

Farmer-Led Trials: Mulching for Moisture

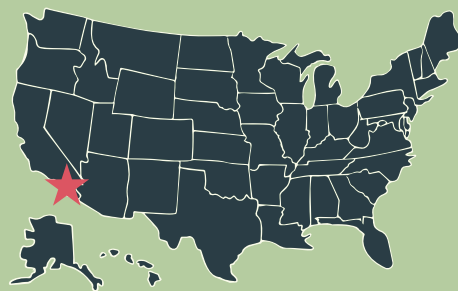
IN A NUTSHELL

Jorge Reyes is a beginning grape grower operating a newly established vineyard in southern California, and is in the process of obtaining organic certification. As the farm is off-grid and has no water storage capacity, irrigation can be very costly, particularly in the prevailing climate of the region. Jorge wanted to know whether mulching could help preserve soil moisture and suppress weeds on his farm, saving energy and labor.

Jorge applied mulch treatments and took soil moisture measurements at regular intervals over the growing season, and saw that mulching had a significant effect of preserving soil moisture and mitigating weed pressure, resulting in less labor required to maintain mulched plots.

ABOUT THE FARM

Reyes Vineyard is owned and operated by Jorge Reyes, a proud descendent of a Mexican migrant farmworker family who had a dream of owning a farm one day. After retiring from the Navy, Jorge was able to purchase a 3 acre vineyard located in Potrero, California in 2021. Jorge's young vineyard produces organic grapes and he is in the process of obtaining



2024

Farmer-Researcher:

Jorge Reyes

Reyes Vineyard

Potrero, CA



Jorge Reyes in front of his grape vines.

organic certification. Jorge plans to produce organic wine with his different grape (Syrah and Viognier) varieties. The vines in the vineyard range from 2 years to 30 years old. With the majority of the vineyard having been replanted in 2022.

As a beginning farmer, Jorge has a multitude of challenges on his farm: he has limited access to power since his farm is off-grid, the climate is hot and very dry, and he has limited storage capacity. These farm realities helped Jorge shape an idea for his trial as something that



Reyes Vineyards showing mulched grape vines on the right alongside un-mulched vines on the left in the research plot.

Why Mulch?

- Local climate conditions generally hot and very dry
- Need to optimize water usage (moisture retention critical)
- Weeds are a big problem (reduce labor requirements)

wouldn't require power, would keep his vine roots cool and conserve as much water as possible. Mulch was something that he considered for his farm, but had not yet tried or tested.

WHAT WAS THE ON FARM TRIAL ABOUT?

In this trial, Jorge asked, "Will applying mulch around grapevines suppress weeds and improve soil moisture or grape quality?"

At the outset of the trial, Jorge hypothesized that fewer weeds would mean less labor would be required for the mulched treatment plot and that there would be increased soil moisture retention as well.

Wildfires are also a frequent risk during the dry season, making soil moisture a critical

factor and cost to Jorge's operation. Mulching has also been a consideration to help suppress weeds, which could save a lot of labor time throughout the year.



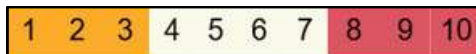
Aerial view of the farm, showing are where research was conducted.



HOW WAS THE TRIAL DONE?

In this trial, Jorge measured the soil moisture content of mulched grapevines and unmulched grapevines. Commercially available organic mulch, with the trade name Orchard mulch from Agriservices was used. This mulch, made of aged yard trimmings, was applied in a 3-5" layer around the base of the treatment vines.

The measurements were taken with a soil moisture probe on three different dates: June 17th; July 18th; and August 22nd, respectively. Jorge maintained his normal irrigation pattern during the entire season, with each plant receiving 1 hour of irrigation twice a week. Soil moisture readings were taken 3 days after irrigation (Moisture reading was taken right before the next irrigation of the week). Soil moisture readings were based on a scale of 1-10, with 1 being driest and 10 being wettest (see diagram).



The results reported for MB are ug microbial biomass carbon/gram of soil. The results also show as a fungal:bacterial ratio, and the estimated percentage of total fungi and total bacteria.

Jorge also captured Brix measurements for the two treatments. Using a hydrometer, he measured the aggregate Brix readings for grapevines that were mulched and an aggregate reading for unmulched grapes. The harvested grapes were measured on August 25th and September 3rd, respectively. Jorge also took pictures and made observations of weed growth in the trial plots.

