

Screening of bioagents for control of downy mildew of pearl millet

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ABSTRACT

The bioagents viz., *Trichoderma viride*, *T. harzianum*, *T. hamatum*, *Pseudomonas fluorescens* and effective micro-organisms (EM) along with fungicide Ridomil MZ-72 were screened in sick plot for their effectiveness in controlling downy mildew disease of pearl millet. Seed treatment followed by spraying at 20 days after sowing was done. Among the bioagents, *T. harzianum* and *P.fluorescens* were found most promising in reducing the disease incidence with increase in emergence of crop and grain yield. However, the chemical treatment of Ridomil MZ-72 was most significant in respect of all the parameters under study.

Key words : Downy mildew, Bioagents , *T. harzianum*, *P.fluorescens*

INTRODUCTION

Pearl millet production is affected by various biotic and abiotic stresses. Among the biotic factors diseases viz., ergot and downy mildew are important. Downy mildew caused by *Sclerospora graminicola* (Sacc.) Schoret, is one of the major factor that restrict the production potential of pearl millet. It has become occasional setback to pearl millet hybrid programme in India. The pathogen *S. graminicola* is biotrophic in nature, seed and soil borne with profusely branched mycelium that systematically colonizes stem, leaves and apical meristem producing symptom starting from first leaf stage to flowering. The crop is mainly grown by poor farmers and managing downy mildew is very difficult due to its biotrophic nature. Recent research into the control of soil borne diseases has mostly concentrated on chemical methods that offer considerable cost effective and pollution free control. Various biocontrol agents including fungi and bacteria have been reported as antagonist to soil borne pathogens of graminaceous downy mildews. The present study was, therefore, undertaken to determine the effect of different biocontrol agents viz., four fungus species, one bacterial and the effective microorganisms (EM) which are both aerobic and anaerobic (lactic acid bacteria, photosynthetic bacteria, yeast and fungi) on downy mildew pathogen and to compare their effectiveness with fungicide Ridomil MZ-72 (Metalaxyl+Mancozeb) in controlling the disease under field conditions along with effect on crop emergence, tiller production etc.

MATERIALS AND METHODS

A field experiment was carried out with downy mildew susceptible pearl millet hybrid HB-3 in the well-

developed downy mildew sick plot of Plant Pathology Section, College of Agriculture, Pune during Kharif 2004. The experiment was laid out in randomized block design with four replications and seven treatments. Seed treatment followed by spraying at 20 days after sowing was done.

Seed Treatment:

For the seed treatment with fungal and bacterial biocontrol agents, procedure given by Agrwal *et. al.* (1977) was followed. Potato dextrose broth was inoculated with each fungal antagonist and incubated at $26\pm 2^{\circ}\text{C}$ for 7 days. After incubation seeds of pearl millet (HB-3) were immersed in broth for five minutes and dried in shade before sowing. While for bacterial antagonist Kings 'B' medium was used. Seeds were immersed in EM solution poured in petriplates for five minutes, removed, dried in shade and used for sowing. The fungicide Ridomil MZ-72 WP was applied to the seed @ 4 gm a.i./kg.

Spraying:

Spraying with all biocontrol agents and fungicide was done 20 days after sowing of the crop. The fungal antagonist cultures were multiplied on potato dextrose broth for 7 days under 12 hrs. light cycle without shaking. The cultures were harvested and blended in sterile distilled water (spore count 5×10^{-7} spore ml^{-1}) and used for spraying (Haware *et al.* 1999). Similarly, bacterial suspension (10^{-8} CFU ml^{-1}) was prepared with Kings 'B' broth and used for spraying. EM solution was sprayed @ 1 % while fungicide Ridomil MZ-72 WP @ 0.4 %.

Observations recorded:

The downy mildew disease affects the emergence

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