

COMUNICACIONES

Control of Yellow Sigatoka of Banana with "Delsene" M-200 a new Carbendazim/Mancozeb fungicide

Sumario. Fueron comparados tres fungicidas para el control de la Sigatoka Amarilla (*Mycosphaerella musicola*). Ellos fueron "Delsene" M-200, "Benlate" O D y Spraytex C T. Aunque no hubo diferencias significativas entre "Delsene" y "Benlate", ambos fueron significativamente mejores que "Spraytex" C. T. Sin embargo, hubo mayor número de hojas más sanas con la aplicación de "Delsene" M-200 que con la de "Benlate" O D. Por ello se considera que "Delsene" M-200 es una alternativa conveniente de fungicida respecto a "Benlate" O D y que esta nueva combinación en el uso de fungicidas puede reducir la amenaza de que se desarrollen mutantes resistentes del hongo *M. musicola*.

Light petroleum oil has been used for many years to control Yellow Sigatoka (*Mycosphaerella musicola* Leach) in Jamaica and other banana producing countries. Shillingford (6) found benomyl to be much more effective than oil against this disease in Jamaica and it is now added to oil for use in areas prone to severe disease outbreaks.

It has been found that intensive and exclusive use of systemic fungicides can result in selecting out resistant fungal mutants (1, 2). The occurrence of benomyl resistant strains of *Cercospora* has already been demonstrated for celery, peanuts, and sugar beet (3, 4, 5).

Benzimidazole-resistant strains of *M. musicola*, due to spraying with methyl thiophanate, have been reported on bananas in Suriname and resistance of *M. fijiensis* var *difformis* (Black Sigatoka) to benomyl was detected in Central America (8). To cope with this problem, the use of more than one fungicide with different mechanisms of action has been recommended as an effective method of preventing the build-up of resistant strains. Also, banana researchers in the French Antilles claim that there is less chance of selecting resistance when benomyl is used with oil compared to its use in oil-water emulsion. Various programs were suggested, but benomyl combined with a protectant fungicide was thought less likely to cause resistance than when it is used in rotation with these fungicides (2, 7).

This paper reports on the effectiveness of a new formulated combination of carbendazim and

mancozeb in controlling Yellow Sigatoka in Jamaica and compares it with benomyl and paraffinic oil.

Materials and methods

The experiment was conducted from December 1977 to January 1979 on a 88.8 ha-plantation at Golden Vale, Portland, Jamaica—a valley with high humidity and high disease pressure. Total rainfall for 1978 was 481.8 cm (Figure 1) and hence the test was conducted under conditions favoring severe disease development. The plantation was sub-divided into three blocks of 24.8, 25.2 and 38.8 ha to which tank-mixed "Delsene" M-200/oil, "Benlate" OD/oil and Spraytex CT oil were applied respectively. The rates tested were:

"Delsene" M-200 (E. I. DuPont de Nemours) 10 percent methyl 2-benzimidazole carbamate plus 64 percent of a coordination product of zinc ion and manganese ethylenebisdithiocarbamate at 1.12 kg per 20 l oil/ha;

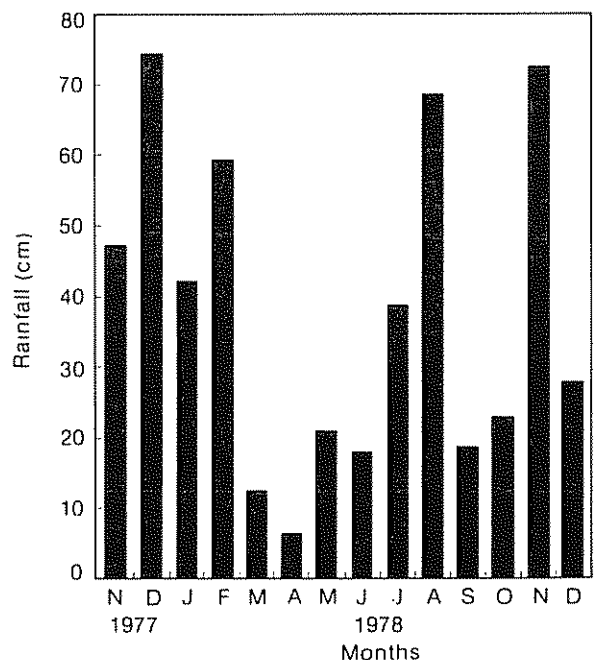


Fig. 1. Rainfall in cm for November 1977 to December 1978 at Golden Vale.

