

# Effect of Some Fungicides on the Control of Red Rot of Sugarcane

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## ABSTRACT

An experiment was conducted to find out the efficacy of three systemic fungicides in controlling red rot pathogen (*Colletotrichum falcatum* Went) of sugarcane at BSRI, Ishurdi, Pabna. The variety Isd 5/55 was taken and inoculated by red rot pathogen in the field at alternate internodes and kept for two months to develop red rot infection in whole cane. Two bud sets prepared from the inoculated canes were treated in suspension of the fungicides namely, Bavistin @ 0.10, 0.15 and 0.20%, Benlate and Tilt @ 0.22, 0.25 and 0.30% for 30 minutes. The fungicides treatment eliminated the red rot pathogen from 22.01 to 92.47% compared to untreated check in tissue planted on oat meal agar medium. Though all the fungicides showed significant control of the disease but none resulted 100% elimination of the pathogen from samples. Among the three fungicides, Bavistin (0.15%) was more effective and controlled 92.47% of the disease followed by Benlate and Tilt.

**Key words :** Red rot, *Colletotrichum falcatum*, sugarcane, control.

## INTRODUCTION

The sugarcane crop is vulnerable to many diseases as it remain in the field for 12-15 months and passes through different environmental conditions. So far 38 sugarcane diseases have been recorded in Bangladesh of which red rot is considered as major one (Rahman *et al.*, 1993). It is the earliest known sugarcane disease and is widely distributed in many sugarcane growing countries in the world. The disease cause losses in several ways, such as germination failure, poor sprouting of stubble, death of tillers and cane stalks. The infected setts are known to impair germination which leads to poor stand and decline yields (Agnihotri *et al.* 1979). Kirtikar and Verma (1992) reported 44.1% loss in cane yield in the variety CoS 430. Sandhu *et al.* (1969) recorded 12 to 41.5% losses in the variety Co 312, Co 313, Co 453 and CoL 29. Ahmed *et al.* (1986) reported 28.52% losses in initial infection and 82.73% when red rot infection was over 50% in the cultivators L 116 and B 4360. It is reported from preliminary survey that red rot alone is perhaps responsible for 10-15% yield reduction and 100% cane loss in some particular plots due to the disease is not uncommon (Anon., 1979). Some high yielding popular varieties like 1 particular plots due to the disease is not uncommon (Anon. 1979). Some high yielding popular varieties like Isd 5/55, Isd 9/57, Co 419, Co 527, Co 1158, BO 17, Bo 34, BO 67, BO 70, Q 69, BS. 96 (Isd 15) and Isd 17 have been withdrawn from commercial cultivation due to their susceptibility to red rot (Malek, 1987; Rahman, 1988). Considering the severe loss in yield and sugar, the control of red rot is considered to be most important. The disease can be avoided through genetic resistance, clean cultivation, crop rotation and by use of apparently healthy seed. The control measures are good in themselves but have not made any major field impact to decline the disease effectively or completely (Singh *et al.* 1986).

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Red rot of sugarcane is mainly seed piece transmissible and largely a systemic disease which has not been controlled through ordinary fungicides (Lewin *et al.*, 1976). Treating sugarcane setts in fungicides (Agrason, Fernasal, Sulphur, Perenox, Spersul, Chloride, Aretan and Cupravit) for 10 minutes did not have much effect in controlling red rot. Anzalone (1970) reported control of red rot in seed pieces with benomyl (100 or 200 ppm), when treated under air pressure of 10 lbs p.s.i for 15 minutes. Chand *et al.* (1974) reported that benomyl (0.25%) and Vitavax (0.05%) increased germination over the control by 50% and reduced the red rot incidence in the variety Co 312 by 1 hour treatment of setts. Khirbat *et al.* (1980) performed laboratory test with 4 fungicides against *C. falcatum*. In general the benzimidazole, plantvax (oxycarboxin) and Hoe 6053 (pyracarbolic) effectively inhibited spore germination. Literature reveals that little work has been done with the systemic fungicide to control the disease. As the red rot fungus is largely a systemic pathogen, systemic fungicides like Bavistin, Benlate and Tilt have been tried in this investigation and the results are presented.

