Advanced, Region-Specific Vineyard Practices

Oregon State University OSU

Dr. Patty Skinkis

December 14, 2010

Grapes can grow anywhere.

Well, almost…

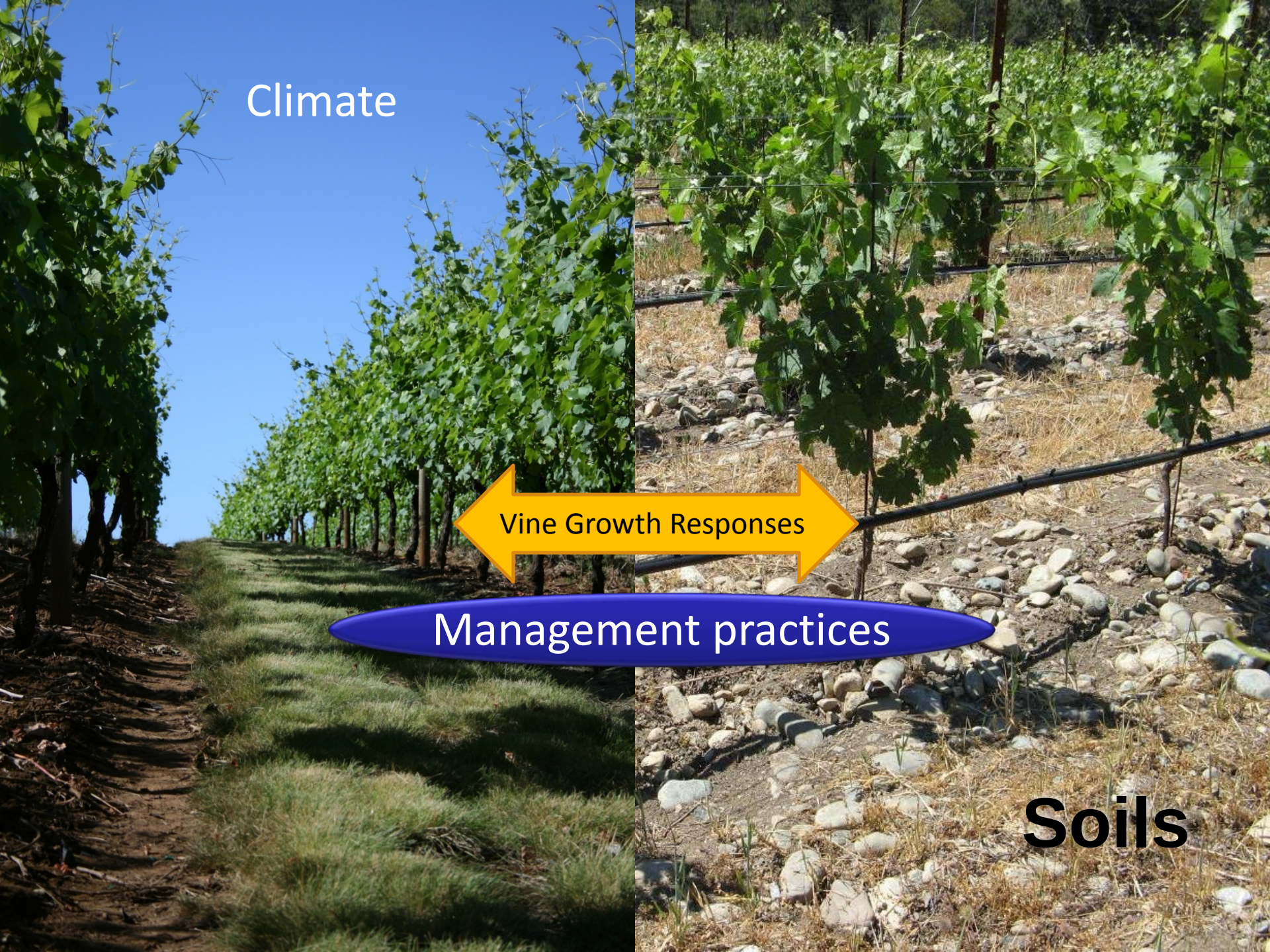
Site Selection

No location is perfect.

Some are just better than others.

