

Effect of Soil Treatment on Sugarcane Seedlings

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ABSTRACT

An experiment was conducted to study the effect of soil treatment on sugarcane seedlings in the glasshouse using fuzz of the cross Isd. 16 x I. 156/66. The fuzz was sown in sterilized unsterilized, sterilized+brassiccol, sterilized+lesan, unsterilized + brassiccol and unsterilized+lesan media. Media and fuzz were sprayed with solution of the fungicides brassiccol and lesan dissolved at the rate of 1g in two litres of water. No significant difference was found among treatments for days to germinate. Significantly higher rate of germination was recorded in the steam sterilized media with or without fungicides compared to unsterilized media except unsterilized+lesan. Significantly lower seedling mortality was recorded in the steam sterilized media with or without fungicides. Lesan showed some effects on the rate of germination and seedling mortality. Hence, lesan may be used in the sterilized media to raise sugarcane seedlings.

INTRODUCTION

Germination failure, damping-off and death of seedling are the limiting factors in raising sugarcane seedlings under glasshouse conditions. Damping-off of sugarcane seedlings in nursery beds and mortality of transplanted seedlings are serious problems in India and it is caused by two soil borne pathogens *Pythium* species and *Rhizoctonia* species (Agnihotri *et. al.* 1976). In favourable environmental circumstances, 100% seedlings can be destroyed by various damping-off pathogens if no plant protection measures are taken (Agnihotri, 1983). At Sugarcane Research and Training Institute (SRTI) seedling mortality is a common feature in raising sugarcane seedlings. The reason is suspected to be damping-off disease as described by Agnihotri (1983). Lesan (Dexon) which is a p-dimethyl amino-benzene-diazo sodium sulphonate is excellent to control damping-off disease caused by *Pythium* sp. (Agnihotri *et. al.* 1976), while brassiccol which is a pentachloronitro-benzene is toxic to *Rhizoctonia* sp. (Nene, 1976). Therefore, based on the information available, and considering the importance of seedling raising, an experiment was undertaken to find out the effect of soil treatment on days to germinate, rate of fuzz germination and seedling mortality of sugarcane.

MATERIALS AND METHODS

Two fungicides brassicol (75% a. i.) and lesan (70% wp), media (steam sterilized and unsterilized), fuzz and plastic trays were used as experimental materials. The media were mixture of soil, press-mud and sand (2: 2: 1). For steam sterilization, the media were placed inside the sterilization plant and kept there for one hour at 100°C. Solutions of the fungicides were prepared dissolving at the rate of 1 g fungicide in two litres of water. The treatments were categorized as sterilized, unsterilized, sterilized + brassicol, sterilized + lesan, unsterilized + brassicol and unsterilized lesan. The sterilized and unsterilized media were placed in the small plastic trays and soaked well separately with the solution by sprinkler. In each medium, fuzz of the cross Isd. 16x1.156/66 was sown in four replications each with 1g of seed (fuzz). The sown fuzz was covered with a thin layer of sterilized and unsterilized media separately and sprayed thoroughly with the solutions again. Temperature was maintained in the glasshouse in between 30-35°C, and fuzz was sprinkled with water every day as per requirement. Data were recorded on number of days to germinate, number of seedlings germinated per gram and percent seedling mortality under glasshouse condition. The germination count was taken upto 7 d, while total number of seedlings per gram and seedling mortality were recorded upto 14 and 30 d from the date of sowing, respectively. The data were statistically analysed.

RESULTS AND DISCUSSION

In case of days to germinate, no significant difference was found among different treatments although the use of brassicol and lesan in sterilized media reduced 1d compared to unsterilized media without any fungicides (Table 1). The insignificant difference in speed of germination among the treatments indicates that sterilization of growth media either by steam or fungicides has no effect on speed of germination. However, use of fungicides in sterilized media might have shortened germination period.

Higher rate of germination was recorded in sterilized media with or without fungicides compared to unsterilized media (Table 1). Significantly higher number of seedlings germinated in sterilized media with or without fungicides and in unsterilized media treated with lesan. No significant difference was observed in seedling germination between unsterilized and unsterilized media treated with brassicol fungicides indicating that brassicol has no effect on stimulating fuzz germination. The result was partially corroborated with the findings of Wismer (1960) who reported that seedling germination was not adversely affected when the soil and fuzz was treated with chemicals before sowing.

Table 1. Mean values of days to germinate, rate of germination and seedling mortality in sugarcane.

Treatments \ Parameters	Days to germinate (d)	Number of seedlings germinated/g	Seedling mortality (%)
Unsterilized	4.00a*	81.25c	9.71a
Sterilized	3.50a	115.50ab	3.93bc
Unsterilized + Brassicol	3.50a	99.25bc	0.60a
Unsterilized + Lesan	3.50a	117.50ab	7.00ab
Sterilized + Brassicol	3.00a	141.00a	3.90bc
Sterilized + Lesan	3.00a	141.75a	1.71c

* Figures accompanied by the same letter do not differ significantly at 5% level as per DNMR test.

Table 1 shows that fungicides had no significant effect in reducing seedling mortality compared to sterilized media which indicates that steam sterilization is enough to kill the damping-off pathogens in soil. Significantly higher mortality was observed in unsterilized as well as in unsterilized media treated with brassicol compared to sterilized media with or without fungicides. The lowest seedling mortality was recorded in the sterilized media treated with lesan. The results also show that the use of lesan in both the sterilized or unsterilized media was found more effective in reducing seedling mortality than the brassicol. The results partially supported and expanded the findings of Rao and Rao (1970), where they saved 80% seedling by chemical spraying. The results were also in partial agreement with the findings of Agnihotri *et al.* (1976) who reported that a combination of vitavax (15 ppm) and Dexon (30 ppm) was superior to all fungicides in protecting sugarcane seedlings against soil borne pathogens. The reports of Wismer (1960) are also in partial agreement with the present result where he found disease free seedlings when treated the soil and seeds with chemicals.

In conclusion, it can be stated that fungicides (brassiccol and lesan) have no significant effect in reducing days to germinate and seedling mortality and in increasing percent germination compared to sterilized media. Therefore, it may be suggested for the use of steam sterilization in raising sugarcane seedlings. Lesan with sterilized media may also be used to raise sugarcane seedlings in the glasshouse.

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