### MATERIALS AND METHODS

Three systemic fungicides namely Bavistin, Benlate and Tilt were used in different doses to control the red rot disease in sugarcane setts. The dose of Bavistin were 0.1, 0.15 and 0.20%, Benlate 0.2, 0.25 and 0.3% and Tilt 0.2, 0.25 and 0.3%. Red rot infected setts obtained from artificially inoculated canes of the susceptible variety Isd 5/55 were used to set up the experiment under laboratory condition. Ten months old standing canes were inoculated with spore suspension ( $6 \times 10^5$  conidia/ml) of a mixture of isolates by needle method at every alternate internode and kept for a month for disease development. After one month, observation was made by splitting open the canes and was ensured for red rot development mostly with white patches in each internode including the un-inoculated internode. Two bud setts prepared from each un-inoculated internode having internal red rot symptoms which was also observed in both the cut ends.

The treatment was done by dipping the prepared setts in different concentrations of the three chemicals for 30 minutes. Required quantity of untreated setts were kept as control for comparison. In the laboratory, isolation was also made from treated and untreated seed cane to find out the presence of red rot pathogen. For isolation, tissues were drawn from nodes of the cane, surface sterilized with 90% alcohol and plated on oat meal agar. The plates were incubated at 28°C for 10 days and presence of red rot pathogen was recorded and data were computed.

### RESULTS AND DISCUSSION

Tissues planted on oat meal agar (OMA) medium yielded red rot pathogen in varying percentage ranging from 4.67 to 55.0 as against 66.67% in untreated (dip in water) diseased setts. Though fungicidal treatment did not control the red rot pathogen 100% however, data revealed that yielding and isolation of the pathogen was significantly ( $P < 0.05$ ) reduced by all the fungicides with different doses (Table 1). Treatment with Bavistin at 0.10, 0.15 and 0.20% concentration greatly reduced recovery of red rot the re growth pathogen not differed significantly among the doses. Different doses of Bavistin controlled the disease from 91.4 to 92.47%. Treatment with Benlate and Tilt though significantly reduced yielding and isolation of the pathogen but percentage of disease control did not exceed 62.5%. So, Bavistin was found more promising than Benlate and Tilt in controlling red rot pathogen (Table 1). Red rot pathogen grew (4.67 to 55.07%) from tissue samples of diseased cane on oat meal agar medium though the setts were treated for 30 minutes with Bavistin and Tilt in different doses.

**Table 1. Effect of some systemic fungicides in controlling red rot pathogen and recovery of *C. falcatum* after treatment of diseased cane by tissue planting in oat meal agar (OMA) medium *in vitro*.**

| Fungicides                     | Doses<br>(% actual compound) | Isolation of <i>C. falcatum</i> from tissue<br>sample in OMA medium (%) | % of disease control<br>over check |
|--------------------------------|------------------------------|-------------------------------------------------------------------------|------------------------------------|
| Bavistin                       | 0.10                         | 5.33                                                                    | 91.40                              |
|                                | 0.15                         | 4.67                                                                    | 92.47                              |
|                                | 0.20                         | 4.67                                                                    | 92.47                              |
| Benlate                        | 0.20                         | 42.67                                                                   | 36.00                              |
|                                | 0.25                         | 36.00                                                                   | 46.00                              |
|                                | 0.30                         | 32.67                                                                   | 49.00                              |
| Tilt                           | 0.20                         | 52.00                                                                   | 22.01                              |
|                                | 0.25                         | 44.00                                                                   | 34.00                              |
|                                | 0.30                         | 25.00                                                                   | 62.50                              |
| Untreated check (Dip in water) |                              | 66.67                                                                   |                                    |
| C.V.                           |                              | 12.300%                                                                 |                                    |
| S.E. Mean                      |                              | 2.240%                                                                  |                                    |
| LSD (0.05)                     |                              | 9.151                                                                   |                                    |

This indicated that treatment with systemic fungicide did not give complete control of red rot pathogen from diseased cane. Treatment with Bavistin at 0.10, 0.15 and 0.20% concentration greatly reduced the regrowth of red rot pathogen and controlled the disease from 91.4 to 92.47%. Treatment with Benlate and Tilt though significantly reduced the growth of pathogen but they could not control beyond 62.50%. Bavistin found more promising than Benlate and Tilt in controlling red rot pathogen. The results is in conformity with the findings of Lewin *et al.* (1976) who reported least disease incidence of 2.7% as against 9% incidence in control when setts treated with Bavistin (0.025%) for 15 minutes. In other experiment conducted with 8 chemicals, viz. Tecto, Tilt, Bavistin, Aretan 6, Agallol, MEMC-6, Rovral and Vitavax 200 on red rot and wilt pathogen of sugarcane *in vitro* completely inhibited the growth in petridishes (Iqbal *et al.* 1987). It can be concluded from the results that treatment of setts with Bavistin (0.15%) for 30 minutes can give effective protection against red rot pathogen.

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