



FIRE DAMAGED VINES



The impact of fire in vineyards can manifest itself in several different ways, and the amount and type of damage then determines the best approach to treating the vines. Some effects of fire are obvious, such as dehydrated leaves and burnt bark, but others are not. Radiant heat can cause damage or death without obvious external damage.

Checking for damage

The internal damage can be most readily checked within a few days of a fire event if the radiant heat has been great enough to kill tissue. The cambium layer is a narrow layer of

cells just under the bark that produces the vascular system which conducts nutrients and water through the vine. Once this layer is killed there is no further growth of that part of the vine and it dies. Being obscured under the bark it is not possible to ascertain the health of this tissue from external observation.

Making a small cut into the tissue with a knife, much like that used in T budding, will reveal the health of the cambium layer. If the tissue is moist and creamy white perhaps with a greenish tinge, then the cambium is still alive and the vine has a chance of recovery. If the cambium is dry and brownish in colour then it is dead and that part of the vine will not grow.



Varations in damage

Some fires only burn one side of the vine as they move through a vineyard, and in those cases the trunk may be partly killed and the sheltered side may be still alive. The vine may well survive and produce new growth from the top but it will always have a strip of dead wood in the trunk, which may become susceptible to wood rots and termites. So if only a small section of the trunk is alive it may be a better strategy to replace the vine.

Vineyards with straw mulch along the vine line have been observed to be particularly badly affected by fire. The heat from the burning mulch around the base of the trunk destroys the cambium and virtually ringbarks the vine at ground level. In some cases where the planting material was completely disbudded below ground, there will not be any regrowth because there are no latent buds. However in other cases where vines were not so intensively disbudded, latent buds below ground level may well be alive and suckers are produced which can be trained up into new vines. Check the potential for sucker growth by digging down below ground level and looking for young shoots pushing out from the section of trunk below ground level.

In other crops, e.g. olives, plants that are under stress and plants with narrow diameter trunks suffer more from fire damage than well watered or older plants with larger diameter trunks.

Vines that appear alive after the fires may not survive in the long term. Some vines have been observed to re-shoot after the fire and then to collapse a month or two later. It can be difficult to exactly determine the extent of damage on every vine.

Responding to fire damage

Vines with leaves that are partly or totally scorched should have the crop removed to eliminate competition for water, carbohydrates and nutrients. In addition the grapes may well have picked up a smoke taint from the smoke and be rendered unsuitable for winemaking.

Plastic irrigation lines and above ground controllers can also be destroyed by fire. It is vital that the irrigation infrastructure is replaced quickly (if rain doesn't fall) particularly if the soil is quite dry. Water should be applied to match the vine growth and not liberally applied such that it saturates the soil and reduces root function.

Vines that have been killed outright by high intensity fire from long grass or mulch, could be left to determine if suckers come away from below the ground. If the fire occurs early in the season (before veraison) and suckers are appearing, then the old dead trunk should be removed and a new sucker trained up to form a new trunk. The large root system will push the shoot along and it should grow and mature before the autumn frosts. When vine trunks are killed by fire after veraison there may not be adequate time for growth to mature before autumn frosts so vines should be left to sucker and dead trunks removed in winter.

Where vines are killed back to the ground, the cambium layer below soil level is still alive and may continue to grow to try and reform the vascular tissue. This callusing at ground level shows up as 'puffy' tissue growth not unlike crown gall callusing. This callus tissue will not produce shoots.

Grafted vines

Grafted vines are often planted with the graft union above ground level. The rootstock section are usually completely disbudded so a vine damaged or killed below the graft union will not produce suckers. Incompletely disbudded rootstocks may produce suckers which will have to be re-grafted to produce a crop. In such cases the costs of training up a sucker and field grafting need to be weighed against removing the vineyard and starting again with new grafted material.

Remedial pruning

Vines that are still alive can be considered for remedial pruning, but very little research has been conducted on this to produce firm recommendations. If fires damage leaves early in the season then there will be plenty of time for vines to grow new shoots and have them mature before autumn frosts. Fires late in the season diminish the time available for shoot regrowth and vines that are alive push out new shoots anyway.



One approach is to leave the vines alone and make decisions at pruning time on how best to get the vine back into production for the following season. It also provides time to undertake a bud fruitfulness assessment to determine if the fires have damaged the inflorescence initials within the buds. Vines may not often return to full cropping levels for several years after fires and this may benefit the vine by giving it time to recover and regrow damaged tissue.

Another approach that growers have taken is to prune the vines back to focus regrowth into new shoots that can be used as spurs or canes for the following season. However pruning back the shoots may be removing carbohydrate which otherwise would have gone into storage in the roots and trunk. If carbohydrate has been lost then regrowth and fruitfulness in the following season is likely to be reduced.

Any regrowth will need to have adequate irrigation and light doses of nutrition to match the amount of growth generated. Pests and diseases will need to be controlled although in the latter part of the season there are generally not many issues. Experience has shown that vines often take 2 to 3 years to get back into full production and some vines will continue to collapse after showing initial signs of recovery. The amount of work in rejuvenating a mix of dead and sick vines needs to be weighed up against a total replant of the block. It may be an opportunity to replace under-performing varieties with something new or to change over to phylloxera and drought or salinity tolerant rootstocks.

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