PATHOGENICITY OF *ROTYLENCHULUS RENIFORMIS* ON *HELIANTHUS ANNUUS* (CV. MORDEN)

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Abstract : An experiment was conducted under glass house condition to determine the pathogenicity effect at different inoculum levels on sunflower (*Helianthus annuus*) Cv. Morden. Observation recorded after 75 DAI (Days after inoculation) revealed that all growth parameters were decreased with increasing inoculum levels except the lowest one (500 nematodes/kg soil). Reduction in plant growth parameters was more pronounced at 8000 inocula level in comparison to control. Significant reduction in nematode population was observed among different inoculum levels at crop maturity.

Keywords : *Helianthus annuus*, Pathogenicity, *Rotylenchulus reniformis*

INTRODUCTION

Sunflower (*Helianthus annuus* L.) is a major source of vegetable oil in the world. In India, sunflower (*Helianthus annuus* L.) was introduced in commercial cultivation around 1969 and within a short span it has reached a level of 2.1 million hactare with the annual production of 1.3 million ton of seed (Damodaram and Hegde, 2002).The production of this crop is seriously affected by the insect pests, attacking at different stages of crop growth. A number of plant parasitic nematodes have been reported to be associated with sunflower (*Helianthus annuus* L.). Among these, *Rotylenchulus reniformis* is considered as an important limiting factor in achieving the optimum yield. The associations of this nematode (*R. reniformis*) with sunflower (*Helianthus annuus* L.) have been reported by Amarantha and Krishnappa (1989) and Prasad (2008) which cause 37.7% avoidable yield loss of sunflower (*Helianthus annuus* L.) due to *R. reniformis*. The present work was undertaken to establish the damaging threshold level of *R. reniformis* on sunflower (*Helianthus annuus* L.) plant.

MATERIAL AND METHOD

Seeds of sunflower cv. Morden were obtained from NBPGR, New Delhi, were surface sterilized in 0.1% mercuric chloride solution for 2 minute and sown in 15cm. diameter Polythene bags containing 1kg sterilized soil/bag and replicated three times. Seven days after germination, thinning was done, keeping one sunflower seedling of uniform sized. Control without nematode was also maintained. Ten days after sowing of sunflower seeds, Pre-adults of *Rotylenchulus reniformis* (500, 1000, 1500, 2000, 4000 and 8000) were inoculated by pipetting around the roots of growing seedlings by removing the top 2-3 cm/bag. After inoculation, some sand was put around the plant. After 75 days of nematode inoculation, plant growth parameters *viz.*, shoot length, fresh and dry weight of shoot and root, Head dia. and Number of seed *etc*. were recorded separately. Nematode population in soil was calculated according to Cobb's modified sieving and decantation technique (Cobb, 1918).

RESULT AND DISCUSSION

In the present investigation, data revealed that except 500 nematodes/bag all levels of nematode inoculum reduced growth parameters of the plant. However, a significant reduction was observed at 1000 level and above. The shoot and root length was maximum reduced at 8000 inocula level. The maximum reduction in shoot length was 53.5cm and 3.5cm in root length in comparison to control. In fresh weight of shoot and root, maximum reduction was found 25.5g, 12.0g at 8000 inocula level and minimum 58.8g and 14.0g at 500 inocula level, respectively in comparison to control. In dry weight of shoot and root, maximum reduction was occurred 7.8g, 2.0g at 8000 inocula level and minimum 18.0g, 4.2g at 500 inocula level, respectively in comparison to control. In head diameter maximum reduction were 3.0cm at 8000 inocula level and minimum 5.2cm at 500 inocula level in comparison to control. Number of seeds was found maximum reduced 65.0 seeds at 8000 inocula level and minimum 90.0 seeds at 500 inocula level in comparison to control (Table 1 and plate 1).

Nematode population in root was found to be increased with increasing initial inocula levelfrom 500 to 8000 pre- adults resulted in lesser population. Maximum nematode population was found 2030 at 8000 inocula level and minimum was 850 at 500 inocula level. These findings were inconformity with the observation made by Fazal *et al.*, (1994); Khan and Dar (2002) and Prasad and Ahmad, (2002). Bhagawati *et al*., (2007) observed significant decrease in shoot growth of okra (*Abelmoschus esculentus*) at an initial inocula level of 1st J_2 of *Meloidogyne incognita*. Nematode population was found to increase with increasing inoculum level. Sherif *et al.*, (2009) reported 57.7% reduction in fresh weight of ground nut (*Arachis hypogaea*) at

inoclum level 2000 J_2/peanut plant. Similar results also observed by Mc Gawley *et al.*, (2011) on soybean (*Glycine max*).

Plate 1: *Helianthus annuus* (Cv. Morden) plant affected by *Rotylenchulus reniformis* at different inocula level.
1. Control plant
2. 500 pre-adults of *Rotylenchulus reniformis*
3. 1000 pre-adults of *Rotylenchulus reniformis*
4. 1500 pre-adults of *Rotylenchulus reniformis*
5. 2000 pre-adults of *Rotylenchulus reniformis*
6. 4000 pre-adults of *Rotylenchulus reniformis*
7. 8000 pre-adults of *Rotylenchulus reniformis*

Table 1: Effect of different inocula level of *Rotylenchulus reniformis* on plant growth characters of *Helianthus annuus* (Cv. Morden).

Inoculum Levels (pre-adult/kg soil)	Length (cm)		Fresh weight (g)		Dry weight (g)		*Head dia. (cm)	No. of seeds/10g	Nematode population (250g soil)
	Shoot	Root	Shoot	Root	Shoot	Root			
500	70.0	6.2	58.8	14.0	18.0	4.2	5.2	90.0	850
1000	65.5	5.9	45.5	13.8	16.5	4.0	5.0	87.7	1470
1500	62.0	5.7	42.0	13.5	13.0	4.0	4.8	86.5	1600
2000	58.0	4.2	30.2	13.0	10.0	2.9	4.7	80.2	1740
4000	55.0	4.0	28.5	12.9	9.5	2.5	4.0	74.3	1900
8000	53.5	3.5	25.5	12.0	7.8	2.0	3.0	65.0	2030
Control	72.5	6.5	60.0	14.5	20.0	4.9	5.9	91.2	00
S.Em.	2.7	0.7	2.6	1.5	1.7	0.5	0.7	4.1	14.9
CD at 5%	6.3	1.5	5.8	3.0	3.5	1.2	1.4	8.2	32.9

*Diameter of floret disc only, C = Control

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