The OPRAtive Word

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Finschhafen Disorder in Oil Palm

Its symptoms, causal agent, current knowledge and control

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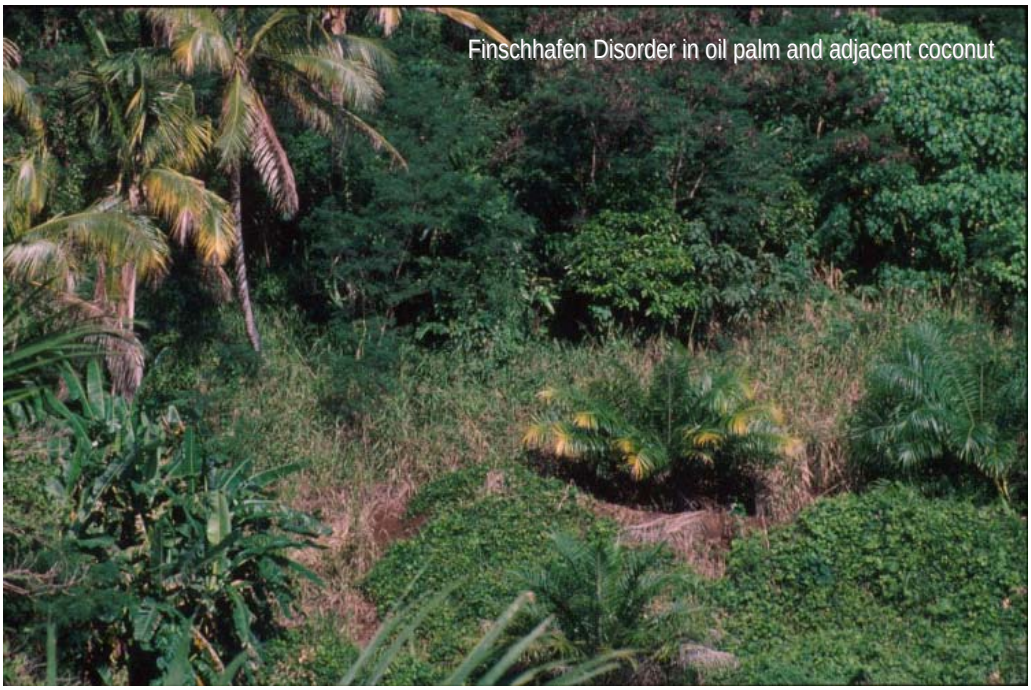
INTRODUCTION

Finschhafen disorder was first identified in 1960 in a grove of coconuts near Finschhafen in Morobe Province, Papua New Guinea. From there it has spread into various parts of PNG, including West New Britain, where it was first recorded in 1994.



Finschhafen Disorder in oil palm and adjacent coconut

SYMPTOMS

Early symptoms of the disorder include a yellow/bronzing from the tip of the leaflets found at the tip of the fronds. As the condition advances the leaflet tips become necrotic, with advanced symptoms appearing as senescence of leaves, with accelerated and pronounced yellowing and necrosis. Normally the condition does not spread beyond the first 45 leaflets at the tip of the frond.

In coconut palms, however, this disorder can affect all the leaflets on a frond and numerous fronds, resulting in reduced yields, slowing of growth rate and, occasionally, the death of young coconut palms.

The appearance of symptoms on oil palm are usually associated with nearby damage to coconut, which is the preferred food plant of the causal agent.

Symptoms of Finschhafen disorder are sometimes confused with magnesium deficiency, however the latter symptoms show a shade affect, where leaves that are shaded do not turn yellow.

THE CAUSAL AGENT

Feeding by a brown leafhopper (*Zophiuma lobulata* Ghauri) causes Finschhafen disorder on coconut and oil palm. It is thought that the symptoms are caused by a localised toxic reaction to *Z. lobulata* feeding on the fronds.

The nymphs and adults of the leafhopper are easily recognized.

The adults are 1.5-2.0cm long and have a distinctive eye on the tip of each forewing.

The female leafhoppers lay batches of eggs on the leaves of coconut and oil palms. The eggs are covered with very white waxy threads that are produced by special glands. These batches are easily recognizable.

CURRENT KNOWLEDGE

BIOLOGY OF *Z. LOBULATA*

Both nymphs and adults of *Z. lobulata* feed on the fronds of coconut and oil palm by pushing their mouthparts (stylets) into the leaf/stems using saliva to break down the tissue. It is this saliva which is suspected to cause the damage to the palms. The leafhoppers show a preference for the younger fronds but can also be found on the

Finschhafen Disorder symptoms on oil palm fronds

older fronds with symptoms. Most feeding occurs on the petiole, midrib or the central veins of the leaflets. Besides coconut and oil palm, the leafhoppers are also found feeding on betel nut, granadilla and pandanus.

