

# Eutypa Dieback

The Next Grapevine Threat is Already Here

by [Mick Winter](#)

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While vineyardists, scientists and other agricultural experts are gearing up for a major battle with Pierce's Disease and its far-traveling vector, the Glassy Winged Sharpshooter, a team of top scientists is focusing on another threat--Eutypa Dieback. In fact, it's a threat that is already found in most vineyards.



*The canker appears as a darkened or discolored wood extending in a wedge shape to the center of the trunk.*

Eutypa is a fungus that leads to woodrot--and a resulting decrease in yields--in older grapevines. Studies in California have so far shown two separate species of the fungus: *Eutypa lata* and *Eutypa armeniacae*. Based on preliminary research including DNA fingerprinting, *E. armeniacae* appears to be the species most predominant in vineyards, but both species produce the same results.

Investigators see Eutypa as a looming threat because it affects older vines. Although the disease can strike vines when they're young, symptoms do not appear until the plant is at least six to eight years old, with plants over 10 years old showing the most symptoms. Because huge portions of California vineyards have either been newly planted or recently replanted, the seriousness of Eutypa may not be apparent for several years. Current estimates are that Eutypa can reduce grape yields by as much as 90 percent. In fact, if unattended, the disease will eventually kill the vine.

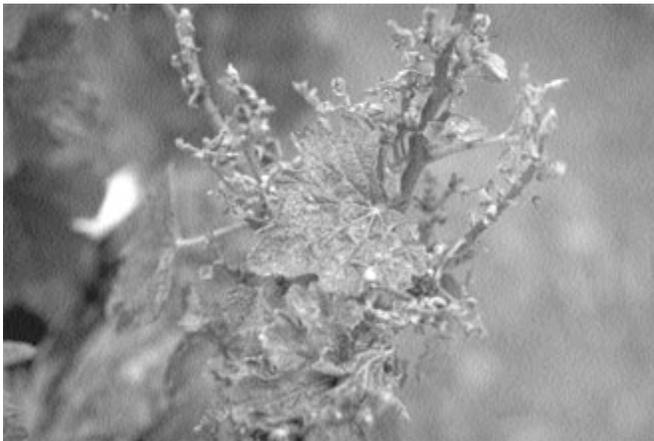
To prepare to meet this challenge, the **American Vineyard Foundation**, assisted by a California State Grant, is funding a five-year project--with \$270,000 allocated for the first year--to investigate the disease and the best methods of controlling it. The project is called "Development of Control Methods for Eutypa Dieback Disease", and will produce progress reports at the end of each year.

AVF Project Coordinator for the Eutypa studies is **Dr. Nancy Irlan**, Director of Life Sciences Program at **E & J Gallo Winery** in Modesto, California. Dr. Irlan's role is to facilitate and coordinate the various teams throughout California that are involved in the research.

The Eutypa program is noteworthy because it involves researchers from many sectors. Private industry is represented by Gallo, which for several years conducted in-house Eutypa research. Government brings scientists from the US Department of Agriculture's **Western Regional Research Center** in Albany, California, and academia contributes faculty members from **University of California, Davis** and **Fresno State University**. Scientists in Australia and New Zealand will likely be joining the project, and research is being coordinated with colleagues in Europe as well.

### AVF Eutypa Project Objectives

1. Improve disease diagnostics and forecasting methods
2. Evaluate viticultural practices for improved control
3. Evaluation and improvement of chemical and biological control agents
4. Mechanisms of host susceptibility and resistance
5. Mechanisms of fungal pathogenicity and virulence.

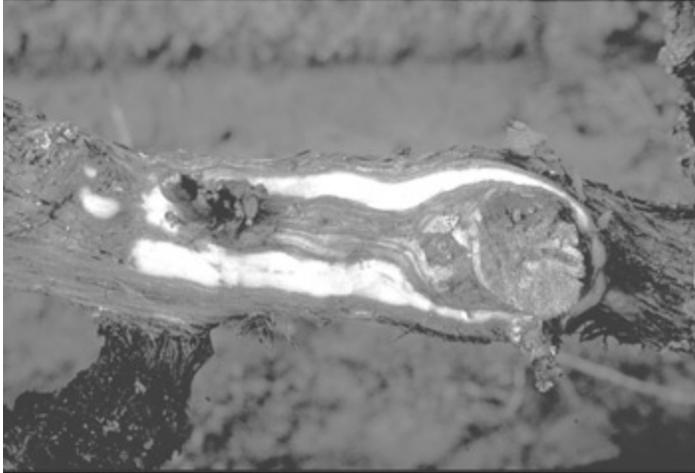


*Leaves are smaller than normal, cupped, misshapen and yellowed.*

Irlan stresses that this is a long-term project and the teams are just at the very beginning of their research. "Many of us in the industry feel that Eutypa is a very significant problem," Irlan says. "Is it an escalating problem? We don't know. It's always been there and it's not going away. We're trying to address it with a multidisciplinary approach. We want to be prepared and have the methods in place to help control the disease and reduce its agricultural and economic impacts."

