

# Weed Control Options for Vineyards



**University of California**  
Agriculture and Natural Resources

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# Why Manage Weeds?

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**Direct competition**



# Why Manage Weeds?

## Direct competition

Extremely important when grapes are young.

There is a milk carton under there!



# Why Manage Weeds?

Direct competition

**Water (stress) management**



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If you determine how much water each vine should receive, how do you account for the weeds?



# Why Manage Weeds?

Direct competition

Water (stress)management

**Frost protection**



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Water (stress)management

**Frost protection**

Interfering with absorption  
and reradiation of warmth  
may add to frost damage



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Water (stress)management

Frost protection

**Harbor other pests**



# Why Manage Weeds?

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**Harbor other pests**

Vole, gophers, increased  
moisture and disease  
pressure



# Why Manage Weeds?

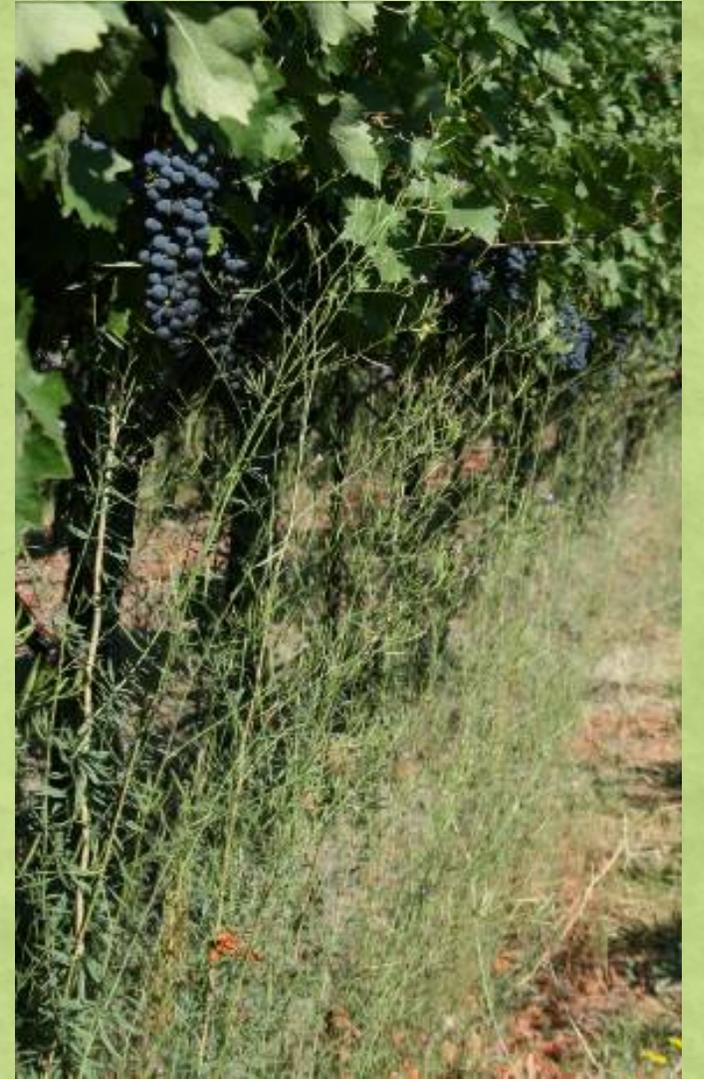
Direct competition

Water (stress)management

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Harbor other pests

**Interfere with harvest operation**



# Why Manage Weeds?

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Water (stress)management

Frost protection

Harbor other pests

**Interfere with harvest operation**

By hand or machine, weeds in the cluster are not a good thing



# Why Manage Weeds?

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Frost protection

Harbor other pests

Interfere with harvest operation

**Effect crop quality**



# Why Manage Weeds?

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Water (stress)management

Frost protection

Harbor other pests

Interfere with harvest operation

**Effect crop quality**

Off-flavors from weeds



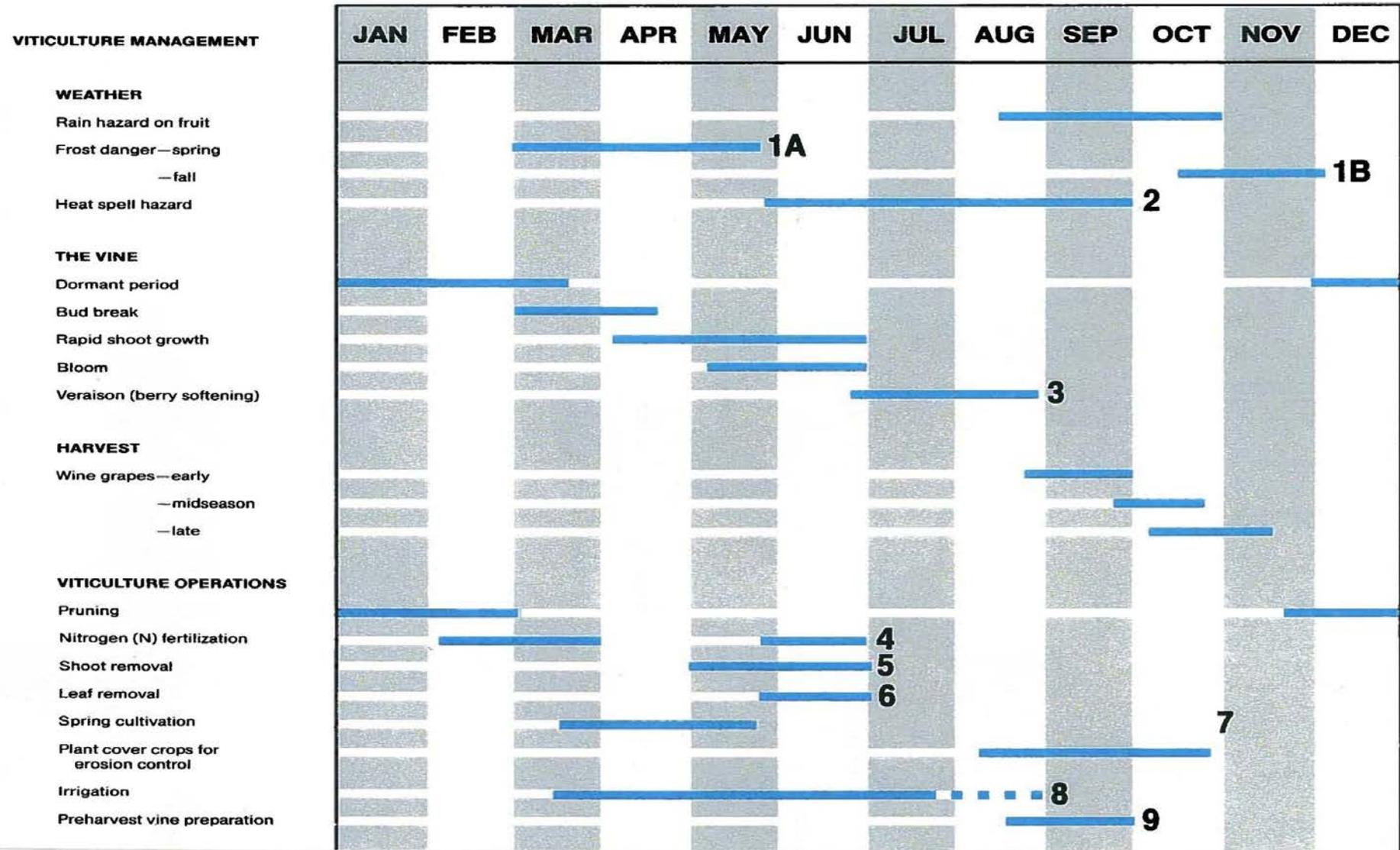
# Essentials of Good IPM Program for Weeds