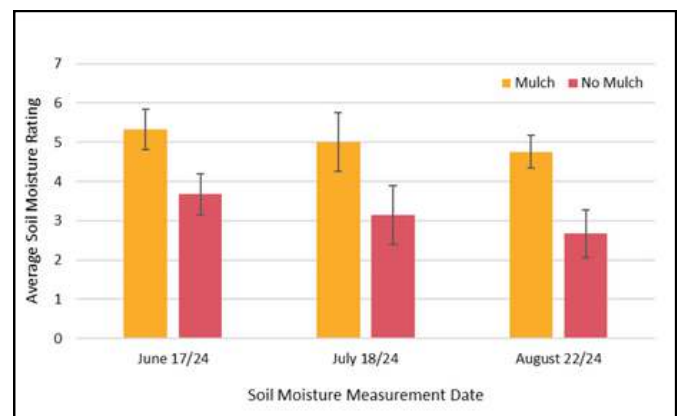


Figure 1a. Soil moisture levels in Syrah grapes treated with and without mulch. Error bars denote standard deviation; within each measurement date, overlapping error bars indicate no significant difference between treatments at $\alpha=0.05$.

Related Research:

[Mulching can help with weed control in vineyards with no detriment to fruit quality.](#) Lisa W. DeVetter, Craig A. Dilley, Gail R. Nonnecke



Field layout

MAY



Mulch applied to treatment areas

MAY



Soil moisture measurements

JUNE-AUGUST



Data analysis

SEPTEMBER



"I am excited to see what happens next year. I know I'll have a better maintained vineyard because of the mulch and I am hoping that grape yield may even improve from the greater and more even moisture retention."

- Jorge Reyes, farmer-researcher

FINDINGS

In both Syrah and Viognier varieties, soil moisture decreased throughout the growing season, likely in response to increased air temperatures and evapotranspiration (Figures 1a and 1b). Mulching had a significant effect of preserving soil moisture compared to unmulched plots at all three sampling dates in Syrah, and in 2 out of 3 sampling dates in the Viognier plots (Figures 1a and 1b).

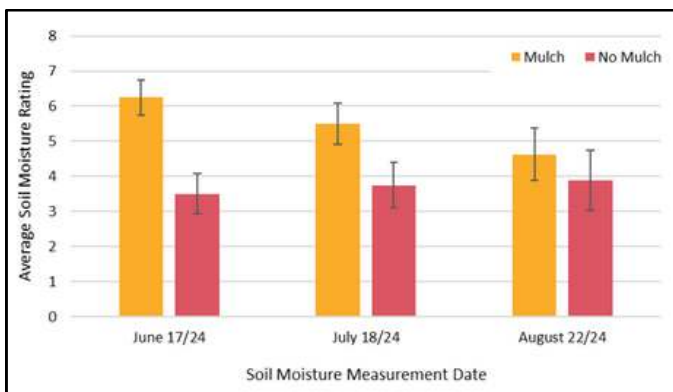


Figure 1b. Soil moisture levels in Viognier grapes treated with and without mulch. Error bars denote standard deviation; within each measurement date, overlapping error bars indicate no significant difference between treatments at $\alpha=0.05$.

Through observation, Jorge noted that there were less weeds and less labor in trimming required for the mulching treatment. While irrigation management in grape production is complex, the increased soil moisture and reduced weed presence in mulched plots represents a promising management strategy for Jorge.

Jorge was also curious about the relationship between soil moisture and sugar content, but time did not permit a formal evaluation. Brix readings were taken as an aggregate reading across plots, and data suggest that average Brix scores from mulched vines were higher than Brix scores from the unmulched vines (22 vs 20, respectively; data not shown).

Further investigations could include a look at the effect of mulch on soil temperature, overall yield, grape moisture content, and other quality parameters not investigated here.



Un-mulched grape vines in the trial area.



Mulched grape vines in the trial area.

TAKE HOME MESSAGES

After seeing first hand the results of this project, Jorge plans to incorporate mulching as a regular practice in his vineyard. The small scale that this trial was conducted on showed him the potential beneficial impacts that mulching can have, including: an increase in moisture retention and weed suppression, and a reduction in the frequency of irrigation. Along with these attributes, the mulching may increase the habitat biodiversity for beneficial organisms in his soil. In the coming seasons, Jorge wants to investigate if mulch can suppress weeds in the long term, and if it helps accelerate the ripening of his grapes. He also hopes to get a better understanding of how he can fine-tune his irrigation needs with the help of moisture sensors and mulch to sustain a productive and resilient vineyard.

ACKNOWLEDGEMENTS

This report is made possible by OFRF's Farmer Led Trials program. In this program, farmers receive technical support to address their challenges through structured on-farm trials. To learn more about OFRF Farmer Led Trials Program, visit our website page at <https://ofrf.org/research/farmer-led-research-trials/>

To cite this paper, please use the following: Jorge Reyes, M. Hathaway, H. Estrada, T. Velez. 2024. Farmer-Led Trials: Mulching for Moisture. Final Report. Organic Farming Research Foundation. www.OFRF.org



United States Department of Agriculture
Agricultural Marketing Service
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