More suitable

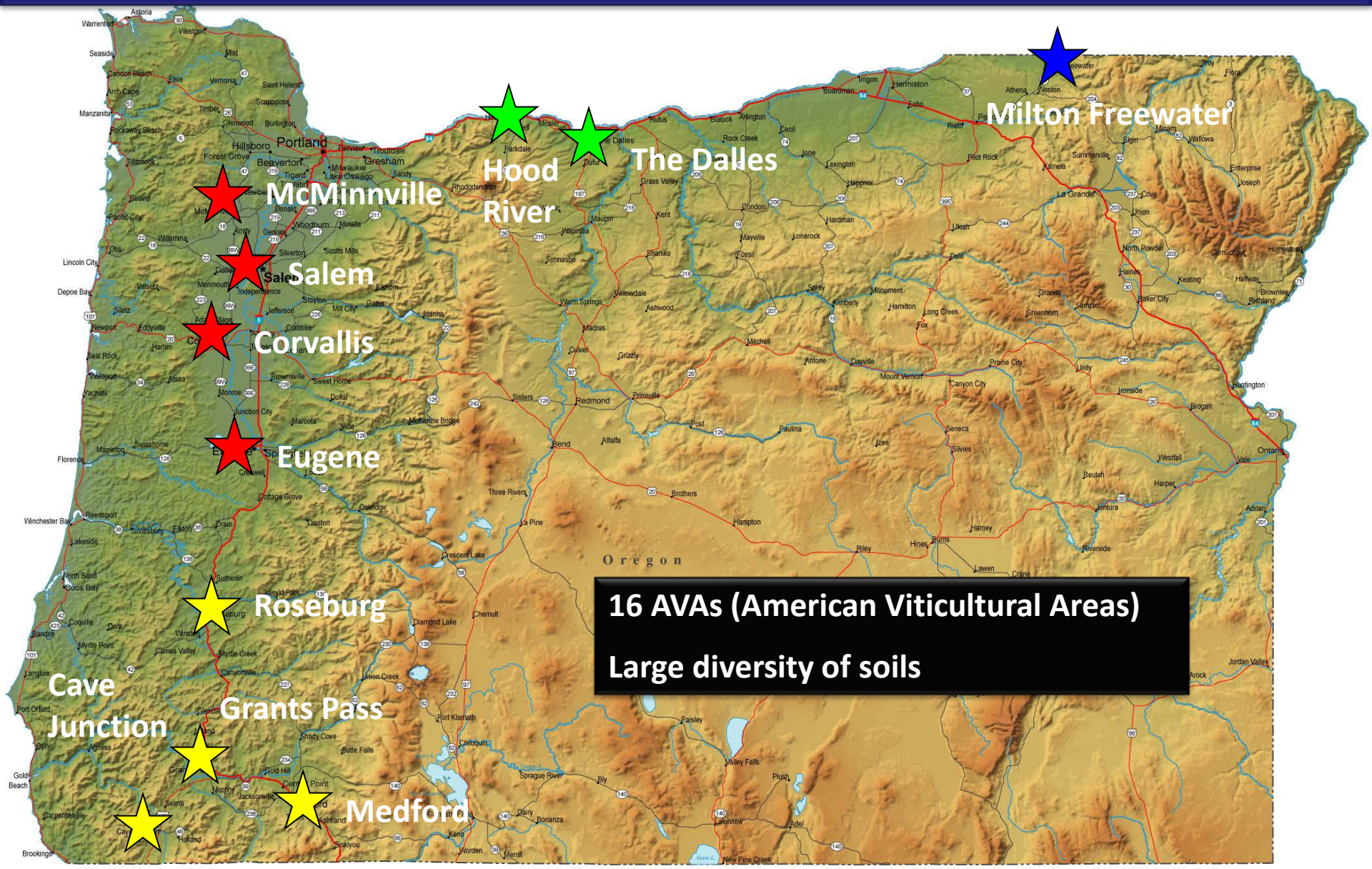
Less suitable


Climate
Vine Growth Responses
Management practices
Soils

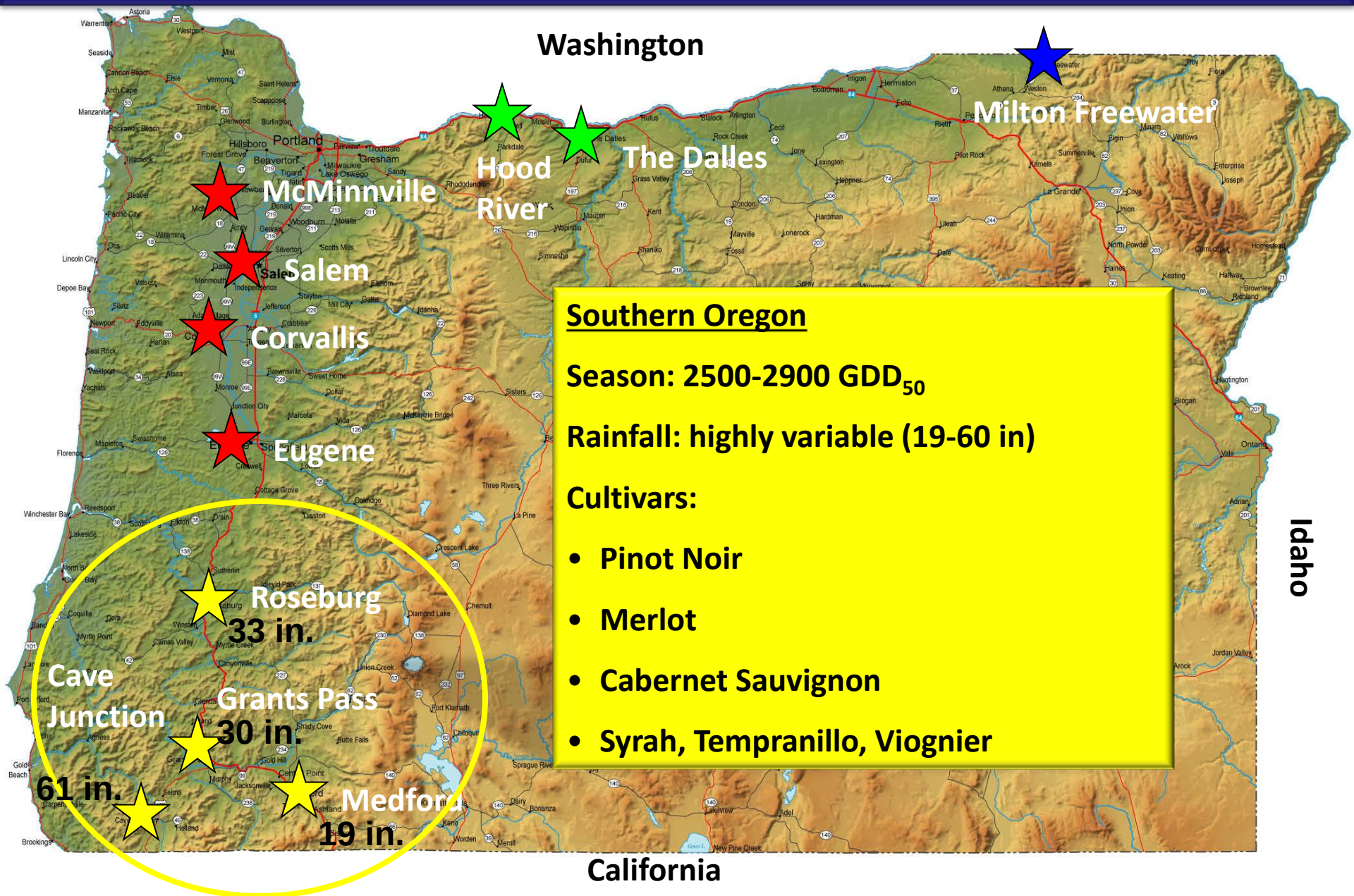
Challenges in Viticulture

- Site and cultivar selection
- Management for quality
- Standards for production

Oregon's Wine Production Areas



Oregon's Wine Production Areas



Southern Oregon

Season: 2500-2900 GDD_{50}

Rainfall: highly variable (19-60 in)

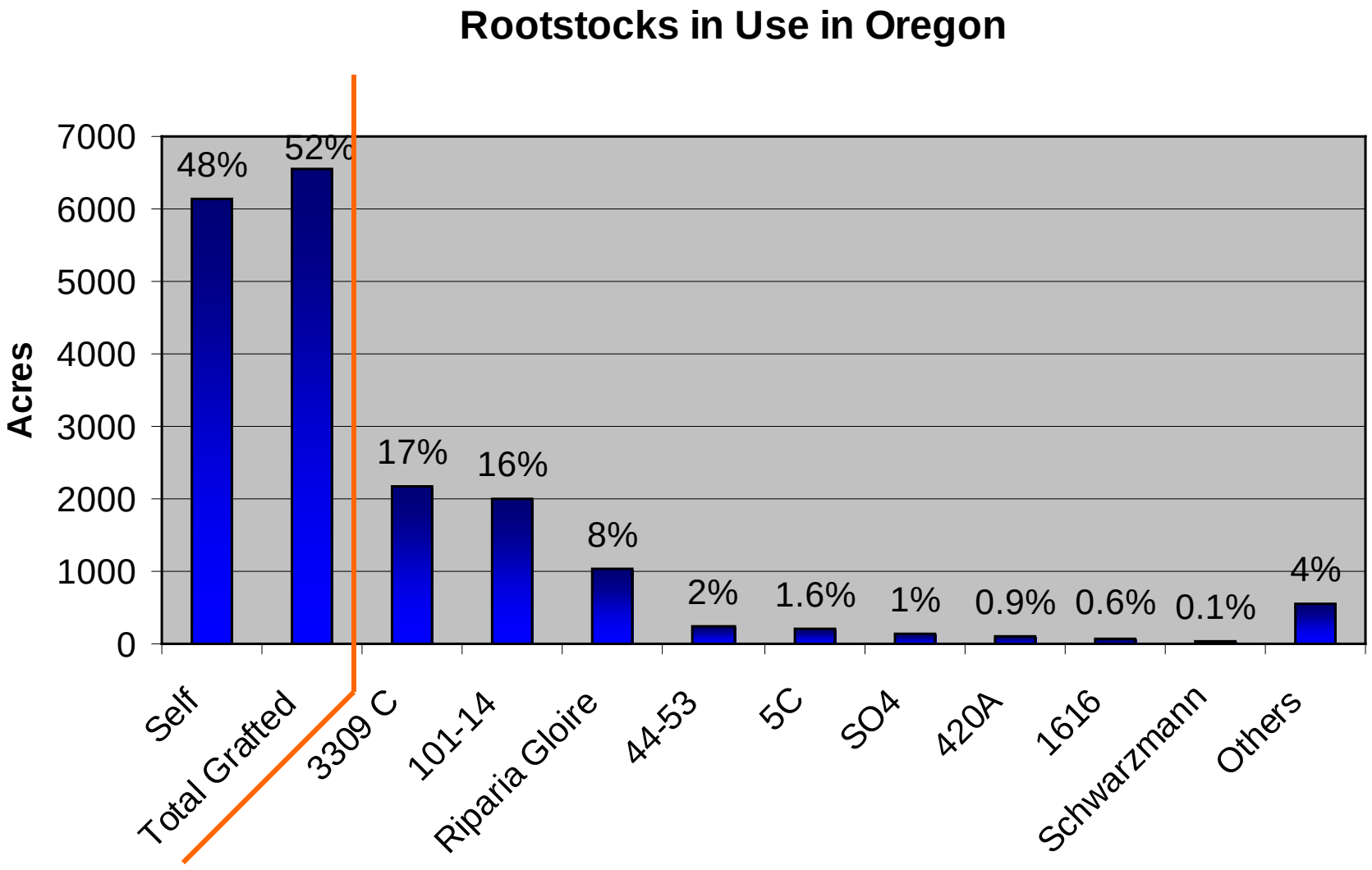
Cultivars:

- **Pinot Noir**
- **Merlot**
- **Cabernet Sauvignon**
- **Syrah, Tempranillo, Viognier**

Selecting Cultivars and Rootstocks

Depends on conditions:

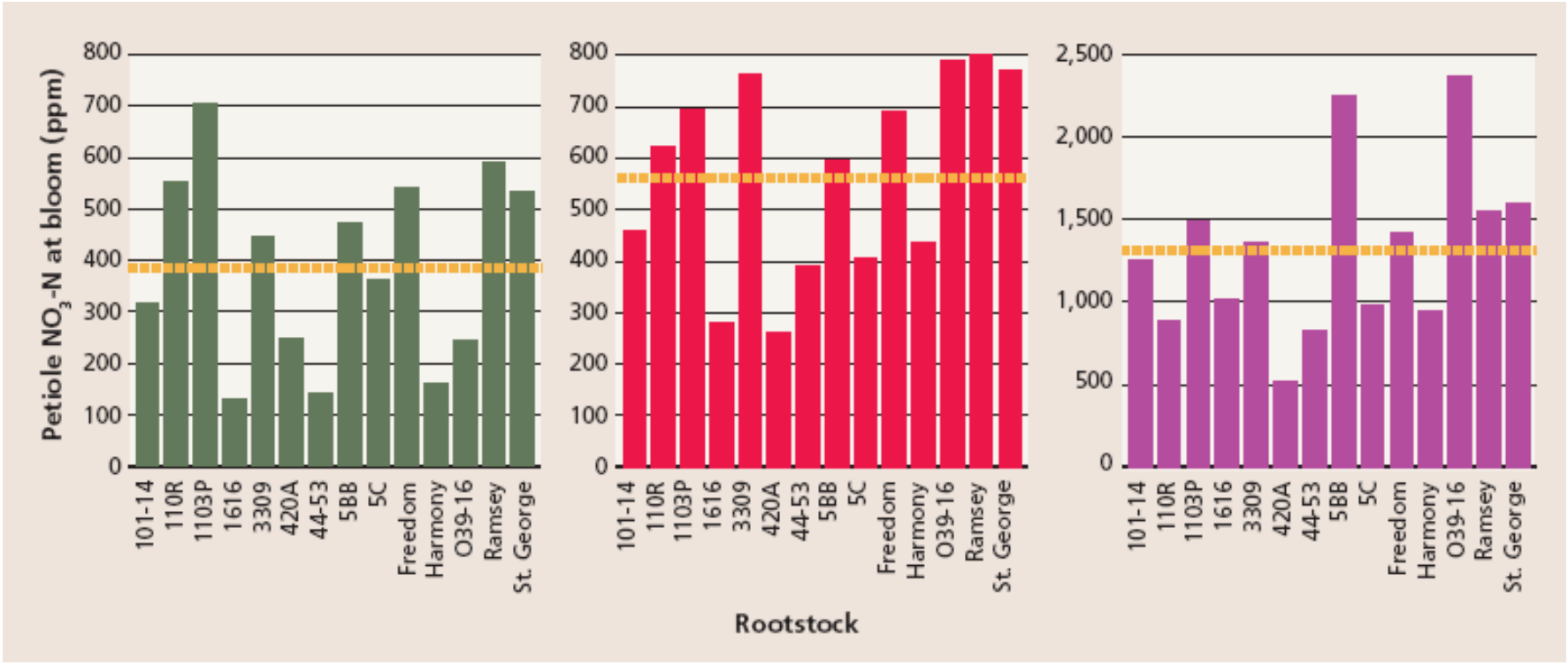
- Macroclimate
  - Latitude
  - Regional GDDs
- Mesoclimate
  - Temperatures
  - Soils
- Market


Rootstocks in Use in Oregon
Acres
7000
6000
5000
4000
3000
2000
1000
0
48%
52%
17%
16%
8%
2%
1.6%
1%
0.9%
0.6%
0.1%
4%
Self
Total Grafted
3309 C
101-14
Riparia Gloire
44-53
5C
SO4
420A
1616
Schwarzmann
Others

NASS 2007

Rootstocks

- Uses
  - Phylloxera resistance
  - Nematode resistance
  - Soil adaptability (nutrition, pH, salinity)
  - Drought tolerance
  - Growth and development
    - Vine vigor
    - Fruit set



Lambert, Anderson and Wolpert, 2008. California Agriculture


Plant Materials

How to Obtain Plant Materials

Plant Materials

- **Certified plant materials**
  - Tested as free of critical viruses
  - Not guarantee against all diseases
  - Not free of bacterial disease (crown gall)

- **FPS** Foundation Plant Service (CA)

- **NWGF** Northwest Grape Foundation Service (WA)

Certification Process

Importation license required for foreign materials.

