Pacific Pests, Pathogens, Weeds & Pesticides - Online edition

Taro rhabdovirus diseases (089)

Common Name

Bobone and taro vein chlorosis.

Scientific Name

Viruses assoicated with these two rhabdoviruses are: i) *bobone* = *Colocasia bobone rhabdovirus* (CBDV) and ii) taro vein chlorosis = *Taro vein chlorosis virus* (TaVCV). There is evidence that TaVCV in Fiji and Samoa are different strains.

Distribution

CBDV occurs in Papua New Guinea and Solomon Islands. TaVCV has been recorded from Federated States of Micronesia, Fiji, New Caledonia, Papua New Guinea, the Philippines, Samoa, Solomon Islands, and Vanuatu.

Hosts

These viruses have only been found in taro.

Symptoms & Life Cycle

CBDV. In most varieties of taro the virus causes mild symptoms when alone. Small dark green distorted patches occur on one or two leaves before healthy leaves are produced (Photo 1). However, when CBDV occurs with other viruses it produces a lethal disease; in Solomon Islands growers call this disease *alomae*, and the susceptible taro are called 'male' are they are large).

Photo 1. The dark green distorted area on the leaf is typical of CBDV in the 'male' taro, the common type of taro in the Pacific islands. This is not a serious disease as only 1-2 leaves are affected.

Photo 2. *Bobone* on the 'female' taro variety *Oga* showing stunted distorted leaves (Malaita, Solomon Islands) after infection by CBDV.

A few lower-yielding varieties that resistant to *alomae*, but CBDV infection causes a severe stunting disease called *bobone* (Photo 2). These are the so-called 'female' taro of Solomon Islands, **see Fact Sheet no. 01**). Plants are grossly distorted with short, thickened, twisted leaves that stay green. Gradually, they recover and leaves look healthy.

CBDV is invariably present in plants with *alomae*, but whether TaVCV is also needed to cause *alomae* is not yet known. (**See Fact Sheet no. 01** for more details on these diseases.)

Photo 3. Leaf infected with TaVCV showing the yellowing is along the smaller veins giving a feather-like symptom.

TaVCV. The virus produces a yellow feather-like pattern similar to *Dasheen mosaic virus* (**see Fact Sheet no. 88**), but in the case of TaVCV, the yellowing is much brighter (Photos 3-5). Also, as the leaf ages the yellow lines turn brown (Photo 4). Symptoms of TaVCV often occur on plants with *bobone* and also with *alomae* (see above).

Photo 4. Leaf with symptoms of TaVCV. Note the yellow feather patterns are starting to decay as the leaf ages; this does not happen with *Dasheen mosaic virus*.

Spread of CBDV is by *Tarophagus* planthoppers, and spread of TaVCV is possibly the same(Photo 7). The planthoppers suck up the viruses when they feed on sap. The viruses multiply inside the planthoppers, and after 3-4 weeks they spread the viruses as they feed.

CBDV and TaVCV are also spread in other ways:

- From mother plants to suckers.
- By growers when infected planting material is taken from one garden to another.

Impact

On their own, the impact of CBDV or TaVCV on the yield of the taro varieties found commonly in Pacific island countries is thought to be small. Usually, only one or two leaves are affected before healthy-looking leaves develop. However, the impact of CBDV and other as yet unidentified viruses is severe. Entire plantings are destroyed very rapidly once

The impact of CBDV on the few taro varieties that are resistant to *alomae* (in Solomon Islands and possibly Papua New Guinea) but are susceptible to *bobone* is much less. Corms of diseased plants are about 25% less than those that stay healthy, but not every plant develops symptoms, so overall yield is much less. However, there is an additional loss from growing 'female' taro: there is an opportunity loss involved in deciding tom grow lower yield, but alomae tolerant taro compared to those that are potentially higher yielding.

Detection & inspection

Look for leaves showing irregular, dark green thickened patches, or look for leaves that show more extensive, stunted green, twisted leaves; these are symptoms of CBDV. In both cases, plants should out-grow symptoms. Look for leaves showing bright yellow, feather-like symptoms along the main veins, and produce healthy leaves after one or two with symptoms (TaVCV).

