

Banana Bunchy Top Virus

Pests and Diseases of American Samoa

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Introduction

Bananas are one of the most important food crops in American Samoa and most Samoans grow them on their land. Bananas do not hold the same place in traditional Samoan culture as taro but they are still a main source of carbohydrate in the diet. Bananas are not an export crop but consumed locally. They are either baked, boiled or fried when still green, or eaten ripe.

Banana Bunchy Top Virus (BBTV) is one of the most important diseases of banana. It is caused by a virus and carried over short distances by the banana aphid. Long and short distance spread is by infected pieces of the mat (rhizome), transplanted suckers, or virus-infected tissue culture plants. BBTV was first recorded in Fiji in 1889, where it caused serious damage. It arrived in Samoa in the late 1950s and in American Samoa shortly after.

Symptoms

Infected plants are dwarfed and their emerging leaves small and narrow with brittle, yellow edges. The leaves grow upright and have a stunted, bunched appearance (Fig. 1).



Fig. 1. Sucker with symptoms of Banana Bunchy Top Virus.

Mature plants infected with the disease usually do not produce fruit, or the fruit may not emerge from the stem. The virus eventually infects the whole mat and banana production is permanently lost (Fig. 2).



Fig. 2. Suckers growing from a mat infected with BBTV.

A campaign by the American Samoa Community College Land Grant Program (Land Grant) Extension Service from 1996 to early 1998 put the problem before the people of American Samoa. Public awareness was raised and a few farmers now control BBTV on their land. There is a Bunchy Top Law (American Samoa Government Administrative Code 24.04) that places responsibility for eradication of BBTV on occupiers of the land, but it is not usually enforced.

In March 1999, Land Grant and the American Samoa Department of Agriculture conducted a BBTV survey of the Territory. Over 30,000 banana mats were evaluated in 20 villages and 10 commercial farms on the main island of Tutuila; 10,000 mats were counted on the islands of Ofu, Olosega, Ta'u and Anu'u. The average number of mats infected with BBTV on Tutuila was less than 5% in villages and just over 5% on the 10 commercial farms and Anu'u; no BBTV was found on Ofu, Olosega or Ta'u. Several factors may have led to low percentages of BBTV in American Samoa. First, there is a period of up to 125 days between the time a virus-carrying aphid infects a plant and when the plant begins to show symptoms of the disease. These plants and others with early, mild symptoms were not counted in the survey. Second, in many areas dense undergrowth on unkempt farms may have hidden infected suckers from the surveyors. Also, mats recently killed by the disease were not counted. Finally, Samoans traditionally cut down plant stems with symptoms of BBTV in an effort to control the disease. This practice was probably a major reason for the low number of infected mats counted.

Control

There are no known banana varieties resistant to BBTV and no chemicals to control it. Programs aimed at controlling the disease by managing the aphid population have been unsuccessful. Plant quarantine, while essential, is notoriously difficult to enforce. Cutting down virus-infected mats with a bush knife is ineffective; the virus is also in the mat and emerging suckers will be infected. Once introduced, BBTV has never been eradicated from a country. The disease is at a relatively low level in American Samoa and for unknown reasons is moving slowly, compared to other countries: parts of Australia, India, Pakistan and Samoa were devastated by BBTV in the past. If left untreated, however, the cumulative effects of BBTV in American Samoa could be severe.

In early 1999, Hawai'i Department of Agriculture reported eradication of BBTV on Kauai following the destruction of all banana plants in a one square mile area of infection. Roundup Ultra® (glyphosate) played a key role in these results (Fig 3).



Fig. 3. BBTV-infected mat injected with glyphosate.

Roundup Ultra® has recently been registered for use in American Samoa to destroy banana plants infected with Banana Bunchy Top Virus (EPA Reg. No. 524-475). It is the center of a new Land Grant campaign to greatly reduce the amount of BBTV in the Territory.

The following steps are recommended by the Land Grant Extension Service for the destruction of BBTV-infected plants by homeowners and commercial growers.

1. Remove any banana bunches growing on infected mats before treatment.
2. Spray aphids with soapy water (1 tbsp. liquid dish soap/gallon water), Safer Soap® or kerosene; the insects are mostly found on suckers and where leaves meet stems.
3. Make a hole at least one foot above the ground in every stem of the infected mat; use a screwdriver or other sharp object.

4. Spray 1 ml (one squirt from a spray bottle) of concentrated Roundup Ultra® into the hole in the plant stem; if the stem diameter is greater than 3 inches, spray 2 ml into the hole. Wear safety glasses, rubber gloves, long-sleeved shirts, long pants and close-toed shoes.
5. For very small plants and suckers, make a hole down through the top and spray once into the hole.
6. Never spray more than 15 ml (15 squirts) into any one mat.
7. Check treated mats every two weeks and kill any new growth with the same method; also check surrounding mats for symptoms of the disease (Fig. 4).
8. Never harvest or eat bananas from treated mats.

Replanting

It is important to replace treated mats with plants free from the virus. If treated mats are replaced with suckers or 'bits' from the field, the material should be selected from an area free of BBTV. After planting, check new mats routinely for virus symptoms.



Fig. 4. Banana mat killed with glyphosate injections.

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For further information on recognizing or controlling Banana Bunchy Top Virus, please contact: American Samoa Community College Land Grant Extension Service; tel. 684-699-1394; fax 684-699-5011.

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