

Under-vine management for Finger Lakes vineyards

With contributions from:

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Current Under-vine Management

- Herbicides pose risks of increased resistance in the weed community, leaching, runoff, and environmental contamination
- Bare soil is vulnerable to erosion, crusting, soil structure degradation, and rapid water runoff



Vegetative Vine Growth



- Excessive vegetative growth is associated with poor grape and wine quality
- Costly and timely maintenance to rectify



White Clover



Cultivation



Glyphosate



Native Vegetation

ANNUAL RYE GRASS

(Lolium multiflorum L. perenne var. Italicum)



BUCKWHEAT

(Fagopyrum esculentum)



NATURAL VEGETATION



GLYPHOSATE CONTROL



BUCKWHEAT

(Fagopyrum esculentum)



CHICORY

(Chichorium intybus L.)



GLYPHOSATE CONTROL





Alfalfa



Chicory



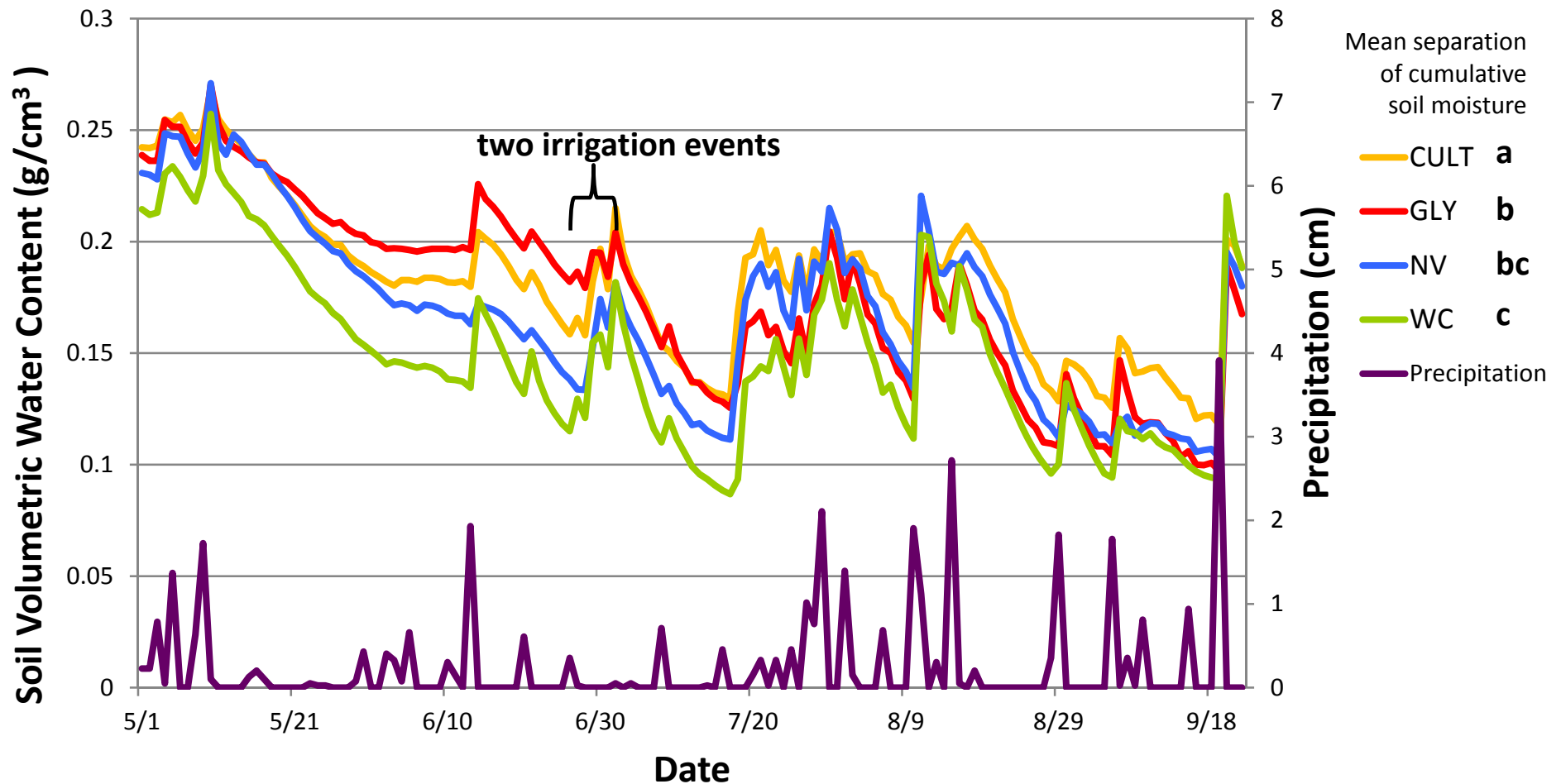
Fescue grass



Tillage Radish



Mid-Day Soil Moisture 2012



Soil water content (g/cm³) under four under-vine treatments in 2012.
CULT=Cultivation, GLY=Glyphosate, NV= Native Vegetation, WC=White Clover.

Pruning Weights: kg/vine

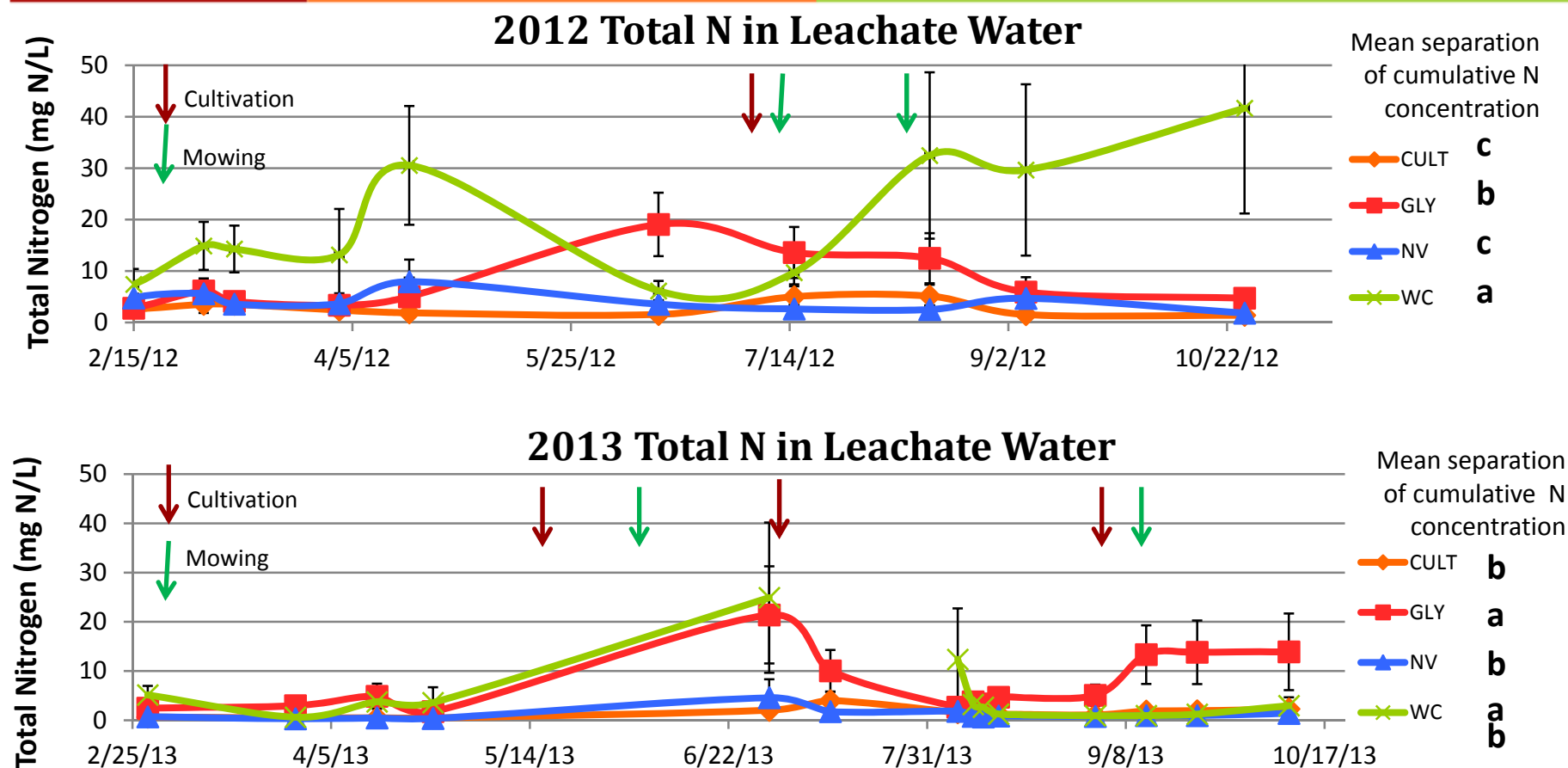
Treatment	2011	2012	2013
CULT	0.8 ab	0.3 b	0.9 b
GLY	1.0 a	0.7 a	1.4 a
NV	0.7 b	0.4 b	0.6 b
WC	0.7 b	0.3 b	0.8 b
p-value	0.001	<0.001	<0.001