- Know the ecology and dynamics of your crop.
- Know your weeds: Identification and biology.
- Have a monitoring program- and use it!
- Consider all management techniques and determine which is best for you

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# Grape Lifecycle



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# Malva







# Ryegrass

- Species *Lolium perenne* L. – perennial ryegrass
  - Subspecies - multiflorum (Lam.) Husnot – Italian rye
  - Subspecies - perenne – perennial ryegrass
- Species *Lolium rigidum* Gaudin – Wimmera ryegrass



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# Confirmed Herbicide Resistance in Italian Ryegrass in Northern California

- Glyphosate (Roundup and others) (Lanini)
- Glufosinate (Rely, Lifeline and others) (Jasieniuk)
- Fluazifop (Fusilade) (Hanson, Brunharo)
- Paraquat (Gramoxone) (Hanson, Brunharo)
- Sethoxydim (Poast) (Hanson, Brunharo) (reduced effectiveness)

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# Sharp-point Fluvellin (*Kickxia elatine*(L.)Dumort)

- Reproduces by seeds
- Most seeds germinate in spring or summer
- Will germinate thru fall if moisture is present.
- Seeds can last up to 20 years!



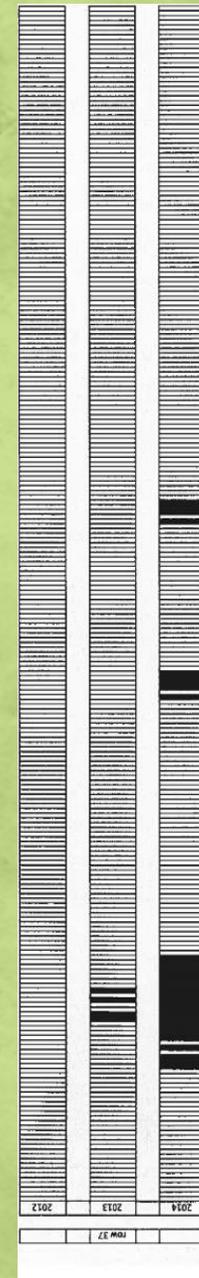
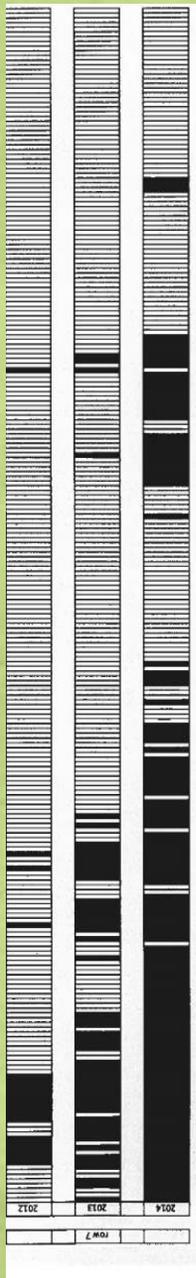




Transects 126 ft. long/ 252 points



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# Undervine weed management strategies

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- **Undervine cover cropping +/- mowing**
- Tillage
- Flaming
- Animals
- Herbicides

