



RESEARCH ARTICLE

Biological control of collar rot of sunflower using rhizobacteria

■ P. VISHWANATH^{1*}, S. SHANKAR², V. C. SUVARNA¹ AND JAYASHEELA¹

¹ Department of Agricultural Microbiology, University of Agricultural Sciences, BENGALURU (KARNATAKA) INDIA

² College of Horticulture, University of Horticultural Sciences, BIDAR (KARNATAKA) INDIA

ARTICLE INFO

Received : 15.03.2012

Revised : 12.08.2012

Accepted : 22.09.2012

Key Words :

Sunflower, Collar rot,
Biological control,
Rhizobacteria

ABSTRACT

A study was conducted to screen potential biocontrol agents, *Pseudomonas fluorescens*, *Bacillus subtilis*, *Pseudomonas* sp.-I, *Bacillus* sp.-I and *Bacillus* sp.-II for the management of *Sclerotium rolfisii* the causal agent of collar rot of sunflower in dual culture test and they overgrew the pathogen upto 76.2, 88.8, 80.01, 35.9 and 77.8 per cent *in vitro*, respectively. Among these biocontrol agents, *P. fluorescens*, *B. subtilis*, *Pseudomonas* sp.-I and *Bacillus* sp.-II were tested against collar rot of sunflower when delivered as seed dressing or soil application in pot trials in greenhouse conditions. *B. subtilis* as seed treatment was more effective in disease control by producing minimum disease incidence (10-17 %) followed by other biocontrol agents. Significant increase in seedling emergence, plant stand and biomass were recorded in all biocontrol agents treatments compared with the untreated control. Treatment with the *Bacillus* sp.-II as seed treatment showed maximum plant height (90.80 cm), maximum number of leaves per plant (20.37) and biomass (10.87g/plant) followed by other biocontrol agents treated as seed treatment as well as soil drenching under greenhouse conditions. *Bacillus subtilis* was more effective in disease suppression compared to other strains and *Bacillus* sp.-II was more effective in plant growth promoting activity followed by other biocontrol agents.

How to view point the article : Vishwanath, P., Shankar, S., Suvarna, V.C. and Jayasheela (2012). Biological control of collar rot of sunflower using rhizobacteria. *Internat. J. Plant Protec.*, 5(2) : 391-393.

*Corresponding author:
microshankar08@gmail.com

INTRODUCTION

Sunflower is one of the major oilseed crops grown in India. It is a common observation that the reduction in yields is mainly due to the diseases rather than pests in the crop. Collar rot is one of the major diseases of sunflower caused by *Sclerotium rolfisii* and has become a big threat to crop production. The pathogen causes pre and post emergence damping-off, root/collar rot and wilt of sunflower and is considered as one of the economically important diseases in India (Hebbar *et al.*, 1991). Controlling this disease by chemical means is very much temporary and deteriorating the soil health. Under these circumstances, biological control is the best alternative to safeguard crop yields. Biological control of plant pathogens has been considered as a potential control strategy in recent years (Weller, 1988). A large number of soil bacteria

like *Bacillus* spp. and *Pseudomonas* spp. have earlier been reported to possess inhibitory properties against a number of plant pathogens (Hegde *et al.*, 1980; Fiddaman and Rossell, 1993; Hebbar *et al.*, 1991). An attempt has been made in this experiment to compare the efficacy of soil bacteria among selected strains *viz.*, *Pseudomonas fluorescens*, *Bacillus subtilis* and strains isolated from rhizosphere of infected plant, applied through seed treatment and soil drenching for controlling collar/root rot of sunflower caused by *Sclerotium rolfisii* and to know their effect on growth of sunflower under *in vitro* and *in vivo* conditions.

MATERIALS AND METHODS

The pathogen (*Sclerotium rolfisii*) was isolated from infected collar rot of sunflower plant. Two soil bacteria