Under the electron microscope the particles of both viruses are rod shaped (Photo 6). Molecular tests are available based on specific primers for each virus.

Management

NATURAL ENEMIES

Cyrtorhinus fulvus, a bug that feeds on the eggs of *Tarophagus* species (Photo 8), reduces the population of the plant hopper, but experience shows that it is not enough to stop the spread of *alomae* when *Tarophagus* populations are high (Photo 9).

CULTURAL CONTROL

At present, the cause of *alomae* is unknown; it can only be managed as follows:

- Do not grow 'male' and 'female' taro in the same garden; CBDV from plants with *bobone* may interact with other viruses to cause *alomae* in the so-called 'male' taro.
- Never plant taro next to gardens where *alomae* is present.
- If *bobone* occurs, mark plants with a stake; at harvest, cut off the corms, sell or eat them, and burn the plants and suckers. Do not replant them. (It is likely that roguing alone will not be sufficient and an insecticide is needed). In both Papua New and Solomon Islands, *Derris* species (fish poisons) have been introduced with high rotenone content sufficient to control *Tarophagus*). See information from agricultural authorities.
- If *alomae* occurs, remove the plants carefully (**see Fact Sheet no. 01**), and, if available, use chemicals to kill the planthoppers on the remaining plants (see below).

CHEMICAL CONTROL

Under commercial cultivation using the higher-yielding ('male') taro, regular application with a synthetic pyrethroid insecticides will kill *Tarophagus* planthoppers and prevent *alomae*. Good results are also likely if insecticides are used on the low-yielding ('female') taro, although in this case insecticides should be combined with removal of *bobone*-infected plants (see above).

When using a pesticide, always wear protective clothing and follow the instructions on the product label, such as dosage, timing of application, and pre-harvest interval. **Recommendations will vary with the crop and system of cultivation. Expert advice on the most appropriate pesticide to use should always be sought from local agricultural authorities.**

Photo 5. Feather like pattern on a leaf infected with TaVCV. Note the insects on the leaf are *Tarophagus* sp., which are likely to spread this virus.

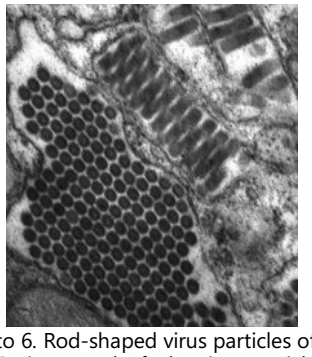

Photo 6. Rod-shaped virus particles of TaVCV in a taro leaf. The virus particles can be seen lengthways and end on.

Photo 7. The Philippine egg-sucking bug, *Cyrtorhinus fulvus*.

Photo 8. Nymphs, winged and wingless adults of *Tarophagus* species, the planthopper that spreads *Colocasia bobone disease rhabdovirus,* and most probably *Taro vein chlorosis virus*.

AUTHORS Helen Tsatsia & Grahame Jackson

Information from Lethal taro viruses - still unresolved. (https://www2.pestnet.org/other-pacific-plant-protection-stories/); and Carmichael A, *et al.* (2008) TaroPest: an illustrated guide to pests and diseases of taro in the South Pacific. ACIAR Monograph No. 132, 76 pp. (https://lrd.spc.int/about-lrd/lrd-project-partners/taropest); and Revill RA, *et al.* 2005) Incidence and distribution of viruses of Taro (*Colocasia esculenta*) in Pacific island countries. Australasian Plant Pathology 34: 327-331; and Shaw DE, *et al.* (1979) Virus diseases of taro (*Colocasia esculenta*) and *Xanthosoma* sp. in Papua New Guinea. Papua New Guinea Agricultural Journal 30: 71–97; and from Macanawai AR, *et al.* (2005) Investigations into the seed and mealybug transmission of the *Taro bacilliform virus*. Australasian Plant Pathology 34: 73-76. Photo 6 Rothamsted Research, Harpenden, UK.

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