# Undervine cover cropping +/- mowing



# Undervine cover cropping +/- mowing



Weed Competition

Erosion control

CO<sub>2</sub> sequestration

# Undervine cover cropping +/- mowing



# . Undervine cover cropping +/- mowing

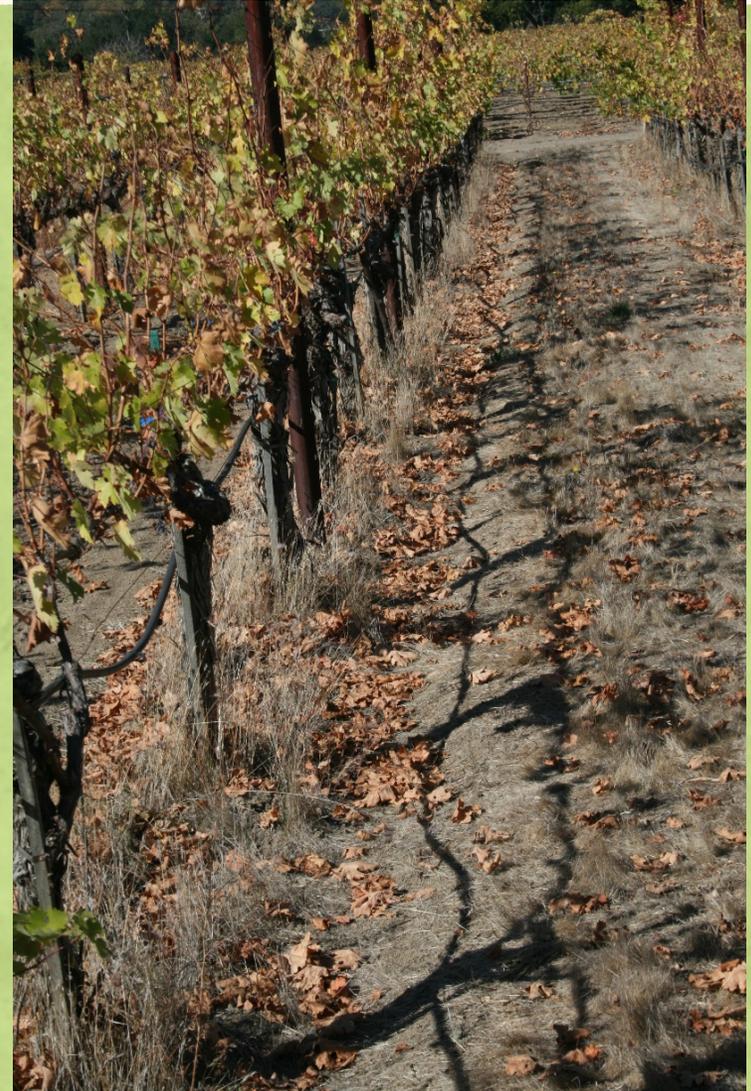


# Undervine cover cropping +/- mowing

Row #	willowherb	fluvellin	bindweed	oxtonge	sow/prec let	bur clover	dry grass
10	3.2%	0.0%	4.4%	2.4%	0.0%	4.4%	92.9%
13	1.2%	0.0%	1.2%	0.0%	0.0%	5.6%	87.3%
25	1.6%	0.0%	5.2%	0.0%	0.0%	1.2%	85.7%
31	0.0%	0.0%	4.0%	2.8%	0.0%	2.0%	96.4%

Transects 126 ft. long/ 252 points

# Undervine cover cropping +/- mowing



# Alternative weed management in vineyards.

Undervine covercrop?



**Increased vertebrate pests**

# Undervine weed management strategies

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- Undervine cover cropping +/- mowing
- **Tillage**
- Flaming
- Animals
- Herbicides

# Tillage



# Tillage

1. Is our vineyard suitable for mechanical cultivation?



C212-05



C212-09

# Tillage



# Tillage

Fossil Fuel Use

Release sequestered CO<sub>2</sub>

Erosion

Vineyard following cultivation



# Tillage



# Tillage



# Undervine weed management strategies

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- Undervine cover cropping +/- mowing
- Tillage
- **Flaming**
- Animals
- Herbicides

# Flaming



# Flaming - Advantages



No resistance

No residue

Non-chemical



# Flaming Disadvantages



# Undervine weed management strategies

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- Undervine cover cropping +/- mowing
- Tillage
- Flaming
- **Animals**
- Herbicides

# Alternative weed management in vineyards.

Will you utilize sheep?



