Vineyard Weed Management and Covercrops

UC CE University of California Agriculture and Natural Resources Cooperative Extension

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Why Manage Weeds?

Direct competition

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Extremely important when grapes are young.

There is a milk carton under there!

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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?

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Frost protection

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

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Harbor other pests

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Vole, gophers, insect hosts

Why Manage Weeds?

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Frost protection

Harbor other pests

Block air movement

Why Manage Weeds?

- Direct competition
- Water (stress)management
- Frost protection
- Harbor other pests
- **Block air movement**
- Reduced air movement could increase pathogens and frost potential

Why Manage Weeds?

Direct competition

Water (stress)management

Frost protection

Harbor other pests

Block air movement

Interfere with harvest operation

Why Manage Weeds?

- Direct competition
- Water (stress)management
- Frost protection
- Harbor other pests
- Block air movement
- **Interfere with harvest operation**
- By hand or machine, weeds in the cluster are not a good thing

Why Manage Weeds?

- Direct competition
- Water (stress)management
- Frost protection
- Harbor other pests
- Block air movement
- Interfere with harvest operation
- **Effect crop quality**

Why Manage Weeds?

- Direct competition
- Water (stress)management
- Frost protection
- Harbor other pests
- Block air movement
- 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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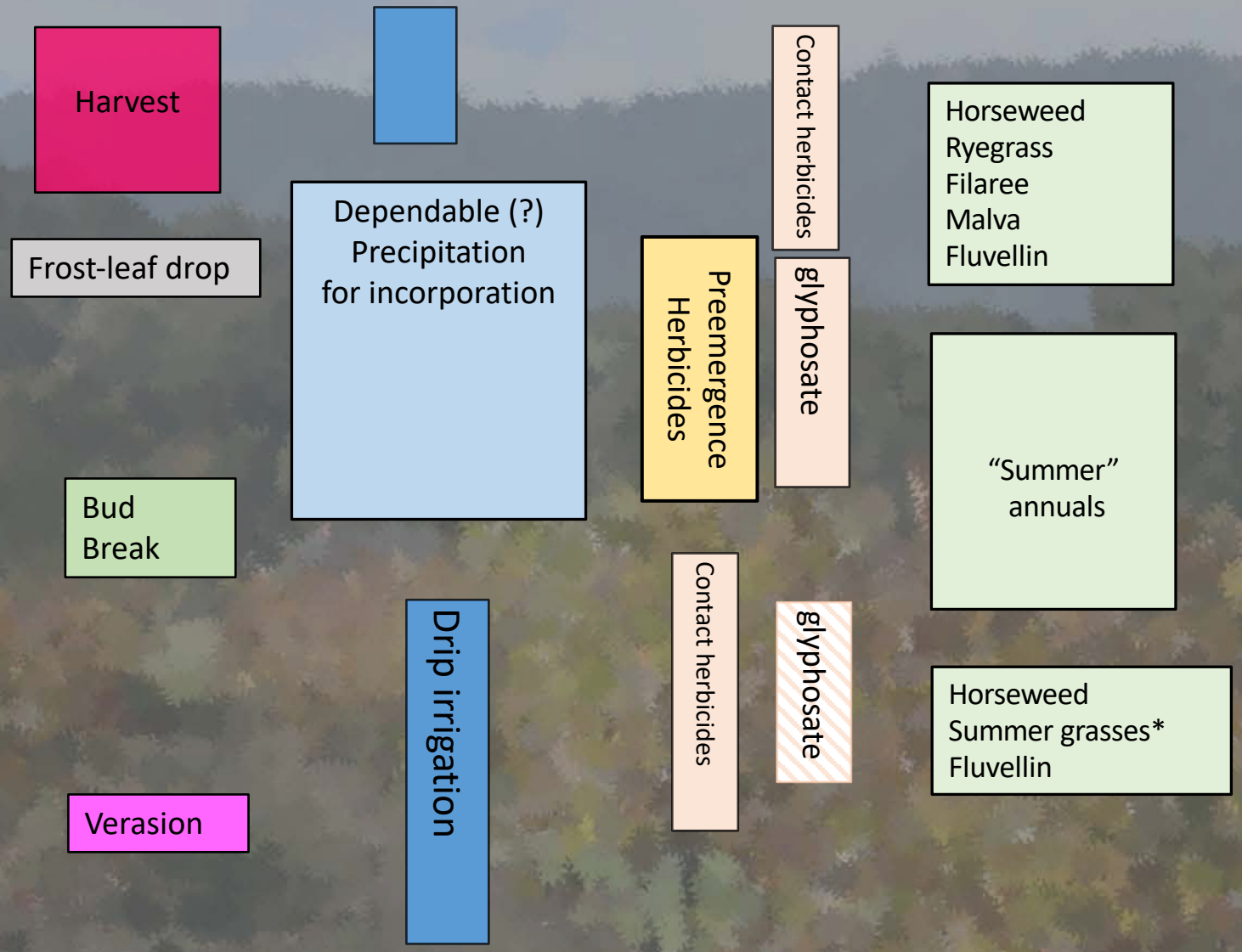
Northern California Weed Control Calendar

- September
- October
- November
- December
- January
- February
- March
- April
- May
- June
- July
- August



