

CYTOSPORA CANKER

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Objectives:

To ascertain the role of the Cytospora fungus in the dieback of French prune trees.

Results and Conclusions:

The susceptibility of French prune trees to 76 cultures of Cytospora was determined by means of mycelial inoculations. Some cultures caused no infection but others resulted in the formation of small elliptical cankers. In healthy trees the cankers did not become perennial, but in weakened trees they grew more rapidly and tended to become perennial. In the latter trees greatest canker activity occurred during the summer, whereas in healthy (resistant) trees greatest canker development occurred during spring and fall. Canker activity during the summer appears to be limited by the healing reaction of the host.

Since Cytospora cankers failed to develop extensively in healthy trees, studies were conducted to determine what factors were responsible for disease predisposition. Trees subjected to postharvest moisture stress developed significantly larger cankers following inoculations with Cytospora than did well-irrigated trees. In an extensive survey of commercial orchards, soil factors were found to be highly correlated with disease incidence. Soils with heavily-infected trees tended to be high in clay content, shallow, and/or low in total potassium. Trees showing chronic potassium deficiency also showed increased amounts of Cytospora canker. Some evidence was obtained that nematodes may play a role in the predisposition of trees to Cytospora canker, but further work is necessary to definitely establish this fact.

Another phase of the study dealt with the production and dispersal of spores (conidia and ascospores) of the pathogen. Conidia could be trapped following rain at any time of the year, but ascospores were common only in the spring. Ascospores were found to be both water-borne (released during rain) and air-borne (released following rain). Conidia were released by water and were dispersed largely by wind-blown rain. The distance of dispersal was correlated with the mean wind velocity during the rain. Increasing time and/or temperature between rains were related to increasing numbers of conidia subsequently caught.

Both conidia and ascospores were able to cause infection, however, conidia were 10 to 10,000 times more common than water-borne ascospores. Conidia are usually produced on cankers within the first year after infection, but ascospore production generally does not begin until a year or two later. Since prune orchards generally are pruned on a yearly basis to remove dead or excess wood, conidia probably cause most of the infection.

A study of mode of infection by the pathogen showed that neither pruning cuts nor leaf scars were important as infection courts. Sunburned areas of the bark served as the major infection sites. They occurred most commonly on branches bent over by the crop or on branches prematurely defoliated by prune dieback or lack of water. Sunburns cracked open due to natural stresses or were invaded by insect borers during the same season they occurred. Although sunburns served as infection courts, they could not be demonstrated to exert any general predisposing effect on an otherwise healthy tree to the continued development of Cytospora canker.

Work Planned:

Most of the needed research on this project has been completed and the results are being prepared for publication. The following two aspects, however, justify further investigations:

1. The relationship of branches with prune dieback to Cytospora infection and canker development.
2. The effect of nematodes on the susceptibility of prune trees to Cytospora canker (cooperative with Nematology).

Publications:

Bertrand, P. F. 1974. Cytospora canker of French prune. Ph.D. thesis, UCD. 113 p.