**Dr. Jerome Siebert**, an agricultural economist at University of California, Berkeley, is preparing an economic impact study on Eutypa in California vineyards which will be finished in the next few months. Siebert says: "At this point it appears the effects of Eutypa will be seen as significant, both in loss and yield as well as the costs associated with vineyard management. We're trying to determine the exact parameters of the problem, so we'll have a clear idea of the costs of dealing with it."

Industry surveys show that Eutypa is ranked across the United States as one of the highest viticultural research priorities that need to be addressed. The disease appears to be prevalent in every winegrowing region, and certainly in all major wine regions.



*An Eutypa infected vine has been cut open to reveal the extent of damage.*

"I've heard growers say that Eutypa can have as much of an economic impact as Pierce's Disease," says **Patrick Gleeson**, Executive Director of the American Vineyard Foundation. "Is there a need for panic? No. But we do feel there is a sense of urgency."

Gleeson says that AVF has been funding Eutypa programs for the past twelve years. "We've been making moderate progress, but felt it was time to establish a team approach to identify all the issues from A to Z. We wanted to show state and federal funding agencies that the industry is addressing its own problems."

"We are trying to be as efficient as possible with the resources to address a statewide and nationwide problem, not just a regional one. We need to find a way to at least manage Eutypa, if not totally eliminate it from the vineyards."

One research site, located in the Lodi-Woodbridge District of California's Central Valley, is managed by **Mike Vail**, viticulturist at **Vino Farms** based in Lodi. Vail says: "I'm not sure if people realize just how big a problem Eutypa is. If they don't think about it early on, they're not going to be prepared for it as it develops. Eutypa has always been a problem for us and other vineyards. It's almost a given that as soon as a vineyard is eight years old or so, it begins to exhibit Eutypa symptoms. The more severe it becomes, the more the yield drops. A vineyard can go from a 7 or 8 ton yield down to 3 ½ tons. I'd guess we spend up to \$200 an acre just in maintenance costs, in addition to the costs resulting from lower yields. Hopefully the project will result in a strategic management program that we can use to prolong the life of vineyards."

## DISEASE CYCLE OF EUTYPA DIEBACK

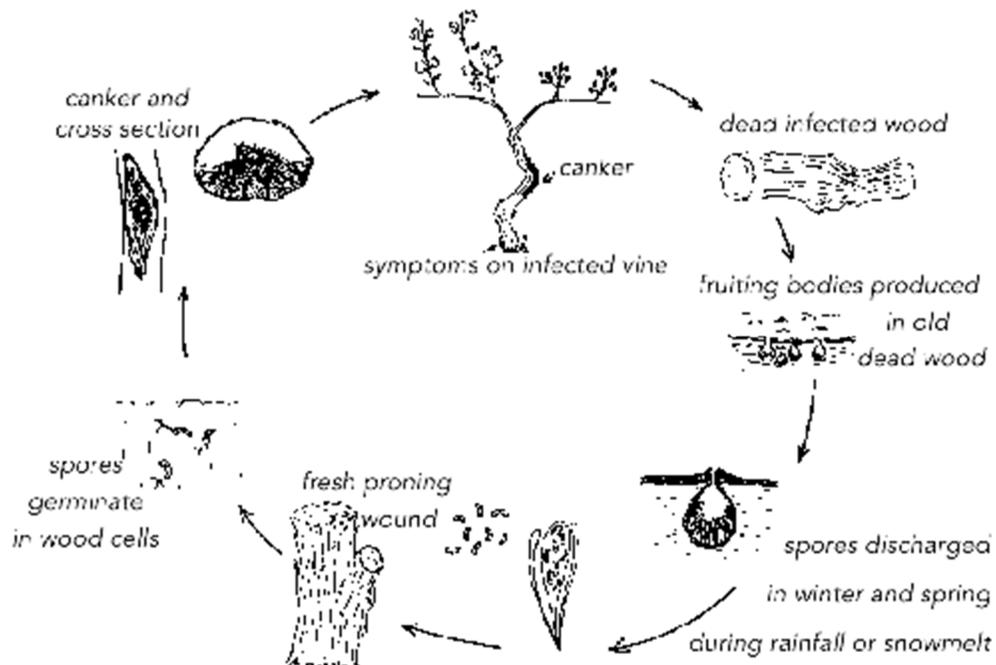


Figure 7

The Eutypa team is interested in contacting vineyardists and others in the winegrowing community to determine current effects and methods of control for Eutypa, as well as to locate research sites. Contact Dr. Nancy Irlan at (209) 341-4424 or Patrick Gleeson at (707) 252-6911 for more information. **wbm**

### Eutypa Close Up

Eutypa is found worldwide and is especially common in Mediterranean climates. It attacks many other plants as well as grapevines, and is a major disease of apricots. Symptoms are generally found in plants 10 years or older, and are seldom found in vineyards less than eight years old. However, the infection event can occur several years before disease symptoms are apparent.

