

Selecting and Managing Vineyard Cover Crops to Reduce Net Consumption of Basin Water

Cover Crop Termination Experiment

Fritz Westover, Viticulturist
Craig Macmillan, PhD

Declines in the Paso Robles Groundwater Basin and several years with very little rain have increased awareness of water conservation practices in vineyards. Cover crops can improve water infiltration from precipitation while also preventing erosion and building organic matter in soil. However, the cost of those cover crops in terms of water use is not well understood on the Central Coast. In 2014 grant funding from Western Sustainable Agriculture Research and Education (Western SARE) was awarded to the Vineyard Team for a 2-year study to evaluate the management of grass cover crops to reduce net water consumption.

The Experiment

This experiment measured the effect of five (5) different combinations of techniques and timings of terminating a grass (Blando Brome) cover crop on soil moisture depletion compared to a clean cultivation control.

EXPERIMENT 2
Cover Crop Termination
Clean cultivation (control)
No till, mow after seed set
Mow at bud break
Mow and disk at bud break
Mow 30 days after bud break
Chemical mow at bud break

Each experiment was repeated at three sites on the east side of Paso Robles, California with randomized complete block designs with three replications.

Methods and Materials

A cover crop of Blando Brome was planted in November of 2014 and 2015. Helena Chemical Company donated the seed,

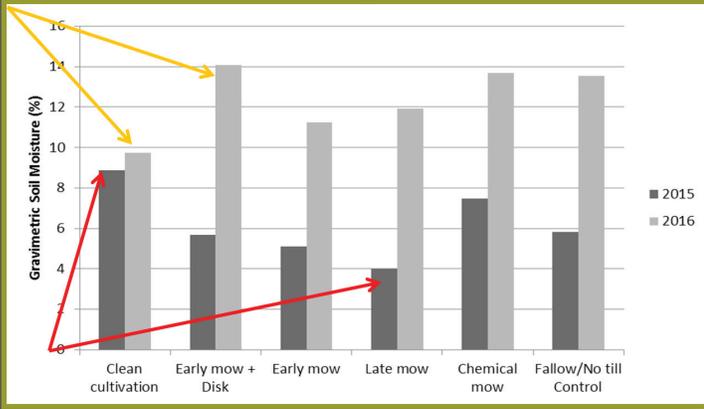
the labor, and the expertise for planting the cover crops in both 2014 and 2015. In late April of 2015 and May of 2016 soil samples were collected from 18" and 36" in the experimental plots. Plant material was also collected to see if there were differences in the amount of biomass produced by the cover crop under the different termination treatments. Both years the soil and plant samples were processed at Cal Poly San Luis Obispo. The gravimetric soil moisture content and the dry matter biomass of the samples were collected for analysis. Pruning weights were taken at one of the sites in January 2016 in each experimental plot to determine if the different treatments had any effect on vine growth during the 2015 season. Treatment effects were assessed by ANOVA at the 5% significance level. Each site (vineyard) was a complete experimental design to itself which allowed comparisons to be made between sites.

Results

At two of the three sites there were no statistically significant differences between treatments in terms of soil moisture depletion in either year. At the third site there was a significant difference in soil moisture depletion between the Clean Cultivation and Late Mow treatments in the first year and between Early Mow + Disk and Clean Cultivation in the second year. These differences are hard to interpret as the Clean Cultivation treatment had the most soil moisture in Year 1 and the least soil moisture in Year 2.

In terms of plant biomass, the Fallow/ No-till treatment produced significantly more plant biomass than the other treatments in both years at two sites and in one of the years at the other site.

COVER CROP TERMINATION EXPERIMENT Soil Moisture, J.Lohr



The experiments at these three sites suggest that the timing and method of terminating a grass cover crop such as Blando Brome does not produce differences in soil moisture before the growing season begins.

Discussion

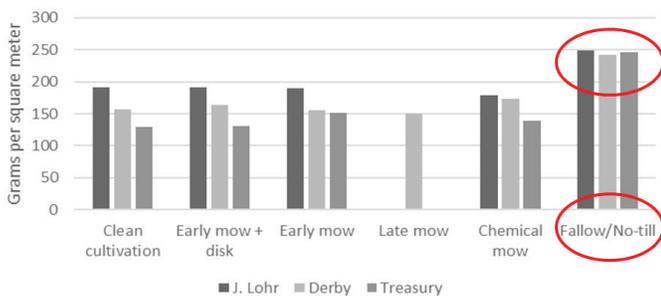
As far as can be measured with this set of experiments with this design, the timing and manner of terminating a cover crop in a vineyard does not appear to affect soil moisture in any meaningful way. This is especially interesting given that fallow/no-till plots tended to produce significantly more plant biomass than the other treatments, but did not deplete soil moisture to a greater degree. These findings suggest that the presence of a grass cover crop in a vineyard middle during the winter and spring months does not increase the necessary quantity of water that must be supplied to vines through irrigation.

One factor which could have affected this experiment is the lack of rainfall during the winter of 2014-2015 and again during the winter of 2015-2016. If more water had been available during the growth of the cover crop, differences between the treatments might have been observed. Additional data must be collected in seasons with higher rainfall to determine if seasonal rainfall is a factor.

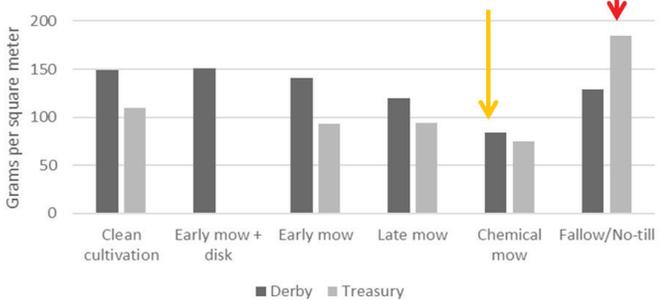
This project was funded by a grant from Western SARE.

Pruning weights showed that the different experimental treatments did not produce differences in vine growth during the 2015 season at any of the sites.

COVER CROP TERMINATION EXPERIMENT Biomass Produced, 2015



COVER CROP TERMINATION EXPERIMENT Biomass Produced, 2016



Acknowledgements

The Vineyard Team wishes to thank the cooperating growers on this project: J.Lohr Vineyards and Wines, Treasury Wine Estates, and Derby Wine Estates.

Thanks to Paul Crout and Nate Miller of Helena Seed and Chemical Company without whose help this project could not have been completed.

Thanks to Craig Stubler, Soil Science Technician, Natural Resources and Environmental Sciences Department, Cal Poly San Luis Obispo.

This project is supported by a grant from Western Sustainable Agriculture Research and Education.

www.vineyardteam.org