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EFFECT OF SOIL TYPE ON COLLAR ROT INCIDENCE IN CHICKPEA

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ABSTRACT

Effect of different soil type on collar rot incidence was studied. Four different soil type found in Chhattisgarh state*viz*. clay loam, sandy loam, gravely and clay on collar rot incidence were taken for study. Significant difference in mortality percent was observed among treatments of soil type. Clay loam was found to be most favorable in disease development with highest mortality (77.50 %), followed by sandy loam soil with 70 per cent mortality. However least mortality was observed in gravely soil with 47.50 %.

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INTRODUCTION

Chickpea (*Cicer arietinum*) is a legume of the family *Fabaceae*, subfamily *Faboideae*. Chickpea, a self-pollinating diploid, is the world's third most important pulse crop after dry beans (*Phaseolus vulgaris* L.) and dry peas (*Pisum sativum*). It ensures nutritional security besides being a rich source of protein and is also important in substantial agriculture as it improve/enhance physical, chemical and biological properties of soil by fixing atmospheric nitrogen symbiotically. A number of biotic and abiotic factors are involved in low production of chickpea. Among the biotic factor, collar rot disease caused by *Sclerotium rolfsii* Sacc., [telemorph *Athelia rolfsii* (Curzi) Tu & Kimbrough] is a serious threat, which under conducive condition caused 55-95% mortality of the crop at seedling stage .

*Sclerotium rolfsii*is an omnivorous soil borne fungal pathogen causes disease on a wide range of agricultural and horticultural crops. The fungus being a well known type member of the genus Sclerotiumas it forms differentiated sclerotia, usually causes collar rot diseases. Sclerotia are considered to be extremely hardy and relatively (Rasu*et al.,* 2013). *S. rolfsii* can over winter as mycelium in infected tissues or plant debris. Sclerotia serve as the principal over wintering structure and primary inoculum for disease persisting near the soil surface, Sclerotia may exist free in soil or in association with plant debris. Those buried deep in soil may survive for a year or less, whereas those at surface remain viable and may germinate in response to alcohol and other volatile compound released from decomposing plant material.

Management of *Sclerotium rolfsii* causing collar rot of chickpea is difficult to achieve chemically (Sab *et al.,* 2014), and excessive use of agrochemicals in conventional crop management has caused serious environmental and health problems including loss of biodiversity and human disorders. As root disease severity is strongly influenced by soil type, soil pH, soil temperature, moisture, and the biological activity of suppressive microorganism.Organic matter is known to affect soil structure, aeration, drainage, moisture holding capacity, nutrient availability, and microbial ecology (Davey, 1996). Hence, the present study was conducted to ascertain the effect of different soils types on collar rot incidence in chickpea.

MATERIALS AND METHODS

Isolation, Purification and maintenance of culture

The diseased plants exhibiting characteristic symptoms of collar rot were collected from field and brought to the laboratory for isolation. The diseased parts (root and collar region) were cut into small pieces by sterilized blade and surface sterilized with 0.1% Mercuric chloride for one minute followed by three washing with sterile water. These surface sterilized bits of infected root and collar region were placed in petriplates containing PDA. The petriplates were kept for incubation at 27 ± 2^0C and whenever fungal colonies appeared, they were sub cultured and purified on PDA slants.

Mass Multiplication of culture

Table 1: Effect of soil type on collar rot incidence in chickpea

S.N.	Treatment	Soil type	Mortality per cent
1.	T_1	Dorsa or Clayloam(Alfisol)	77.50 (62.12)
2.	T_2	Matasi or Sandyloam(Inceptisol)	70.00 (56.92)
3.	T_3	Kanhar or Clayey(Vertisol)	65.00 (53.97)
4.	T_4	Bhata or Gravely(Entisol)	47.50 (43.54)
Sem+C.D. (p = 0.05)			3.8612.05

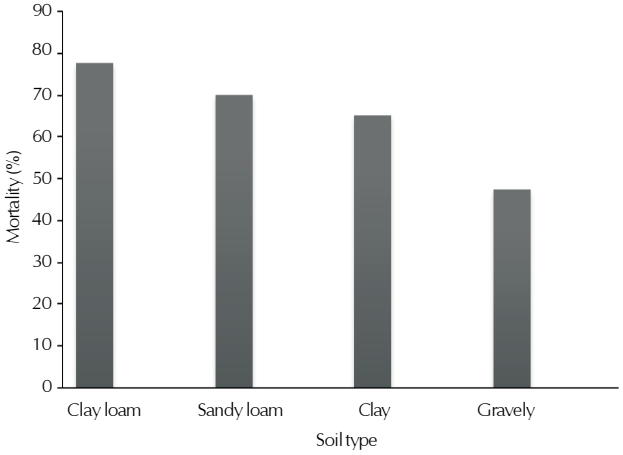

Figure 1: Effect of soil type on collar rot incidence in chickpea

The *Sclerotium rolfsii* was mass multiplied in soil-maize media. Prepared mixture (soil-sand and maize) in 2:1:1 ratio was filled @ 400 g/bag in 6 x 11 inches polythene bags and plugged with non absorbent cotton with the support of one inch diameter PVC ring (length 1.5 inch). These bags were sterilized in autoclave with 1.02 kg/cm² pressure for 25-30 minutes. The sterilized bags were inoculated with 7 days old culture of *Sclerotium rolfsii*. The inoculated bags were incubated in BOD incubator at 27±2°C for 15 days. Multiplied culture of *Sclerotium rolfsii* utilized for development of artificially sick plot of *Sclerotium rolfsii*.

Soil type

In order to determine the efficacy of inoculum in different soils, the soil type clay loam, sandy loam, clay and gravely found in Chhattisgarh state were obtained and inoculums @ 6g/kg soil was mixed in each soil type. Two pots were kept for each treatment in one replication and four replications were maintained. The pots were irrigated and covered with polythene sheet for the inoculums to establish. Five surface sterilized seeds of chickpea were sown in each pot and data on seedling mortality were recorded two weeks after sowing. Less than.

RESULTS AND DISCUSSION

Four different soil types found in Chhattisgarh state were taken for study, in which clay loam (Fig. 1) was most favorable with highest mortality (77.50 %), followed by sandy loam soil with 70 per cent mortality. Gravely has least (47.50%) mortality, which was significantly less than clay laom soil and sandy loam soil. In clay soil 65 per cent mortality was recorded and no significance difference was recorded among sandy loam, clay and gravely soil. Wokocha (1987) while studying the effect of soil type on damping of tomato seedling caused by *Sclerotium rolfsii* reported similar results. In agreement to above finding Hussain *et al.,* 2006 found that in clayey soil, seedling mortality was 94% whereas in clay loam, sandy loamy and sandy soils, it was 82, 78 and 60%, respectively. Seedling mortality in sandy soil was significantly less than that noted in all other types of soil. Mishra and Shukla (1986) reported similar results while working with different textures of soil in chickpea.

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