

Effect of Damping off Disease on Fuzz Germination and Seedling Mortality of Sugarcane

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ABSTRACT

An experiment was carried out to study the effect of damping-off disease on fuzz germination and seedling mortality of sugarcane. Dead and damped seedlings were collected from nursery bed; isolation of pathogen was made in PDA medium, purified and identified as *Pythium* sp. The isolated fungus was multiplied in bulk quantity in sand-maize meal and also in PDA medium and tested separately on seedlings of crosses CoL 33×CP-50/6 and Co.630 × Co.661 in replicated microplots. Fuzz germination was comparatively lower in inoculated plot and was significantly lower in sand-maize meal inoculum inoculated plots than control plots. Seedling mortality ranged from 54.5 to 92.1% in inoculated plots and were significantly higher than control plots (ranged from 17.2 to 18.5%) in both the crosses. The highest mortality was observed in sand-maize meal grown inoculum inoculated plot which was significantly higher compared to control as well as PDA grown inoculum inoculated plots. *Pythium* has great effect on seedling mortality and the sand-maize meal medium is suitable for growing of this fungus.

INTRODUCTION

Damping off disease caused by *Pythium* sp. is a serious problem in raising sugarcane seedlings from the true seeds (fuzz). This disease is also a serious problem of sugarcane seedlings in nursery bed (Dutt *et. al.* 1938; Subba *et. al.* 1962). Under favourable conditions, 90-100% seedlings may be destroyed by this disease if no plant protection measures are taken (Agnihotri, 1983). A striking feature of this disease is the rapidity at which seedlings are killed. Healthy seedlings may collapse within one or two days of infection. Damp soil and cloudy weather are the suitable environment for severe attack of the damping-off pathogen (Agnihotri, 1983). During favourable weather condition the disease is also observed in Bangladesh. Every year lot of seedlings are damaged in glass-house as well as nursery bed of Breeding Division of Sugarcane Research & Training Institute (personnal observation). Most of the damage occurs possibly due to the incidence of this disease. However, the extent of loss of seedlings caused by this disease in Bangladesh is not yet determined. Therefore, an experiment was undertaken to investigate the effects of damping-off disease caused by *Pythium* sp. on fuzz germination and seedling mortality of sugarcane.

MATERIALS AND METHODS

A. Experimental materials : The true seeds (fuzz), infected seedlings, fuzz and fungus growing media were used as experimental materials.

B. Isolation of fungus : Dead and damped seedlings were collected from nursery bed of Breeding Division and kept under running tap water for 24 hours. The

specimens were then washed in sterile distilled water, but not surface sterilized with any disinfectant and the infected roots were cut and cultured in non acidified PDA medium (Edgerton, 1959). The fungus grown in the medium was identified as *Pythium* sp. following procedure of Middleton (1943) and description of Gilman (1957). The fungus was then purified and reproduced on sand-maized meal and also in PDA media inoculation.

C. Inoculation test : Five grams of inoculum grown both in sand-maize meal and PDA media were mixed with 95 g of sterile fuzz grown media (mixture of soil, pressmud and sand in 2:2:1 ratio) according to the procedure described by Agnihotri *et. al.* (1976). The *Pythium* infested media were taken in plastic trays and fuzz from the crosses CoL. 33XCP. 50/6 and Co. 630XCo. 661 were sown in 4 replications with 1g in each replicate. Side by side control plots were also maintained in which fuzz were sown in uninfested media. Data were recorded on fuzz germination after 1 week of sowing, while survivals of seedlings were counted weekly upto 6th weeks of inoculation. The percent mortality was calculated from last stand count and data were analysed statistically.

RESULTS AND DISCUSSION

Fuzz germination was lower in inoculated microplots compared to control microplot (Table 1). In avarage, the lowest germination was observed in sand-maize meal medium which was found statistically significant compared to control plot. On the otherhand, fuzz germination rate of the cross CoL. 33XCP. 50/6 was significantly higher than that of the germination rate of Co. 630XCo. 661 cross in the PDA medium. The lowest number of fuzz germination was observed in PDA grown inoculum inoculated plots of the cross Co. 630XCo. 661 with the second lowest in sand-maize meal inoculum inoculated plot of the cross COL. 33XCP. 50/6.

The mortality percent was comparatively higher in inoculated plot than noninoculated ones. The average value in respect of seedlings mortality showed 86.9 and 64.8% in sand-maize meal and PDA inoculum inoculated microplots respectively which were significantly higher than control (17.9%) microplots (Table 1). However, no significant difference in seedlings mortality was recorded between two crosses. In the crosses, and two media used, the mortality percent were always found significantly higher than the control plots. The mortality ranged from 54.5 to 92.1% in inoculated plots, and 17.2 to 18.5% in control plots. The highest percentage of seedling mortality was observed in sand-maize meal inoculum inoculated plots of the cross Co. 630XCo. 661 (92.1%), and was found significantly higher than the mortality percent in all other media of the crosses.

The lower germination and higher percentage of seedling mortality in inoculated plots were recorded due to infection of the fungus *Pythium* sp. Moreover the highest mortality percent in sand-maize meal grown inoculum inoculated plots due to severe incidence of *Pythium* in this media. The results were corroborated with the findings of Agnihotri *et. al.* (1976) where they found 55.1 to 93.4% seedlings mortality using sand-maize meal media in pathogenicity test of *Pythium*. From the result, it may be

Table 1. Mean value of fuzz germination and mortality of seedlings in control and inoculated microplots.

Cross	Control microplots		Inoculated microplots				Mean	
	Germination (Nos)	Mortality (%)	PDA		Sand maize meal		Germination (Nos)	Mortality (%)
			Germination (Nos)	Mortality (%)	Germination (Nos)	Mortality (%)		
CoL.33×CP.50/6	435.0 a*	17.2d	430.0 ab	75.0 b	307.0 c	81.7 ab	390.7 a	58.0 a
Co 630×Co 661	367.0 abc	18.5 d	303.0 c	54.5 c	328.0 bc	92.1 a	332.7 b	55.1 a
Mean	401.0 a	17.9 c	366.5 ab	64.8 b	317.5 b	86.9 a		

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

concluded that *Pythium* has great effect on seedling mortality and the sand-maize meal media is suitable for growing the fungus.

REFERENCES

- Agnihotri, C.P.; Tripathi, B.K. and Singh, K. 1976. Damping-off of sugarcane seedling and its control by fungitoxicants. *Sugarcane Breeding News*, **37** : 5-9.
- Agnihotri, V.P. 1983. In Diseases of sugarcane. Mohan Pramlani for Oxford and IBH publishing Co. 66, Janpath, New Delhi. pp. 152-162.
- Dutt, N.L.; Krishnaswamy, M.K. and Rao, K.S.S. 1938. A note on seed settling and seed germination in certain sugarcane. *Indian J. Agri. Sci.*, **8** : 429-439.
- Edgerton, C.W. 1959. In sugarcane and its diseases. Louisiana Press, USA : pp. 137-154.
- Gilman, J.C. 1957. In soil fungi. Oxford & IBH Publishing Co. 36 Chowringhee Road, Calcutta-16. pp. 152-163.
- Middleton, J.T. 1943. The Taxonomy, host range and Geographic distribution of the genus *Pythium*. *Mem. Torrey Bot. Club.*, **20** : 1-171.
- Subba, R.K.S.; Kandaswamy, P.A. and Natarajan, B.V. 1962. Vigour as an unreliable basis for the selection of sugarcane seedlings from seed pans for field standings. *Proc. ISSCT 11th Cong. Mauritius*, pp. 568-570.