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Preventing Grapevine Trunk Diseases

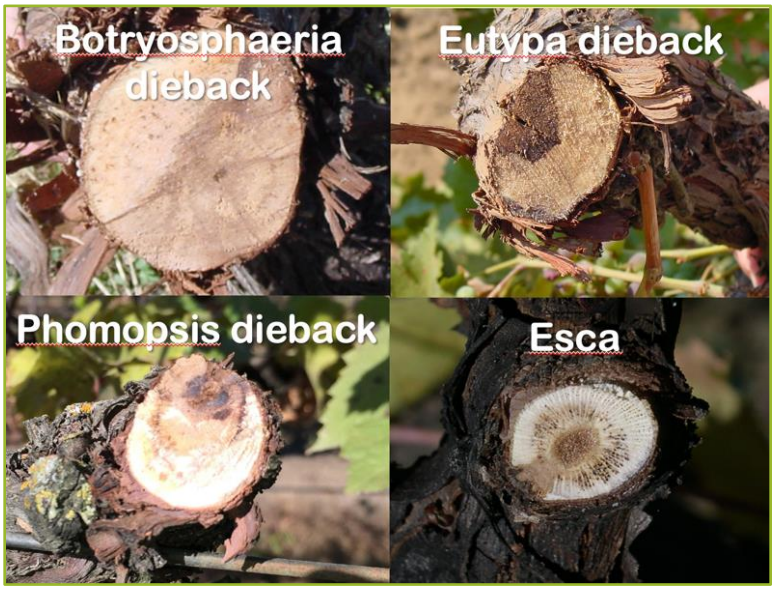
Grapevine Trunk Diseases are one of the major threats to viticulture sustainability. The fungal pathogens ('trunk pathogens') attack the permanent woody structure of the vine, causing chronic wood infections, so it is important to prevent them from infecting in the first place. Effects vary from killing fruiting positions (spurs and canes) to preventing ripening. Pruning wounds are thought to be the primary point of entry.

This Grower Guide focuses on the actions needed to prevent trunk diseases.

Major Trunk Diseases

The most common trunk diseases are Botryosphaeria dieback and Phomopsis dieback. Less common are Eutypa dieback and Esca (aka Black Measles or Petri disease in young vines). Phomopsis cane and leaf spot (caused by the same pathogen as Phomopsis dieback) is also a common disease of shoots, leaves, and fruit during wet springtime weather in some climates.

Although the symptoms do not become very obvious until vines are mature (5-7+ years old), prevention should begin as soon as vines have permanent trunks established (3 years old). Both young and mature vines are at risk of infection. The time between infection and symptom expression can be months to years, depending on the trunk disease and susceptibility of the grape variety.



Examples of cankers, discolorations, & necrosis in vines infected with trunk pathogens.
Photo Credit: Kendra Baumgartner, USDA ARS, Davis.

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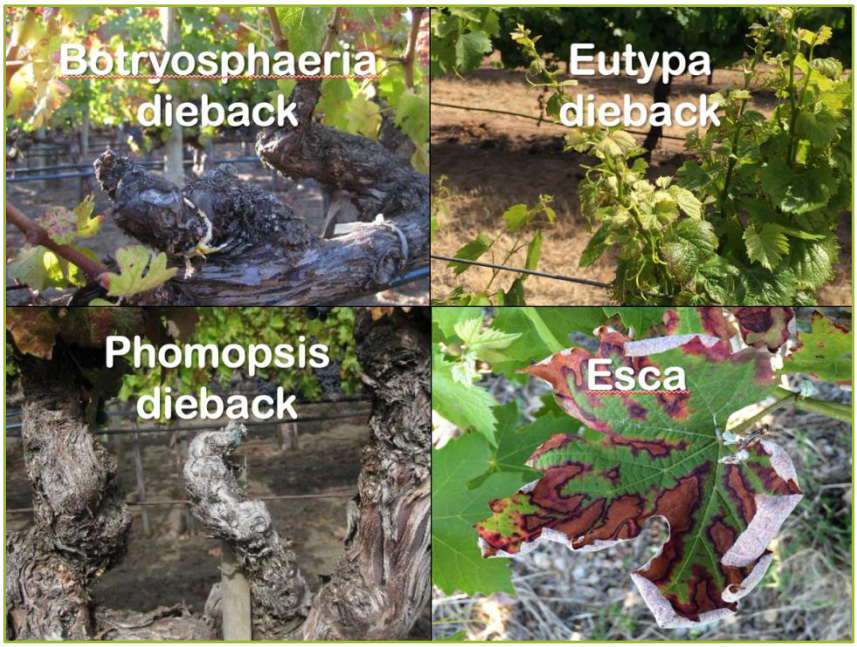
How Trunk Pathogens Infect Pruning Wounds:

(1) The following conditions cause spore release:

- Rainfall
- High relative humidity
- Temperature above 32°F (0 °C)

Note: Different trunk pathogens require different climate conditions for spore release and infection, making it challenging to know when to protect vines.

(2) Once spores have reached a pruning wound, they start to slowly colonize the wood. The infection then becomes established within an inch or two of the pruning wound, and the fungus produces toxins and/or decomposes the wood, causing wood tissue death, sap flow disruption, and wood decay.