Tim Martinson

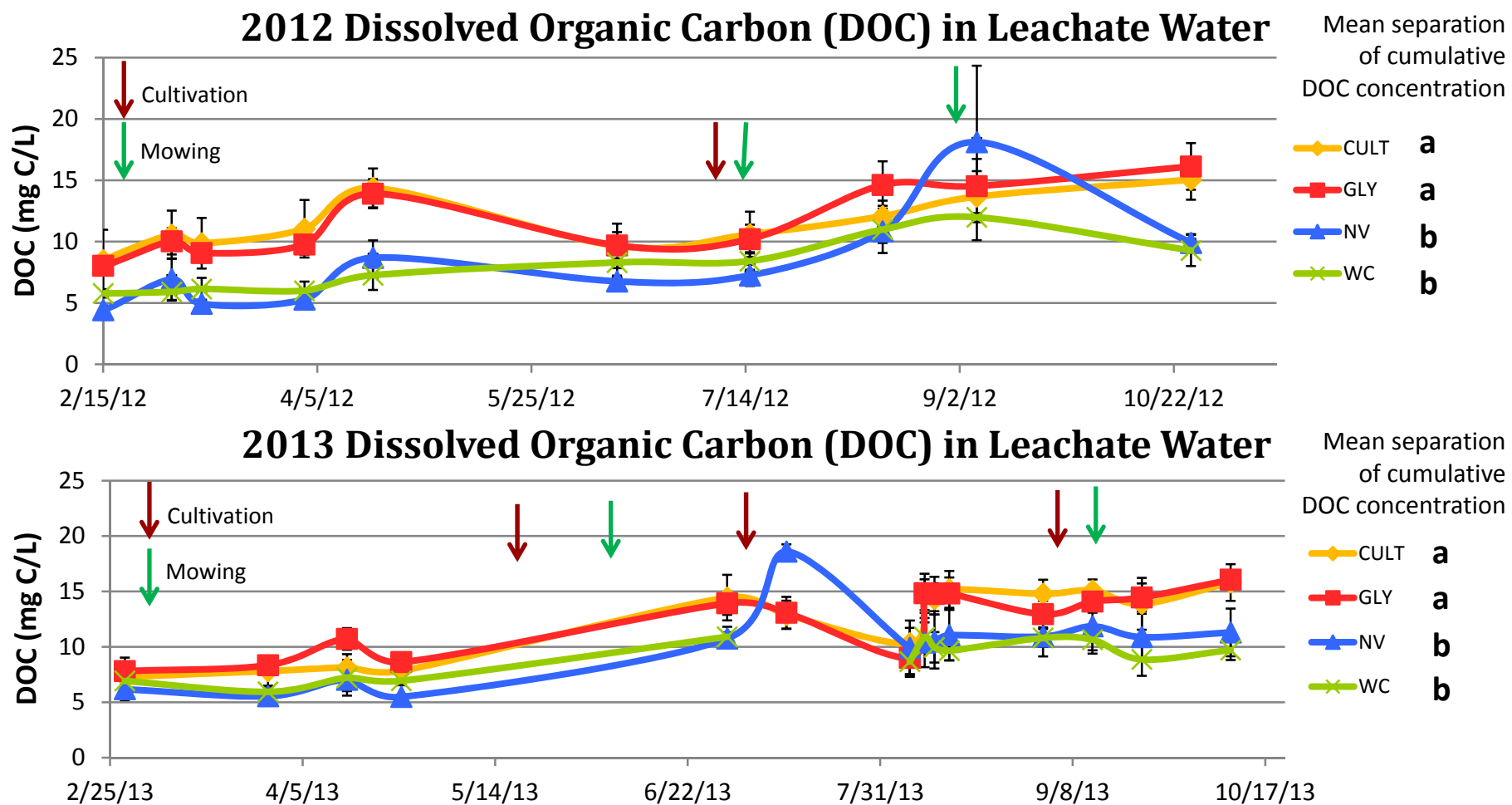
Pruning Weights (kg/vine) of treatment vines. CULT=Cultivation, GLY=Glyphosate, NV= Native Vegetation, WC=White Clover.

