International Journal of Chemical Studies

P-ISSN: 2349–8528
E-ISSN: 2321–4902
IJCS 2019; 7(5): 72-74

Received: 22-07-2019
Accepted: 24-08-2019

Amol Harne
Dept. of Plant Pathology,
RVSKVV, Gwalior,
Madhya Pradesh, India

Reeti Singh
Head, Principle Scientist,
COA, Dept. of Plant Pathology,
RVSKVV, Gwalior,
Madhya Pradesh, India

Deepak Kumar Verma
M.Sc. Scholar, COA, Dept. of
Plant Pathology, RVSKVV,
Gwalior, Madhya Pradesh, India

Correspondence
Amol Harne
Dept. of Plant Pathology,
RVSKVV, Gwalior,
Madhya Pradesh, India

Integrated management of dry root rot of clusterbean incited by *Rhizoctonia bataticola* (Taub.) Butler

Amol Harne, Reeti Singh and Deepak Kumar Verma

Abstract
Clusterbean is important legume crop in arid and semi arid regions of India. Occurrence of root rot disease has become major constraints in recent years for profitable cultivation of clusterbean. The efficacy of various botanical, fungicides, bioagents and homeopathic drugs were evaluated against *Rhizoctonia bataticola* (Taub.) Butler causing dry rootrot of clusterbean. Among the different treatments tested in pot condition , lowest root rot incidence was recorded in seed treatment with Carbendazim + soil application of *T. harzianum* was found significantly superior in reducing the disease incidences of dry root rot (13.33%) followed by seed treatment with Sulphur + drenching with Carbendazim (15.00%), soil drenching of carbendazim (16.66%). Similar trend was found in case of percent reduction over control.

Keywords: Efficacy, seed treatment, root rot, clusterbean

Introduction
Clusterbean is a rich source of protein, it maintain the soil fertility through biological nitrogen fixation and thus play a vital role in sustainable agriculture. The crop suffers from major diseases such as Alternaria blight, Anthracnose, Root rot, Bacterial blight and Powdery mildew. Out of these dry root rot rotcaused by *Rhizoctonia bataticola* has become a major biotic threat in several regions of the country. The use of bio control agents, botanicals, homeopathic drugs for controlling dry root rot diseases in plants is considered as an interesting alternative to synthetic fungicides due to their eco friendly effect on the environment as well as they are economically feasible. They can reduce cost of disease management and also mitigate the harm done by excessive and repeated use of fungicide.

Materials and Methods
The pot experiment was conducted in two consecutive year 2017-18 and 2018-19 for determining the efficacy of botanicals, fungicides, bioagents and homeopathic drugs against dry root rot of clusterbean. The potting mixture clay: sand (1:1) was sterilized with 40% commercial formalin. Plastic pots (8' × 11') filled with sterilized potting mixture was inoculated with 20 gm inoculums of *R. bataticola* which raised on sorghum grain mixed to the depth of 5 cm. Ten seeds placed in a hole at the depth of 5 cm and covered with potting mixture and watered weekly as required. Pots were kept under natural light. Three replications for each treatment were maintained. Control pots were maintained by without adding any treatment. Percent mortality was observed after 10 and 20 days of sowing. Percent mortality was calculated by using the following formula:

$$\text{Percent disease incidence} = \frac{\text{Number of diseased plants}}{\text{Total number of plants}} \times 100$$

Results and Discussion
Percent Disease Incidence (2017-18)
In 2017-18 the significantly minimum disease incidence of *R. bataticola* was found in combination of seed treatment with Carbendazim + soil application of *T. harzianum*, seed treatment with Sulphur + drenching with Carbendazim, dipping seed in Neem leaf extract and seed treatment with *P. fluorescens* (13.33%). These treatments were at par with each other in reducing the disease incidence.

However maximum disease incidence was observed in control (96.66). In Captan the disease incidence was 76.66 followed by seed treatment with *T. harzianum* (63.33%), Carbendazim (60.00%) and Sulphur (50.00%).

Percent Disease Incidence (2018-19)

In 2018-19, minimum disease incidence of *R. bataticola* was found in combination of seed treatment with Carbendazim + soil application of *T. harzianum* followed by seed treatment with Sulphur + drenching with Carbendazim (16.67%) and seed treatment with *P. fluorescens* (23.33%). These treatments were at par with each other in reducing the disease incidence. However maximum disease incidence was observed in control (93.33). In Captan the disease incidence was 80.00% followed by seed treatment carbendazim (63.33%) and *T. harzianum* (60.00%).

Percent Disease Incidence (Pooled)

The results on pooled data indicated that seed treatment with Carbendazim+ soil application of *T. harzianum* was found significantly superior in reducing the disease incidences of dry root rot (13.33) followed by seed treatment with Sulphur + drenching with Carbendazim (15.00%), soil drenching of Carbendazim (16.66%) and seed treatment with *P. fluorescence* (18.33%) were on par with each other.

Percent reduction in disease

In case of reduction percentage similar trend was observed. The highest reduction in dry root rot incidence was observed in the combination of seed treatment with carbendazim+ soil application of *T. harzianum* (86.00%) followed by seed treatment with Sulphur + drenching with Carbendazim (84. 20%), drenching with carbendazim (82.46%), seed treatment with *P. fluorescence*. (80.70%), dipping seed with Neem leaf extract (77. 37%). The results are in accordance with Mohan *et al.* (2006) [2], Surianchandraselvan, (1997) [3]; Manoranjitham *et al.* (2000) [1]; Tewari and Mukhopadhyay, (2003) [5] and Gaur *et al.*, (2005). Similarly, Taya *et al.* (1990) [4] found that single application of carbendazim or in combination with thiram as seed treatment or soil drench and seed treatment plus drenching were effective for controlling root rot.