Acquisition

Cultivar, species

Testing & Observation

Virus, disease, pests

Vine “clean up”

“Mother” vines

Vegetative propagation

Distribute

Movement of Plant Materials

- **Plant Quarantine for Grapes**
  - Regulated by Oregon Department of Agriculture
  - Regulate movement into Oregon
  - Phytosanitation certificate is necessary

- **Who's impacted?**
  - Anyone shipping grapevine materials INTO the state!
  - Not only for nurseries
  - Applies to harvested fruit!

Management for Quality

- Management strategies
- Advancement in the vineyard
- Standards for production

Management Challenges - Southern Oregon

Extension Viticulture Projects

- Determining a regional model for ET-based irrigation scheduling
- Irrigation management to achieve fruit quality targets

Common challenges statewide

Vigor management

Economics

Economics of Vineyard Management

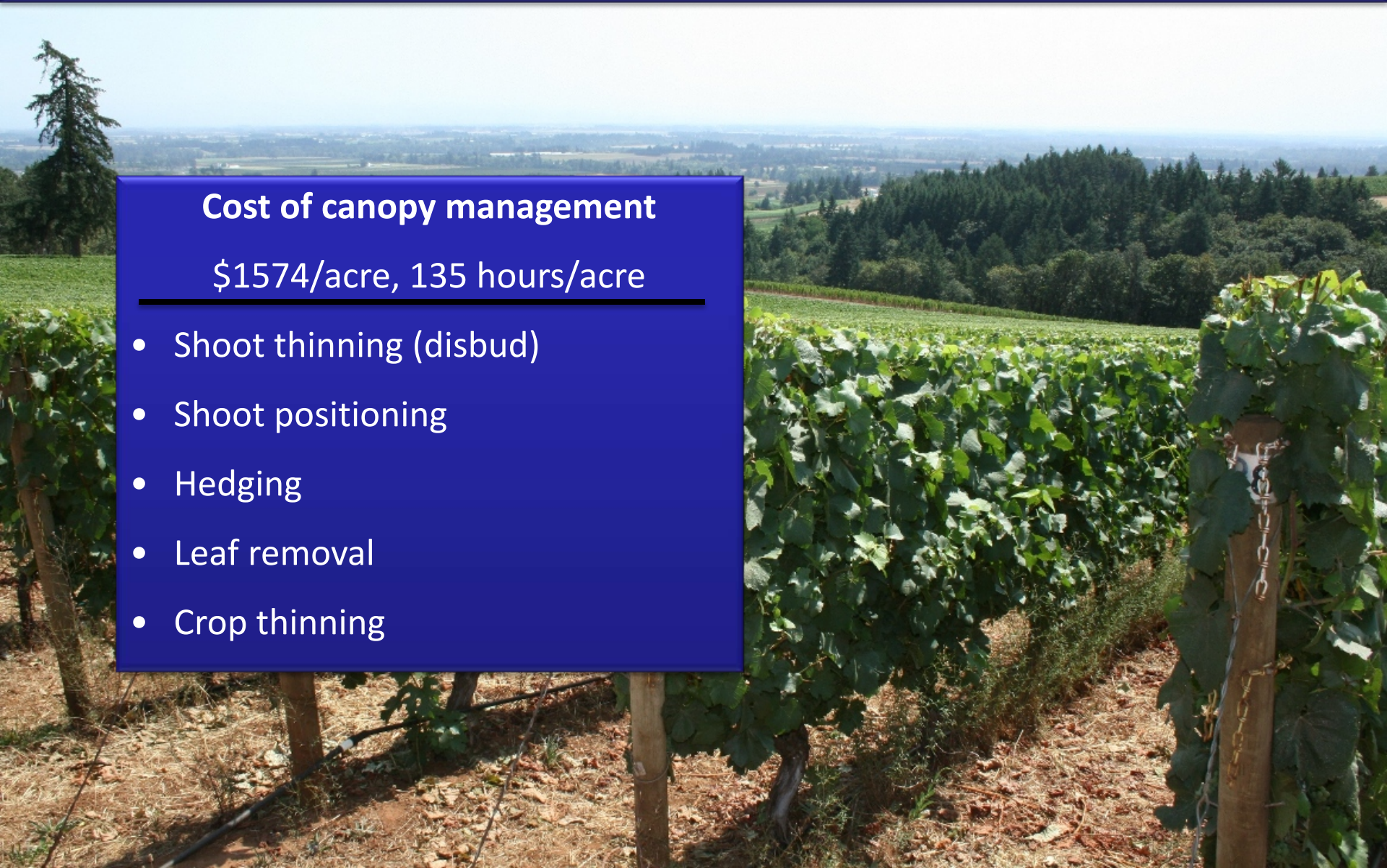
Per acre

VARIABLE CASH COSTS	Description	Labor	Machinery	Materials	Total	Cost/ton
Vine replacement with tubes	2.50 hours	33.75	0.00	75.00	108.75	43.50
Tie vines	15.00 hours	202.50	0.00	4.00	206.50	82.60
Prune & Brush removal	30.00 hours	$405.00	$0.00	$0.00	$405.00	$162.00
Hedging	3.00 applications	50.08	38.20	0.00	88.28	35.31
Shredding brush	1.00 x/acre	7.86	5.10	0.00	12.96	5.18
Fungicides	9.00 applications	120.20	95.15	200.00	415.35	166.14
Fertilizer - foliar applied	1.00 x/acre	0.00	0.00	10.00	10.00	4.00
Vine training	35.00 hours	472.50	0.00	0.00	472.50	189.00
Sucker removal	20.00 hours	270.00	0.00	0.00	270.00	108.00
Disbudding	30.00 hours	405.00	0.00	0.00	405.00	162.00
Cluster thinning	40.00 hours	540.00	0.00	0.00	540.00	216.00
Leaf pulling	20.00 hours	270.00	0.00	0.00	270.00	108.00

Vineyard Economics: Establishing and Producing Pinot Noir Wine Grapes in Western Oregon 2008 – OSU Extension

