



University of California Agriculture and Natural Resources

VINEYARD MANAGEMENT DURING THE DROUGHT Maxwell Norton, Farm Advisor

Winter

How vines respond this season is partially dependent on what happened to them last season. It is good to find out what is happening below 2 feet. Vines can survive under very dry conditions. I have observed vineyards that were not irrigated for a long time due to economics or ownership issues, come back when taken care of. They will be weak and uneven for the first couple seasons.

Spring growth patterns are dependent on carbohydrate (CHO) reserves. Very dry soils after harvest may inhibit the late-summer or fall root flush and that can be reflected in spring growth patterns.

Very dry soils in winter can also be hard on the vine – depending on how deeply rooted the vine is. Some CHO assimilation & nutrient storage occurs after harvest. Delayed and uneven spring growth is a classic symptom of vines that were too dry in the fall and winter. If dry in fall and < 1 inch of rain in Nov-Dec, apply 5-10 gallons/vine.

Salinity management

If salinity is high, apply a deep irrigation in winter to dissolve salts. Light irrigations will not dissolve the salts. Salts must be dissolved and kept in solution so they can be leached out. After a deep irrigation, if still no rain, short pulses of water will start pushing it down.

Recognize when you are adding salt to your soil: From (1) well water and (2) canal water that had well water pumped into it upstream of you. Analyze any water source during mid summer when demand is highest. Manure & composts can carry a lot of salt/unit of nutrient. Most synthetic fertilizers are in the form of a salt – look at the analysis – higher is usually better – do you need all the other stuff?

If you have a small amount of “good” water and a larger amount of “poor” water, experience with trees indicates it is best to start with the good water and go as long as you can before switching to the poor water. We think this would also apply to grapes. We want the plant to grow as long as possible before applying the stress of salty water.

Frost Management

Bud break which occurs during second half of March to early April, is the beginning of frost season. The vine is using very little water because of no leaf area – weeds will be using most of the water at that point. This may be an opportunity to flush some salts out since you may be applying a lot of water for frost control anyway

Other factors

No sense in allowing weeds or even the cover crop to use up valuable water – mow them short or kill them. Even though there is no canopy yet cover crops are still using up moisture that the vine can use later. Close mowing or spraying may be better than disking because vine roots may be close to the surface and able to take advantage of a chance rain event.

The amount of loss due to evaporation from the soil, depends on the % of time the soil surface is wet - frequent, light irrigations result in soil that is wet for a longer % of time. Soil evaporation accounts for 13-15% of vineyard ET once irrigation commences under high frequency, daily irrigation. Grape growers do not use micro jets or micro sprinklers because they raise the humidity of the vine which is favorable to some diseases. Any sprinkler loses more water to evaporation than drip.

If you have an orchard or vineyard block that is reaching the end of its practical lifespan then now might be a good time to pull it and use that water for the rest of the ranch. If one variety of grapes is getting a much better price, you can of course favor it water-wise.

Rootstocks

Drought and salinity tolerance of grape rootstocks vary and may be a consideration if you are planning a vineyard. We are still learning about rootstock tolerances. The following are considered to have some tolerance to salinity (From: *Wine Grape Varieties in California* UC publication 3419).

Salt Creek/Ramsey High

Dogridge Med-high

140Ru Med-high

1616C Med-high

1103P Med-high

If the vines are losing leaves by late summer and are barely alive, excess vigor is no longer a consideration.

The following are considered to have high or medium-high tolerance to drought:

110 Richter

140 Ruggeri

1103 Paulson

44-53M

Ramsey

During the growing season

Effects of water stress on growth and berry development depends on timing & severity of that stress.

As a broad generalization, during the growing season, you can irrigate at around 70% ET until veraison, and gradually dry out from veraison to harvest. You will reduce berry size and yield.

Water stress will delay sugar accumulation when temperatures are >100F. If it is hot – try not to stress too much.

Dropping crop does not, itself, reduce water usage. The main determinant of water use is the number of illuminated leaves/per acre – in other words – how big the canopy is. If the crop is not competing for CHO then those resources go into growing a bigger canopy. That is why knocking the nuts off of almond trees in Spring will increase water use instead of reducing it. If you think you are going to have trouble ripening a crop, then reducing it can help concentrate the sugars in fewer berries.

Bud break to flowering: you are probably still using up water stored in profile

Flowering to fruit set: Very sensitive period because of rapid cell division – if profile is dry – good time to apply some water

Fruit set to veraison: This is a time that we apply some mild stress to the vines

Veraison to harvest: If leaves are falling off you are losing ability to make sugar and ripen the crop. Can you at least keep the leaves on and halfway healthy? Tolerance to mites and leafhoppers is compromised – spray if needed. Once the berries are mature they can tolerate some stress.

Summary

Check soil moisture at all levels. Spend water where it is needed most. Let salinity drive management decisions. Use less fertilizer. Use more herbicide. Control the mites and leafhoppers.

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