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Malva


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Ryegrass

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



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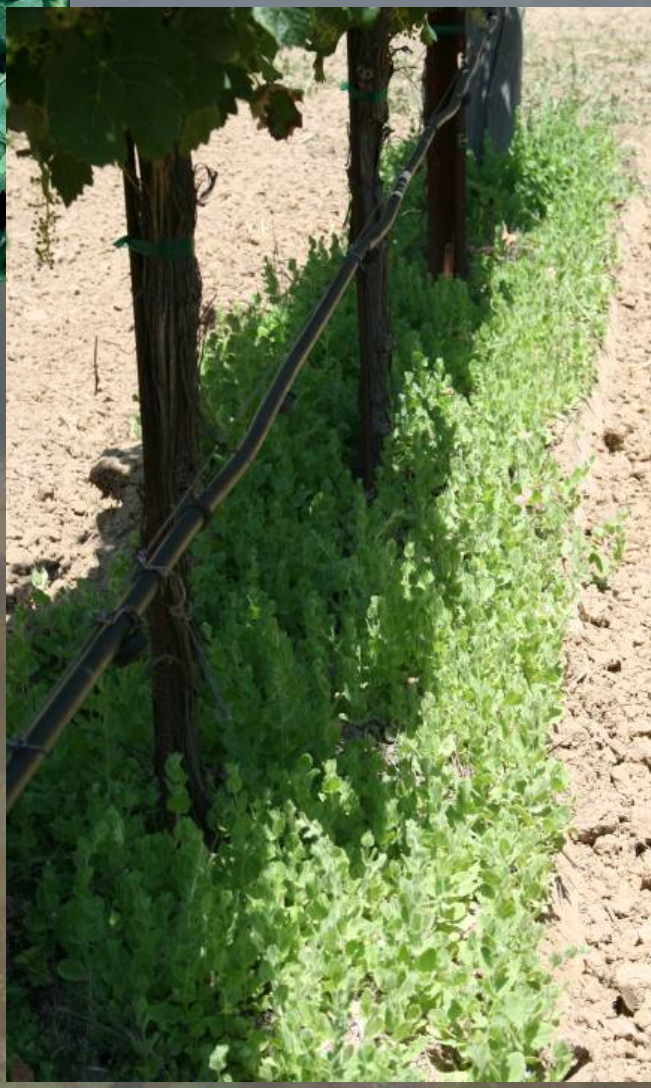
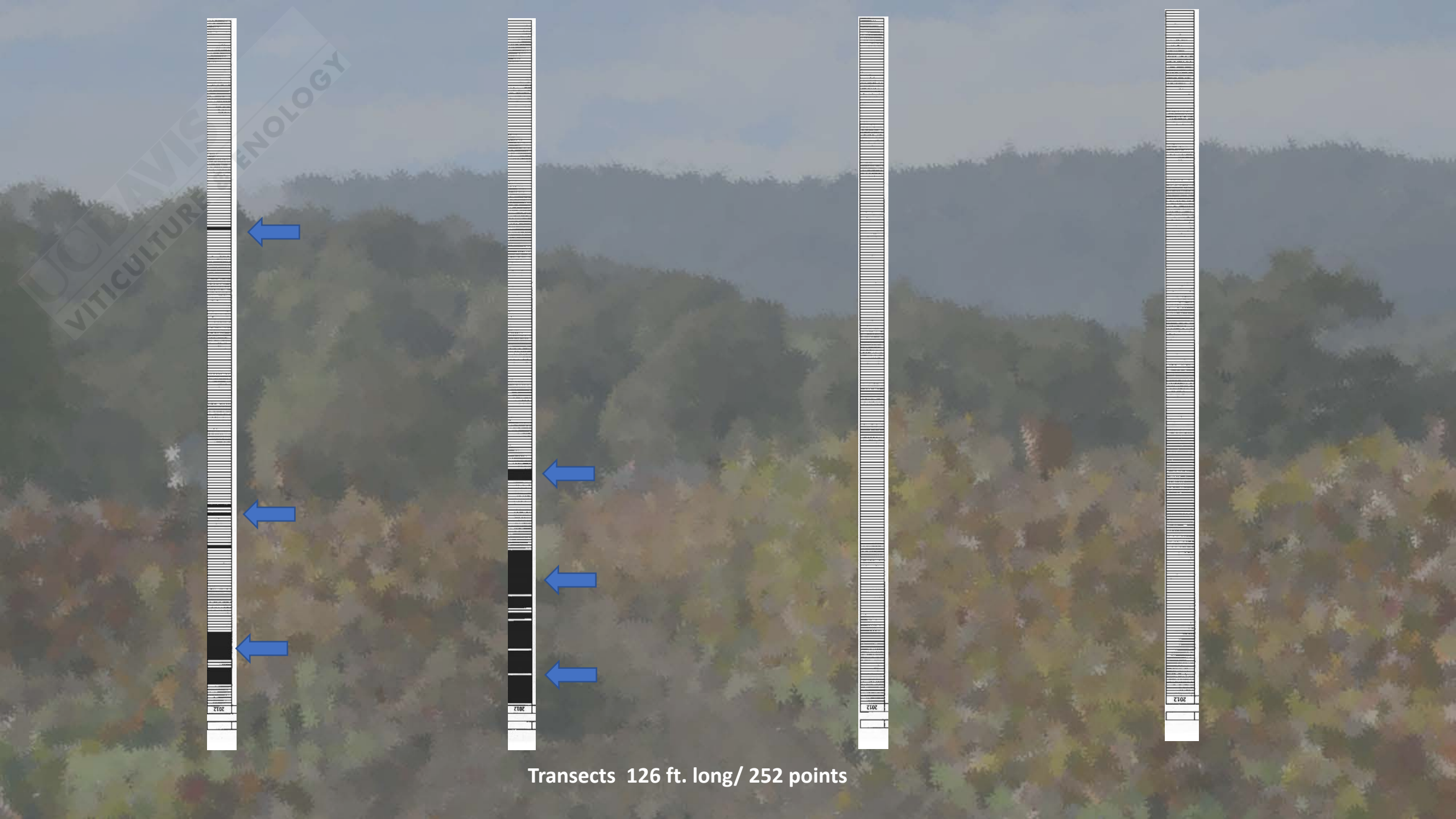
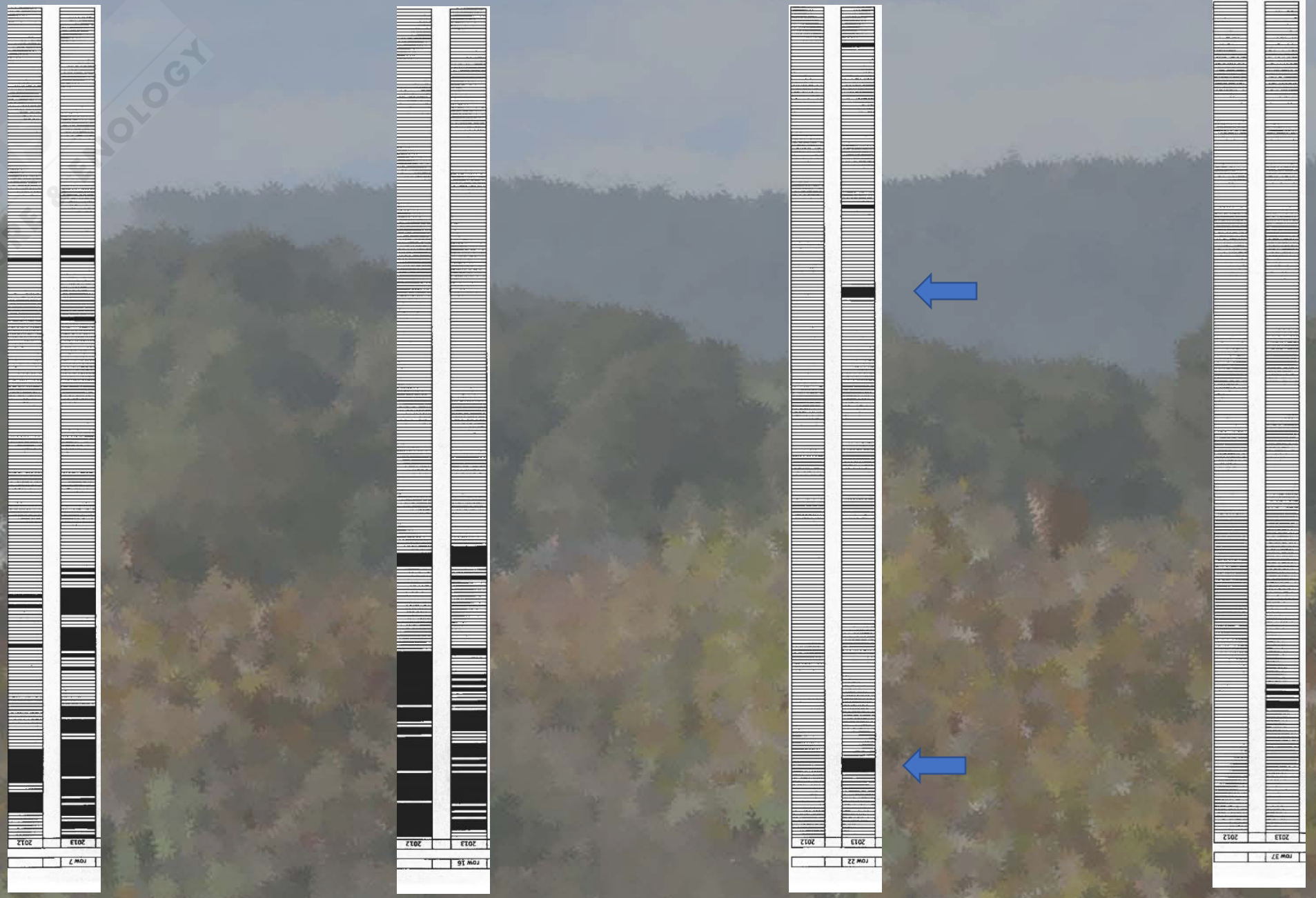
Sharp-point Fluvellin (*Kickxia elatine(L.)*Dumort)