# Animals

In the right situation animals can do a good job of weed control



# Animals

In the wrong situation animals can cause compaction, and crop damage-

Can be expensive- do you rent or buy?  
Commercial operations use 200-300 head/acre

Are there health/safety restrictions?



# Animals



# Animals



# Animals



# Undervine weed management strategies

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- Undervine cover cropping +/- mowing
- Tillage
- Flaming
- Animals
- **Herbicides**

# Herbicides Registered for Use on Bearing Grapes

Surflan  
Chateau  
Princep  
Goal  
Solicam  
Kerb  
Alion

Casoron  
Karmex  
Devrinol  
Trellis  
Prowl  
Matrix  
Mission

Glyphosate  
Gramoxone  
Rely  
Goal  
Shark  
Fusilade

2,4-D  
Poast  
Venue





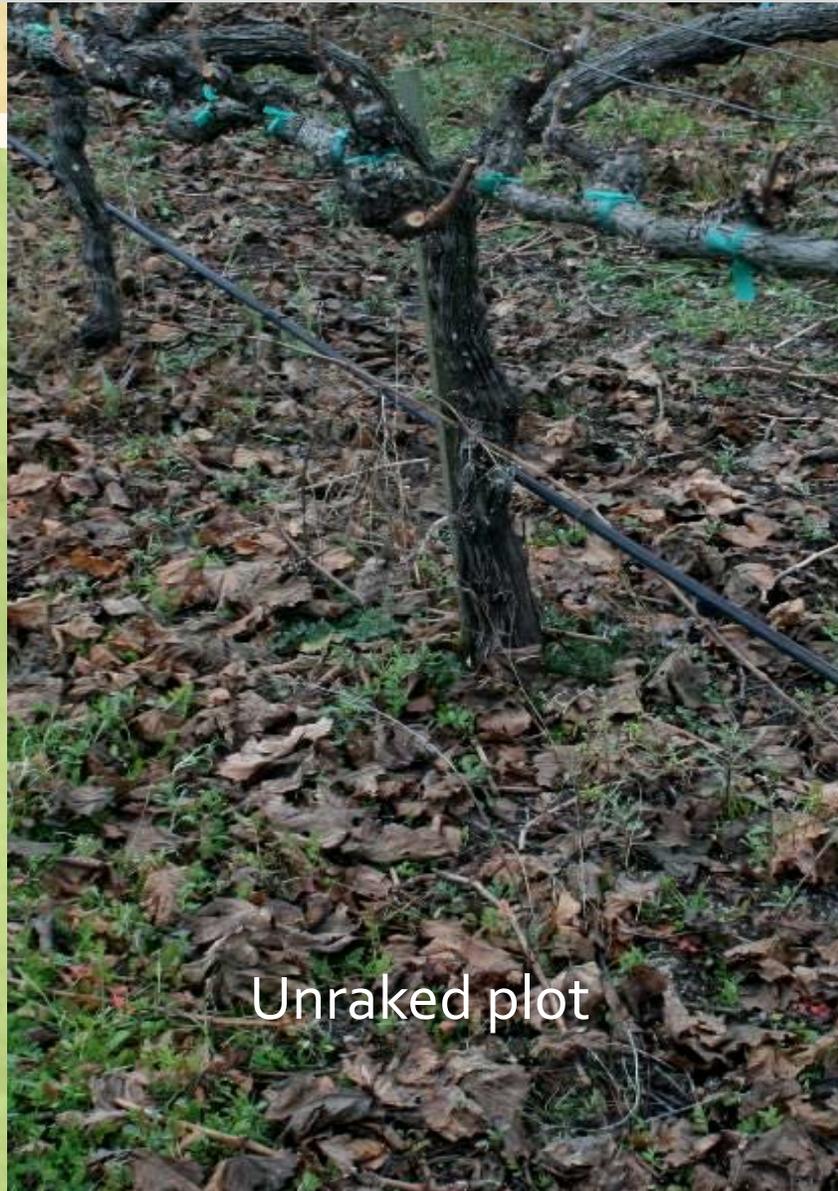
# Herbicide Resistance

- Herbicide resistance: the inherited ability of a plant to survive and reproduce following exposure to a dose of herbicide normally lethal to the wild type
  - “We used to be able to control this weed with this treatment but it doesn’t work as well anymore...”