"Benlate" OD, (E. I. DuPont de Nemours) 50 percent oil dispersible benomyl [methyl 1-(butylcarbamoyl)-2benzimidazole-carbamate] at 0.21 kg per 20 l oil/ha; and

Spraytex CT (Texaco Caribbean Inc.) Paraffinic oil (unsulphonate residue of not less than 92% vol., °API gravity 34.5-36.5, viscosity of 75-85 SUS at 100°F. and IBP 650 ± 5) at 20 l/ha.

All treatment were applied by fixed-wing aircraft flying at 10 to 12 m above the canopy. Carbendazim/mancozeb and benomyl were applied 18 times between February and December, 1978 on a 14-21 days' cycle. Oil alone was applied 20 times on a 14-21 days' cycle up to May and then on a 10-14 days' cycle in response to high disease pressure following the rains from May onwards (Figure 1).

Four plots were randomly selected in each treatment block and 20 mature, non-flowering plants in the center of each plot were assessed every two weeks. Percentage leaf necrosis on the fourth through ninth fully-opened leaf, the position of the youngest fully-opened leaf with spotting and the total number of standing leaves were recorded.

Results and discussion

The results are shown in Table 1, Figures 2 to 4. Carbendazim/mancozeb and benomyl were significantly better than oil in controlling Yellow Sigatoka. There were no significant differences between carbendazim/mancozeb and benomyl in mean percentage spotting, but, for age of youngest leaf spotted and number of standing leaves per plant, carbendazim/mancozeb was significantly better than benomyl. There was very little increase in leaf

spotting up to a month after the last application of the two fungicides on December 14. However, in the oil treatment block, over the same period, spotting began to increase rapidly (Figure 2). This effect was probably due to lower inoculum in the fungicide/oil treatments resulting from reduced foliar necrosis; and the longer residual activity of the fungicides.

This report demonstrates that a carbendazim/mancozeb spray program gives better control of Yellow Sigatoka than benomyl and may reduce the risk of pathogen resistance.

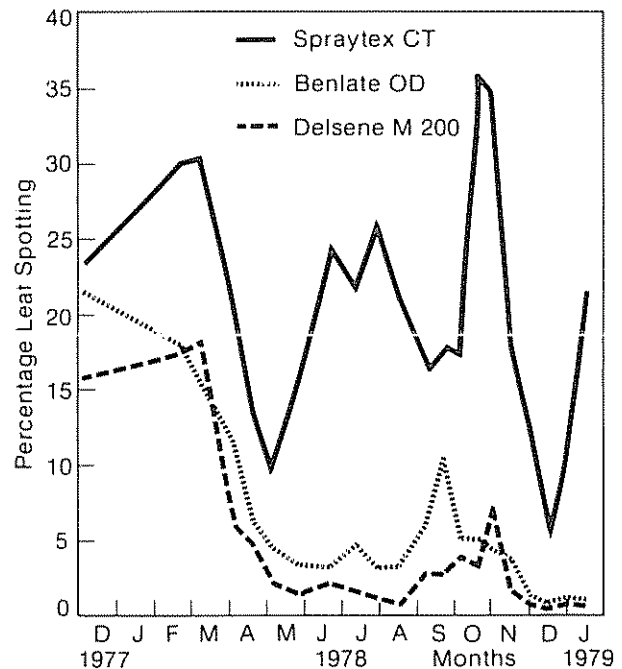


Fig. 2. Mean percentage leaf spotting in plots sprayed with "Delsene" M-200, "Benlate" OD and Spraytex CT oil at Golden Vale

Table 1. Means¹ for percentage spotting, age of youngest leaf spotted and number of leaves per plant in plots treated with "Delsene" M-200, "Benlate" OD and Spraytex CT oil.

| Fungicide | Mean percentage spotting | Mean age of ² youngest leaf spotted | Mean number of leaves per plant |
|----------------------------|--------------------------|--|---------------------------------|
| Carbendazim/mancozeb + oil | 2.53 ³ a | 10.05 a | 11.25 a |
| Benomyl + oil | 4.20 a | 9.58 b | 11.08 b |
| Oil | 18.53 b | 6.50 c | 10.80 c |

1. Means are based on nine assessments in four plots per treatment.

2. The position of the youngest leaf spotted is determined by counting downwards from the first fully opened to the oldest standing leaf.

