

Integrated Management of Seed and Collar Rot of Groundnut Caused by *Aspergillus niger* Van. Teighem

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ABSTRACT: Collar rot or crown rot disease of groundnut caused by *Aspergillus niger* is prevalent throughout the groundnut growing areas of the State in rainy as well as post-rainy seasons resulting in reduced crop stand and post-emergence seedling blight with an average reduction in crop yield to the tune of 15 per cent. Experimental trial on the integrated management of collar rot of groundnut indicated that seed dressing with Bavistin @ 2g/kg alone and combined administration of seed treatment with *Trichoderma viride* @ 4g/kg, soil application of *T. viride* @ 2.5kg/ha and soil application of neem cake @ 1000 kg/ha were at par in their efficacy in reducing collar rot disease. However, seed treatment with Bavistin @ 2g/kg alone was superior to all other treatments in maintenance of crop stand and realisation of increased pod yield.

Key words: Groundnut, collar rot, *Aspergillus niger* and management

INTRODUCTION

Diseases are major constraints in groundnut production in different parts of the world. A number of fungi (species of *Aspergillus*, *Rhizopus*, *Fusarium*, *Penicillium*, *Rhizoctonia* & *Sclerotium*) are associated with seed and are present in soil. They cause pre- and post-emergence rotting of seeds and seedlings and at later stages collar rot or crown rot (*A. niger*), stem rot or wilt (*S. rolfsii*) and dry root rot (*Macrophomina phaseolina*) (Kolte, 1985). On an average, collar rot of groundnut is responsible for reduction in crop yield to the tune of 15 per cent in the farmers' field. Further, non-availability of tolerant and resistant variety coupled with cultivation of the crop under input starved condition aggravate the disease situation. In this context, a field experiment on Integrated Management on collar rot was designed during kharif 2013 season in the Central Research Station, Orissa University of Agriculture and Technology, Bhubaneswar to evaluate eight different treatments for their efficacy in minimizing the disease.

MATERIAL AND METHODS

A field experiment on collar rot was laid out during kharif season of 2013 at Central Research Station, Orissa University of Agriculture and Technology, Bhubaneswar in a randomized block design with three replications and nine treatments. Susceptible groundnut cultivar AK 12-24 was used as the test host plant. The experimental plot size was of 5.0 X 3.0m with 10 rows of plants at a spacing of 30 cm between rows and 10 cm from plant to plant. A basal dose of fertilizer @ 20 kg N in the form of Urea, 40 kg P₂O₅ in the form of single super phosphate 40 kg of K₂O as Muriate of potash per hectare was applied at the time of sowing. Seed treatment with *Trichoderma viride* and soil application of neem cake either singly or in various combinations were tested against seed treatment with Bavistin 50% WP. Control plots were maintained simultaneously. Observations on disease intensity were recorded from the eight inner rows of each treatment. The percentage of plants affected in each treatment was calculated. Besides, data on final plant stand and dry pod yield were recorded.

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Sl. No.	Treatments
1.	Seed treatment with <i>Trichoderma viride</i> @4g per kg of seed
2.	Soil application of <i>T. viride</i> @2.5kg/ha
3.	Soil application of neem cake @ 1000 kg/ha
4.	Seed treatment with <i>T. viride</i> + soil application of <i>T. viride</i>
5.	Seed treatment with <i>T. viride</i> + soil application of neem cake.
6.	Soil application of <i>T. viride</i> + soil application of neem cake.
7.	Seed treatment with <i>T. viride</i> + soil application of <i>T. viride</i> + soil application of neem cake.
8.	Seed treatment with Bavistin @2g per kg of seed
9.	Control

RESULTS AND DISCUSSION

There was significant difference among the treatments for per cent disease incidence, final plant stand and pod yield (Table 1). The experiment indicated that Bavistin treated seeds (2g/kg of seed) significantly gave highest pod yield of 1126.33kg/ha with lowest disease incidence (5.33%) with maximum plant population (3.02 lakhs/ha). Combined administration of seed treatment with *T. viride*, soil application of *T. viride* and soil application of neem cake @ 4g/kg of seed, 2.5 kg/ha and 1000 kg/ha respectively was second best in realisation of pod yield (1095.00 kg/ha) and control of collar rot disease (62.50%). In spite of low disease pressure during kharif 2013 season, the trend of treatment performance in respect of plant population, yields as well as reduction of disease incidence was in conformity with the treatments imposed.

Table 1
Effect of integrated disease management methods on disease intensity, plant population and pod yield of groundnut crop

Treatment	Percent disease incidence	Percent disease control	Final plant stand ('000/ha)	Pod yield (kg/ha)	Percent increase in yield over control
T1- Seed treatment <i>Trichoderma viride</i> @ 4g/kg of seed	7.00 (15.31)	56.25	281.33	1048.33	20.96
T2- Soil application <i>T. viride</i> @ 2.5kg/ha	7.66 (16.06)	52.12	280.00	1045.66	20.65
T3- Soil application of Neem cake @ 1000kg/ha	8.66 (17.10)	45.87	286.00	1061.66	22.50
T4- Seed treatment with <i>T. viride</i> soil application <i>T. viride</i>	8.00 (16.41)	50.00	278.66	1038.33	19.80
T5- Seed treatment with <i>T. viride</i> +soil application of Neem cake	6.66 (14.95)	58.37	282.00	1058.33	22.11
T6- Soil application of <i>T. viride</i> +soil application of neem cake	7.33 (15.70)	54.18	285.66	1065.66	22.96
T7- Seed treatment <i>T. viride</i> + soil application of <i>T. viride</i> + soil application of Neem cake	6.00 (14.18)	62.50	292.00	1095.00	26.34
T8- Seed treatment with Bavistin @ 2g/kg of seed	5.33 (13.34)	66.00	302.66	1126.33	29.96
T9- Control	16.00 (23.56)	-	262.66	866.66	-
CD (P=0.05)	1.45		3.84	11.33	

Figures in parentheses are arcsine transformed values

The experiment on Integrated Management of collar rot of groundnut by integrating together different components namely cultural, biological and chemical was taken up in susceptible variety AK 12-24. Data indicated that seed dressing with Bavistin @ 2g/kg alone and combined imposition of seed treatment with *Trichoderma viride* @ 4g/kg, soil application of *T. viride* @2.5kg/ha and soil application of neem cake @1000 kg/ha were equally effective in controlling collar rot disease. However, the former treatment was statistically superior to all other treatments in better maintenance of crop stand and realisation of higher pod yield indicating persistent performance of Bavistin over years (Mohapatra and Behera,2012). The study also revealed that seed inoculation with *T. viride*, soil inoculation with *T. viride* and soil application of organic amendment like neem cake either singly or in various combinations offer fair degree of disease control improving seedling emergence and vigour (Charitha Devi and Prasad,2009).

The inhibitory effect of Bavistin on collar rot disease has also been reported by earlier workers (Behera and Roul, 1995 and Karthikeyan,1996).

Seed treatment with *T. viride* was not as effective as that of chemical seed dressing against collar rot disease. However, it was found as a viable alternative

being relatively safe, eco-friendly and economical. Antagonistic effects of soil fungi, bacteria and actinomycetes against *Aspergillus niger* have been reported by earlier workers (Das Gupta and Raj, 1998).

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