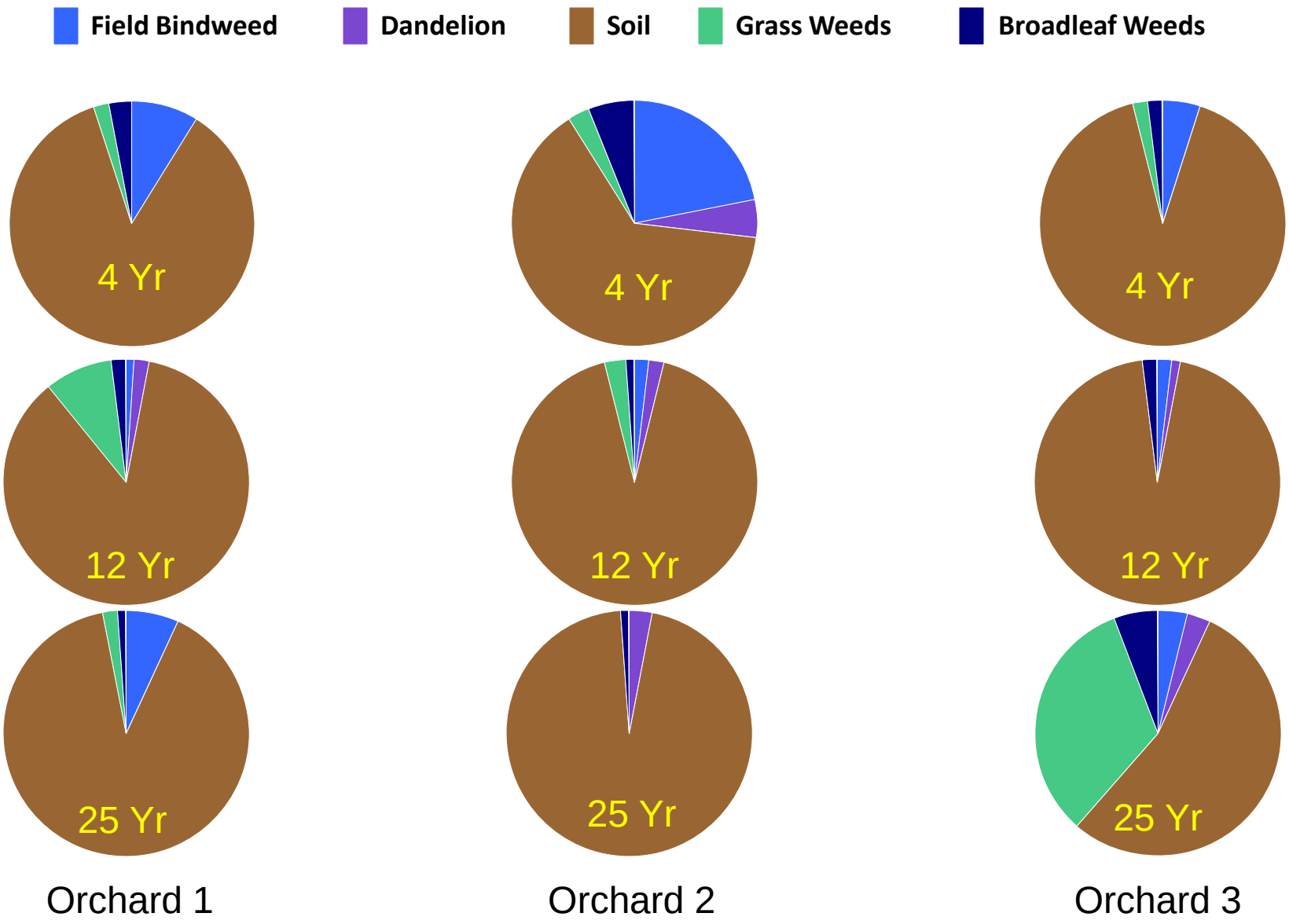
Weed species detected in abundance

Alfalfa	Bulbous bluegrass	Hoary cress	Redroot pigweed
Annual sowthistle	Common mallow	Jointed goatgrass	Shepherdspurse
Barnyardgrass	Dandelion	Kochia	S. groundcherry
Bindweed	Downy brome	Lambsquarter	Western salsify
Black medic	Filaree	Orchardgrass	Wild buckwheat
Blue vervain	Foxtail barley	Prickly lettuce	Wild oats
Broad-leaf dock	Green foxtail	Prostrate knotweed	Willowweed
Buckhorn plantain	Hare barley	Puncturevine	Yellow foxtail

Weed species present at low densities

Annual bluegrass	Burdock	Houndstongue	Russian thistle
Annual sunflower	Curly dock	Musk thistle	S. milkweed
Asparagus	Dodder	P. groundcherry	
Bull thistle	Field horsetail	Povertyweed	

Weeds within the Tree Row



Multiple Options Available for Weed Control in Fruit Production

- Prevention
- Cultural
  - Groundcovers
  - Mow and blow
  - Irrigation management
- Mechanical/Physical
  - Handweeding
  - Cultivation
  - Mulches
  - Mowing
  - Flaming
- Chemical
  - Registered herbicides



Postemergence Herbicides

Herbicide	Trade Name	Site of Action	Apple	Pear	Apricot	Cherry	Nectar.	Peach	Plum