- Canopy management

The price we pay for premium fruit…



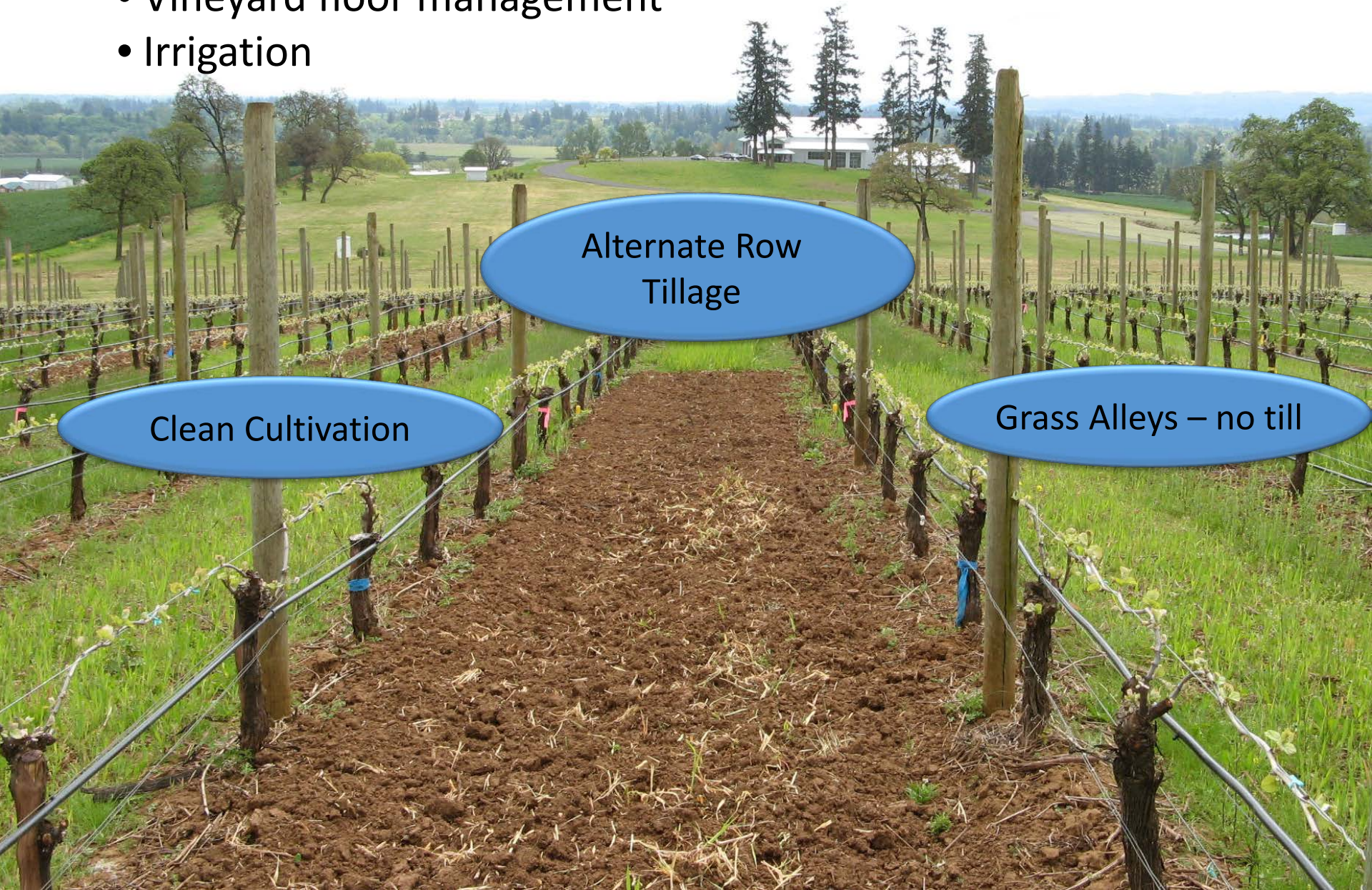
Cost of canopy management

$1574/acre, 135 hours/acre

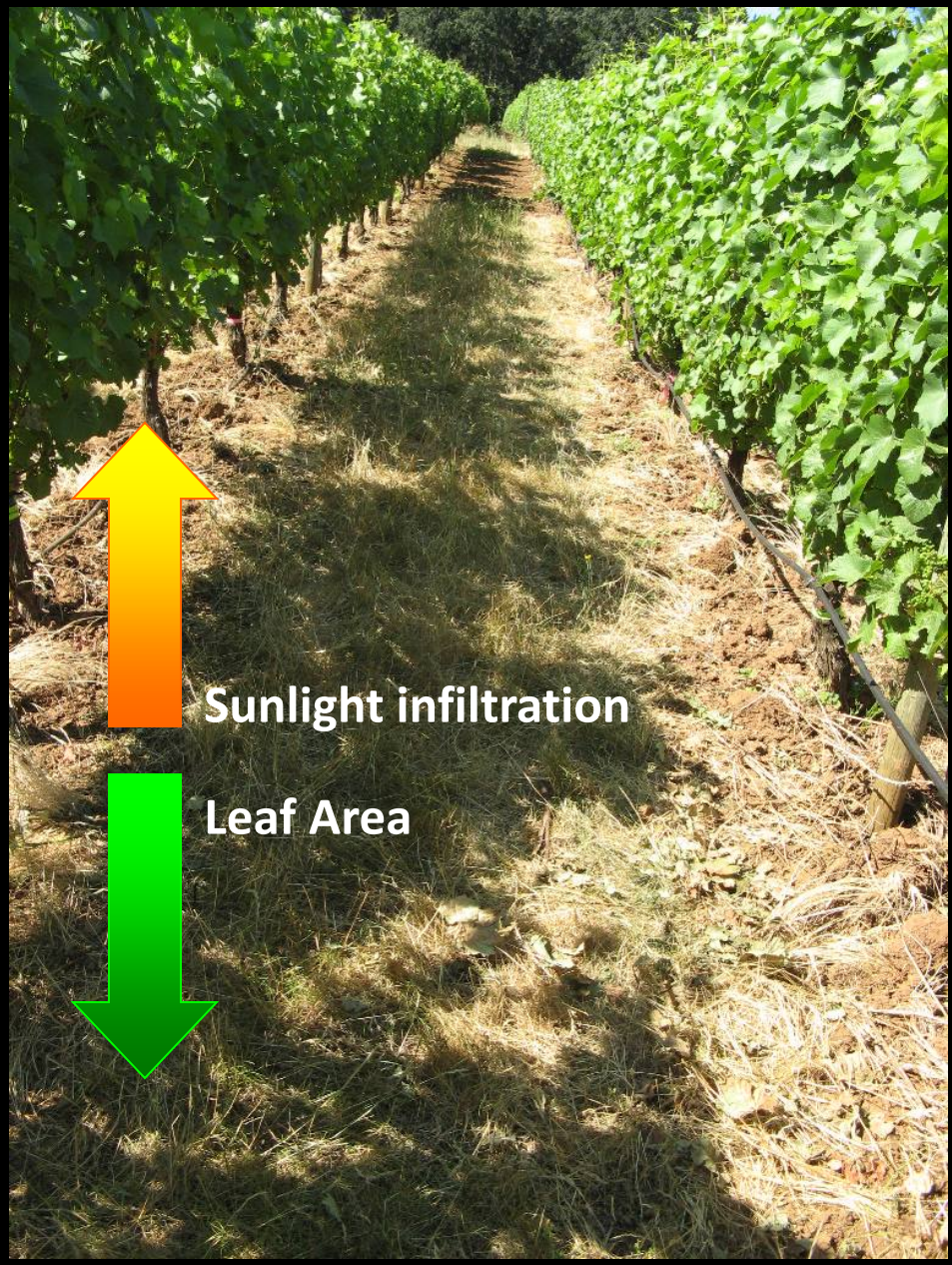
- Shoot thinning (disbud)
- Shoot positioning
- Hedging
- Leaf removal
- Crop thinning

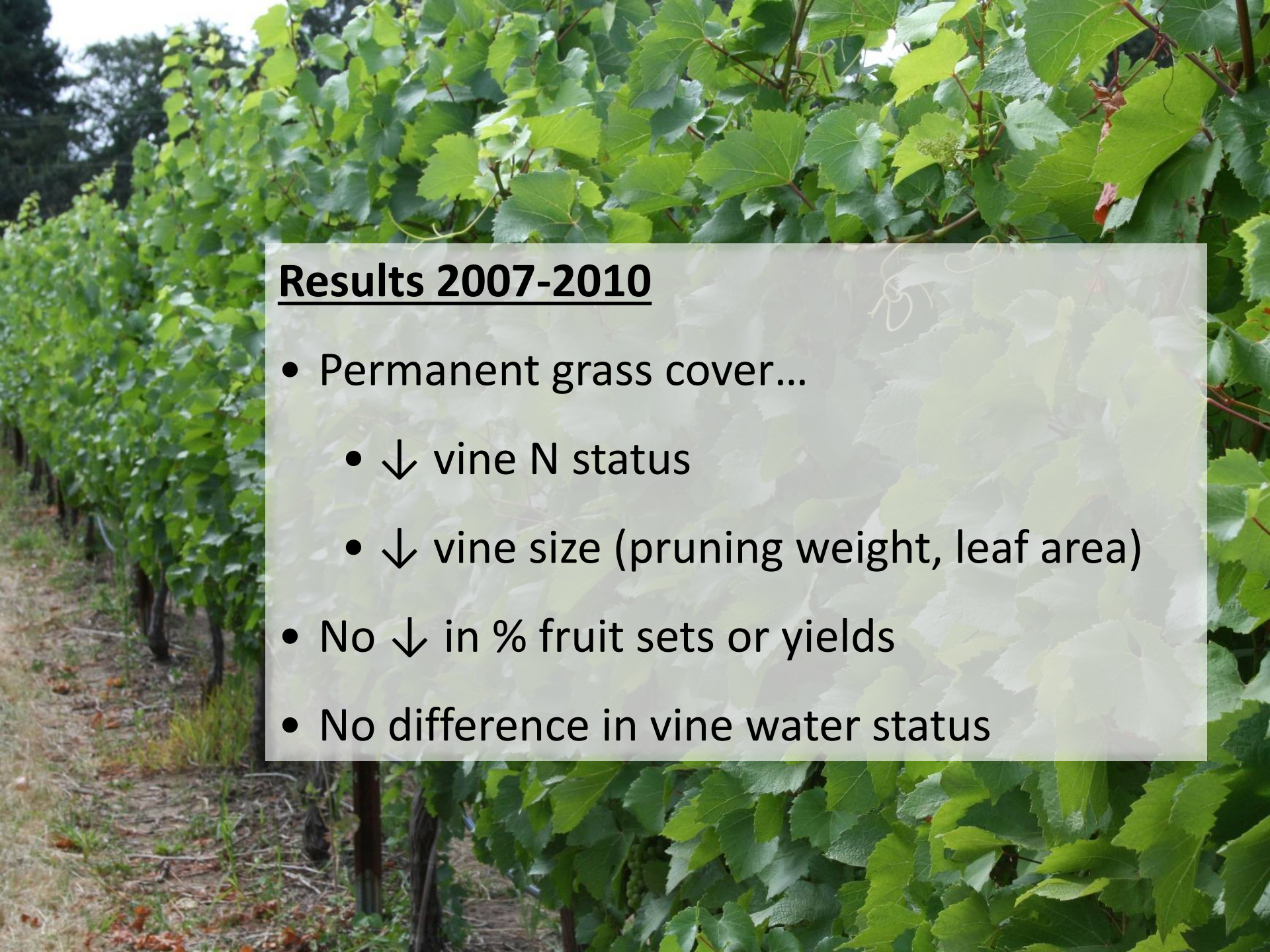
Managing vine size through indirect methods:

- Vineyard floor management
- Irrigation



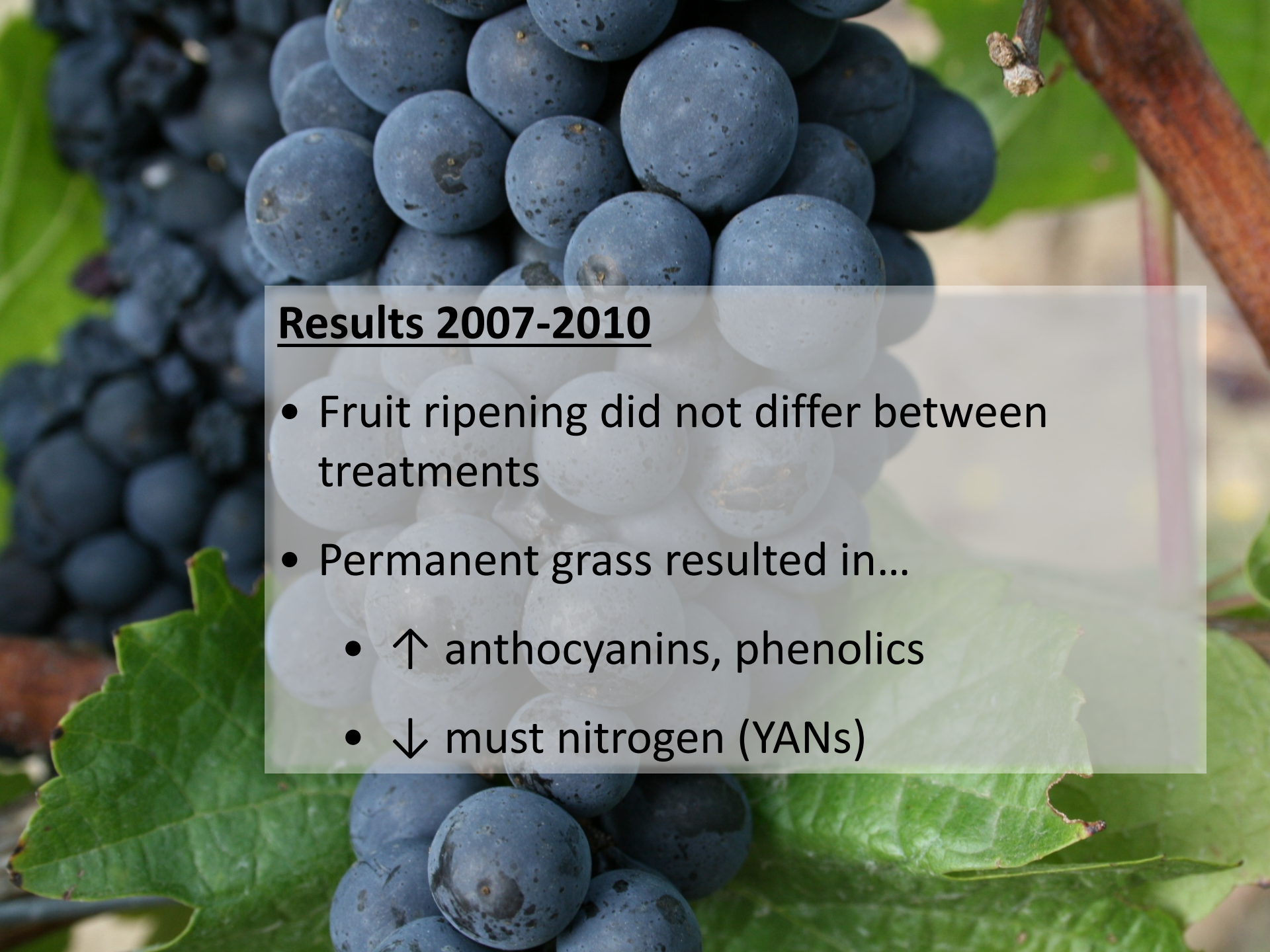

Impacts on metabolomics?


Sunlight infiltration
Leaf Area



Results 2007-2010

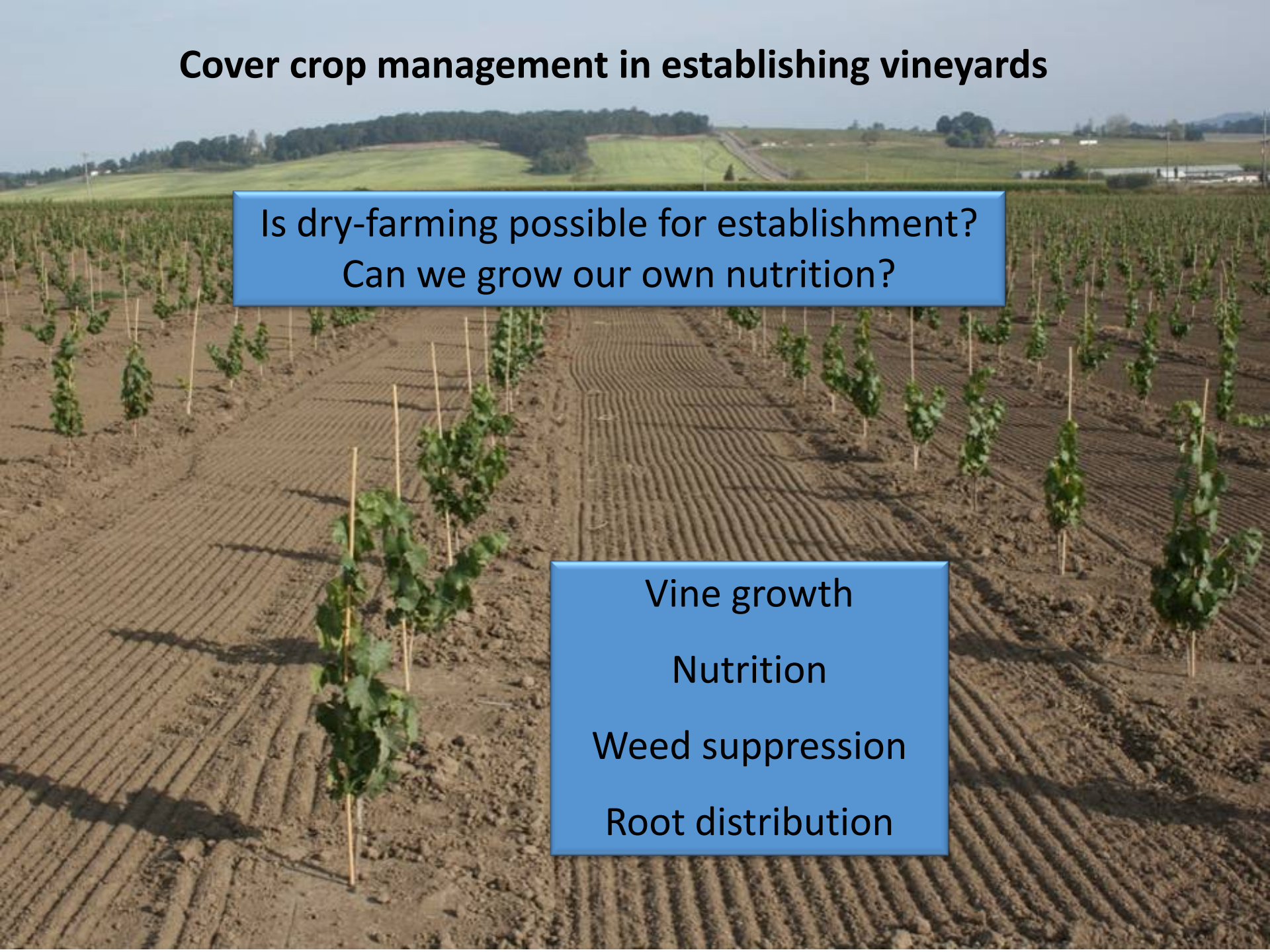
- Permanent grass cover…
  - ↓ vine N status
  - ↓ vine size (pruning weight, leaf area)
- No ↓ in % fruit sets or yields
- No difference in vine water status



Results 2007-2010

- Fruit ripening did not differ between treatments
- Permanent grass resulted in…
  - ↑ anthocyanins, phenolics
  - ↓ must nitrogen (YANs)

Cover crop management in establishing vineyards



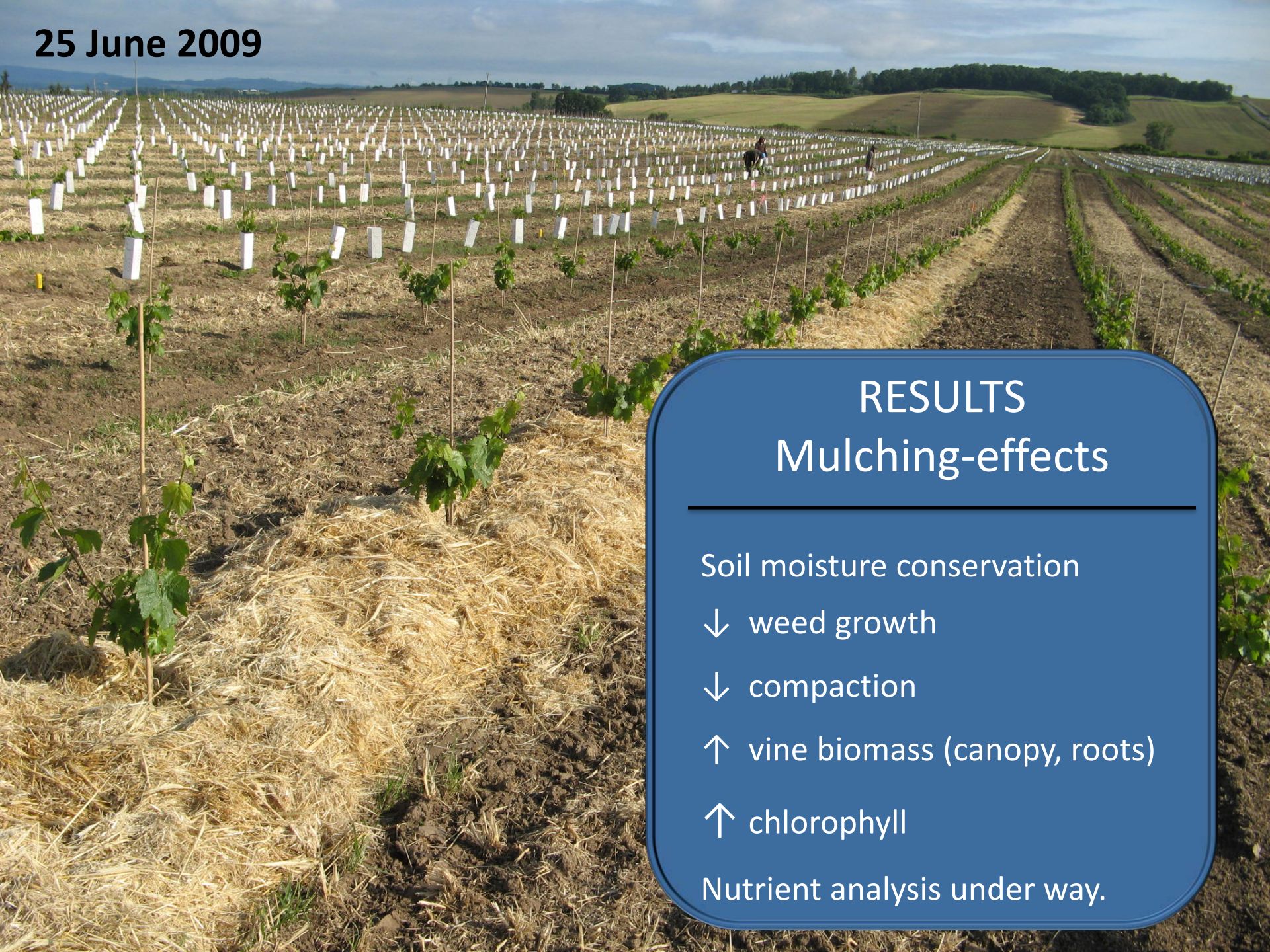
Is dry-farming possible for establishment?
Can we grow our own nutrition?