- 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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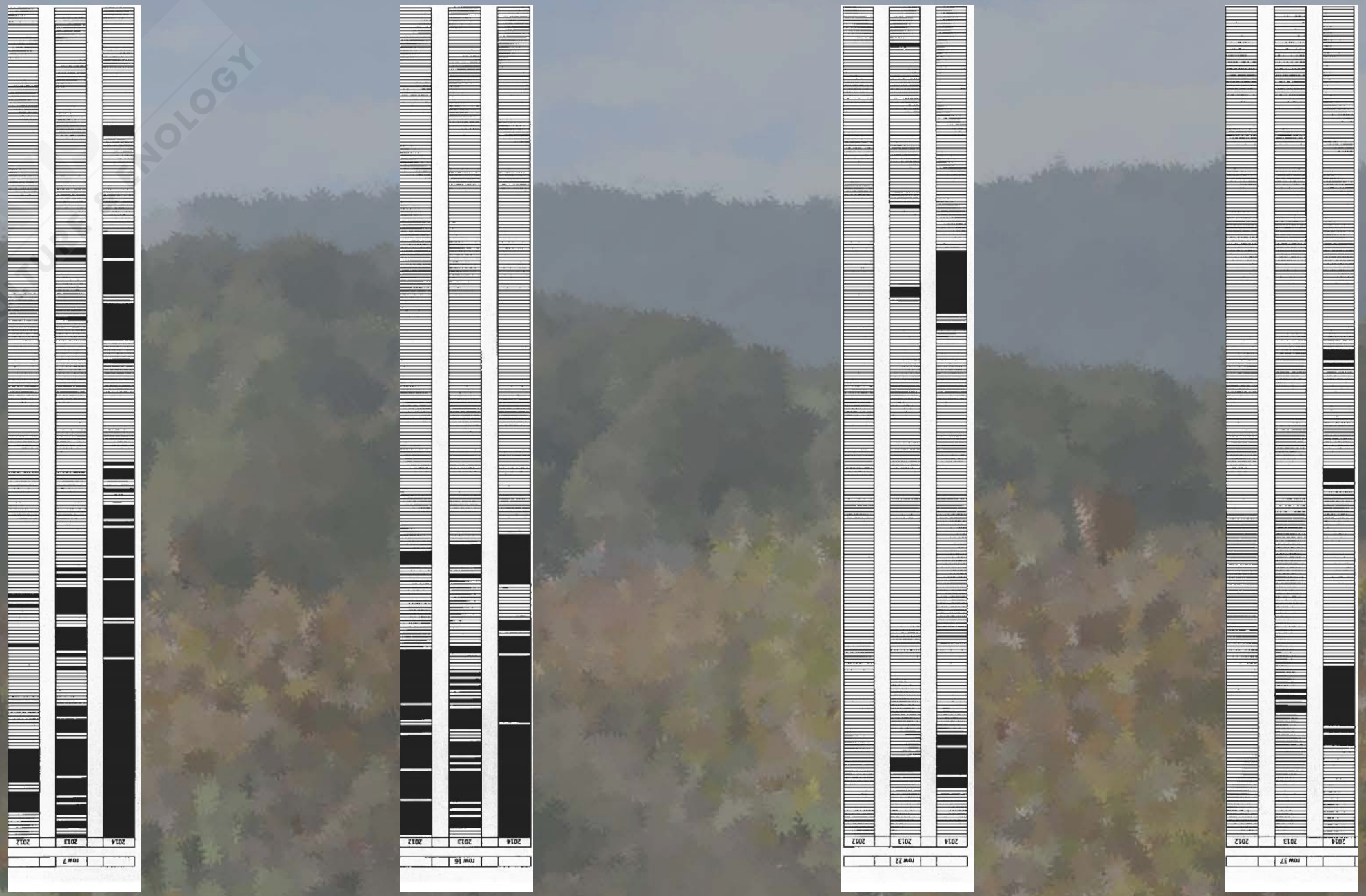