			Pome		Stone Fruit				
Carfentrazone	Shark	E / 14	R	R	R	R	R	R	R
Clethodim	Select	A / 1	NB	NB	NB	NB	NB	NB	NB
2,4-D	Orchard Master	O / 4	R	R	R	R	R	R	R
Diquat	Diquat	D / 22	NB	NB	NB	NB	NB	NB	NB
Fluazifop	Fusilade	A / 1	NB	NB	R	R	R	R	R
Glyphosate	Roundup	G / 9	R	R	R	R	R	R	R
Glufosinate	Rely 280	H / 10	R	N	N	N	N	N	N
Halosulfuron	Sandea	B / 2	R	N	N	N	N	N	N
Paraquat	Gramoxone	D / 22	R	R	R	R	R	R	R
Pyraflufen	Venue	E / 14	R	R	R	R	R	R	R
Saflufenacil	Treevix	E / 14	R	R	N	N	N	N	N
Sethoxydim	Poast	A / 1	R	R	R	R	R	R	NB
Clopyralid	Stinger	O / 4	N	N	R	R	R	R	R

Adapted from Brad Hanson, UC Weed Science 2012

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Clethodim	Select	A / 1	NB	NB	NB	NB	NB	NB	NB
2,4-D	Orchard Master	O / 4	R	R	R	R	R	R	R
Diquat	Diquat	D / 22	NB	NB	NB	NB	NB	NB	NB
Fluazifop	Fusilade	A / 1	NB	NB	R	R	R	R	R
Glyphosate	Roundup	G / 9	R	R	R	R	R	R	R
Glufosinate	Rely 280	H / 10	R	N	N	N	N	N	N
Halosulfuron	Sandea	B / 2	R	N	N	N	N	N	N
Paraquat	Gramoxone	D / 22	R	R	R	R	R	R	R
Pyraflufen	Venue	E / 14	R	R	R	R	R	R	R
Saflufenacil	Treevix	E / 14	R	R	N	N	N	N	N
Sethoxydim	Poast	A / 1	R	R	R	R	R	R	NB
Clopyralid	Stinger	O / 4	N	N	R	R	R	R	R