Vine growth

Nutrition

Weed suppression

Root distribution



RESULTS
Mulching-effects

Soil moisture conservation

↓ weed growth

↓ compaction

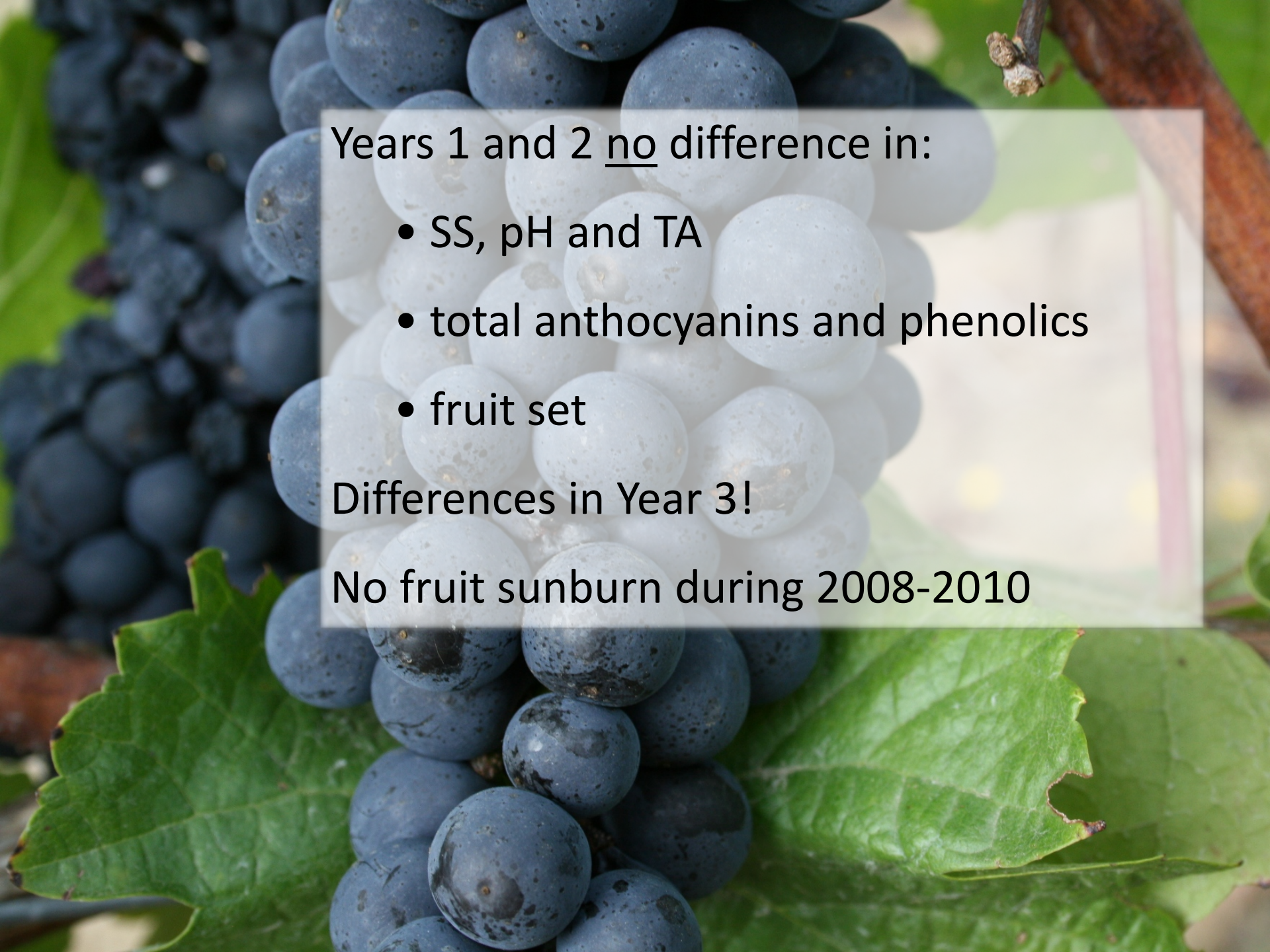
↑ vine biomass (canopy, roots)

↑ chlorophyll

Nutrient analysis under way.


August 2009

Effects of early season leaf removal on disease reduction and fruit quality



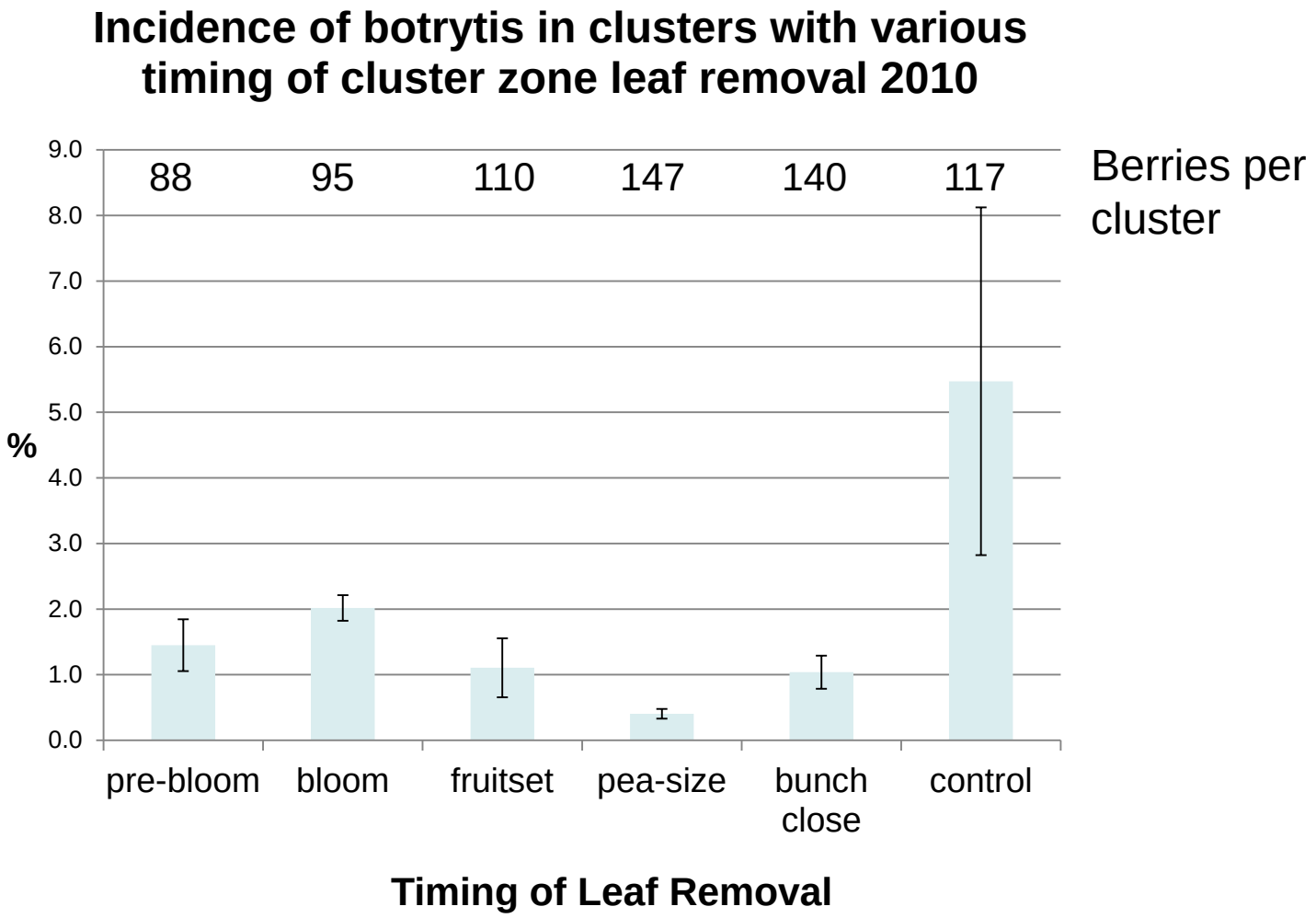
Years 1 and 2 no difference in:

- SS, pH and TA
- total anthocyanins and phenolics
- fruit set

Differences in Year 3!

No fruit sunburn during 2008-2010

Preliminary 2010 Disease Data



Grower adopted practice

Can we effectively mechanize early season leaf pulling?