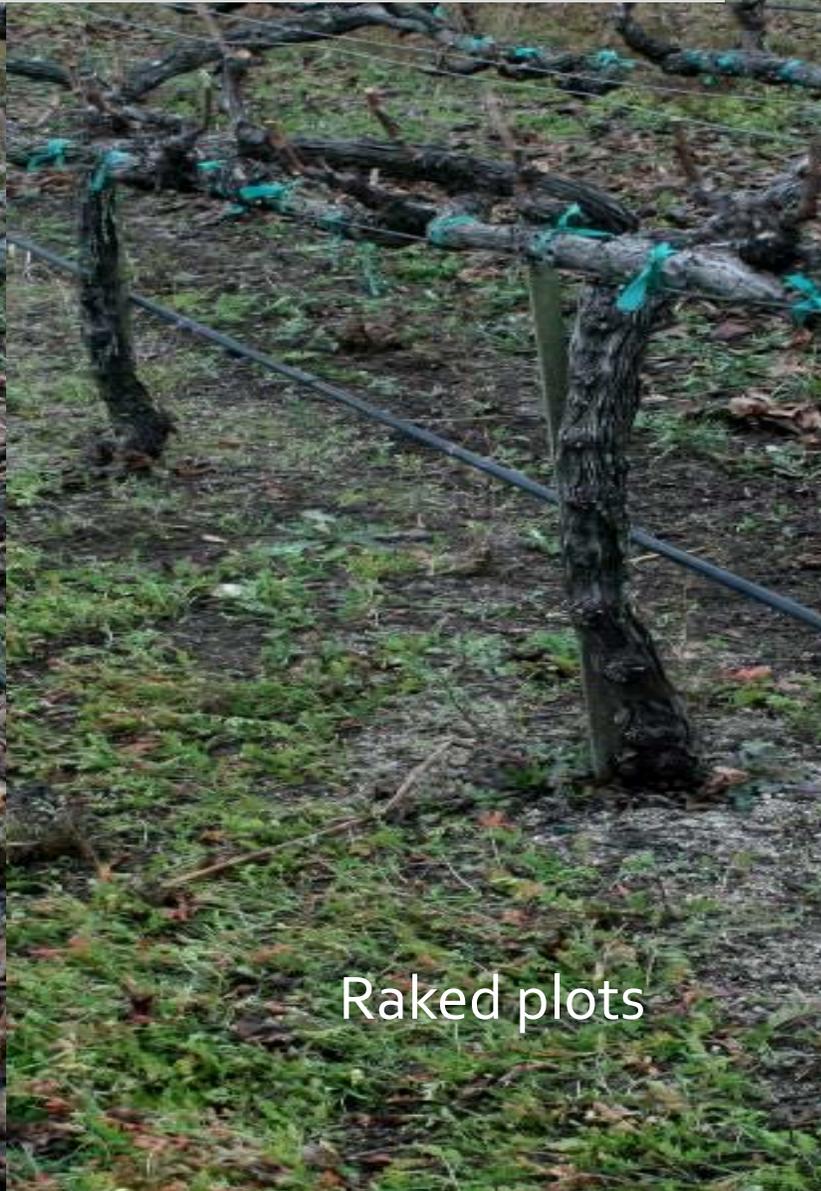
# Herbicide Tolerance

- Herbicide tolerance: the inherent ability of a species to survive and reproduce after herbicide treatment; implies no selection or genetic manipulation to make the plant tolerant
  - “We’ve never gotten dependable control of this weed with this herbicide...”

