Pacific Pests and Pathogens - Fact Sheets

Coconut tinangaja (198)

Photo 1. Distorted small nuts on a coconut palm with tinangaja viroid disease.

Photo 2. Long, thin nuts on a coconut with tinangaja viroid disease. On the right, the seednut is also showing "scarification" - longitudinal lines down the husk. Another typical feature of the disease.

Photo 3. Coconut palm with advanced symptoms of tinangaja viroid.

Photo 4. Coconut palm with advanced symptoms of tinangaja viroid showing the "pencil-point" tapering of the trunk.

Common Name

Tinangaja, yellow mottle decline

Scientific Name

Coconut tinangaja viroid. The abbreviation is CTiVd.

Distribution

Narrow. It is only recorded from Guam, but related to the more serious coconut cadang-cadang disease that occurs in the Philippines.

Hosts

Coconut

Symptoms & Life Cycle

Tinangaja is caused by a viroid. A viroid is a length of RNA, much smaller than the RNA of the smallest virus, and without a protein coat.

The first obvious sign of the disease are yellow spots on the leaves, and small, thin, scarred nuts without a central kernel (Photos 1&2). As the disease progresses, leaf, flower and nut production slow down, and there is a general yellowing of the leaves, a tapering of the trunks, and death (Photos 3&4). From the time of the first symptoms until death can take up to 15 years.

The viroid is related to cadang-cadang viroid, the cause of a lethal disease of coconuts in the Philippines. Coconut tinangaja viroid is known only from Guam.

Although diseased palms occur in small groups, it is not known how the disease spreads naturally, although there is a suspicion that it is spread in pollen and seednuts. However, it is known that tools used for cutting and pruning can spread the viroid, and this may be the main method of spread. Long distance spread of the disease is assumed to occur with the movement of seedlings or transplanted palms used in landscaping.

Impact

The impact of the disease in Guam has been considerable. Coconuts in Guam are not used for copra, but they are used for drinking ("milk") and food ("meat"); they are also used for oil. Apart from these uses, coconuts play a landscaping role (Guam has a significant tourist industry), in reducing coastal erosion, as windbreaks, and as shade for many plant species less tolerant to sunlight.

The costs of not being able to grow sufficient coconuts to drink and eat are high, as the coconuts have to be imported; there are costs, too, in not being able to grow sufficient palms for environmental schemes, and in having to replace palms that are killed by the disease.

Finally, there is also a possibility that tinangaja has reduced the diversity of coconuts on the island, and that those surviving are those with some tolerance; many other types may have succumbed to the disease.

Detection & Inspection

Look for leaves that have tiny yellow spots, and palms with small, deformed nuts without kernels. Look for palms where production of leaves, flowers and nuts gradually declines over the years, and where leaves yellow. A molecular test is available, and its use is the only way to be certain that the viroid is present in palms showing symptoms.

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

Control is difficult for the following reasons: (i) there is a long time between infection and symptoms; (ii) it is difficult to tell when symptoms first occur, and (iii) there is no information on natural infection. The only control measures are those involving cutting and pruning tools. Do the following:

- Disinfect tools using 10% bleach plus 1% mineral or vegetable oil between working on palms.
- Only take seed from areas known to be free or have a very low incidence of tinangaja.
- Remove and destroy infected trees and replace them with healthy seedlings. Ideally, the replacements should be tested for the disease.

RESISTANT VARIETIES

There is evidence that the Javanica Red Dwarf is more tolerant to the disease than other varieties.

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