

FUNGICIDAL TREATMENTS OF SUGARCANE SETTS AS A MEANS OF DISEASE CONTROL

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SUMMARY

Two-budded setts of variety Co 1158 were treated with six fungicides namely Aretan 6, Agallol, Granosan M, Benlate, Homai and Topsin M. The randomized complete block, design with four replications was used. Six hundred eye buds per treatment were dipped in the fungicides for ten minutes and then planted in the field. Dipping in water was served as control. Data on germination, tiller, yield and pathogenic associations were recorded. It was observed that none of the fungicides showed any significant difference on germination, tillering and yield of sugarcane. Three fungi namely *Aspergillus*, *Penicillium* and *Fusarium* were isolated and identified from the non-germinated setts and young dead plants. There was no variation in fungal association due to chemical treatment. No serious sett-or soil-borne pathogen could be detected.

INTRODUCTION

A number of diseases which are known to be associated with sugarcane setts (Benda and Ricaud, 1977) and those cause poor germination and death of young plants are identified in Bangladesh (Ahmed et al., 1976). These sett-or soil-borne pathogens are generally responsible for sett deterioration. Several studies were made to keep setts free of those pathogens (James, 1976; Lewin et al., 1976; Muthusamy and Subbaraja, 1973). Mercuric compounds were generally used but recently hot water and non-mercurial systemic chemicals were advocated (James, 1976; Muthusamy, 1973; Srinivasan and Rao, 1968). In Bangladesh, mercurial fungicides like Aretan 6, Agallol and Granosan M were mostly used. Due to hazardous nature of mercurial compounds, the present thinking is to replace mercurials by hot water and non-mercurial systemic chemicals (Reddy, 1977; Singh, 1967; Srinivasan and Rao, 1968). Three non-Mercurial systemic sett-treating chemicals were available and as such the present experiment was designed to find out a suitable pre-planting sett-treating chemical under Bangladesh pathogenic environment.

MATERIALS AND METHODS

Six fungicides namely Aretan 6, Agallol, Granosan M, Benlate, Homai and Topsin M, the last three being non-mercuric systemic, were taken in this study. The major commercial sugarcane variety Co. 1158 was used. The following poses of the fungicides were used :

Aretan 6=0.5 percent
Agallol=0.25 percent
Granosan M=0.25 percent
Benlate=0.05 percent
Homai=0.1 percent
Topsin M=0.1 percent

The solution was prepared separately for each chemical with the above concentration and three hundred two-budded setts per treatment were selected. The setts were then dipped in the solution for ten minutes and planted in the field. Water treatment was considered as control. The design was randomized complete block with four replications. Normal doses of fertilizer, general intercultural operations and pest control measures were taken. Germination count after 100 days of planting, tiller count after 200 days and yield data after 13 months were recorded. Non-germinated setts and young dead plants were collected and studied. The associated fungi in such cases were cultured, isolated and identified in the laboratory.

RESULTS AND DISCUSSION

The experimental results are presented in table 1. It is evident that setts treated with Benlate showed the lowest percentage of germination while the highest record of germination was obtained in case of Aretan 6. It was found from the statistically analysis that there were no significant difference among the treatments (Table 2). The germination percentage of systemic fungicides, in general, was lower than the mercurial compounds. Reddy-(1977) reported that in Fiji mercurial compounds gave better germination than the systemic chemicals.

The maximum number of tillers were obtained when Aretan 6 was used as pre-planting treatment while setts treated with Topsin M showed minimum number of tillers. However, there was no significant difference among the chemicals (Table 3). Similar in significant difference was obtained in case of yield of sugarcane for different treatments (Table 4), although highest yield was recorded for Homaj and lowest yield for Granosan M.

Table 5 summarizes the observations on fungal association on Co 1158 upon treatment with different fungicides. In all, three fungi could be isolated and identified. They were **Penicillium**, **Fusarium** and **Aspergillus**. These fungi except **Fusarium**, are not pathogenic to sugarcane. **Fusarium**, on the other hand, could neither produce any disease symptom nor responsible for settling death in this study. The most important sett-rotting pathogens like **Ceratocystis**, **Colletotrichum**, **Helminthosporium**, **Pythium**, **Cephalosporium** could not be detected.