# Remove leaves and debris



Unraked plot



Raked plots

Plots raked and treated on  
December 19th with 10 oz  
Chateau  
+24 oz Roundup



# 60% Leaf Cover

Raked pre-treatment

Raked post treatment

Unraked pre-treatment

Unraked post treatment



	3/1/2008		6/12/2008	
% Leaf Cover	% Fillaree Cover		% Willowherb control	
	Raked	Not	Raked	Not
60	5	50	100	70
50	7	30	100	50
50	15	40	90	40
40	3	20	90	50
40	5	10	100	70
33	1	15	90	70
25	5	20	100	70
Ave	8.30%	28%	96%	60%



**Willowherb**





# Comparison of Weed Control Methods

Year 1

		TREATMENT	FALL	LATE WINTER/SPRING	EARLY SUMMER
<b>1</b>	<b>WHITE</b>	Total cultivation	Cultivate	Cultivate	Cultivate
<b>2</b>	<b>BLUE/WHITE</b>	Cultivate +post herbicide	Cultivate	Post herbicide (Glyphosate)	Glyphosate
<b>3</b>	<b>ORANGE/WHITE</b>	Cultivate + organic herbicide	Cultivate	Organic herbicide	Cultivate
<b>4</b>	<b>BLACK</b>	Conventional Post then Pre +Post	Glyphosate	Glyphosate + Flumioxazin	-----
<b>5</b>	<b>BLUE</b>	No-Till Post herbicide (glyphosate)	Glyphosate	Glyphosate	Glyphosate
<b>6</b>	<b>PINK</b>	No-Till Post herbicide (glufosinate)	Glufosinate	Glufosinate	Glufosinate
<b>7</b>	<b>ORANGE</b>	Organic-No-Till	Suppress 7%	Suppress 7%	Undervine Mow (weed eater)

First cultivation November 10	Second cultivation March 15	Third cultivation May 31
First Herbicide application Dec 20	Second Herbicide application Mar 9	Third Herbicide application June 9
		Weed Eater June 9

		May 25	July 6	July 6	May 25	July 6	July 6	May 25
		Overall	Overall	AVE	Fluvellin	Fluvellin	AVE	grass
WHITE	Total cultivation	3	2	4.25	3	6	5.5	6
		5	4		5	4		5
		7	4		8	5		7
		4	7		8	7		4
BLUE/WHITE	Cultivate +post herbicide (glyphosate)	2	8	8.0	1	8	8.13	10
		4	7		4	7		10
		5	8		5	8		10
		7	9		7	9.5		10
ORANGE/WHITE	Cultivate + organic herbicide	3	1	4.25	2	1	4.25	6
		5	3		5	3		7
		4	6		4	6		7
		4	7		7	7		4
BLACK	Conventional Post then Pre +Post	9.9	10	8.5	9.9	10	10	10
		8	8		10	10		10
		9	8.5		9	10		10
		9.5	7.5		9.5	10		10
BLUE	No-Till Post herbicide (glyphosate)	7	7	7.88	7	7	7.88	10
		4	7		4	7		10
		4	8.5		4	8.5		10
		7	9		8	9		10
PINK	No-Till Post herbicide (glufosinate)	1	5	6.75	1	5	6.75	10
		4	6		4	6		10
		5	8		5	8		10
		6	8		6	8		10
ORANGE	Organic-No-Till	5	5	5.25	8.5	5	7.25	3
		2	6		8	8		2
		5	6		7	7		4
		4	4		9	9		4

Treatment 1  
Total cultivation



Treatment 2  
**Cultivate +glyphosate**



# Treatment 3 Cultivate + Suppress



# Treatment 4 Conventional Post then Pre +Post



Treatment 5  
**No-Till Post herbicide (glyphosate) 3 times**



Treatment 6

**No-Till Post herbicide (glufosinate) 3 times**



Treatment 7  
**Organic-No-Till (Suppress 2 times- mowing)**



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# Thank You

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