



Fig. 1



Fig. 2



Fig. 3

Eutypa fungus causes grapevine dieback

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Inoculation experiments initiated in 1974 on healthy Grenache grapevines have conclusively shown that the apricot dieback fungus *Eutypa armeniaca* is capable of producing cankers and weakened shoot growth, the forerunners of dying and dead arms. This report is a follow-up of progress in the identification of the cause of a grapevine dieback disease described in the February 1975 issue of *California Agriculture*.

Infections in vineyards occur as the fungus, in the form of wind-blown spores, apparently enters the vine through freshly-made, large pruning wounds and gradually kills the surrounding wood and bark to form a canker (figs. 1 and 2). In the spring, shoots arising adjacent to the cankers become progressively stunted, and the leaves on these shoots become distorted and yellowed (fig. 3); the shoots die several years after the appearance of the initial symptoms.

'Eutypa dieback' is proposed as a common name for this disease.

Sixteen cordon-trained, seven-year-old Grenache grapevines growing in an experimental vineyard at the University of California, Davis, were inoculated with *E. armeniaca*—half the vines in July 1974, the remainder in November 1974. Every other arm on the vines was removed by pruning, and plugs of five-day-old cultures of the fungus on potato dextrose agar were placed directly onto the freshly exposed stubs. Agar alone was placed on an equal number of pruned sites as controls. Then the wound sites were covered with aluminum foil for one month to retain the inoculum in position and to prevent rapid desiccation. Thus, for the two dates, 48 pruning wounds were inoculated with *E. armeniaca* and 48 with agar as controls.

In May of 1975, 1976, and 1977, when normal growth averaged about 15 to 18

inches, the shoots growing adjacent to the inoculation sites were examined for the presence of stunting or abnormal leaf symptoms. The table shows the progressive development of these symptoms.

In May 1977, the trunks of eight of the vines in the experiment were cut off below the cordon branches to permit detailed examination and isolation of the fungus from the experimental pruning wounds. The remaining eight vines were left intact for future evaluation of disease development and its effects on crop production. Shoots and bark tissues were stripped from each severed cordon; sections at the wound sites were split longitudinally to facilitate recovery of the fungus from the inner wood tissues. After surface sterilization, small wood chips were cut from margins of the discolored wood and incubated on agar plates at 20 to 25°C. When present, colonies of *E. armeniaca* were recognized by their mycelial characteristics within 3 to 4 days.

Eutypa was recultured from 96 percent (23 of 24) of the inoculation sites and from 12 percent (3 of 24) of the controls. Canker development away from the original pruning stubs extended an average of 223 mm for the *Eutypa* inoculations and 14 mm for controls (fig. 4.).

Thus, evidence is provided that *E. armeniaca* is capable of inciting cankers adjacent to pruning wounds, and causing stunted shoot and chlorotic leaf symptoms in grapevines. The fungus can be recovered from the infected tissue of these cankers, thereby completing the requirements of Koch's postulates—that an organism isolated from diseased tissue be used to inoculate a healthy plant, produce the symptoms of the disease, and be recovered—and demonstrating that *E. armeniaca* is the causal agent of a dieback disease of grapevines.

Other studies have been initiated to find suitable methods of preventing the occurrence of this disease. It is suspected that air-borne spores of *Eutypa* infect pruning wounds following rain storms, as has been shown for apricot trees. The most damaging effects of *Eutypa* dieback are evident on older vines that were drastically cut in retraining, resulting in large pruning wounds.

Observations of the Development of Chlorotic Leaf and Stunted-Shoot Symptoms of 16 Grenache Vines Inoculated with *E. armeniaca* in July or November, 1974

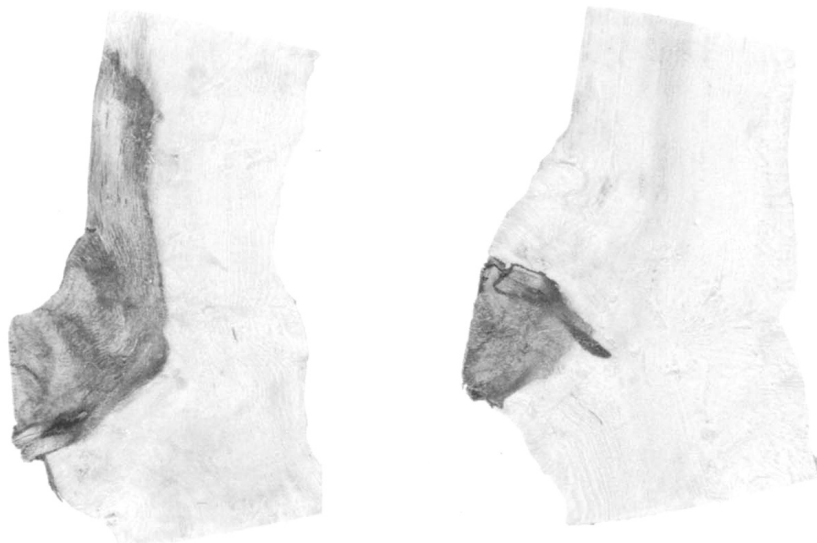
Inoculation treatment	Number of arms inoculated	Number of sites with symptoms observed in May				Total
		1975	1976	1977		
<i>Eutypa armeniaca</i>	48	2	15	16	33	
Agar only (control)	48	0	0	2	2	

Fig. 1. A large canker on the trunk of a Cabernet Sauvignon vine is associated with unhealed pruning wounds. The bark has been stripped from the healthy portion of the trunk to reveal the nondiseased wood which is white in color.

Fig. 2. Leaf and shoot stunting (right) are symptoms of *Eutypa* dieback on a Carignane grapevine. Note the contrast with healthy leaves and shoots (left).

Fig. 3. A cordon branch of a *Eutypa*-diseased Chenin blanc vine was cut in cross-section through a canker to reveal the extent of wood tissue deterioration.

Fig. 4. (below) Sections of Grenache cordon branches split longitudinally to reveal the extent of canker development three years after inoculation. The site on the left was inoculated with agar (control); the one on the right was inoculated with *Eutypa armeniaca*.



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