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Undervine weed management strategies

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

Undervine cover cropping +/- mowing

Undervine cover cropping +/- mowing

Weed Competition

Erosion control

CO_2 sequestration

Undervine cover cropping +/- mowing

Undervine cover cropping +/- mowing

Undervine cover cropping +/- mowing

Row #	willowherb	fluvellin	bindweed	oxtounge	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

Undervine cover cropping +/- mowing

Increased vertebrate pests

Undervine weed management strategies

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

Tillage

Tillage

Is our vineyard suitable for mechanical cultivation?

C212-05

C212-09

Tillage

- Excellent weed control
- Non-chemical

Tillage- timing is very important

Tillage

Fossil Fuel Use

Release sequestered CO2

Erosion

Vineyard following cultivation

Tillage –

Undervine weed management strategies

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

Flaming

Flaming - Advantages

No resistance

No residue

Non-chemical

Flaming Disadvantages

- Timing important
- Not as good on grass
- Cost
- Potential Fire Hazard

Undervine weed management strategies

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

Undervine weed management strategies

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

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

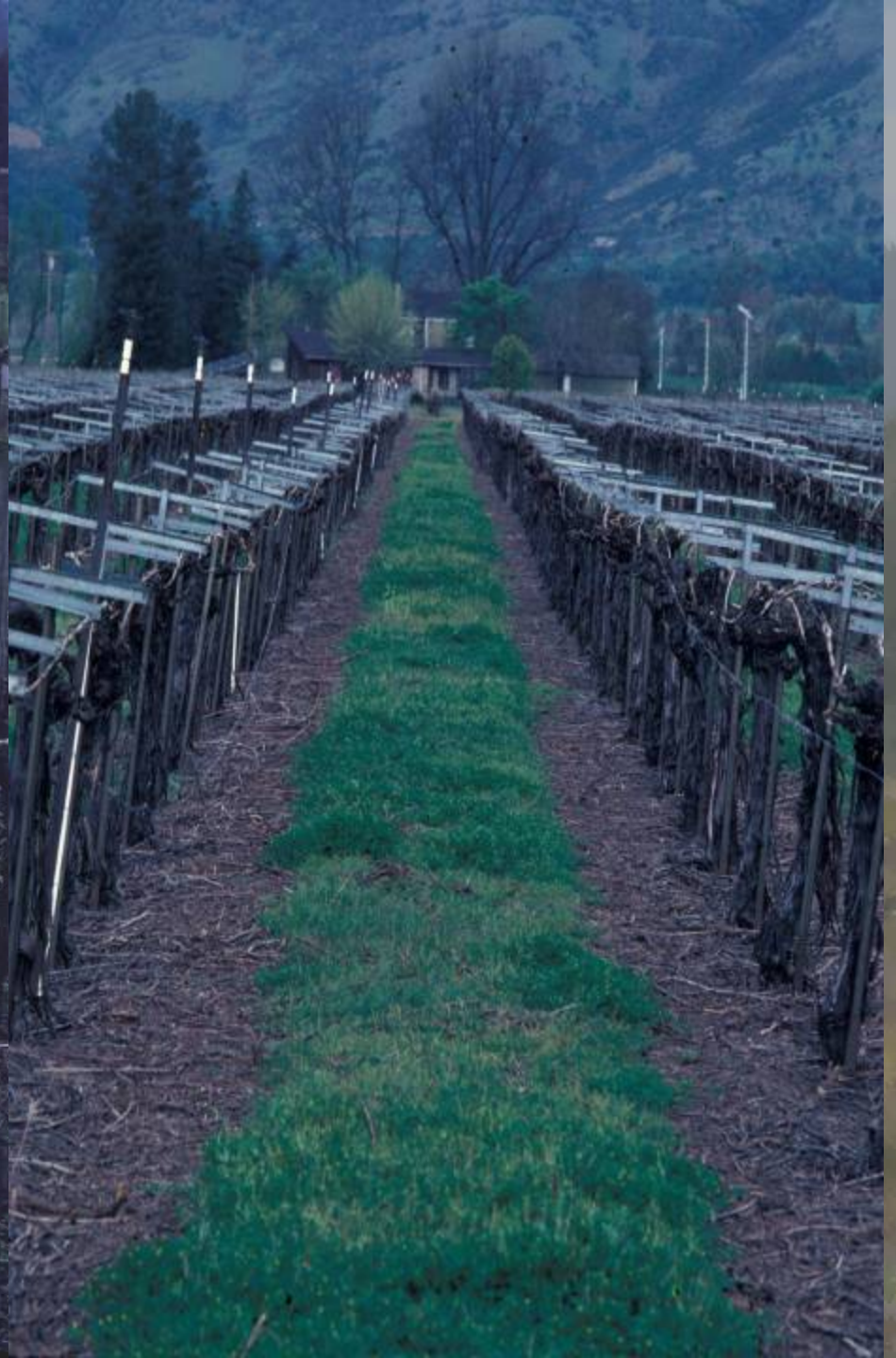
Herbicides Registered for Use on Bearing Grapes

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

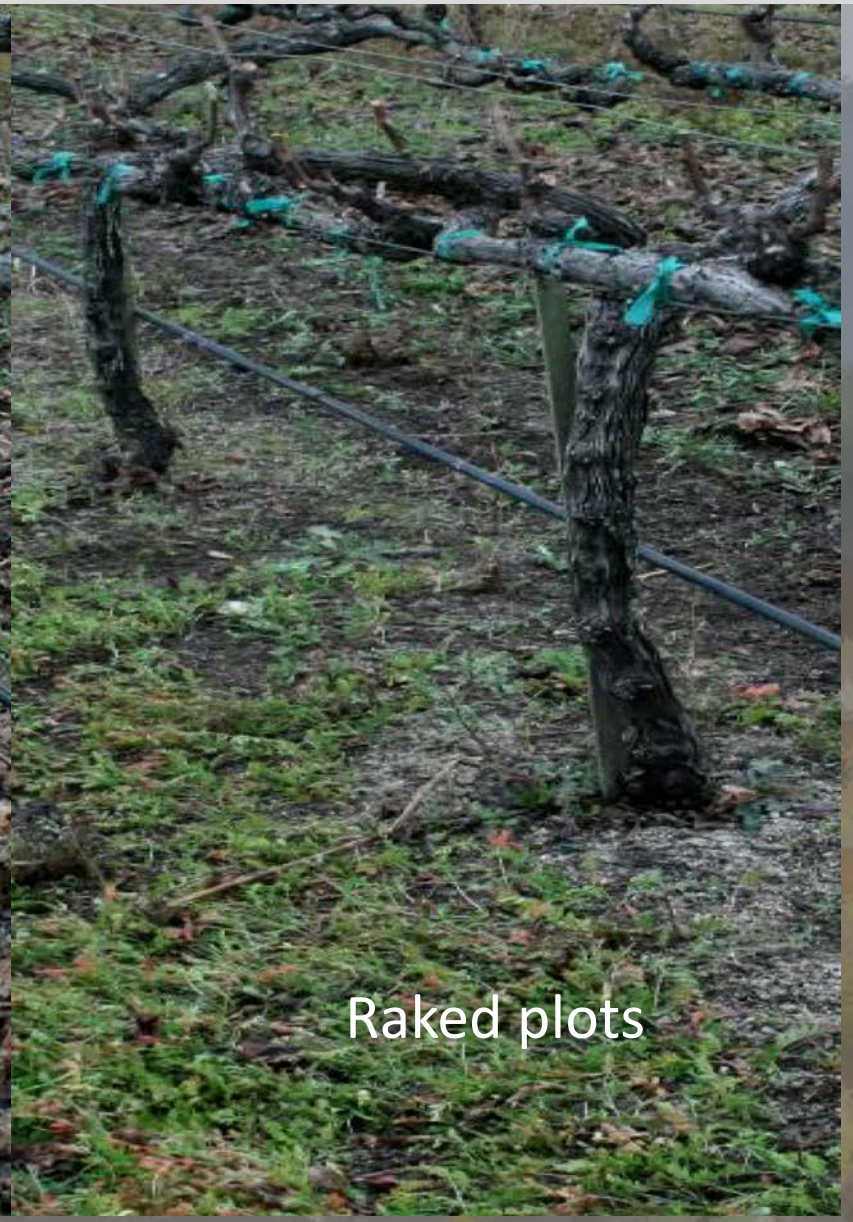
- Herbicide resistance: the inherited ability of a plant to survive and reproduce following exposure to a dose of herbicide normally lethal to the wild type
  - "We used to be able to control this weed with this treatment but it doesn't work as well anymore…"

