

CURTAILMENT OF CITRUS GREENING DISEASE *

by

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INTRODUCTION

Greening disease remains one of the most serious diseases of citrus in the cooler production areas of the Transvaal and Natal. Infection has also been found in the hotter areas, especially near windbreaks. Although the insect vector occurs in the Cape, and is capable of transmitting the disease, greening does not spread in this region for some unknown reason.

Causal organism

The disease is caused by a gram negative bacterium-like organism which occurs in the sieve elements of the phloem of the host. Attempts by several laboratories to culture the organism on artificial medium have to date been unsuccessful. Until this has been achieved, the exact identity of the organism will remain unknown.

The vector

Greening is transmitted by the adult citrus psylla, *Trioza erytrae*. Although the organism can be ingested during the nymphal stages, it will only be transmitted when the nymph has reached the adult stage. When the insect feeds on infected shoots, the causal organism is ingested and subsequently multiplies in the insect's body. Once a psylla is infected, it remains so for life. The greening organism is transmitted by the infected psylla to healthy shoots during feeding. Transmission of the disease organism to healthy plants by adult psylla can occur within 48 h after acquisition.

DISEASE IDENTIFICATION

General tree appearance

Greening can cause stunting, leaf and fruit drop and twig dieback. Frequently only one or a few branches are affected while the rest of the tree appears normal and produces normal fruit. Infected branches tend to drop their leaves during autumn or early winter resulting in out of season blossoming and flush.

Fruit symptoms

Affected fruit are reduced in size, lopsided and of poor quality. Some fruit drop prematurely and those remaining on the trees do not fully colour up. Diseased fruit may produce normal or abortive seed. There is no evidence that the disease can be transmitted through the seed.

Leaf symptoms

Two types of leaf symptoms predominate. Normal size leaves turn yellow along the main and secondary veins. This symptom can progress to a blotchy mottle and is usually associated with vigorous growth. Secondly, leaves on weak terminal twigs are small, upright and show a variety of chlorotic patterns similar to zinc deficiency symptoms. The leaves become leathery and tend to drop, especially during early winter. The resultant bare twigs may die back or flower and flush out of season. High temperatures can suppress symptom expression and therefore symptoms are better recognised during the cooler months of the year.

Fluorescent test

Some citrus, especially sweet oranges and mandarins, produce a phenolic compound when infected with greening. This substance has a distinctive, specific, violet fluorescence when viewed under ultraviolet light. Greened fruit, cut at the stem-end and viewed under a ultraviolet lamp, show this fluorescence in the albedo. The same substance can be found in bark extracts of diseased trees and can be separated by thin layer chromatography for detection.

* Presented at the AGM of the Natal Midlands Citrus Growers' Association

Antibodies

Research to produce antibodies for the identification of the disease is presently being investigated by the University of Pretoria.

CONTROL

Several control measures exist and each farmer should decide which measures are applicable in his situation. Controlling the disease is based on two approaches: i) to keep vector populations as low as possible and ii) to reduce the disease inoculum. The best time to recognise infection visually is during winter.

Control of the vector

This is the most important control measure. Monitor the presence of psylla by scouting and/or yellow traps. Apply control measures at very low population levels to prevent population explosions.

Establishing new orchards with healthy plants

This implies good vector control in the nursery and the use of budwood from healthy trees, mainly from the Outspan Foundation Block at Uitenhage. Buy trees from nurseries registered with the SA Citrus Improvement Program.

Care of young trees in the orchard

Young trees should be kept permanently poisoned by the use of systemic insecticides for the first 3 years. Any abnormal plants should be removed. Cut out greening-infected twigs.

Antibiotic treatment

Inject whole trees or individual infected branches. Trees older than 10 years with more than 40 % infection can be treated. Follow instructions on the label of the antibiotic.

Tree surgery

Removal of infected branches where antibiotic treatment had no effect or where the infection is so low that antibiotic treatment is uneconomical. Infected branches of young trees with less than 50 % infection and infected branches of trees older than 10 years should be removed. The correct method of branch removal is demonstrated in Fig. 1.