The disease appears to affect all varieties of vine with Cabernet Sauvignon, Sauvignon Blanc and Grenache reportedly being particularly susceptible. The disease does not appear to affect the quality of wine, but it does have a drastic effect on the quantity. Research in California has indicated that yields can be reduced as much as 30-60 percent and even 90 percent in severely infected vines.

In 1997 a survey was conducted of 44 South Australian vineyards in districts including the Barossa and Eden Valleys. Of the 60,000 vines surveyed, 4.7 percent showed stunted shoots typical of Eutypa infection, with some vineyards as high as 12 percent. The study concluded that Eutypa dieback was a "significant problem in mature vineyards."

#### Symptoms and Disease Cycle

Eutypa was formerly known as "dead arm" or "dying arm" and thought to be caused by the fungus *Phomopsis viticola*. In 1976, researchers found that the disease was actually two different diseases that often occur simultaneously: "Eutypa dieback" and "Phomopsis cane and leaf spot". Eutypa dieback is the trunk and arm phase, caused by *Eutypa armeniacae* and *Eutypa lata*, fungi that produce the characteristic dieback symptoms.

Eutypa causes cankers on the trunks and cordons of infected vines. The cankers are frequently found surrounding old pruning cuts. They may appear as flattened areas on the trunk and are usually concealed by dead bark. The cankers may be up to three feet long, but do not occur on younger, one- or two-year wood and seldom go below ground line. When the trunk is cut in cross-section, the canker is visible as a darkened or discolored section of wood, extending in a wedge shape to the center of the trunk.

The most striking and obvious symptoms of Eutypa dieback are the leaf and shoot symptoms, which may not develop for up to

three years after infection of the vine. The symptoms are most obvious in spring. Spring shoot growth is weak and stunted above the cankered area. Leaves are at first smaller than normal, cupped, misshapen and yellowed. Later in the season these leaf and shoot symptoms may disappear from all but the basal leaves of affected shoots. The vines may appear to have recovered. However, the infected trunk and all growth above it will eventually die.

The fungus survives in infected trunks for long periods of time, whether they remain as part of the in-place vine or as prunings in the vineyard. Eventually, the fungus produces reproductive structures (perithecial stroma) on the surface of infected wood. Spores (ascospore) are produced in these structures and are discharged into the air. Ascospore discharge is initiated by the presence of free water (either rainfall or snow melt). Most spores appear to be released during winter or early spring, with relatively few being released during the summer months. Unfortunately, most spores are released at the same time pruning is taking place.

The ascospores can be carried considerable distance (30-60 miles) by air currents to recent wounds on the trunk. Pruning wounds are by far the most important points of infection. When the ascospores come in contact with newly cut wood, they are washed onto exposed xylem vessel elements (vascular system of the wood). Once the spores germinate, they begin to infect healthy tissue. The wood dies, becomes discolored, and cankers are formed.

Two to four years after infection, stunted shoots with small cupped leaves appear. This symptom may be in response to a toxin or hormone produced in the canker and transported up the vascular system to developing shoots. Shoots on infected vines, not directly connected to vascular tissue from the canker, develop normally. When the canker enlarges and spreads into the vascular tissue supplying more of the vine, more shoots will show symptoms. After nearly five years, the bark weathers away from the canker and the fungus produces a stroma on the dead wood.

#### Controls

Remove infected trunks from the vineyard. The vine must be cut off below the cankered or discolored wood. The best time to identify infected vines is spring when the leaf and shoot symptoms are most obvious, the wounds are least susceptible to infection, and the availability of ascospores for reinfection is at a minimum. If trunks cannot be removed at this time, they should be marked so they can be removed after harvest, but before the next spring.

When the trunk or cordon is removed, the cut should be made well below the canker area in healthy wood. The cut surface should be protected from reinfection by painting with a wound dressing or an effective fungicide. Research in California and New York has indicated that painting large pruning wounds with a paste of the fungicide Benlate has provided some level of control.

If the canker has extended below the level from which shoots will develop for trunk renewal, the vine should be removed. Cut-out trunks and cordons should be removed from the vineyard and buried or burned to prevent ascospores from being produced on cankered wood, a process that can continue for several years. Furthermore, since old vine stumps left in the vineyard from previous removal practices frequently have the fungus growing in them and are sources of inoculum for new infections, they too should be destroyed.

The double trunk system of training, in which each trunk is pruned to carry half the number of buds, has been a useful system for minimizing crop loss from infected trunks. When one trunk must be removed because of disease, the remaining trunk can be pruned leaving the full number of buds until a second trunk can be reestablished.

Information provided by University of California, Statewide Integrated Pest Management

Project, [www.ipm.ucdavis.edu](http://www.ipm.ucdavis.edu) and Ohio State University Extension, Plant Pathology, [www.ag.ohio-state.edu/~plant.doc](http://www.ag.ohio-state.edu/~plant.doc).

Information is subject to change depending on the results of the five-year AVF Eutypa program.