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 December19th 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

Vineyard Floor Management

Vineyard Floor Management

Middles:

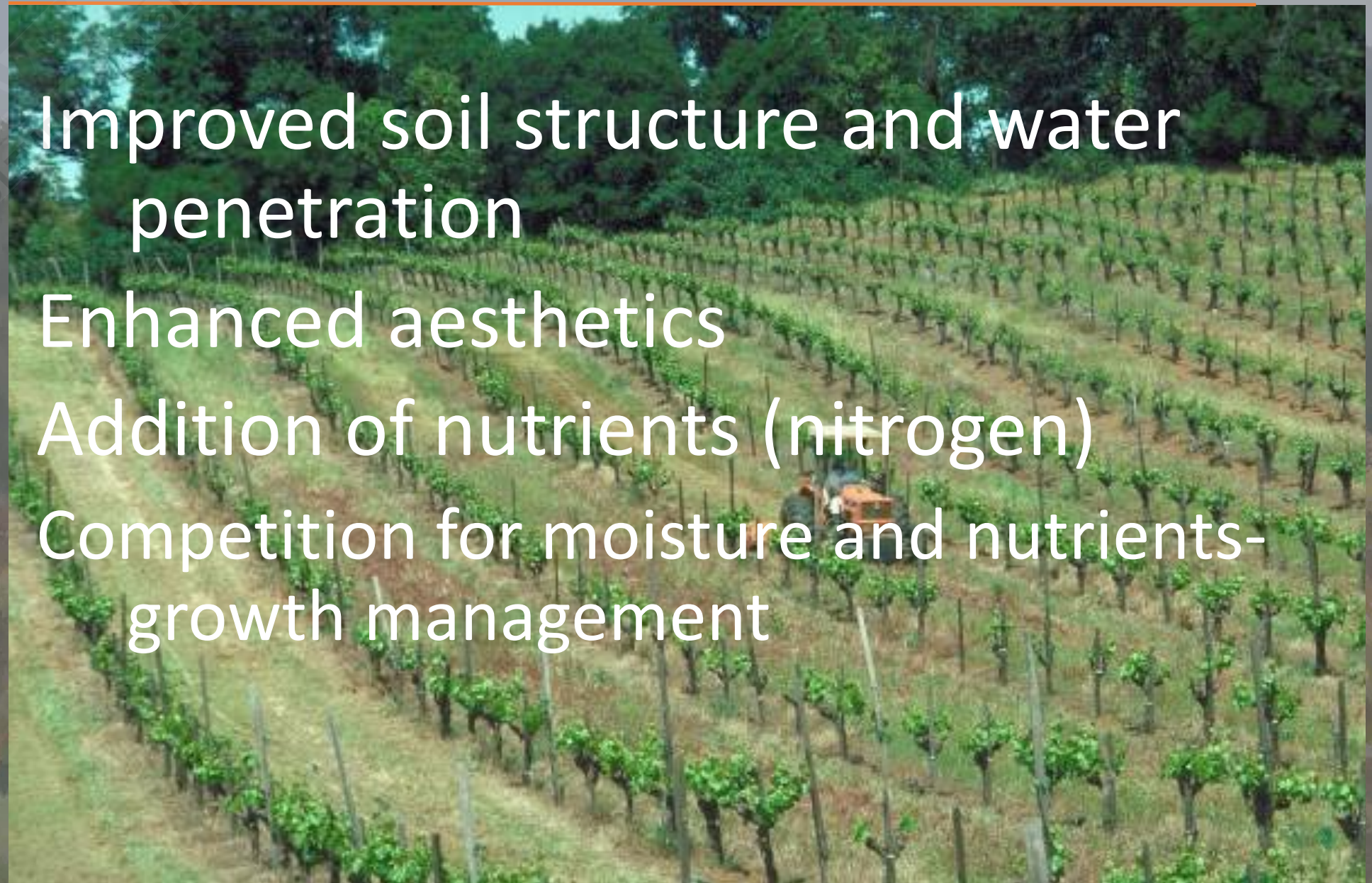
No Covercrop

Covercrop

Covercrops-Potential Benefits

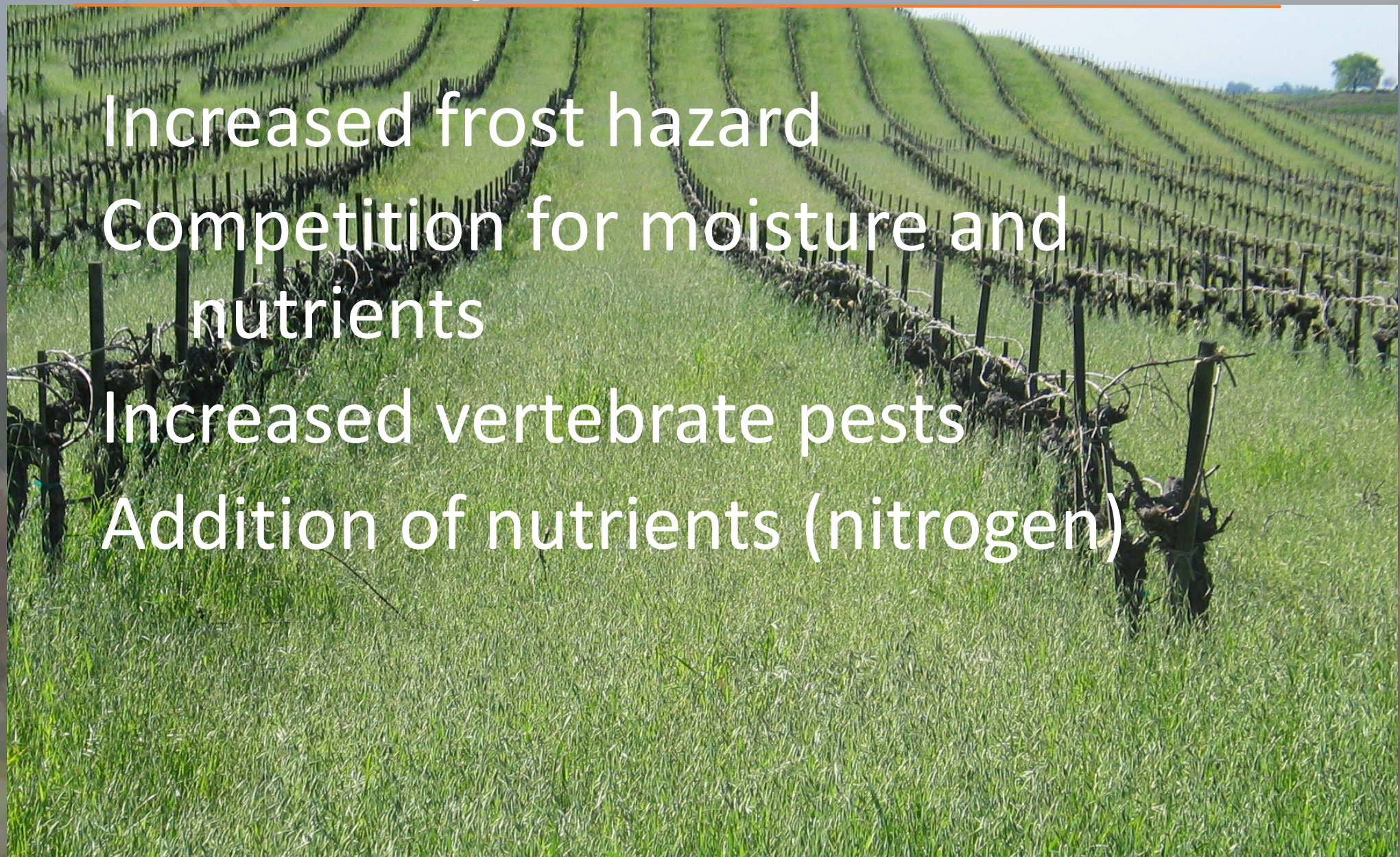
- Vineyard access in winter
- Reduced soil erosion and offsite movement
- Addition of organic matter
- Enhanced pest management

Covercrops-Potential Benefits



- Improved soil structure and water penetration
- Enhanced aesthetics
- Addition of nutrients (nitrogen)
- Competition for moisture and nutrients-growth management

Covercrops-Potential Drawbacks



- Increased frost hazard
- Competition for moisture and nutrients
- Increased vertebrate pests
- Addition of nutrients (nitrogen)

Covercrops -Potential Drawbacks

Additional equipment

Increased water use

Increased cost and management

Vineyard Floor Management

Middles are managed as:

No till- mowed permanent or annual cover

Cultivated- ‘mow down mix’

