Management of root and bulb rot of garlic

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ABSTRACT

Garlic (*Allium sativum* L.) is an important vegetable crop grown all over India. Its productivity is quite low and the crop is known to suffer from several diseases. Among them, root and bulb rot is an important one. It causes severe damage to the crop, particularly in the Saurashtra region of Gujarat. Hence the present investigation was carried out to find out best management of the disease. Among different treatments, the highest bulb yield 7778 kg/ha and the lowest disease incidence 7.39 % were observed in seed treatment of *Trichodermaharzianum* @ 30 g/kg seed + soil application of *T. harzianum* @ 2.5 kg in 500 kg FYM/ha + drenching with *T. harzianum* @ 5 g/lit at 15 DAS.

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INTRODUCTION

Egg parasitoids belonging to Trichogrammatidae family are known to be effective biocontrol agents against many pests in various crops (Takada *et al*., 2001). Nearly 200 species of Trichogramma have been identified of which 25 are used for pest management in 34 crops in 30 countries (Parra and Zuchi, 1997). Moura *et al*., 2004 reported that the use of *Trichogramma* species is a potential key strategy in pest management. But its effectiveness largely depends on the use of insecticide that does not interfere with parasitism and parasitism viability. A key principle of integrated pest management (lPM) is to maximize pest control from natural mortality factors such as predators and parasitoids. These are supplemented with pesticides, by ensuring minimal disruption of biological control agents. It is important that chemical agents are compatible with natural enemies (Schuld and Schmuck, 2002; Nasreen *et al.,* 2003; Youn *et al.,* 2003). One major purpose of Integrated Pest Management (IPM) strategies is to unify the safe and sustainable use of chemical and biological control method. Therefore the side effects of pesticides on biocontrol agent should be evaluated for induction in IPM programmes.

MATERIALS AND METHODS

The experiment was conducted with garlic (variety garlic-4) during 2010-2011, in the plot size 2.25 x 2.00 m with spacing of 15 x 15 cms. Details of treatments were : T_1= Seed treatment of *Trichodermaharzianum* @ 30 g / kg seed, T_2=Seed treatment of *Pseudomonas fluorescence* @ 10 g/kg, **T_3**= T1 + soil application of *Trichoderma harzianum* @ 2.500 kg in 500 kg FYM/ha at the time of sowing, T_4=T3 + Drenching with *Trichoderma harzianum* @ 5 g/lit. at 15 days after sowing (1000 lit/ha), T_5= T1 + soil application castor cake @ 1000 kg/ha at the time of sowing, T_6= Seed treatment with carbenlazim 4 g/kg + one spray of carbendazim (50%WP) @ 0.1 % at 15 days after sowing. (1000 lit/ha), T_7 = Seed treatment with carbendazim 4g/kg + one spray of tebuconazole (25.9 %/m C) @ 0.035 % at 15 days after sowing. (1000 lit/ha), $T_{8=}$ Seed treatment with carbendazim 4g/kg + one spray of hexaconazole (5%EC) @ 0.01% at 15 days after sowing. (1000 lit/ha) and T_9= control. The root and bulb rot incidence % was recorded by counting the infected plants from each plot. Root and bulb rot incidence (%) and yield (kg/plot) were recorded.

RESULTS AND DISCUSSIONS

For the management of root rot in garlic data presented in table 1 results revealed root rot disease incidence percentage to be non-significant. With regard to the garlic bulb yield (Table 1), results were found to be significant. The highest (7778 kg/ha) bulb yield significantly was recorded in the treatment T4, which was at par with T3 (7593 kg/ha) and T5 (6852 kg/ha) garlic bulb yield respectively. The present finding was supported by an experiment for testing various biocontrol agents and soil organic amendments for managing the basal rot of onion.

Table 1. Effect of different treatments on root rot disease incidence% and garlic bulb yield during rabi 2010- 2011

Treatments	Root rot incidence (%)	Garlic bulb yield kg/ha
$T_{1=}$*Trichodermaharzianum*	8.75	5370
$T_{2=}$ *P. fluorescence*	8.15	5370
$T_{3=}$T1+T. har2.5kg.FYM 500k	7.92	7593
$T_{4=}$T3 +Dren.5g/lit *T. harzianum*	7.39	7778
$T_{5=}$T1+Caster cake@ 1000 kg/ha	7.70	6852
$T_{6=}$ ST carbendazim + Drenching	8.50	6296
$T_{7=}$ ST carbendazim + Dren.Tebuconazole	7.70	5923
$T_{8=}$ ST carbendazim+Dren. Hexaconazole	8.54	6111
Control$_{=}T_9$	8.74	5370
S. Em. ±	0.41	437.3
C. D. at 5 %	NS	1311
C. V. %	8.7	12.03

caused by *Fusarium oxysporum.* f. sp. *Cepae* (Subramanium and Sreenivasan, 2012). Among the tested isolates of *Trichoderma sp*., *T. harzianum* (TH3) recorded the maximum (82.77%) inhibition. Consortial formulation of *Pseudomonas* sp. and *Trichoderma harzianum* recorded the least disease incidence of basal rot.

Among different treatments, the highest bulb yield 7778 kg/ha and the lowest disease incidence 7.39 % were observed in seed treatment of *Trichoderma harzianum* @ 30 g/kg seed + soil application of *T. harzianum* @ 2.5 kg in 500 kg FYM/ha + drenching with *T. harzianum* @ 5 g/lit at 15 DAS.

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