Cluster Thinning

Purpose

- Hasten maturity
- Ripening uniformity

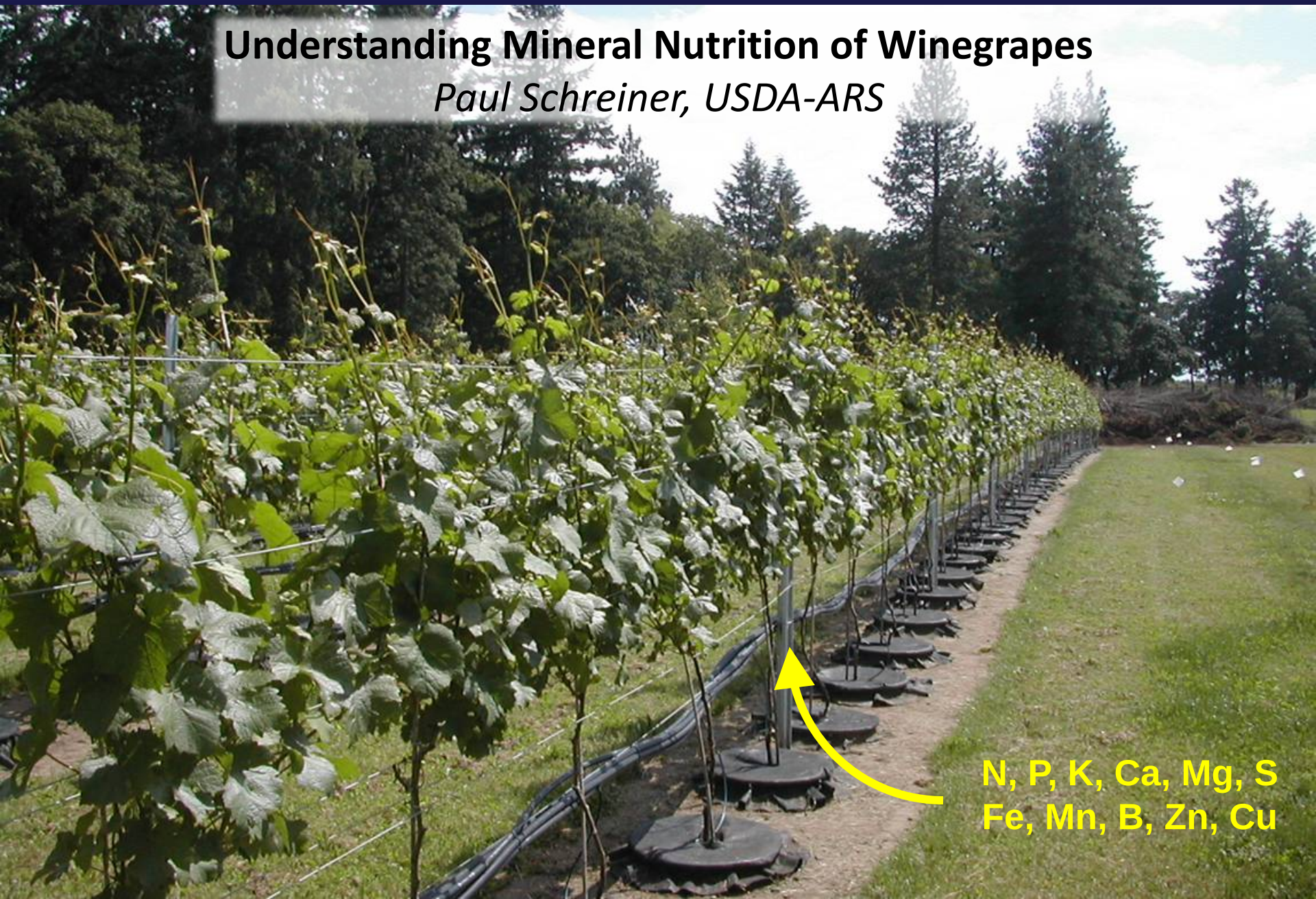
Can we impact economics and quality?

Cost: $540/acre; 40 hours/acre

Preliminary results

- No difference in 2010

Vine Nutrition Research



Powdery Mildew Detection and Modeling

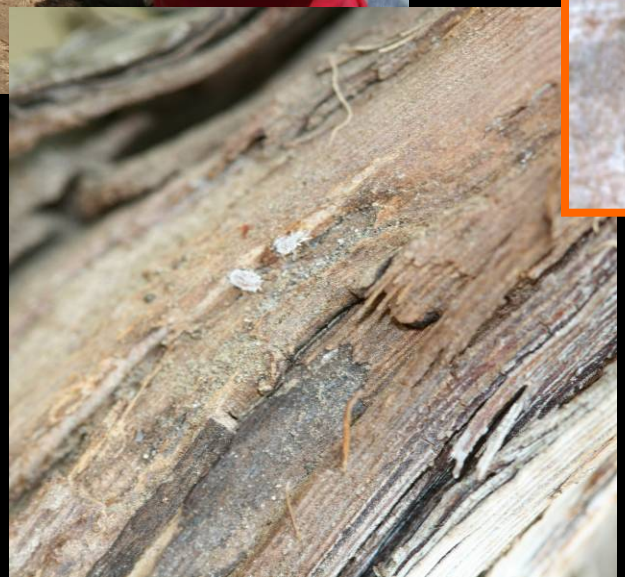
Walt Mahaffee, USDA-ARS

Spore detection traps

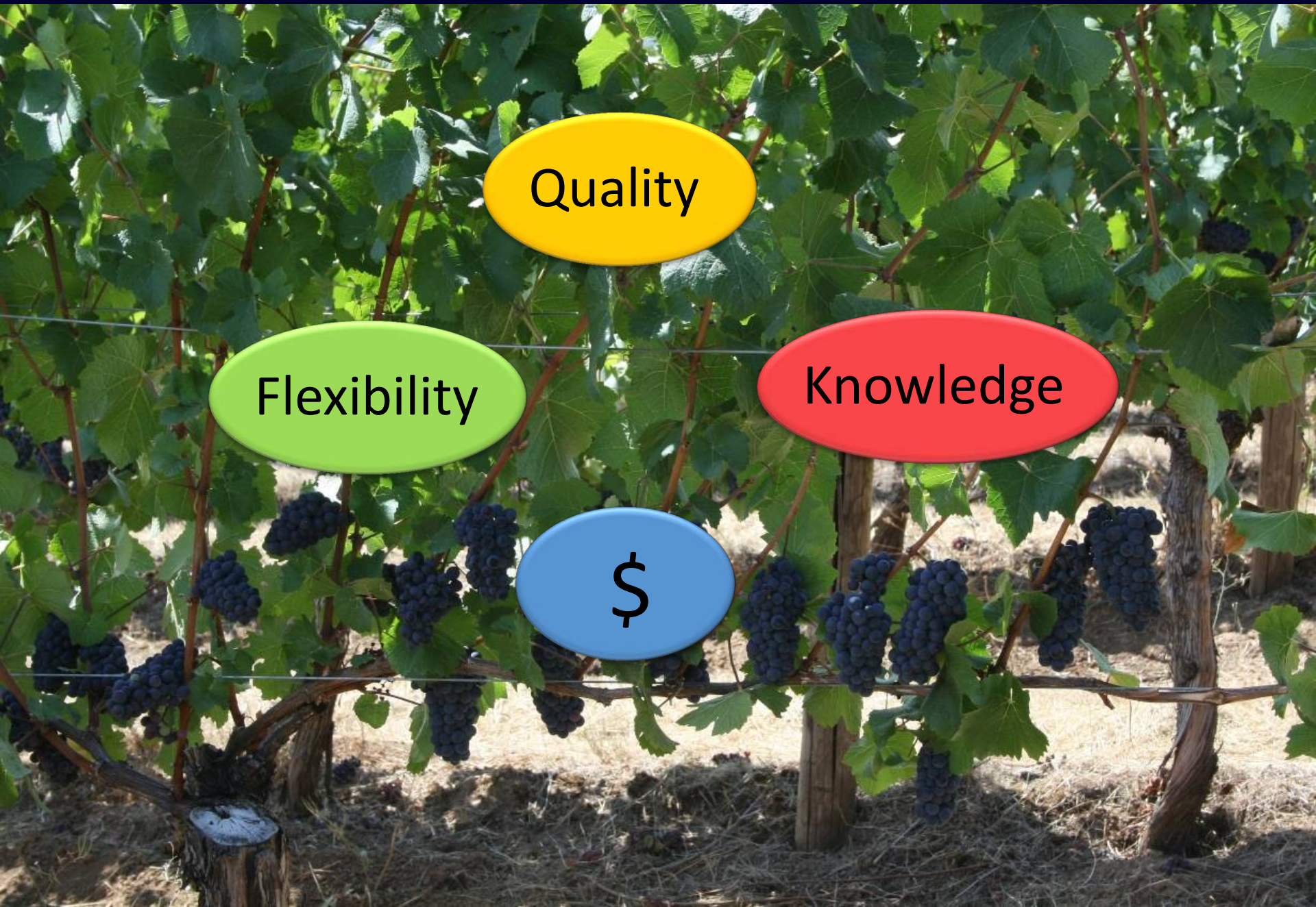
Lab analysis to determine first Powdery Mildew spores detected (PCR)

Grower PCR method developed for on-site analysis

Research on Virus, Insect Vectors & Pests

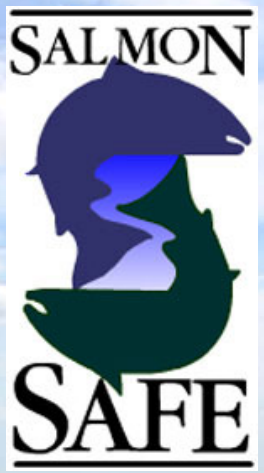


Standards to Judge Vineyard Management Decisions?