Impact on Nitrogen Leaching 2012 and 2013



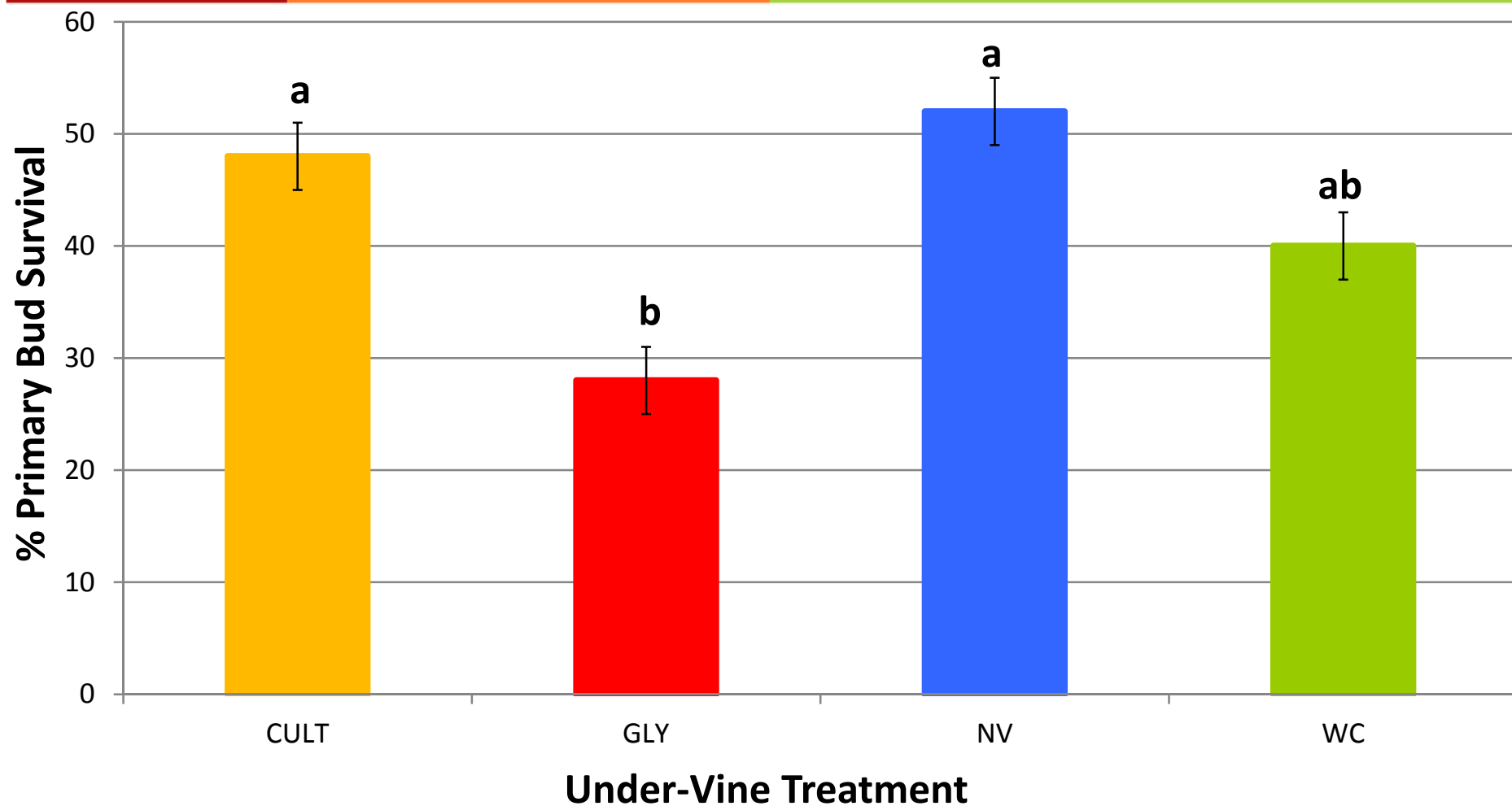
Total Nitrogen concentrations in leachate water, for 2012 and 2013.
CULT=Cultivation, GLY=Glyphosate, NV= Native Vegetation, WC=White Clover.

Impact on Dissolved Organic Carbon Leaching 2012 and 2013



Dissolved Organic Carbon (DOC) concentrations in leachate water, 2012 and 2013.
CULT=Cultivation, GLY=Glyphosate, NV= Native Vegetation, WC=White Clover.

Primary Bud Survival Spring 2014



Average primary bud survival measured on 5/10/2014. CULT=Cultivation, GLY=Glyphosate, NV= Native Vegetation, WC=White Clover.

