



Food and Agriculture
Organization of the
United Nations



International
Plant Protection
Convention



Survey Guidance for
Babuvirus Banana bunchy top virus



Survey Guidance for *Babuvirus Banana bunchy top virus*

Scientific Name

Babuvirus Banana bunchy top virus (BBTV)

Common Name

Bunchy top of banana

Type of Pest

Virus

Taxonomic Position

Class: Arviricetes, **Order:** Mulpavirales,
Family: Nanoviridae

Known Hosts

Musa spp. (banana), including *M. acuminata*,
M. textilis, and *M. x paradisiaca* (syn. *M.*
paradisiaca)

Associated Organism

This virus is vectored by the banana aphid,
Pentalonia nigronervosa, which is present in
Africa.

Survey Protocol

Time of year to survey

Survey can occur whenever leaves are present, but for visual inspection young leaves are more likely to express symptoms of the disease.

Survey Site Selection

Survey where banana occurs. This may include commercial production sites, landscaped areas, or natural areas with wild banana plants.

Visual Survey

Inspect plants for symptomatic foliage. Young leaves are more likely to express symptoms of the disease. Presence of the aphid vector *Pentalonia nigronervosa* (Fig. 6) may be an indication that the pathogen could be present.

Symptoms

Symptoms include narrow leaves with yellowing toward the edges and irregular dark green streaks/flecks in the shape of dots and dashes on leaf midribs and petioles. The dark green streaks can, but not always, form a hook shape where the midrib meets the leaf blade (Fig. 2). Infected plants often have stunted leaves with the discoloration that bunch at the top of the plant (Fig. 4a). Severely affected plants may have dead leaves still attached to the stem and any fruit produced may be stunted (Fig. 4b). Fruit is not always symptomatic but may also be stunted in growth or absent (Fig. 5).



Figure 1. Young banana plant infected with BBTB exhibiting symptoms of erect, bunched, yellow leaves. (Image courtesy of College of Tropical Agricultural and Human Resources, University of Hawaii at Manoa)



Figure 2. Infected banana leaves with green streaks and hooks (see arrow).

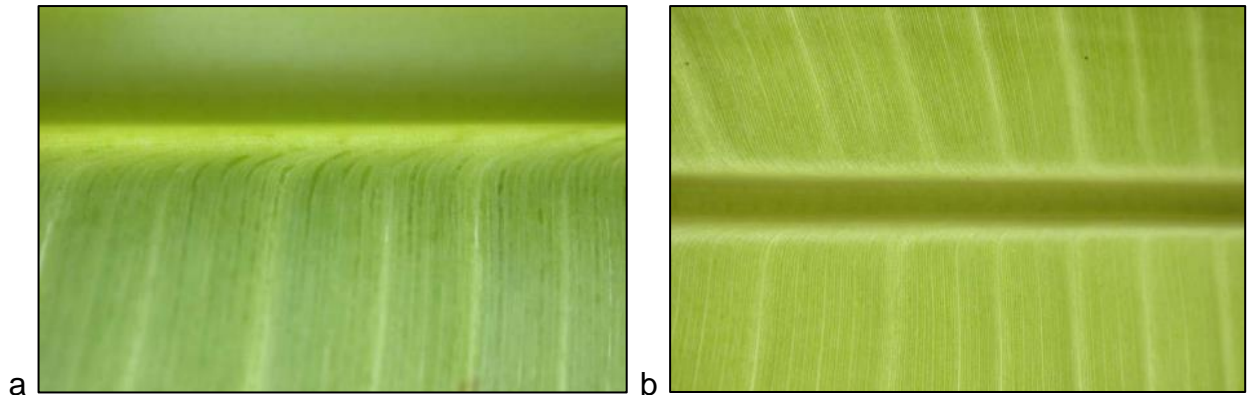


Figure 3. Infected banana leaf (3a) versus healthy banana leaf (3b)

