

Use of Picloram for Eradication of Banana Diseased with Bunchy Top

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ABSTRACT

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Bunchy top disease has severely reduced banana production on Guam. The herbicide picloram (Keipin formulation) effectively eradicated diseased bananas with no detrimental effects to adjacent plants.

Additional key words: *Musa* sp., tropical, virus

Bunchy top, a virus disease of banana (*Musa* sp.), is a serious and persistent problem in many countries of the world (2,4-7,9). It was first recorded in Fiji in 1891 (1) and has since spread to other tropical islands of the Pacific. The disease has been present on Guam since 1974 and has severely limited banana production.

Etiology and control of bunchy top have been studied by several workers (2,5-8). Resistant varieties are not available. Control recommendations for Guam and other Pacific Islands have been to dig and burn infected plants. Although effective, this method is laborious and slow and has resulted in only a token attempt by many farmers to eliminate diseased plants. Legislation enforcing eradication has been used successfully (3), but it is not acceptable

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everywhere. As a result, bunchy top has spread throughout several Pacific Islands.

Studies conducted in Taiwan suggest that picloram in the Keipin formulation is effective in eliminating wild banana from cedar plantations (Nihon, Nohyaku Co., Ltd., Tokyo, Japan; *unpublished*). Keipin is a toothpicklike wooden pin impregnated with 6 mg of picloram that is designed to be inserted by hand into the target plant.

This study was undertaken to evaluate the efficacy of this formulation of picloram in eliminating banana diseased with bunchy top on Guam.

MATERIALS AND METHODS

Seventy-five banana mats diseased with bunchy top of different varieties and sizes were selected from six separate locations around the island. Ten mats served as uninoculated controls. One to six pins were inserted into each pseudostem of the remaining mats 30-70 cm above ground level (Fig. 1).

Treated plants were observed until the corms deteriorated or regrowth started. Where treated plants collapsed, individual mats were checked periodically for 16 mo to determine whether all regenerative tissues were dead. In addition, six treated corms were dug after the pseudostem had collapsed and were examined for living tissue. Appearance and growth of adjacent plants were observed to determine whether picloram moved into adjacent soil.

RESULTS AND DISCUSSION

In all cases where two or more of the pins were used per pseudostem, mats were killed within a 21-day period and there was no regrowth within a 16-mo

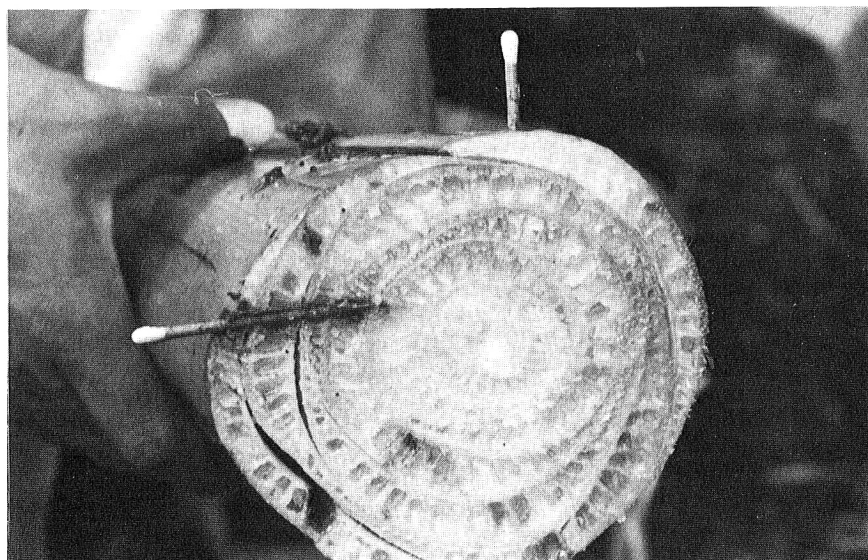


Fig. 1. Pin containing picloram inserted into banana pseudostem.

Table 1. Results of treating 65 banana mats diseased with bunchy top at six locations on Guam with picloram

Location	No. of mats treated	Pseudostem size (cm)	No. of pins/pseudostem	Days to collapse	No. of mats showing growth after 16 mo
Yona	8	5.00-6.25	2-3	8-10	0
Baza Gardens	5	6.25-10.00	1-3	8-14	1 ^a
Yigo A	12	9.75-20.50	3-6	6-21	0
Yigo B	29	3.75-11.00	1-4	5-9	5 ^a
Mangilao	8	6.75-10.25	3-4	6-9	0
Merizo	3	9.75-12.50	4	Unknown	0
Control	10	3.75-7.25	0		10

^aReceived one pin per pseudostem.

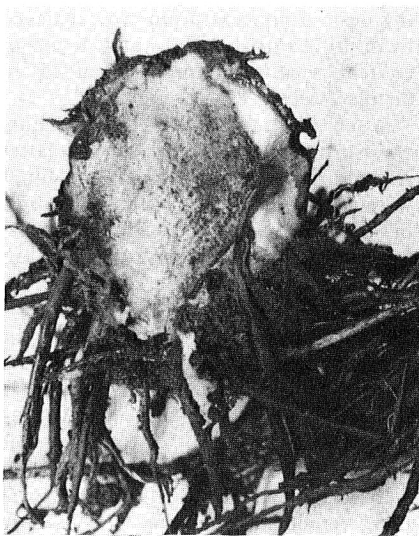


Fig. 2. Banana corm deterioration 8 wk after insertion of three pins into pseudostem.

observation period (Table 1). Dissected corms showed progressive tissue deterioration (Fig. 2). Within 60 days after

treatment, all buds were dark brown to black in color as compared with the normal light-colored, healthy controls.

Only mats in which one pin was placed in each pseudostem showed any regrowth. In these mats, the treated pseudostems collapsed within 6-14 days, and new suckers emerged within 5-6 wk. Sword suckers less than 4 cm in diameter were killed by the application of a single pin when larger pseudostems in the same mat were simultaneously treated with three or more pins.

Although placing pins in each pseudostem of a diseased mat may not be necessary, corm deterioration appeared more rapid and uniform when all pseudostems were treated. Of the 65 mats treated, only six showed regrowth within a 5-6 wk period. In each case, only one pin was applied per pseudostem, and the pseudostems were larger than 5 cm in diameter. No regrowth was noted in the remaining treated mats after 16 mo.

Crop plants and weeds adjacent to picloram-treated banana mats showed no herbicide toxicity symptoms at any of the

locations. Healthy bananas replanted into sites where picloram-killed bunchy top banana corms had rotted also showed no phytotoxicity.

Eradication of banana diseased with bunchy top was rapid, complete, and inexpensive when two to six of the pins were placed in each infected pseudostem. This technique, coupled with a routine monitoring program, promises to be an effective method for reduction of bunchy top disease in banana.

The formulation allows for precise placement of the herbicide with no noticeable effects on adjacent vegetation. It permits selective eradication within a plantation, which can be rapidly followed by plant replacement.

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