Adapted from Brad Hanson, UC Weed Science 2012

Preemergence Herbicides

Herbicide	Trade Name	Site of Action	Apple	Pear	Apricot	Cherry	Nectar.	Peach	Plum
			Pome		Stone Fruit				
Dichlobenil	Casoron	L / 20	R	R	N	R	N	N	N
Diuron	Karmex	C 2 / 7	R	R	N	N	N	R	N
Flumioxazin	Chateau	E / 14	R	R	R	R	R	R	R
Indaziflam	Alion	L / 29	R	R	R	R	R	R	R
Isoxaben	Gallery	L / 21	NB	NB	NB	NB	NB	NB	NB
Norflurazon	Solicam	F 1 / 12	R	R	R	R	R	R	R
Oryzalin	Surflan	K 1 / 3	R	R	R	R	R	R	R
Oxyfluorfen	Goal	E / 14	R	R	R	R	R	R	R
Pendimethalin	Prowl	K 1 / 3	R	R	R	R	R	R	R
Pronamide	Kerb	K 1 / 3	R	R	R	R	R	R	R
Rimsulfuron	Matrix	B / 2	R	R	R	R	R	R	R
Simazine	Caliber 90	C 1 / 5	R	R	N	R*	R	R	N
Thiazopyr	Visor	K 1 / 3	N	N	NB	NB	NB	NB	NB

Adapted from Brad Hanson, UC Weed Science 2012

Matrix and Alion (Residual Control)

Matrix 25 DF (rimsulfuron)

- Preemergence control of many broadleaf and grass weeds
- Partial control of some weeds when applied postemergence
- No more than 4 oz/acre/year
- Can make 2 applications if banding
- Control for 60 to 90 days after treatment
- Preharvest interval 7 days for pome and 14 days for stone fruits
- Approx. $18 per oz. or $72/treated acre

Alion 1.67 lb/gallon (indaziflam)

- Preemergence control of many broadleaf and grass weeds
- Apply 5.0 to 6.5 fl oz/ acre
- Do not exceed 10.3 fl oz/acre/year
- Minimum of 30 days between applications
- Preharvest interval 14 days for pome and stone fruits
- Approx. $14 per fl oz. or $70/treated acre

Apple Tolerance to Alion





Treatment*	Rate	Succors	Trunk circum. growth	New shoot length	Fruit yield
	oz/acre	g/tree	cm	inches	kg/tree
Rely	55	177	4.2	14.4	4.95
Rely + Alion	55 + 5	123	4.28	16.8	9.32
Rely + Alion	55 + 10	79	3.73	16.6	10.92
LSD (0.05)		NS	NS	NS	NS