The findings of the present investigation indicated that there was no significant difference in germination, tiller and yield of sugarcane for treating setts with different fungicides. Generally the failure of germination and death of young tillers which directly contribute on yield are due to the incidence of pineapple and red rot diseases. The pre-planting sett treatment by chemical means is generally done to control such sett-and soil borne diseases. The present experiment was conducted with a resistant variety and disease-free setts were taken. Moreover, field-detection of pineapple disease in Bangladesh could not have yet been possible (Ahmed et al., 1977). There was variation in the findings of the present study and those done by others, but this may be due to disease reaction of the variety and the pathogenic environment of the country. However, further studies are going on to confirm the results.

Table:-1. Average germination percentage, total tiller and yield of Co 1158 upon treatment with six fungicides.

Fungicide	Germination (%)	Total tiller	Yield (b)
Areton 6	58	392	465
Agallol	54	361	431
Granosan M	56	350	419
Benlate	44	354	439
Homai	48	360	493
Topsin M	53	347	425
Water	50	355	477

Table:-2. Analysis of variance showing the effect of sett-treating chemicals on germination of Co 1158.

Sources of variations	d. f.	S. S.	M. S.	F
Total	27	3740.68	138.54	
Treatment	6	1151.93	191.99	1.48
Block	3	259.25	86.42	0.67
Error	18	2329.50	129.42	

Table-3 Analysis of Variance showing the effect of sett-treating chemicals on tillering of Co 1158

Sources of Variations.	d. f.	S. S.	M. S.	F
Total	27	60859.71		
Treatment	6	5374.71	895.79	0.321
Block	3	5191.42	1730.47	0.619
Error	18	50293.58	2794.09	

Table-4 Analysis of Variance showing the effect of sett-treating chemicals on yield of Co 1158

Sources of Variations.	d. f.	S. S.	M. S.	F
Total	27	311538.68		
Treatment	6	19795.93	3299.32	0.32
Block	3	104334.68	34778.23	3.34
Error	18	187406.07	10411.45	

Table-5 Fungi isolated from non-germinated setts and young dead plants of Co 1158 upon treatment with six fungicides.

Treatment	Fungal colonies obtained.
Areton 6	<i>Penicillium</i> sp.
Agallol	<i>Penicillium</i> sp., <i>Fusarium</i> sp.
Granosam M	<i>Fusarium</i> sp.
Benlate	<i>Penicillium</i> sp., <i>Fusarium</i> sp., <i>Aspergillus</i> sp.
Homai	<i>Penicillium</i> sp., <i>Fusarium</i> sp., <i>Aspergillus</i> sp.
Topsin M	<i>Penicillium</i> sp.
Water	<i>Penicillium</i> sp., <i>Fusarium</i> sp., <i>Aspergillus</i> sp.

REFERENCE

1. Ahmed, H. U., M. A. Khan and M. I. H. Mian. 1976. Sugarcane diseases in Bangladesh. ISSCT Sugar Cane Pathol, Newal 15/16; 51.
2. Ahmed, H. U., M. A. Khan and M. I. H. Mian. 1977. Screening sugarcane clones for resistance to pineapple disease. ISSCT Sugar Cane Pathol. Newsl. 18:8-9.
3. Benda, G. T. A. and C. Ricaud. 1977. The use of heat treatment or sugarcane disease control. Proc. Int. Soc. Sug. Cane Technol. 16:483-496.
4. James, G. L. 1976. Pre-plant fungicidal dips-a long term measure against smut. ISSCT Sug. Cane Pathol. Nowal. 17:4-5.
5. Lewin, H. D.; S. Natarajan and S. D. Rajan. 1978. Control of sugarcane red rot (*Physalospora tucumanais* Spog.) by chemotherapy. ISSCT Sug. Cane Pathol. Newsl. 17:17-20.
6. Muthusamy, S. 1973. Systemic fungicides in the control of pineapple disease of sugarcane. ISSCT Sug. Cane Pathol. Newsl. 10:14-15.
7. Muthusamy, S. and K. T. Subba Raja. 1973. Fungicides in the control of sugarcane smut. ISSCT Sug. Cane Pathol. Nowal. 10:11-31.
8. Reddy, K. 1977. New fungicides for the treatment of sugarcane setts. ISSCT Sug. Cane Pathol. Newsl. 19:21-23.
9. Singh, G. R. 1967. Hot water treatment for control of grassy shoot disease of sugarcane. Sugar J. 29 (12) : 14-16.
10. Srinivas, K. V. and T. Rao. 1968. Heat treatment of sugarcane seed material. Indian Sugar 18(9) : 683-690.