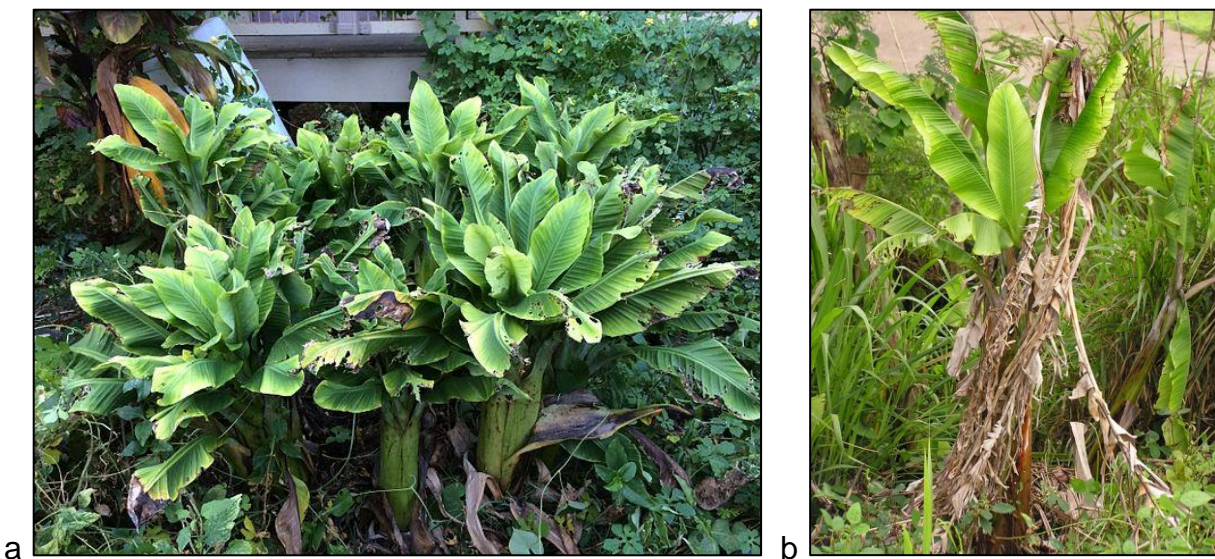


Figure 4. Banana leaves bunched at top of stem (4a) and dead leaves still attached to banana plant stem (4b).

(Figures 2 – 4: Images courtesy of College of Tropical Agricultural and Human Resources, University of Hawaii at Manoa)



Figure 5. Stunted (small) banana fruit infected with BBTV. (Image courtesy of Big Island Invasive Species Committee)



Figure 6. *Pentalonia nigronervosa* vector of BBTV. (Image courtesy of CABI)

Transmission

BBTV is vectored by the aphid *Pentalonia nigronervosa* (Fig. 6). The virus can also be spread when infected plants and vectors are introduced into a new area.

Sample Collection

Collect leaf samples of symptomatic *living* tissue. Use of disposable gloves is recommended. If sampling multiple plants, sanitize hands or change gloves between plants to avoid cross contamination. The midrib of the third leaf from the top is suggested for getting high virus content. Excise with a clean knife. Disinfect knife between plant samples to avoid cross contamination. Place samples with leaf and midrib section in dry paper towels in a resealable, labeled plastic bag. Place the smaller bag with the sample contents inside another larger resealable bag. Remove air from bags before sealing. Keep samples cool and dry in an ice chest, but do not freeze.

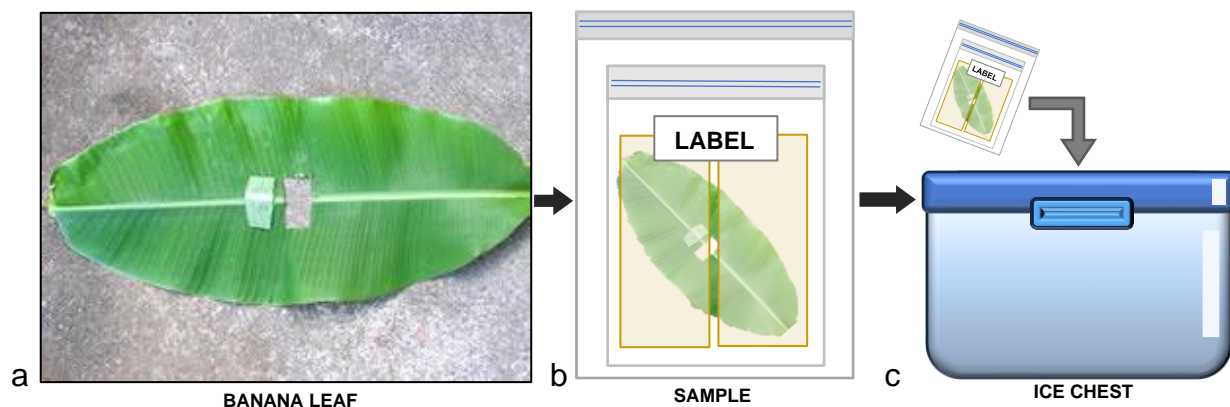


Figure 7. Sample Collection Protocol: Banana leaf (3rd) collected from plant with a section of midrib cut out (a). Entire leaf and midrib placed in labeled, resealable bag with paper towels, then bag placed inside a second, larger resealable bag (b). Sample placed in cool dry in an ice chest, but never frozen (c).

Pest Identification and Diagnostics

Pest Description

The organism itself cannot be seen in the field, only disease symptoms. Diagnosis is made by molecular techniques, such as Polymerase Chain Reaction (PCR). Enzyme-linked immunosorbent assay (ELISA) may also be available.

Identification and Diagnostic Resources

The College of Tropical Agriculture and Human Resources (CTAHR), University of Hawaii at Manoa, has a datasheet with additional images of symptomatic banana plants (<https://www.ctahr.hawaii.edu/oc/freepubs/pdf/PD-12.pdf>).

Easily Mistaken Species

Cucumovirus Cucumber mosaic virus (CMV) on banana presents with interveinal chlorosis and may be confused with *Banana bunchy top virus*.

The United States Department of Agriculture developed this datasheet in support of the Africa Phytosanitary Programme of the International Plant Protection Convention (IPPC) (2023).

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