

WOODINESS OF PASSION FRUIT.*

THE woodiness disease of passion fruit has long been known as a serious disease in New South Wales. The condition is most readily recognized in the fruits, which are quite hard and woody in contrast to normal fruits.

Healthy fruits are somewhat ovoid in shape, and on drying slightly become shrivelled in a characteristic manner. Woody fruits are generally stunted and deformed. They are occasionally spherical in shape, and this feature, coupled with the hardness and purplish leaden colour of the fruit, has given rise to another common name for the disease, viz., "bullet."

The skin or rind of such fruits is abnormally thickened, and is often accompanied by a certain amount of cracking and scaliness of the outer layers. These fruits can only be cut through with difficulty, and are then observed to contain only a limited supply of pulp of inferior quality. Although the disease is most commonly observed on the mature fruits, symptoms of the disease may be observed in fruits in all stages of development. In severe cases, many of the younger fruits fail to mature and fall from the vines.

In addition to these marked symptoms on the fruits, the disease is also characterised by certain abnormalities of the shoots and foliage of the vines. Such vines generally have a stunted and deteriorated appearance. The leaves, particularly of the terminal shoots, are smaller than normal leaves, and frequently are puckered, curled and twisted. On closer examination it is seen that such leaves do not possess a normal green coloration, but are either pale yellowish-green or have a mottled appearance, due to the presence of light-green and dark-green areas. Secondary symptoms of the disease may be observed on the older mature leaves. Although at first normal in appearance, such leaves may later develop a series of small, pale-yellowish spots, particularly in the areas between the veins. These spots should not be confused with the discolorations caused by the brown spot fungus *Gloeosporium fructigenum*.

The disease is most commonly observed during the winter months, although severely diseased vines may be seen throughout the year. Individual vines only may be affected, or the disease may be widespread throughout a plantation. Slightly diseased vines, which have produced a few woody fruits during the winter months, may subsequently produce normal fruits during the summer months, but such vines are not as productive as normal vines.

Although the disease is most apparent on older vines, close examination will often reveal that it is present in young vines, and even in young seedlings, and it is most important that the symptoms of the disease on the leaves and shoots should be fully appreciated in order that control measures should be most effectively applied.

Many different theories have been advanced as to the cause of the disease, but it has now been established that it is due to the action of a virus. The virus is infectious in character, and is present in the sap of

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diseased vines. Diseased vines represent sources of infection and are, therefore, a menace to adjacent healthy vines. The disease was readily transferred by mechanical means in the infection experiments, and it is very likely that this is the most common method of transmission of the disease under field conditions. Infection may be carried on the hands of those working among the vines when pruning, rubbing off the early shoots, and in tying the vines to the supporting stakes and wires. Insects which feed on diseased vines and then migrate to healthy vines may also be concerned in spreading the disease. Passion vines, however, are not very subject to visitation by insect pests, and this aspect is probably not of great importance under commercial conditions.

CONTROL MEASURES.

1. Seedlings should not be raised in proximity to diseased vines. The seedlings should be closely inspected at frequent intervals, and those showing signs of disease in the leaves should be removed and destroyed. Only healthy seedlings should be planted out.

2. After planting out, the vines should be carefully and systematically inspected at intervals, and again any diseased vines which are observed should be immediately removed and destroyed. Such vines should not be pruned. Replacements may be safely made shortly after removal of the diseased vines. The hands and knives should be well washed in soapy water after dealing with a diseased vine and before working with healthy vines.

3. When the disease is observed to be fairly widespread in an older plantation, the vines should never be pruned in October or November with a view to the production of a winter crop. Such action will result in removal of the summer crop, and the subsequent winter crop will contain a high percentage of worthless woody fruits.

4. Older areas of vines should be cut down and destroyed as soon as they become commercially unprofitable. They should not be allowed to remain in a neglected condition, as they are a source of dangerous infection to adjacent young vines.

5. Severely diseased individual vines in older plantations should be first cut off at the ground level and allowed to dry out before removal. This procedure is less likely to cause injury and subsequent infection of the adjacent vines which have become intergrown with the diseased vine on the supporting wires.

6. Remove all weeds and other material which may harbour insects in proximity to the vines. Sprays cannot be applied effectively to passion vines under commercial conditions; thus it is all the more necessary for other means to be adopted to minimise possible insect infestation.