3. Means followed by the same letters in a column are not significantly different at the 5% level by Duncan's Multiple Range Test.

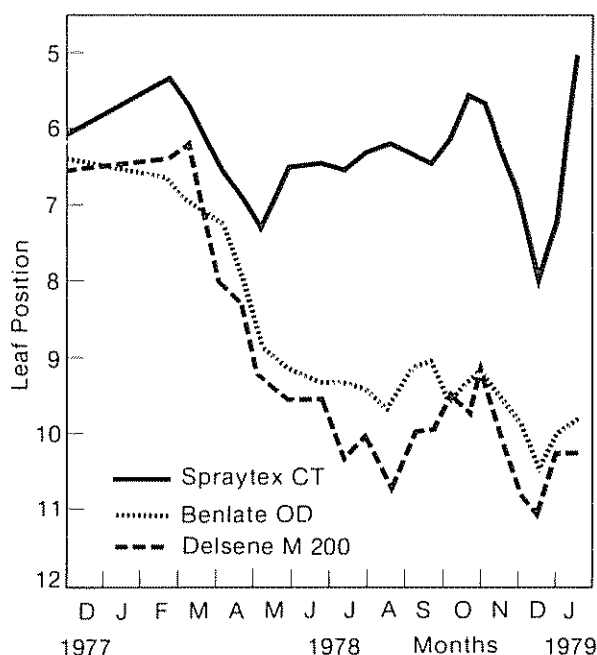


Fig. 3. Mean age of youngest leaf spotted in plots sprayed with "Delsene" M-200, "Benlate" OD and Spraytex CT oil at Golden Vale

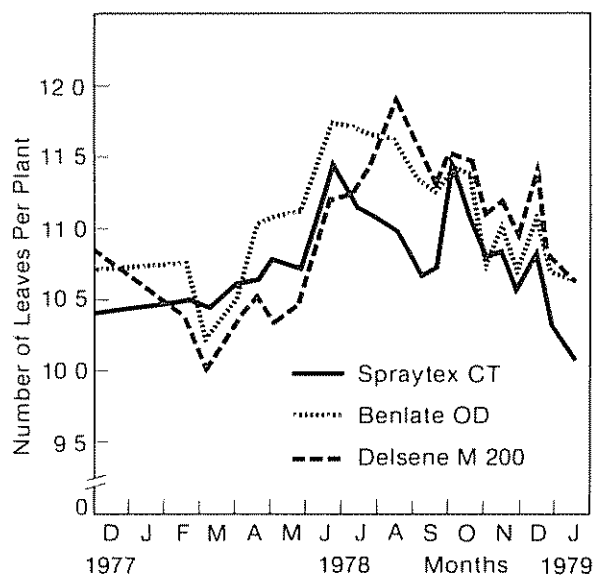


Fig. 4. Mean number of leaves per plant in plots sprayed with "Delsene" M-200, "Benlate" OD and Spraytex CT oil at Golden Vale.

Abstract

"Delsene" M-200/oil (carbendazim/mancozeb) was evaluated for control of Yellow Sigatoka (*Mycosphaerella musicola*) and compared with "Benlate" OD/oil (benomyl) and Spraytex CT oil. "Delsene" M-200/oil and "Benlate" OD/oil were applied at 1.12 and 0.21 kg/20 l oil/ha, respectively. Spraytex CT alone was applied at 20 l/ha. All fungicides were applied by fixed-wing aircraft. "Delsene" M-200/oil and "Benlate" OD/oil were significantly better than Spraytex CT oil in controlling Yellow Sigatoka. There were no significant differences between "Delsene" M-200/oil and "Benlate" OD/oil in percentage spotting. However, there were more completely healthy and more standing leaves on plants treated with "Delsene" M-200 compared with "Benlate" OD. "Delsene" M-200 is considered a suitable alternative to "Benlate" OD and this new combination fungicide may reduce the threat of a build-up of resistant strains of *M. musicola*.

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