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EFFECT OF SOIL AMENDMENTS AND DIFFERENT SOIL TYPES ON MANAGEMENT OF *Sclerotinia* STEM ROT OF CHICK PEA (*Cicer arietinum L.*)

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Abstract: *Chickpea (Cicer arietinum L.) is an important pulse crop growing all over the country in Rabi season. Sclerotinia stem rot incited by Sclerotinia sclerotiorum, is one of the severe diseases causes heavy losses (10-65%) depending upon stage of infection. Minimizing this disease can only be accomplished by careful crop management. Sclerotinia stem rot could be managed by the integration of various cultural practices like. The crop will be amendments with seven different types of soil amendments. Among then soil amendments incorporation of Pyrite was found significantly superior and show minimum average disease incidence (9.00) Next best soil amendments was Neem cake and Paddy straw followed by Caster cake, Mustard cake and Wheat straw. Pyrite and Neem cake were statistically at par in respective average disease intensity. Gypsum was least effective soil amendments which show 24.30% average disease intensity. In different types of soil texture the minimum average disease intensity in clay soil (14.10%) followed by clay loam soil, silty loam soil and sandy loam soil. Clay soil and clay loam soil were statistically at par in average disease intensity. Loamy sand soil was shows maximum average disease intensity (25.44).*

Keywords: *Chickpea, soil amendments, soil texture, neem cake and pyrite.*

Introduction: Chickpea (*Cicer arietinum* L.) is one of the most important pulse crops of India during survey, it has been observed that it suffers from a number of disease among which stem rot caused by *Sclerotinia sclerotiorum* is posing serious threat to the cultivation of the crop and causes heavy losses (10-60%) depending upon stage of infection and wilting. It causes about 10 % loss in yield and the damage has been observed to extent up to 61 % and 43 % at seedling and adult stages, respectively. Intensive use of fungicides for protection of crop from disease has several disadvantages as they are not only expensive but also toxic to the human being and pollute to the environment too. Therefore, it is being demand of the time to develop an alternative effective such as different soil texture and application of different types of soil amendments.

Materials and Methods

a. Effect of Different Types of Soil Amendments on Disease Intensity: To study the impact of different soil amendments, experiment was conducted in the wire house of the department during 2013-2014 and 2014-2015. Earthen pots (30 cm) were taken and filled with 5.0 kg of sterilized soil mixed with 5.0g inoculums at the surface of soil. Certain type of soil amendments like, pyrite and gypsum 2.0 tonnes/ha and neem cake ,mustard cake, castor cake, paddy straw and wheat straw 20.0 tonns/ha were incorporated eight days before sowing of healthy chick pea seeds. After germination of seeds, only 25 plants were maintained in each pot for further observation. Each treatment was replicated thrice and irrigated from time to time as and when required. Observations on average intensity of both the years were recorded.

b. Effect of Different Types of Soil Texture on Disease Intensity: To study the impact of different soil types on stem rot intensity, an experiment was conducted in the wire house of the department during 2013-2014 and 2014-2015. Different types of soils i.e.-loam, silt loam, sandy loam and clay soils were collected from different growing regions of Uttar Pradesh. Five earthen pots of 30 cm diameter were taken for each treatment and filled with different types of

sterilized soils @ 5.0 kg per pot and each pot was incorporated with 5.0 g inoculums separately on the surface of soil. Healthy chick pea seeds were sown in the month of October and 25 plants were maintained in five pots which were taken as one treatment. Each treatment was replicated thrice and irrigated from time to time. Observations on average intensity of both the years were recorded.