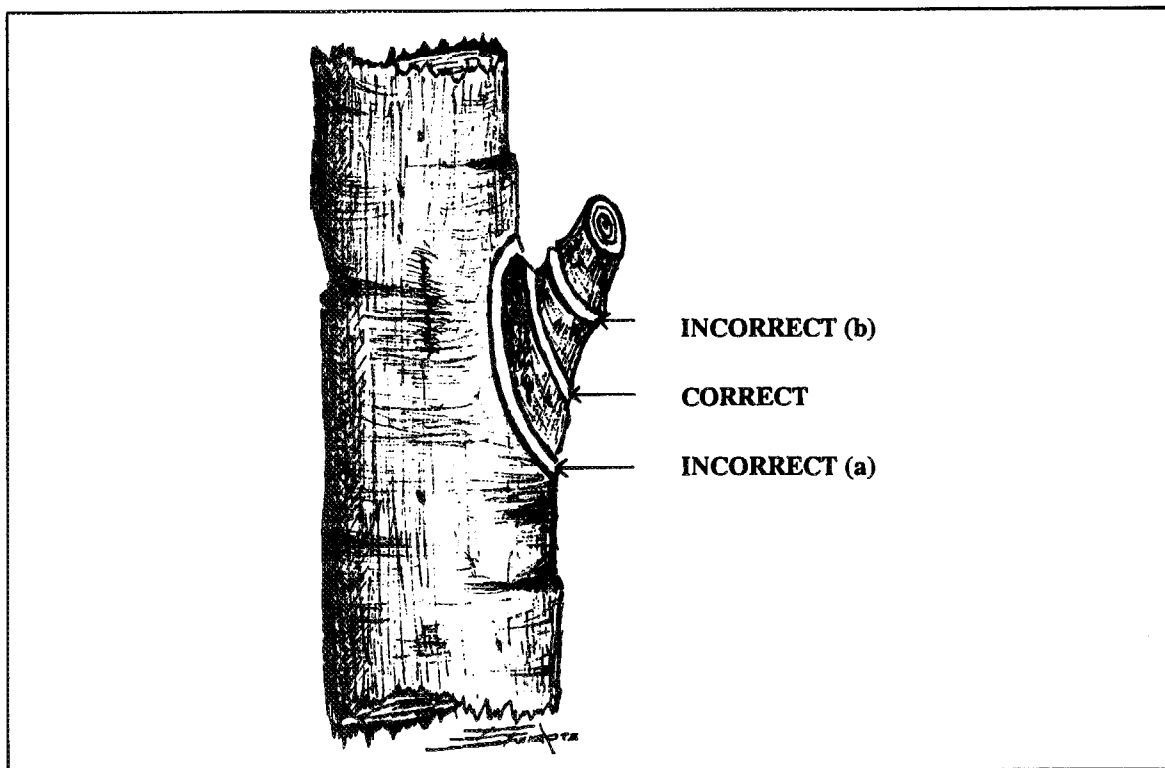


FIG. 1 Schematic presentation of the correct and incorrect methods of removing a branch. If the branch is cut too deeply (incorrect (a)), the wound usually does not heal properly and secondary fungus infections can occur. When a stump is left (incorrect (b)), new growth is stimulated which can be a feeding source for the greening vector

Illustrated by D.H. Swarts

Removal of infected trees

Trees 10 years of age and younger, with an infection of more than 50 % must be removed. Trees older than 10 years which produce uneconomically should be destroyed.

Tolerance and resistance

Citrus cultivars differ in their susceptibility to greening disease. Sweet orange is more susceptible than grapefruit. The rootstock also affects the susceptibility of the scion, trees on trifoliata rootstock being more susceptible.

While lemons are apparently tolerant to the disease, the continual flushing throughout the year is ideal for psylla breeding and can be a source from which infection takes place.

INFORMATION ARTICLE

THE YELLOW PECAN APHID AND HOW TO CONTROL IT

by

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The yellow pecan aphid, *Monelliopsis pecanis*, was first noticed on pecan trees in the Transvaal Lowveld and Natal in 1975. The adult insect is pale yellow, about 2 mm long and has a soft body. Both winged and flightless types occur.

DAMAGE AND SYMPTOMS

During spring and summer the aphids feed on the underside of the leaves (Fig. 1). Although their feeding does not result in any noticeable damage to the plant, they secrete large quantities of honeydew. Sooty mould grows on this secretion and discolours the branches and leaves (Fig. 2). This blackening of the leaves affects the normal functions e.g. photosynthesis, with a resultant drop in yield. Foreign researchers are of the opinion that honeydew promotes the development of pecan scab.

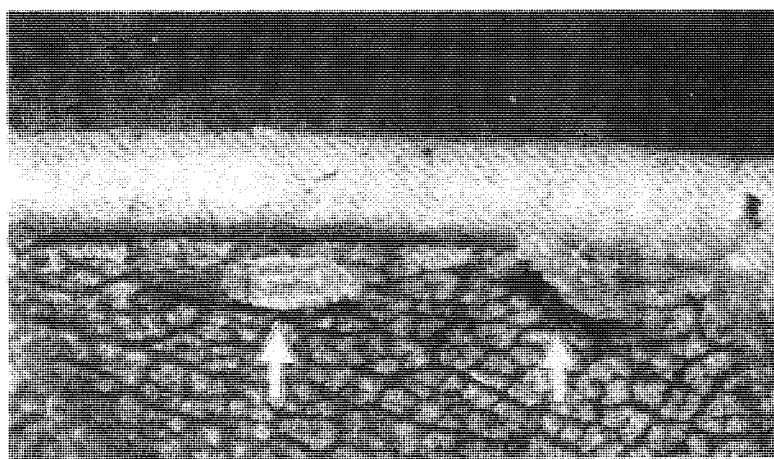


FIG. 1 Two winged adults of the yellow pecan aphid feeding next to the mid-vein on the ventral side of a pecan leaf

LIFE CYCLE

With the onset of winter the females lay eggs in the cracks in the bark of the trees. These eggs hatch in spring. The eggs are black and difficult to see with the naked eye. During summer, however, the females give birth to young nymphs without mating and in autumn males are born. At this stage mating takes place and the wintering eggs are laid. Several generations occur.