Table 1: Effect of selected fungicides, botanicals, bioagents and homeopathic drugs on incidence of *Rhizoctonia bataticola* in cluster bean

Treatment detail	Doses	Percent Disease incidence			Percent reduction over control
		2017-18	2018-19	Mean	
Carbendazim (ST)	2g/kg	60.00 (50.85)*	63.33(52.79)	61.66	35.08
Captan (ST)	2g/kg	76.67 (61.22)	80.00 (63.89)	78.33	17.53
T. harzianum(S)	10g/kg	63.33 (52.78)	60.00 (50.85)	61.33	35.08
Garlic clove extract(D)	30%	50.00 (45.00)	50.00 (45.00)	50.00	47.36
Carbendazim+*T. harzianum*	T1+T3	13.33 (21.14)	13.33 (21.14)	13.33	85.96
Captan +*T. harzianum*	T2+T3	50.00 (45.00)	60.00 (50.85)	55.00	41.89
T. harzianum(ST)	8g/kg	33.33 (35.22)	30.00 (33.00)	31.66	66.55
P. fluorescens (ST)	8g/kg	13.33 (21.14)	23.33 (28.78)	18.33	80.70
Sulphur (ST)	10ml/kg	50.00 (45.00)	40.00 (39.15)	45.00	52.62
Neem leaf extract (D)	40%	13.33 (21.14)	30.00 (33.00)	21.50	77.37
Carbendazim (Drenching)	0.1%	20.00 (26.07)	13.33 (21.14)	16.66	82.46
Sulphur + Carbendazim	T9+T11	13.33 (21.14)	16.6 (23.86)	15.00	84.20
Control		96.66 (83.85)	93.33 (77.71)	94.99	
SEm ±		3.32	3.50		
CD at 5%		9.86	10.40		

*Value in parenthesis are angular transformed value

* ST- Seed treatment, D- Dipping, S- Soil application

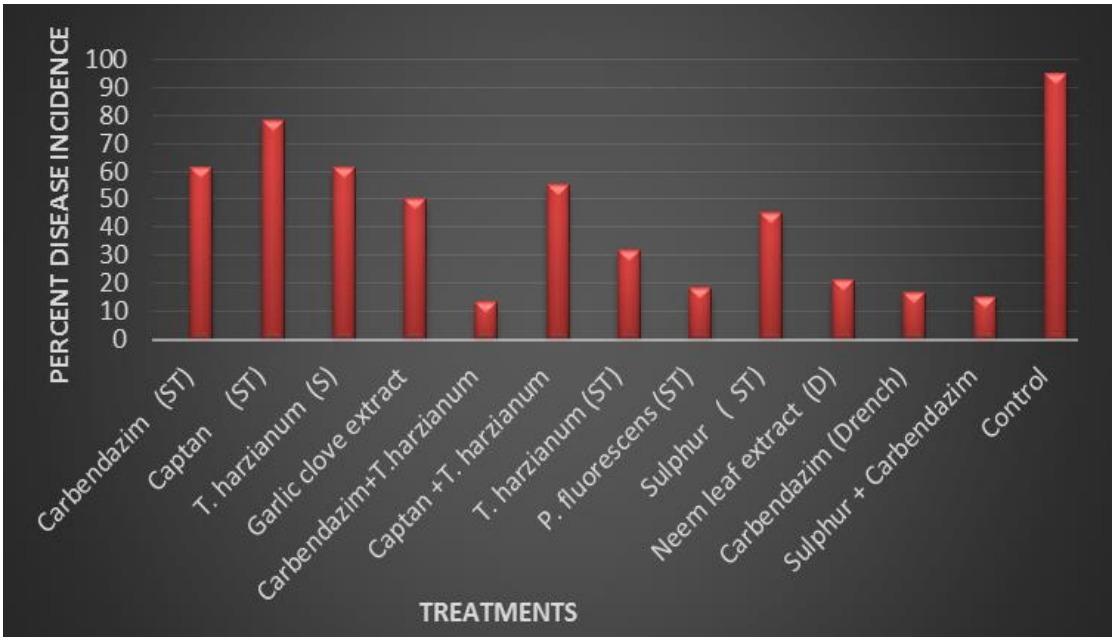

Fig 1: Pot evaluation of selected fungicides, botanicals, bioagents and homeopathic drugs against *R. bataticola*

Plate 1: Management of root rot of Cluster bean through selected fungicides, bioagents, botanicals and homeopathic drugs (pot teial)

References

1. Manoranjitham SK, Prakasham V, Rajappan K, Amutha G. Effect of two antagonists on damping off disease of tomato. Indian Phytopath. 2000; 53:441-443.
2. Mohan, Vijay Prasad SM, Barnwal MK, Kudada N. Fungicidal management of dry root rot disease and yield of chickpea. J Appl. Bio. 2006; 16(1/2):42-44.
3. Suriachandraselvan M. Studies on the charcoal rot of sunflower (*Helianthus annus* L.) caused by Macrophomina phaseolina (Tassi.) Goid. M.Sc. (Ag.). Thesis, submitted to Tamil Nadu Agriculture University, Coimbatore, 1997, 295.
4. Taya RS, Tripathi NN, Panwar MS. Influence of texture and nutritional status of soil on the efficacy of fungicides for the control of dry root-rot of chickpea. Indian J Mycol. Pl. Pathol. 1990; 20:14.
5. Tewari RKS, Mukhopadhyay AN. Management of chickpea root rot and collar rot by integration of biological and chemical seed treatment. Indian Phytopath. 2003; 56(1):39-42.