Results and Discussion

a. Effect of Different Soil Amendments on Disease Intensity of Chick Pea: The results presented in Table-1, reveals that observations on disease incidence showed that all the amendments were significantly effective in reducing the disease over the control. Among then incorporation of pyrite was found significantly superior and show minimum average disease intensity 9.00. Next best soil amendments was neem cake followed by paddy straw, Caster cake and Mustard cake. pyrite, neem cake and paddy straw, were statistically at par with average disease intensity. Wheat straw and gypsum was least effective soil amendments which shows the maximum average disease intensity 22.31% and 24.30% respectively. The present finding coincides with the observation made [1] who reported that stem rot of potato was reduced by the amendments of NPK + FYM. The effect of different soil amendments on incidence of significant reduction in disease incidence amended with Pyrite Neem cake, mustard cake and caster cake in brinjal [2]. It was observed that the application of pyrite, neem cake and mustard cake reduced disease incidence of stem rot of sunflower caused by *Sclerotinia sclerotiorum* [3].

Table 1: Effect of different soil amendments on disease intensity of chick pea.

S. No.	soil amendments	disease intensity		Av. disease intensity
		2013-14	2014-15	
1.	Pyrite	8.30(16.74)*	9.70(18.15)	9.00(17.45)
2.	Neem cake	9.62(18.05)	11.32(19.64)	10.47(18.84)
3.	Paddy straw	12.34(20.53)	12.92(21.05)	12.53(20.72)
4.	Caster cake	15.60(23.26)	17.34(24.58)	16.47(27.92)
5.	Mustrd cake	18.90(25.77)	20.72(27.06)	19.31(26.42)
6.	Wheat straw	21.20(27.42)	23.22(27.79)	22.21(27.61)
7.	Gypsum	24.20(29.47)	24.40(29.60)	24.30(29.53)
8.	Control	24.94(29.93)	25.28(30.13)	25.11(30.03)
	C.D at 5%	(1.80)	(2.30)	(2.05)

*Angular transformed value is in parenthesis

b. Effect of Different Types of Soil Texture on Disease Intensity of Chick Pea: The results presented in Table-2, reveals that the average disease intensity varied from 14.10 to 25.44 per cent in all types of soil tested in the present study. However, it was minimum average disease intensity in clay soil (14.10%) followed by clay loam soil, silty loam soil and sandy loam soil. Clay soil and clay loam soil were statistically at par in average disease intensity. Loamy sand soil showed maximum average disease intensity (25.44).The present finding coincide with the observation made [4] against stem rot of Ajowan caused by *Sclerotinia sclerotiorum*. During the investigation regarding sclerotia germination, it was observed that *sclerotia* germinated better in loamy sand soil than other soil and causes maximum disease intensity also.

Table-2 : Effect of different types of soil on disease intensity of chick pea.

S.No.	Types of Soil	Average disease intensity		Av. disease intensity
		2013-14	2014-15	(Per cent)
1.	Clay Soil	13.36 (21.47)*	14.64 (22.48)	14.10(22.06)
2.	Clay loam soil	15.34 (23.09)	16.36 (23.84)	15.85(23.44)
3.	Silty loam soil	18.28 (25.40)	19.54 (26.23)	18.91(25.78)
4.	Sandy loam soil	21.45 (27.60)	22.46 (28.32)	21.95(27.92)
5.	Loamy sand soil	24.66 (29.80)	26.22 (30.81)	25.44(30.28)
	CD at 5%	(2.52)	(2.31)	(2.14)

**Angular transformed value is in parenthesis*

References

1. Basu, A. and Maiti, M.K. (2006). Role of host nutrition and varieties on the development of stem rot of potato. *Ann. Pl. Protec. Sci.,* 14:479-480.
2. Singh, Ramesh and Singh, L.B. (2007). Evaluation of different soil amendments against Sclerotinia blight of brinjal. *Ann. Pl. Protec. Sci.,* 15:265-266.
3. Singh, Ramesh and Sachan, N.S. (2014). Management of Sclerotinia stem rot of Sunflower through Nitrogen sources and soil amendments. *Ann.Pl.Protec.Sci.,*22(2):440-441.
4. Singh, Ramesh. (2000).Pathological studies on sclerotinia stem rot of Ajowan.Ph.D. Thesis C.S.Azad University of Agric. & Tech. Kanpur.