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Biological Control of Sugarcane Root Rot Disease

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Every year at Sugarcane Breeding Institute, 5 to 6 lakhs sugarcane seedlings are raised from true seed (fluff) which is an essential step in the development of new commercial clones. At the initial stages of seedling growth, root rot disease caused by *Pythium graminicolum* Sub. results in loss of large number of valuable seedlings. Frequent drenching of mercurial fungicide Agallol, has not effectively controlled the root rot disease but it suppressed beneficial microflora in the soil. Many soil borne pathogens have been reported to be controlled by the use of antagonistic organism *Trichoderma* spp. (Sivan *et al.*, 1984; Papavizas, 1985; Mukhopadhyay, 1987). Attempts have been made to control root rot disease in nursery seedbeds by employing antagonistic organism *Trichoderma viride* on a large scale (Padmanaban and Alexander, 1987; 1990). The possible mechanism of control have been studied and the results are presented in this paper.

T. viride was mass multiplied in autoclavable polythene bags containing 250 g of sand maize medium sterilized at 20 lb/inch^2 pressure for 2h. One part of *T. viride* inoculum was mixed with 10 parts of soil and 250 g of the mixture was applied to each bed (45 x 25 cm size) 2 days prior to sowing. *T. viride* was applied in 2100 flats. The establishment of *T. viride* was assessed by taking representative soil samples from flats by standard procedure. Antagonism of *T. viride* was tested by dual culture technique. Crude culture filtrate of *T. viride* was partially purified, incorporated in oats agar medium and the growth of *P. graminicolum* was tested.

The root disease incidence in different seasons during 1984 to 1990 is presented in Table-1. It was drastically reduced in all the years in *T. viride* - applied flats.

Table 1. Effect of *T. viride* on root rot incidence in different years

Year of sowing	No. of flats	Flats showing root rot
1984	2130	10
1985	1860	0
1986	1700	3
1987	1800	10
1988	2000	5
1989	2100	12
1990	2100	5

In 1990, soil samples were collected from each flat 2 months after sowing and population of *T. viride* was assessed by dilution plate technique. The number of *T. viride* colonies was high (25 to 30 cfu/g soil) in 75 per cent of flats.

When mycelium of *P. graminicolum* from dual plates was examined, neither coiling nor lysis was observed. *T. viride* had completely suppressed the growth of *P. graminicolum* within 4 days. Mechanisms of biocontrol by *Trichoderma* spp. like antibiosis, lysis, competition and mycoparasitism have been suggested by many authors (Ayer and Adam, 1981: Cook and Baker 1983; Papavizas and Lumsden, 1980). *T. viride* produced toxic metabolites *in vitro* which inhibited the growth of *P. graminicolum*

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