Standards of Certification

Sustainable – 4032 acres

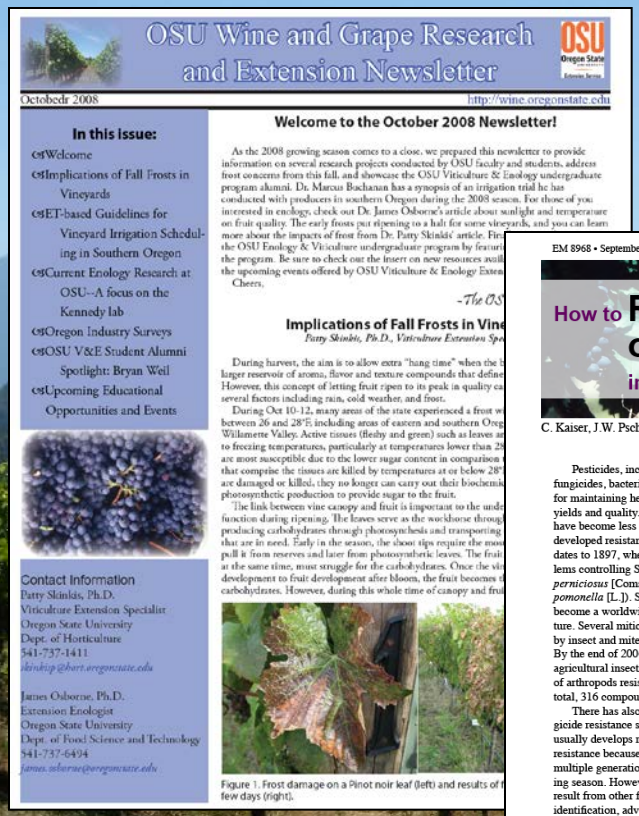


Organic – 1011 acres

Biodynamic – 650 acres

Extension Workshops

Viticulture & Enology Extension



OSU Wine and Grape Research and Extension Newsletter

Octobedr 2008 http://wine.oregonstate.edu

In this issue:

- Welcome
- Implications of Fall Frosts in Vineyards
- ET-based Guidelines for Vineyard Irrigation Scheduling in Southern Oregon
- Current Enology Research at OSU--A focus on the Kennedy lab
- Oregon Industry Surveys
- OSU V&E Student Alumni Spotlight: Bryan Weil
- Upcoming Educational Opportunities and Events

Welcome to the October 2008 Newsletter!

As the 2008 growing season comes to a close, we prepared this newsletter to provide information on several research projects conducted by OSU faculty and students, address frost concerns from this fall, and showcase the OSU Viticulture & Enology undergraduate program alumni. Dr. Marcus Buchanan has a synopsis of an irrigation trial he has conducted with producers in southern Oregon during the 2008 season. For those of you interested in enology, check out Dr. James Osborne's article about sunlight and temperature on fruit quality. The early frosts put ripening to a halt for some vineyards, and you can learn more about the impacts of frost from Dr. Patty Skinkis' article. Fin the OSU Enology & Viticulture undergraduate program by featuri the program. Be sure to check out the insert on new resources avail the upcoming events offered by OSU Viticulture & Enology Exten

Cheers,

-The OS

Implications of Fall Frosts in Vine

Patty Skinkis, Ph.D., Viticulture Extension Spe

During harvest, the aim is to allow extra "hang time" when the fr longer reservoir of aroma, flavor and texture compounds that define However, this concept of letting fruit ripen to its peak in quality ca several factors including rain, cold weather, and frost.

During Oct 10-12, many areas of the state experienced a frost w between 26 and 28°F, including areas of eastern and southern Oreg Willamette Valley. Active tissues (fleshy and green) such as leaves ar to freezing temperatures, particularly at temperatures lower than 2 are most susceptible due to the lower sugar content in comparison t that comprise the tissues are killed by temperatures at or below 28° are damaged or killed, they no longer can carry out their biochemic photosynthetic production to provide sugar to the fruit.

The link between vine canopy and fruit is important to the unde function during ripening. The leaves serve as the workhouse throug producing carbohydrates through photosynthesis and transporting that are in need. Early in the season, the shoot tips require the mos pull it from reserves and later from photosynthetic leaves. The fruit at the same time, must struggle for the carbohydrates. Once the vi development to fruit development after bloom, the fruit becomes f carbohydrates. However, during this whole time of canopy and fru

Figure 1. Frost damage on a Pinot noir leaf (left) and results of f few days (right).

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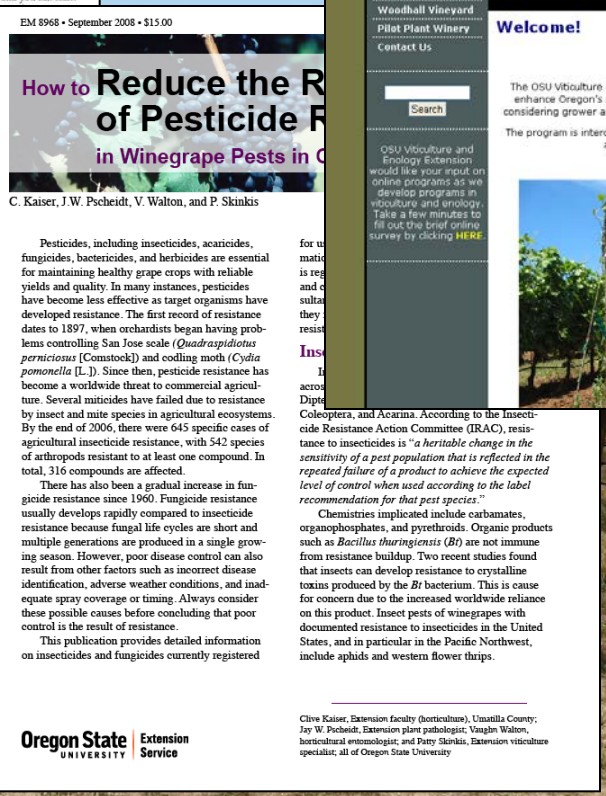

EM 8968 • September 2008 • $15.00

How to Reduce the R of Pesticide R in Winegrape Pests in C

C. Kaiser, J.W. Pscheidt, V. Walton, and P. Skinkis

Pesticides, including insecticides, acaricides, fungicides, bactericides, and herbicides are essential for maintaining healthy grape crops with reliable yields and quality. In many instances, pesticides have become less effective as target organisms have developed resistance. The first record of resistance dates to 1897, when orchardists began having problems controlling San Jose scale (*Quadraspidiotus perniciosus* [Comstock]) and codling moth (*Cydia pomonella* [L.]). Since then, pesticide resistance has become a worldwide threat to commercial agriculture. Several miticides have failed due to resistance by insect and mite species in agricultural ecosystems. By the end of 2006, there were 645 specific cases of agricultural insecticide resistance, with 542 species of arthropods resistant to at least one compound. In total, 316 compounds are affected.

There has also been a gradual increase in fungicide resistance since 1960. Fungicide resistance usually develops rapidly compared to insecticide resistance because fungal life cycles are short and multiple generations are produced in a single growing season. However, poor disease control can also result from other factors such as incorrect disease identification, adverse weather conditions, and inadequate spray coverage or timing. Always consider these possible causes before concluding that poor control is the result of resistance.

This publication provides detailed information on insecticides and fungicides currently registered for u matic is reg and c sultan they resist

Ins

Coleoptera, and Acarina. According to the Insecticide Resistance Action Committee (IRAC), resistance to insecticides is "*a heritable change in the sensitivity of a pest population that is reflected in the repeated failure of a product to achieve the expected level of control when used according to the label recommendation for that pest species.*"

Chemistries implicated include carbamates, organophosphates, and pyrethroids. Organic products such as *Bacillus thuringiensis* (*Bt*) are not immune from resistance buildup. Two recent studies found that insects can develop resistance to crystalline toxins produced by the *Bt* bacterium. This is cause for concern due to the increased worldwide reliance on this product. Insect pests of winegrapes with documented resistance to insecticides in the United States, and in particular in the Pacific Northwest, include aphids and western flower thrips.

Clive Kaiser, Extension faculty (horticulture), Umatilla County; Jay W. Pscheidt, Extension plant pathologist; Vaughn Walton, horticultural entomologist; and Patty Skinkis, Extension viticulture specialist; all of Oregon State University

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OSU Viticulture and Enology Extension would like your input on online programs as we develop programs in viticulture and enology. Take a few minutes to fill out the brief online survey by clicking HERE.

OSU

Viticulture and Enology

Hot Links

- Emergency Quarantine for Vine Mealybug in Oregon
- Learn more about Oregon's Viticulture Industry
- Vineyard Development Info for New Growers
- Viticulture Distance Education - More Information
- Take the Vineyard Cover Crop Survey

Welcome!

Our Mission

The OSU Viticulture and Enology program delivers research, extension and teaching programs that enhance Oregon's regional, national and international reputation in grape and wine quality while considering grower and winemaker profitability and environmentally sustainable production practices.

The program is interdisciplinary and involves collaboration with multiple institutions. See the "Faculty and Staff" page for more information on each team member.

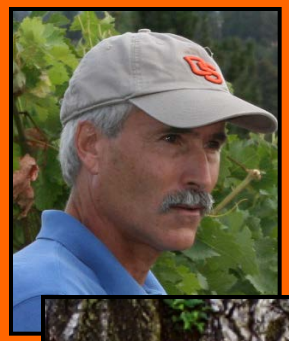
Upcoming Events

Columbia Gorge Annual Vineyard Discussion Tour
Beginning: Tuesday August 11, 2009 @ 9:00am
Ending: Tuesday August 11, 2009 @ 12:00pm
more info

More Events

The Team

Extension




Viticulture








USDA ARS

IPM






Happy Holidays!