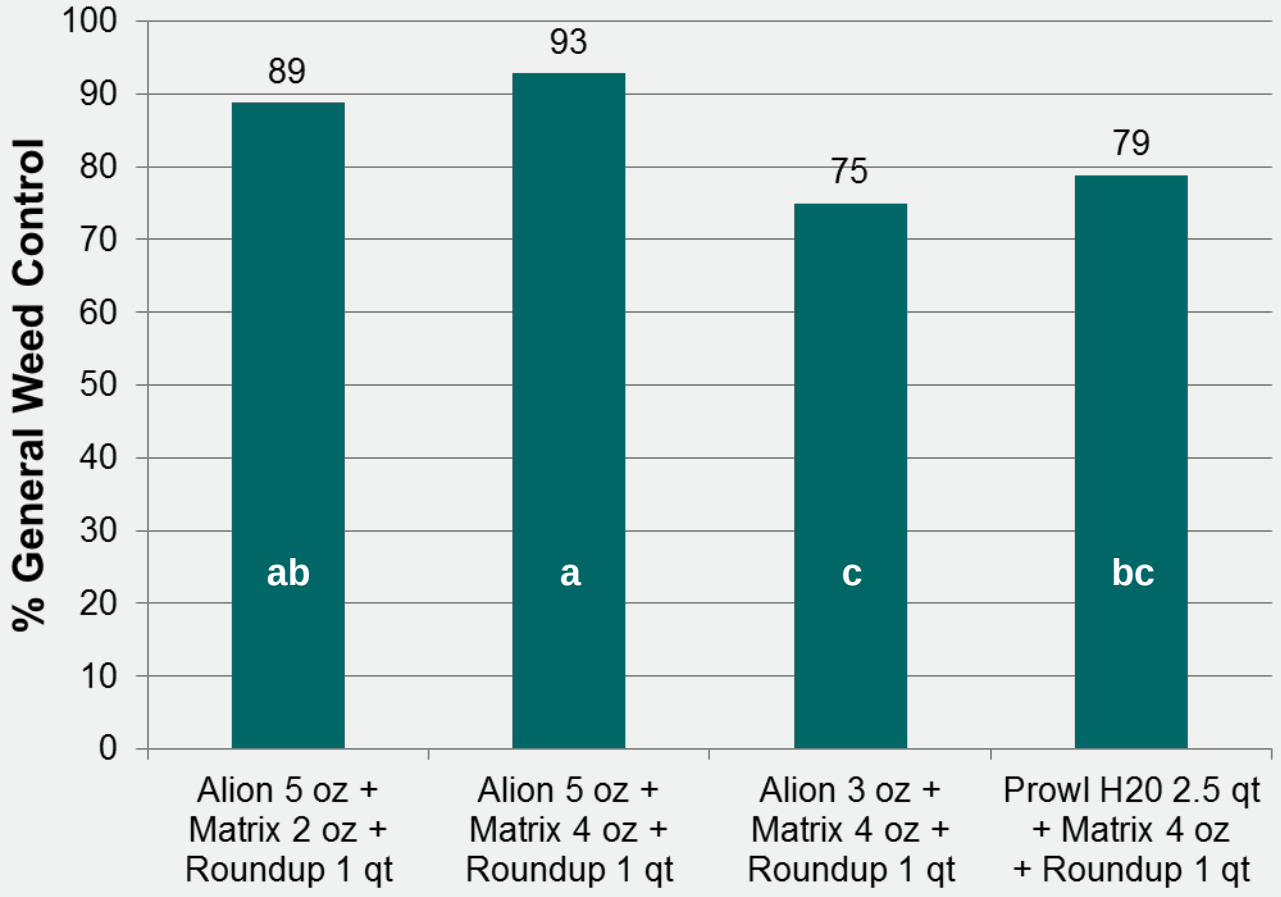
All treatments were applied twice, April 24 and June 8, 2010.

University of Idaho Orchard – Parma, ID

(Jemmett – 2013)

Weeds Present:

Black Medic
Common Groundsel
Common Mallow
Dandelion
Kochia
Redstem Fileree
Russian Thistle
Green Foxtail
Witchgrass