Botryosphaeria and Phomopsis diebacks can kill spurs or trunks without showing leaf symptoms. Eutypa dieback and Esca have diagnostic leaf symptoms that are helpful for their identification.
Photo Credit: Kendra Baumgartner, USDA ARS, Davis.

Preventing Trunk Diseases

1. Promote Vineyard Sanitation

- Remove, burn, bury, or mulch and incorporate pruning debris into the soil.
- Monitor your vineyard health status; mark diseased vines and rip out dead or dying vines.

2. Time Pruning Strategically

- Double prune. Pre-pruning, also known as rough pruning or double pruning, is training-system dependent, but if possible, it is an effective practice to reduce the risk of infection. Pre-prune canes early in the winter (December or January), leaving longer-than-normal canes (approx. 15 inches or 5-8 buds for a spur-pruned system). Make the final pruning cuts late in winter (February or March), when wounds heal more rapidly. In this way, any infections that happened after the pre-pruning will be cut away with the final pruning cuts; the pathogens grow so slowly that they do not have the time to spread from the pre-pruning cut past the final pruning cut and into the permanent structure of the vine. Double pruning allows for final pruning to be faster when budbreak is looming.

- Prune when wounds heal faster. Studies, in California, indicated that this happens in late winter, so prune as late as possible to be still done before bud burst.

- Do not prune when it is raining or when rain is expected within 24 hours.

3. Improve Pruning Techniques

- Keep large wounds to a minimum (wounds larger than 0.5 inches in diameter).
- Avoid large wounds close to the trunk.
- Avoid multiple pruning wounds in the same area.
- Avoid unnecessary cuts to live old wood (>2 years old)
- Leave a wood stub or “buffer wood” on two-year or older wood for dieback and to keep infection points farther from active vascular tissue.

Large cuts on the trunk create wounds that can become infected.

This pruning cut was made on older wood (2+ year) too close to the active spur. Leave more space for old wood to heal (without drying the wood in the path of the new cordon) and treat large wounds with a sealant or fungicide.

Example of “buffer wood” retained when removing live older wood. The small buffer of wood will allow some distance between the wound and the active spur and may reduce dieback into the spur. Aim for 0.5- 1.0 inches of buffer wood on cuts to old, non-fruit-bearing wood.

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FAQs – Protect Pruning Wounds

Q: What is the difference between using a conventional fungicide, a biological product, or a sealant for pruning wound protection?

A: First things first, make sure you read the label for your proposed product and use it accordingly. Several fungicides are labeled as pruning wound protectants that are only approved in some regions. Conventional fungicides provide a chemical barrier to trunk disease pathogens that are non-systemic through the vine and can be washed off in a rain event. Biological pruning wound protectants work by colonizing pruning wounds and competing with trunk disease pathogens to prevent infection. Sealants act as strictly a physical barrier. Sealants can be susceptible to reopening when the wound starts to bleed right before bud burst. While this is a quick overview of the options, make sure you choose the one that fits the needs of your specific vineyard and region.

Q: Do I need to spray long pruned (pre-pruned) canes?

A: No. The aim of double pruning or rough pruning is to remove the bulk of the pruning wood ahead of final pruning and any infections that occur in the tips of the long pruned canes will be removed when final pruning to short spurs. After infection of a wound, trunk pathogens spread slowly; therefore, a possible infection is unlikely to reach the basal (lower) buds before late winter and final pruning. Only final-pruned vines should be treated.

Rough pruned vines will be final pruned to shorter spurs before bud burst. No treatment of pruning wounds is needed until final pruning cuts are made.

Q: Do I need to spray if no rain is expected?

A: It depends on when you are pruning in winter. If you are in areas where rain is most likely to occur within a 7 to 14-day period after final pruning (Eastern US for example), you need to spray, especially if you have to prune in early winter. The number of no-rain days may give you a bigger window of time for applying the spray, but also be mindful of early morning and night-time high humidity, fog, etc. Splashing rain is the leading cause of spread for many of the trunk pathogens.

Q: Will spraying be effective if the wounds are actively 'bleeding'?

A: If many of the vines are bleeding intensively (due to root pressure), budburst is near. The bleeding sap is likely to wash off any spray that is applied. That said, pruning wounds made just before bud break tend to heal faster (within a day or two) and thus the risk of infection tends to be lower, even with rains at this time. The relationship between susceptibility and the presence of bleeding is not known.

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Q: What if it rains after I spray? Do I need to re-apply protectants?

A: It depends. If a fungicide was applied and there is no rain for two weeks, a re-application might not bring about a greater level of protection. If it rains within two weeks (and it is January or early February), it is probably safest to re-apply the fungicide after rain.

Q: If wounds look healed and dry, should I spray anyway?

A: Healed and dry are two very different things. If you are pruning in the winter, pruning wounds will most likely be “dry” because the vine is dormant. In this case, you should spray. What we might call “healed” wounds on a vine are wounds from previous years where the wood tissue is dead and therefore dry because it is no longer functional. In this case, you do not need to spray.

Dead wood from pruning cuts made the previous season can be cut back the following year with close proximity to trunks, cordons, and spurs. Dead wood is not likely a main entry point for trunk pathogens.

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