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Diseases

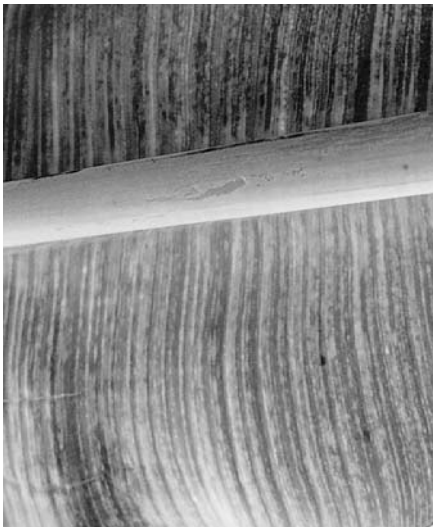
BSV in Australia

Banana streak virus investigations in Australia

Jeff Daniells, Andrew Geering and John Thomas

Banana streak virus (BSV) was first detected in Australia in 1992 in the banana variety Mysore. It has now been found in a range of varieties in Queensland and New South Wales. There have been significant outbreaks on two commercial Cavendish (cv. Williams) plantings at Innisfail. About 5% of plants in these plantations are infected. The properties have been quarantined to prevent further dissemination of infected planting material.

Relatively little is known about BSV compared with some of the other banana infecting viruses and knowledge of the effects of the virus on yield is scanty. The only notable study was done in the Ivory Coast (Lassoudière 1979), and it was found that BSV caused a yield reduction of Cavendish (cv. Poyo) bananas of between 7 and 90%. One of the major objectives of our project on BSV has therefore been to investigate the effects of an Australian strain of BSV on yield of Cavendish (cv. Williams) bananas under local environmental conditions. A field trial was initiated at South Johnstone Research Station in October 1996 in which yields of BSV-infected plants and indexed BSV-free plants established from suckers and bit material are being compared in replicated plots.



Chlorotic streaking of cv. Williams.

Plant symptoms

Chlorotic and necrotic streaking have been commonplace but the symptoms have been periodic in expression and virus concentration in the leaves has widely fluctuated. A range of unusual symptoms have been noted on some of the infected plants which include the following:

- Leaf bases falling away on pseudostem
- Narrow thicker leaves
- General leaf distortion
- Choking
- Broad yellow lines in the leaf blade parallel to the midrib
- Purple margin on leaf blade
- Leaf twisting
- Abnormal arrangement of leaves on pseudostem (Traveller's Palm appearance)
- Grooves in bases of petioles

The first four symptoms have been described before by Lassoudière (1979), the others are new. Some of the symptoms listed above are usually more dramatic than the chlorotic and necrotic streaking but are not diagnostic, as they may also be caused by stress from other sources. However, as these symptoms may be suggestive of infection with BSV they can be helpful in the detection of likely infected plants, which then need to be confirmed by the presence of the more typical streak symptoms, or laboratory assays.

Minimal effects of BSV on plant crop yields

Results from the plant crop (Table 1) show that BSV had a minor effect on yield. The only yield parameter that was significantly affected by infection with BSV was time from planting to harvest, which was delayed by 3 weeks in infected plants, contributing to a 7% reduction in yield per unit of time. No other measurements of yield were significantly affected by the infection. We are continuing to examine growth of the first ratoon crop.

Implications

All plants in the trial are being tested regularly for virus, and thus far, there is no evidence of spread of BSV into the healthy treatment. At this early stage of the investigations it would appear that the current impact of this strain of BSV in commercial plantings of cv. Williams ((5% infection) is likely to be very minor. Environmental conditions in north Queensland (temperature, soil moisture and soil fertility) are close to optimal, so the plant is

Table 1. Effect of BSV infection on plant development, yield and fruit quality.

Treatment	Planting to Harvest (days)	Bunch Wt (kg)	Bunch Wt/Year (kg/plant/year)	% Extra Large Fruit[α]	Hand 3 Finger Length (cm)	Pseudostem Height (cm)	Pseudostem Girth (cm)
BSV -Infected	376[+]	22.3	21.6	58.2	24.4	203	48.4
BSV - Free	355	22.7	23.3	62.2	24.6	205	49.1
F Test	*	NS [++]	*	NS	NS	NS	NS

[+] Values shown are the means of 12 replicated plots (randomized complete block design - 10 sample plants/plot)
[++] Differences not significant
* Significantly different at P ≥ 0.05
[α] Extra Large Fruit ≥ 23.5cm in length

probably able to compensate for any damage caused by infection. However, in more marginal environments, where plants are under greater overall stress, the effects of infection may be greater. The reaction of Cavendish bananas to other BSV strains (Lockhart and Olszewski 1993) may also differ.

In view of experience from overseas (Frans Weilemaker pers. comm.) where BSV effects have increased over time it would seem prudent to maintain quarantine of infected plantings, seek progressive eradication of infected blocks and especially ensure that safeguards on *in vitro* generated planting materials are maintained.

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Distorted leaves.

Purple leaf margins.

Choking of diseased plant.

Traveller's palm appearance of diseased plant.

Leaf bases falling away from pseudostem.

Broad yellow lines in the leaf blade.

Groove in petiole base.