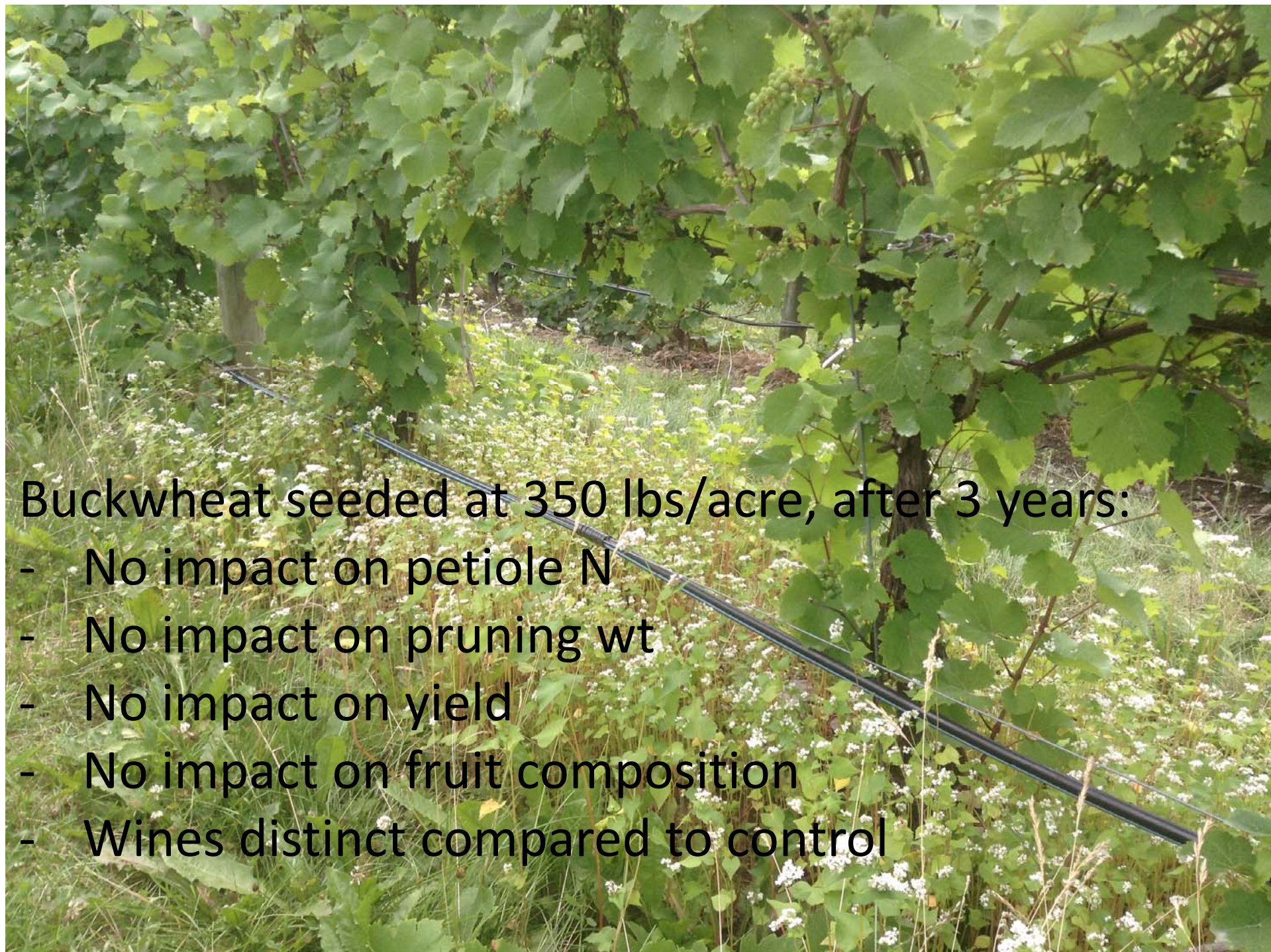
Chicory





Chicory seeded at 5 lbs/acre, results after two years:

- Decrease in petiole N of ~15%
- Decrease in pruning wt of ~28%
- Decrease in yield of ~28%
- Decrease in TA of 1 g/L
- Wines distinct compared to control



Buckwheat seeded at 350 lbs/acre, after 3 years:

- No impact on petiole N
- No impact on pruning wt
- No impact on yield
- No impact on fruit composition
- Wines distinct compared to control



Buckwheat

Chicory



Native Vegetation
Variable impact
May require mowing

Impact on cost of production

Herbicide costs ~\$128 per year (Yeh et al., 2014)

Buckwheat = \$0.65 lb, seeding rate 350 lbs/acre
Seed cost is about \$75 per acre

Blue chicory = \$16 lb, seeding rate 5 lbs/acre
Seed cost is about \$27 per acre

Cost of seeding?

Potential savings on canopy management?

Cost of mowing native vegetation?

Trialing under-vine cover crops

- To replace herbicide strip with little impact on vine size:
 - Buckwheat
- To reduce vine size:
 - Chicory
- To stop using herbicides:
 - Allow weeds to grow (i.e., native veg) but may need to mow periodically

Mature vineyards only!



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