

SPRING FROST DAMAGE

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KILLING TEMPERATURE

Succulent shoots and flower clusters may be killed by temperatures below 31°F. If warm weather and rapid growth have immediately preceded a frost, some killing of rapidly growing shoots is likely to occur at 30°F; but if the temperatures are not lower than 30°F and are of short duration and occur in periods of cool weather, damage is slight. Temperatures of 26°F or lower for a few hours will kill all green shoots, flower clusters, and even buds that are partly open. (Source: "General Viticulture," Winkler.)

CULTURAL PRACTICES CAN REDUCE FROST HAZARD

Growers can reduce the hazard of frost damage if they schedule their weed control cultivation and irrigations at the proper times.

Listed below are factors to consider:

- Freshly disced soil is about 2 degrees colder than firm, bare soil. It would be wise to smooth out and pack this fluffy soil, then pray for rain, or sprinkle irrigate following discing. Wetted firm ground is usually about 2 degrees warmer than dry, firm soil.
- A high covercrop (24 to 30 inches) is usually 2 to 4 degrees colder--but can be as much as 6 to 8 degrees colder--than firm, bare ground.
- A low covercrop is 1 to 3 degrees colder than bare ground.
- Freshly disced soil is about 2 degrees colder than firm, bare ground.
- A shredded covercrop is about 1/2 degree colder than firm, bare ground.
- Wetted, firm, bare ground is usually about 2 degrees warmer than dry, firm, bare ground.

So if you have wet, firm, bare ground when shoot growth is out, then you could probably escape frost damage--providing the temperature doesn't drop too low.

If top soil is quite dry, then delay your spring irrigation until beginning of leaf-out. In the past, frost damage was greatly reduced in vineyards that were irrigated just prior to the frost.

Vineyardists in the south part of San Joaquin County who have large volumes of water can put in levees and flood irrigate if the weather man forecasts a killing frost. Sprinklers give excellent frost protection--if you turn them on. Start the sprinklers before the temperature drops too low. Dewpoint temperatures are important. The lower the dewpoint temperature, the sooner you start your sprinklers. (See chart next page.)

<u>Dewpoint Temperature</u>	<u>Starting Temperatures for Sprinklers</u>
24° and above	34°F
20° - 23°F	35°F
15° - 19°F	36°F

Remember, don't shut them off until all the ice has melted from the vines.

Excessive, heavy irrigations during the early spring may cause perched water table conditions in some of the vineyards in this county--especially those that have 4 to 6 feet of sandy soil with an impervious substratum below. A perched water table can damage the root system due to lack of oxygen.

QUESTIONS ASKED FOLLOWING A FROST

1. Why are the shoots at the top of my vines green and the lower ones burned?

--The area of lowest temperatures during a frost occurs at the surface of the soil, OR if there is a cover crop, it occurs at the top of this vegetation. Obviously it is desirable to lower this zone of cold air as much as possible. A cover crop mowed short results in less frost hazard than a cover crop 1 to 3 feet high. Bare soil receives heat that is stored during the sunlight hours and released at night. Therefore, a firm, bare soil can raise the air temperature around the vines as much as 2 to 3 degrees. Vines trained on a high trellis may escape a frost.

2. Should I fertilize my frosted vineyards now?

--NO! Fertilizers applied late in the spring could cause late vegetative growth which won't harden off in the fall; thus, winter damage may occur to the new wood (especially on some varieties).

3. Should I break out the frosted shoots?

--NO. Research work done by A.N. Kasimatis and J. J. Kissler in San Joaquin County in 1972 showed that breaking out the frosted shoots reduced the yields; so leave them alone!! (Research results reported in the American Journal of Enology & Viticulture, Vol. 25, No. 1, pp. 17-20.)

4. Should I continue to sulfur my damaged vines?

--Yes. If you have green growth with new growth pushing, follow a regular dusting program. Powdery mildew, once established, is difficult to eradicate.

5. Would an irrigation help my frosted vines?

--Irrigation should be determined according to the available moisture in the soil. If an irrigation is needed, then irrigate. I think it is important to apply the first irrigation before the soil becomes too dry --you'll get better water penetration.