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A WILT OF PAPA W CAUSED BY VERTICILLIUM DAHLIAE KLEB.

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Summary

Glasshouse pathogenicity tests with *Verticillium dahliae* isolated from wilted papaw plants in the Brisbane area showed that the fungus rapidly attacks injured papaw roots but that uninjured roots are less readily affected. The disease does not appear to be of widespread economic importance.

Introduction

Wilting of papaw plants was reported from four locations in the Brisbane area in south-eastern Queensland during the winter of 1965. Isolations from discolored internal stem tissue of wilted specimens consistently yielded cultures of *Verticillium dahliae* Kleb.

Infected plants ranged in age from 3 months to 3 years. Older trees which had apparently only recently become infected still bore good crops of fruit which matured normally. The subsequent progress of the disease in these older plants could not be followed, since the area was cleared by the grower to make way for new plantings.

Six-month-old plants in two commercial plantings showed 15 and 25% infection respectively. Most of the severely infected plants in these two areas died out. Those which survived were examined a year later when they had reached bearing age, but the trees in this case appeared to be weak and carried only a poor crop of small fruit.

There are indications that infection may have originated from plant residues from previously susceptible crops, since on one farm the disease occurred only in one area. Papaw plants taken from the same seedbed and planted on other parts of the property were not affected by wilt. The previous cropping history on this farm is not known.

Symptoms

The first indication of the presence of this disease is given by the collapse of the laminae of leaves, usually on one side of the plant. The older leaves are affected first but the leaf wilting rapidly progresses right to the top of the plant. The collapsed leaves dry out while still green and eventually become a grey-brown colour. The petioles remain erect and the dead leaves usually remain attached to the tree.

A transverse section of the stem shows a watersoaked spotting extending through the cortex, vascular region and pith on the side where the leaves have wilted (Figure 1).

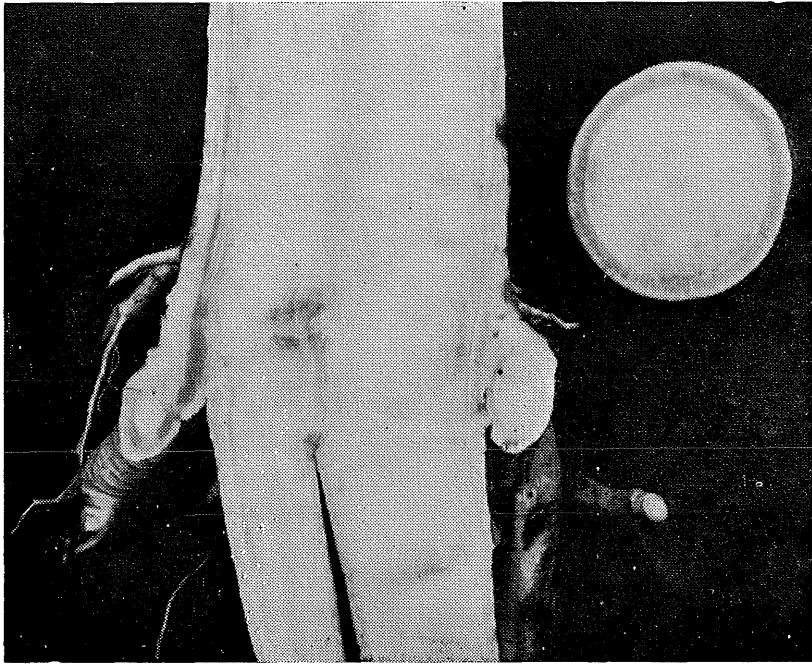


Fig.1.—Longitudinal and transverse sections of young papaw stem, showing watersoaked areas due to infection by *Verticillium dahliae* Kleb.

When the stem is split longitudinally, the watersoaked strands are found to extend down into the tap-root, where the infection will usually be found to have originated in one or two of the lateral roots (Figure 1). In the later stages of infection, these watersoaked areas develop a brown flecked appearance. The fungus is readily isolated from the watersoaked or brown tissue.

Pathogenicity Tests

In a glasshouse trial, three varieties of papaw—Hybrid No. 5, Hoffman No. 3, and a field-run cultivar of the Sunnybank variety—were inoculated at 5 months of age with two isolates of *V. dahliae* taken from infected papaws.

Inoculations were made onto plants with injured and uninjured roots. Inoculum was prepared by macerating cultures of *V. dahliae* grown on potato dextrose agar with water in a blender. Control plants were inoculated with an aqueous slurry of sterile potato dextrose agar.

Where injured plants were inoculated, the roots were washed free of soil, some roots were cut off with a sterile scalpel and the plants repotted in sterile planting medium, adding 75 ml of inoculum when the pots were three-quarters filled.

Uninjured plants were inoculated by carefully washing about one-quarter of the depth of potting medium from the top of the pot so as to expose the roots, adding 75 ml of inoculum slurry, and then refilling the pots with sterile medium.

None of the control plants showed wilt symptoms. Injured plants wilted after 12 days but uninjured plants did not wilt until 34 days after inoculation.

In the early stages, wilting of leaves was confined to one side of the plants, but it rapidly spread to affect all fully opened leaves. The apical shoots, however, maintained a healthy appearance and about 1 month after the disease symptoms first appeared the plants showed signs of recovery, putting out lateral shoots from the axils of wilted leaves. None of the inoculated plants died.

Infected plants showed typical internal stem symptoms, and the fungus was re-isolated from the discolored tissues.

Wilting developed in 10 out of 18 of the injured inoculated plants and in 5 out of 18 uninjured plants. Varietal reactions were as shown in Table 1.

TABLE 1
NUMBER OF PAPA W PLANTS AFFECTED BY VERTICILLIUM WILT

Variety	Hybrid No. 5		Hoffman No. 3		Sunnybank	
	Injured	Uninjured	Injured	Uninjured	Injured	Uninjured
None—controls	0	0	0	0	0	0
16612	2	2	1	0	2	2
16623	2	1	0	0	3	0

Three plants used in each treatment.

Discussion

It was shown that *Verticillium dahliae* can cause severe wilting of young papaw plants in the glasshouse. The variety Hoffman No. 3 appeared to be the least susceptible of the varieties tested, but the number of plants used was not sufficient to make this definite. In the field, a high proportion of young plants died following infection. Infection of older plants does not appear to seriously affect bearing.

This appears to be the first record of *Verticillium* wilt in papaw.

In a survey of several papaw plantations during the winter of 1966, the disease was found in only one of those plantations which had been seriously affected in the previous year. At present it does not appear that this disease is of widespread economic importance but it may become locally severe where conditions favour its development.

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