

Coconut foliar decay (231)

Common Name

New Hebrides coconut disease. It has also been known as foliar decay *Mindus taffini*. The name '*Mindus taffini*' belongs to the planthopper insect that transmits the disease.

Scientific Name

Coconut foliar decay nanavirus. The abbreviation is CFDV.

Distribution

It is only recorded from Vanuatu.

Hosts

Coconut

Symptoms & Life Cycle

The first symptom on palms in the field is yellowing of a few leaflets on any of the fronds between position seven and 11 from the spear leaf. The yellowing spreads along the fronds, and the fronds break near the base so that they hang down through the still green lower leaves. As the younger leaves age, reaching positions seven to 11, they, too, turn yellow, break and hang down. In time diseased palms have a few green fronds at the top, and broken mid-section fronds hanging through the lower, still green fronds below (Photo 1). As the disease progresses, the trunks narrow towards the top, and the palms die after 1-2 years, except for those that are tolerant to the disease and show remission of symptoms. In experimental tests with the susceptible Malayan Red Dwarf, symptoms occur 7-10 months after infection (Photos 2,3&4).

The virus that causes the disease is small and found at low concentrations in coconut palms; because of this, it is difficult to see in sap viewed by electron microscopy. The virus occurs in the phloem of the coconuts - the tubes in plants that transport foods from the leaves to the roots - but it has not been found in *Hibiscus tiliaceus* or in any other plant growing near coconuts. Within coconut palms, the virus occurs in the leaves, roots, trunks, and the embryo and the husk of the nut. However, it is not known if the virus is transmitted in the seed.

Spread is by *Myndus taffini*, a planthopper, which breeds on the roots of *Hibiscus tiliaceus* (Photo 5). The adults of this insect feed on coconuts. In Vanuatu, *Hibiscus tiliaceus* is used as a living fence around blocks of coconuts, and those palms at the margins of the blocks are often the first to show symptoms.

Although *Myndus taffini* is known to transmit the virus, there is little known about its relationship with the virus. For instance, it is not known if the virus multiplies in the insect, or whether the nymphs or the adults, or both, acquire the virus.

Impact

The virus causes a lethal disease of coconuts in Vanuatu. However, it does not affect Vanuatu Tall or Vanuatu Dwarf varieties; they do not show symptoms and are said to be resistant to infection by the virus. By contrast, introduced varieties are nearly all affected by the disease, although there are differences between them. The Malayan Red Dwarf, for instance, is particularly susceptible to infection, whereas the Rennell Tall variety is tolerant, with some showing symptoms and then recovering. When palms recover from infection, and appear healthy once more, they are said to show 'remission' of symptoms.

The disease is important in Vanuatu, not because it affects the local varieties grown in all the islands, but because it affects improvements to the coconut industry based on high-yielding hybrids. Local tall and dwarf varieties are low yielding compared to the hybrid varieties of commerce, e.g., Malayan Yellow Dwarf x Rennell Island Tall, Malayan Yellow Dwarf x West African Tall, and Cameroon Red Dwarf x Rennell Island Tall.

Detection & inspection

Look for yellowing leaflets and fronds in the mid-section of the palm and, later, palms that have a few green fronds at the top and bottom and broken mid-section fronds hanging through those below.



Photo 1. Intense yellowing of mid-section fronds. One of them is hanging down because of a broken petiole, whereas the youngest and oldest fronds are still green.



Photo 2. Foliar decay on Malayan dwarf seeding.



Photo 3. Susceptible Malayan dwarf showing symptoms of coconut foliar decay.



Photo 4. Malayan Dwarf variety with coconut foliar decay showing severe yellowing of the fronds.

Management

QUARANTINE

The FAO/IBPGR *Technical Guidelines for the Safe Movement of Coconut Germplasm* recommend that coconuts should be moved as embryos growing in a sterile tissue culture medium. As a special note, the Guidelines recommend that embryos, seedlings and palms from which pollen is collected should be tested for viroids and *Coconut foliar decay virus*. If that is not possible, seednuts may be transferred if they are germinated in intermediate (third country) quarantine, and indexed for viroids and *Coconut foliar decay virus*. (<http://www.bioversityinternational.org/e-library/publications/detail/coconut/>.)

CULTURAL CONTROL

The removal of the host tree of the insect that spreads the virus is likely to be beneficial but it has yet to be put to the test. *Hibiscus tiliaceus* is popular as a 'living' fence throughout the Vanuatu, and its removal to prevent a disease that occurs only on exotic coconuts is unlikely to appeal to smallholder farmers who usually only plant Vanuatu Tall. Hybrid coconuts are mostly favoured by large-scale commercial producers.

RESISTANT VARIETIES

The disease is best controlled by either planting selected Vanuatu tall or the hybrid, Vanuatu Tall x Vanuatu Red Dwarf.

CHEMICAL CONTROL

This is not an appropriate method of control of this disease. It is difficult to spray coconuts because of their height, and it is unlikely to be a method of economic benefit.



Photo 5. Life stages of the insect that transmits *Coconut foliar decay virus*, *Mindus taffini*.

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Information from Frison EA, et al. (eds.). 1993. *FAO/IBPGR Technical Guidelines for the Safe Movement of Coconut Germplasm*. Food and Agriculture Organization of the United Nations, Rome/International Board for Plant Genetic Resources, Rome. (https://www.bioversityinternational.org/fileadmin/user_upload/Coconut_361.pdf); and from CABI (2019) Coconut foliar decay virus (new Hebrides coconut disease). Crop Protection Compendium. (<https://www.cabi.org/cpc/datasheet/16742>). Photo 2 John Randles, Waite Agricultural Research Institute, Glen Osmond, South Australia.

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