International Journal of Theoretical & Applied Sciences, 15(2): 92-95(2023)

ISSN No. (Print): 0975-1718
ISSN No. (Online): 2249-3247

Integrated Management of Collar Rot Disease of Groundnut

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(Received 27 September 2023; Accepted 07 November 2023)
(Published by Research Trend, Website: www.researchtrend.net)

ABSTRACT: Collar rot disease caused by *Aspergillus nigervan* Teighem is an important seed- and soil-borne disease of groundnut (*Arachis hypogaea* L.) that affects seed quality and reduces yield. The experiments were conducted in Kharif in RRTTS, G. Udayagiri, Odisha in 2021 and 2022. The effects of seed treatment, application of neem cake to soil and inoculation of bioagents in FYM and soil drenching with fungicides should be studied. The treatments were carried out on seeds of *Trichoderma viride* (5 g/kg seeds) and *Pseudomonas fluorescens* (10 g/kg seeds) with 1.5 q/ha of neem cake applied to the soil and 4 kg of bioagents applied to the soil in 10 qtl FYM, incubated at 30% humidity. for 15 days in the stable and applied twice on the 15th and 30th days after sowing and scattering validamycin (0.2%) in the soil and (metalaxyl + mancozeb) (0.2%)] on the 15th and 30th day after sowing (DAS). The rate was (61%) and highest pod yields of 1557 kg/ha were recorded with soil application of Neemcake@1.5q/ha 15 days after sowing and during sowing + application of 4 kg of bioagent in 10q FYM to the soil, incubated in the stable at 30% humidity for 15 days and application twice after 15 and 30 days after sowing, then seed coating with *T. viride* @ 5 g/kg seeds + soil By applying 4 kg of bioagent in 10 qtl FYM, incubated at 30% humidity under dispersion conditions for 15 days, and two applications on the 15th and 30th days after sowing, diseases can be prevented up to 52% with a pod yield of 1510 kg/ha.

Keywords: Collar rot, *Aspergillus niger,* groundnut, FYM.

INTRODUCTION

Groundnuts are an important oilseed crop during Kharif and Rabi seasons. India imports about half of its national edible oil requirements. The continued rise in oilseed imports, particularly groundnuts and mustard, is at the forefront of India's oilseeds scenario. Groundnut is cultivated in 3.1Mha with production of 4MMT and productivity 1640kg/ha, USDA. In India, the total area is 39.31 lakh hectares, production is 6.86 million tons with an average yield of 1,745 kg/ha (Anonymous 2019). Rajasthan ranks second in terms of area and production with an area of 7.34 lakh hectares, annual production of 1,612 million tonnes and intra-rabi productivity of 2,195 kg/ha (Anonymous 2019-20). Peanuts play an important role in the livelihoods of small farmers. India is the largest oilseed producer in the world and the oilseed sector occupies an important place in the country's economy. This country accounts for 12 to 15% of the world's oilseed area, 6 to 7% of vegetable oil production and 9 to 10% of total edible consumption.

However, due to farmers' partial adoption of the practices, there is a significant gap between farmers' potential and actual production. Reports from farmers suggest that fluctuations in peanut production yield are influenced by several constraints, including: unreliable rainfall; lack of high-yielding, disease-resistant varieties; parasites and diseases; low prices from manufacturers; poor agronomic practices; and lack of institutional support (Bucheyeki *et al.,* 2008). One of the major problems in peanut production and processing is the huge inefficiencies resulting from the uncertain production environment due to rain-fed farming, the weak resource base of small-scale farmers and processors, and the low adoption of improved technologies. The technology gap, i.e. Lack of knowledge of recently introduced production and crop protection technologies and associated management practices in farmers' fields is the biggest obstacle in peanut production. Peanut disease caused by *Aspergillus niger* van Teighem is one of the most important seed- and soil-borne diseases.

This pathogen is polyphagous, ubiquitous, nontargeting and highly destructive in nature in soil and seeds (Vimal Kumar and Saifulla 2017). It is important to note that this disease occurs in almost all peanut growing regions in the world. Dighule *et al.* (2018) reported that the incidence of the disease in Maharashtra is 28–50%.

MATERIALS AND METHODS

The experiment was conducted at RRTTS Training Farm, G. Udayagiri. The main objective of the experiment is to evaluate bioagents and fungicides for managing groundnut collar rot. A new and innovative technology with higher production potential within a specific cropping system can be popularized through a frontline demonstration program (Pokar *et al.,* 2014). The experiment was carried out with groundnut var. Dharani with design-RBD, seven treatments and three replications. The crop was sown in the rains in the second week of July. The following treatments are performed as given below.

T_1 - *T. viride* seed treatment @ 5 g/kg seed + soil application of 4 kg bio-agent in 10 qtls of FYM incubated in 30% humidity for 15 days under shelter and applied twice at 15 and 30 days after sowing

T_2-Seed treatment with *Pseudomonas fluorescens@* 10gm/kg seed + application of 4kg bio-agent to soil in 10qt FYM incubated in 30% humidity for 15 days under shelter and application twice 15 and 30 days after sowing.

T_3-application of neem cake @1.5qtl/ha at the time of 15 days after sowing and at the time of earthing up.

T_4– soil irrigation with Validamycin @ 2gm/lt at earthing up.