Bronc Plus Dry added to all treatments @ 15 lb/100gal; Roundup Weathermax

Evaluated: 10/26/13

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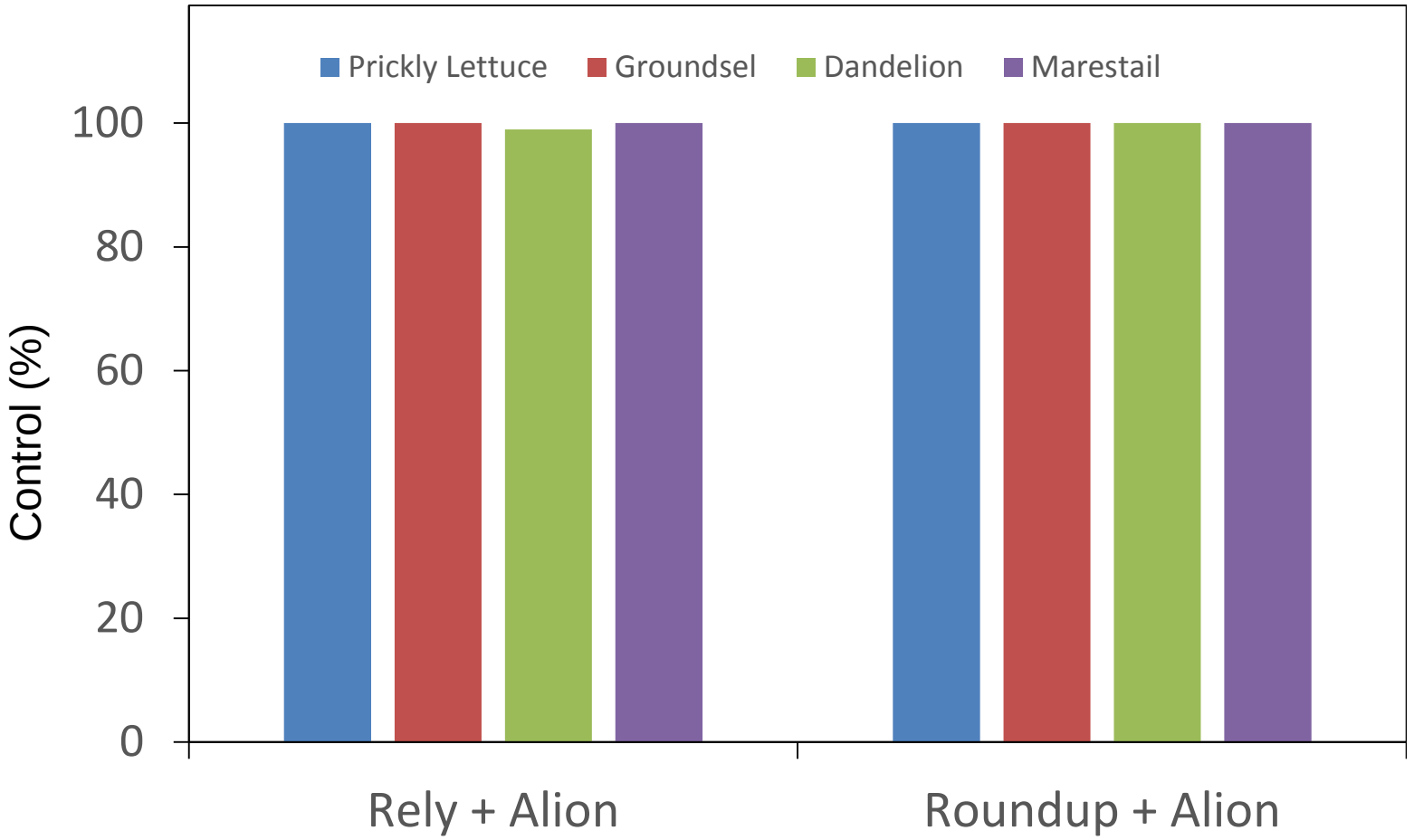
Weed Control with Alion in Tart Cherry

August 8, 2011, 111 DAT



Treatments applied May 11, 2011 at Kaysville.

Weed Control with Alion in Tart Cherry

350 DAT



Untreated



Roundup + Alion

Weed Control with Alion in Tart Cherry

Treatment*	Rate	Prickly lettuce	Salsify	Russian thistle	Fescue	Hoary cress	Tree circumf. growth
	oz/acre	%	%	%	%	%	cm
Untreated		0	0	0	0	0	3.2
Roundup	32	95	97	54	79	75	4.2
RU + Alion	32 + 5	95	99	94	93	89	4.4
Rely + Alion	56 + 5	86	96	80	78	98	3.8
Rely	56	89	94	79	39	45	4.0
RU + Surflan	32 + 64	95	94	81	86	93	4.2
LSD (0.05)		NS	NS	35	21	41	NS

Treatments were applied twice, April 26, 2010. Evaluations 63 DAT. Tree measurements 191 DAT. Rely is not registered for use in tart cherry.

Summary from Alion Trials

- No injury was observed in apple or tart cherry
- Weed control was generally improved compared to applications of Roundup or Rely alone.
- Great potential to reduce the number of applications during the season
- Opportunity to include herbicides with different modes of action into the system
- Additional tests may identify more effective combinations



Conclusions

- Herbicides are a critical tool for weed management in fruit production systems
- Limited product registrations require proactive stewardship in order to maintain the utility of current herbicides
- Economics of a treatment may have to be viewed longer term.