The total generation time of the leafhopper is about four months; consisting of an egg incubation period of 8-9 days, a mean of 86 days as nymphs, and a 30 day pre-oviposition period before the females begin to lay eggs. The eggs are ovoid in shape, about 2mm by 1mm and an egg mass has an average of 39 eggs (1-217). There are five nymphal instars before the insects become adult. All the nymphal instars have the long, waxy filaments extending from the rear end.

Egg cluster of *Z. lobulata*

NATURAL ENEMIES

There are several predators of *Z. lobulata* including some salticid spiders. So far, two species of egg parasitoids have been recorded; an unidentified micro-hymenopteran and *Ooencytrus malayensis*, a parasitoid that is found in several pest species of bugs, butterflies and moths. Egg masses sampled in outbreaks of the leafhoppers often have 50% or more of their eggs parasitized by the egg parasitoids. Two unidentified species of entomophagus fungi are also associated with *Z. lobulata.* Observations in the field suggest that both the egg parasitoids and the fungi appear to suppress the leafhopper outbreaks and therefore have potential for control.

APPEARANCE OF SYMPTOMS

In coconut, it was shown experimentally that it took six to seven months for the symptoms to appear after intensive feeding by the leafhoppers had begun. Field data for oil palm suggests that the period for the symptoms to appear is similar. This means that when symptoms are reported from oil palm plots, the upsurge of the leafhoppers is likely to have passed 6-7 or more months before. When plots with symptoms are examined, usually only few leafhoppers are found and any egg batches often show high levels of parasitism, suggesting a suppression by the parasitoids.

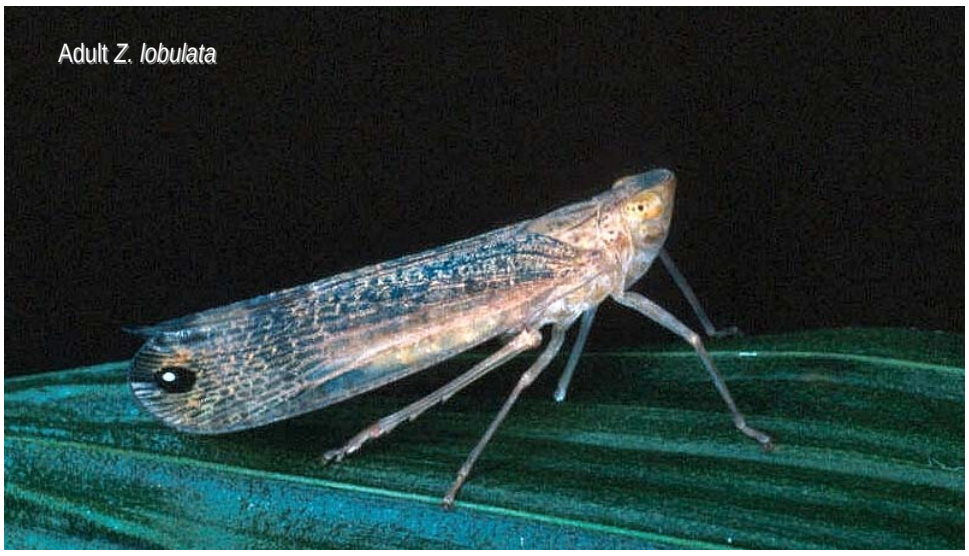
MONITORING AND CONTROL

Because it is the feeding of *Z. lobulata* that causes the symptoms, control of the disorder is dependent on the management of the leafhopper populations. The best way of find upsurges of the leafhoppers is to monitor for the presence of large numbers of the leafhoppers, in particular for the presence of large numbers of egg batches which are distinctive and easy to see on the undersides of the palm leaflets or petiole/rachis. If found at this time (6-7 months before the symptoms come through) the leafhoppers can be controlled using a single

Juvenile *Z. lobulata*

trunk injection per palm of 60%w/v methamidophos (or similar recommended systemic insecticide) at 10ml per palm in a single 1.5cm diameter hole, 15cm deep and drilled at a 45° angle into the trunk, 1m above the ground. The hole should be plugged with a wooden stake to prevent rainfall trunk-flow from flushing the insecticide from the hole and also to avoid infections getting into the palm. Since the efficacy of the insecticide remains for up to 60 days, any nymphs hatching from eggs will be controlled. Trunk injection at the time that symptoms appear is likely only to clear up the remnants of the population which peaked 6-7 months before.

It is hoped that IPM strategies, based on a clear knowledge of the pest, the appearance of symptoms, and using the parasitoids, fungal diseases and any other identified biocontrol agents, can be developed to reduce the use of insecticides.



Adult *Z. lobulata*

For further information on Finschhafen Disorder, please contact PNGOPRA's Senior Entomologist at the address below.

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