Combination- every other row

No-Till MowingAdvantages

No-Till Mowing Disadvantages

- Higher potential for frost
- Competition when growing near vines
- Increased water use

No-Till Mowing Disadvantages

Favors low-growing and perennial weeds

Cultivated Middles

Cultivated Middles Advantages

Added Organic Matter

Cultivated Middles Advantages

Release of Nitrogen

Cultivated Middles Advantages

Cultivated Middles Advantages

Cultivated Middles Disadvantages

Cultivated Middles Disadvantages

Cultivated Middles Disadvantages

Cultivated Middles Disadvantages

Release of Nitrogen-May increase vine vigor

Covercrops

Types of Covercrop

Covercrops

Resident Vegetation

Covercrops

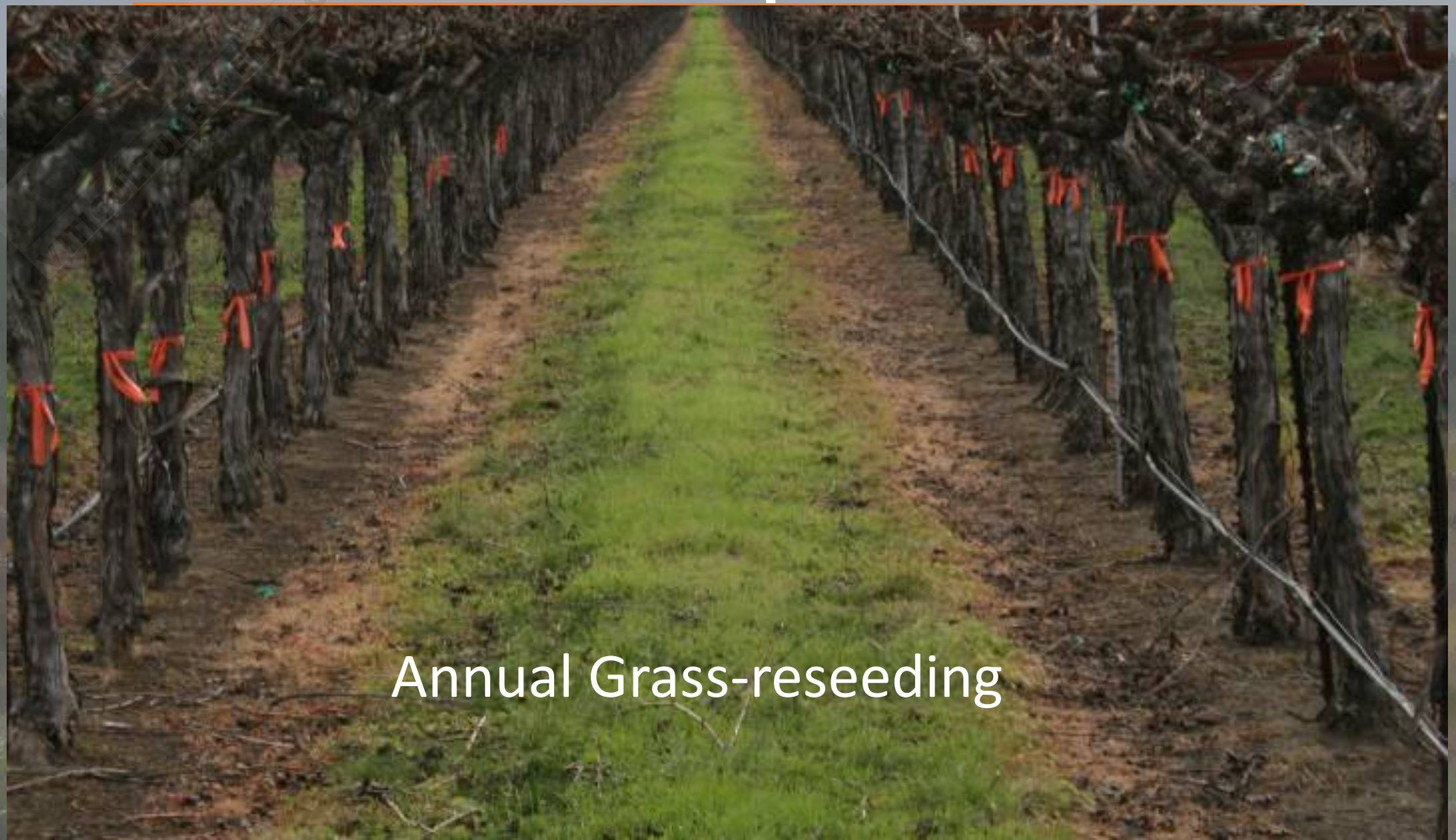
Resident Mustards

Covercrops

Cultivated Mustards/Radish

Covercrops

Covercrops



Annual Grass-reseeding

Covercrops

Covercrops

Perennial Legume-Clover

Covercrops

Annual Legume-Cereal Mix

Covercrops

Perennial Grass

Covercrops

Perennial Grass-Turf-Type

Covercrop Resources

Cover Cropping in Vineyards-*A Grower's Handbook-*

Chuck A. Ingels, Robert L. Bugg, Glenn T. McGourty, and L. Peter Christiensen

DANR Publication -3338

Covercrop Resources

UC SAREP Program webpage-

http://www.sarep.ucdavis.edu

on the left menu look for Cover Crops

Thank You!

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