T_5 - Soil drenching with (Metalaxyl + Mancozeb) @ 0.2% twice at 15 DAP and 30 DAP

T_6-T3+ Soil drenching with (Metalaxyl + Mancozeb) @ 0.2% twice at 15 DAP and 30 DAP

T7- control

The field was ploughed twice, and after each ploughing was covered, the seeds were sown in a row with a spacing of 30 x 10 cm and the sowing rate was 150 kg per ha and fertilizer application based on a soil test was performed. seed treatment, soil drenching and spraying were done according to treatment. In the case of local controls, farming practices were maintained. Observations were recorded for pod yield, percent disease control and B:C ratio.

EXPERIMENTAL FINDINGS

Interactive effect of seed treatment-cum-drenching:

Percentage control of disease was highest (61%) and pod yield (1557 kg/ha) was recorded by application of neem cake @1.5q/ha at 15 days after sowing and at the time of earthing up.+ Soil irrigation with (Metalaxyl + Mancozeb) @ 0.2% twice at 15 DAS and 30 DAS in T6 followed by *T. viride* seed treatment @ 5 gm/kg seed + soil application of 4 kg bio-agent in 10 qtls FYM incubated at 30% moisture for 15 days under casting and application twice at 15 and 30 days after sowing with 52% disease control and yield of 1510 kg/ha. (Table 1)

The incidence of the disease was calculated according to the given formula.

Disease incidence (%) = number of diseased plants/ Total number of plants observed × 100

Table 1.

Treatments	**Germination (%)**	**PDI 35DAS**	**Per cent Disease control**	**Yield (kg /ha)**	**B:C ratio**
T_1 - Seed treatment with *T. viride* @ 5gm/kg of seed +soil application of 4kg of bio-agent in 10qtls of FYM incubated in 30% moisture for 15 days under shed and applying twice at 15 and 30days after sowing	88.50 (70.18)	15.31 (23.03)	52.30	1510	1.44
T_2 - Seed treatment with *Pseudomonas fluroscens@* 10g/kg of seed +soil application of 4kg bio-agent in 10qts of FYM incubated in 30% moisture for 15days under shed and applying twice at 15 and 30days after sowing.	84.00 (66.42)	20.01 (20.57) **(20.57)**	32.24	1144	1.11
T_3 – application of neem cake @1.5q/ha at the time of 15days after sowing and at the time of earthing up.	81.50 (64.53)	19.14 (25.91)	36.22	1376	1.32
T_4 – Soil drenching with need based Validamycin @2gm/l	76.00 (60.67)	21.48 (27.56)	28.42	1001	1.01
T_5 - Soil drenching with(Metalaxyl + Mancozeb)@ 0.2% twice at 15DAS and 30DAP	78.50 (62.38)	15.76 (23.34)	49.17	1440	1.38
T_6 – T3+ Soil drenching with (Metalaxyl+Mancozeb) @ 0.2% twice at 15DAS and 30DAS	90.75 (72.24)	**12.61 (20.79)**	61.31	1557	1.49
T_7 - Control	75,71 (60.47)	31.01 (33.83)		677	0.80
SE(m)+	1.98	3.19		68	
CD(0.05)	5.81	10.21		195	
Figures in parentheses are angular transformed values					

RESULTS AND DISCUSSION

The importance of chemicals and biological control agents cannot be denied in the management of plant diseases, especially biological agents that have been shown to be highly effective in the management of soil-borne fungal plant pathogens. In the present research, in terms of disease control and yield, all tested fungicides and bioagents performed better in reducing disease percentage and increasing yield of groundnut pods. Our results are consistent with the findings of Prajapati *et al.* (2016). They found that onion black mould rot of onion(*Aspergillus niger*) can be reduced by applying carbendazim, trifloxystrobin (25%) + tebuconazole (50%), azoxystrobin (18.2%) + difenconazole (11.4%), hexaconazole and propiconazole. Similarly, Jadon *et al.* (2015) evaluated ten fungicides against major groundnut diseases. They noted that tebuconazole 2 DS @ 1.5 g/kg seed, mancozeb 75% WP @ 3 g kg/seed, carbendazim 12% + mancozeb 63% WP @ 3 g kg/seed were very effective in controlling soil borne diseases including collar rot. While Kapadiya and Moradiya (2017) reported seed treatment and two tebuconazole sprays per leaf highly effective in controlling collar rot disease. Tejpal *et al.* (2022) reported seed treatment with Hexaconazole @ 0.2% and drench with Carbendazim+ Mancozeb can control 90% collar rot of groundnut. According to Aiswariya *et al.* (2022), Nath and Patel (2022). Seed treatment with bioagents followed by fungicides provide best disease control.

The experiment showed a positive response in reducing the incidence of disease and increasing the yield of pods. Based on the experimental findings it can be concluded that percentage control of disease was highest (61%) and yield of pods (1557 kg/ha) was recorded by application of neem cake @1.5q/ha at the time of 15 days after sowing and at the time of earthing + Soil watering (Metalaxyl + Mancozeb) @ 0.2% twice at 15 DAS and 30 DAS.

CONCLUSION AND FUTURE SCOPE

Percentage control of disease was highest (61%) and pod yield (1557 kg/ha) was recorded by application of neem cake @1.5q/ha at 15 days after sowing and at the time of earthing up + Soil application with (Metalaxyl + Mancozeb) @ 0.2% twice at 15 DAS and 30 DAS. Integration of bioagents and fungicides in farmers field could be undertaken in future.

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