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Research Article

Management of Meloidogyne Incognita and *Rhizoctonia bataticola* in Chick Pea (*Cicer arietinum*)

R. K. Pandey[1], S.R, Singh[2], and S.K. Singh[3]

[1]Bundelkhand University, Jhansi (U.P.), India
[2]KVK, Hathras (U.P.), India
[3]CCR (PG) College, Muzaffarnagar (U.P.), India

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Abstract An experiment was conducted during 2018-19 under laboratory condition to determine association between root knot nematode, Meloidogyne incognita and soil borne pathogen, Rhzizoctonia bataticola causing dry root rot disease in chickpea (Cicer arietinum L.). Observations recorded for the growth parameters revealed that the growth and nodules formation of chickpea significantly reduced by fungus, R..bataticola and the nematode, M. incognita. Maximum reduction in shoot length was exhibited with nematode alone (10.20cm) followed by nematode inoculated 7 day prior to fungus (11.75) and simultaneously (12.21cm). Reduction in fresh root weight was more pronounced in nematode inoculated plant than R. bataticola. Symptoms of dry root rot were more prominent when both pathogens were mixed together as compare to the fungus alone. Fungus was also reduced gall population.

Keywords: Meloidogyne incognita, Rhizoctonia bataticola, Chickpea, Dry root rot.

Introduction

The Plant parasitic nematodes are one of the biotic factors that adversely affect productivity of pulses in 'India. They are often associated in various disease complex in which their synergistic effect and damage is much more pronounced. Apart from itself adversely effect, provide, a venue for entry to other pathogens (3). Besides being initiator or aggravator in disease complexes nematode it self may also be affected adversely by the other partner as well (4). An experiment has been conducted to study the interaction of Meloidogyne incognita and Rhizoctonia bataticola on dry root rot of chickpea (Cicer arietinum L).

Materials and Methods

Chickpea was sown in sterilized earthen pots having 500-cm3 autoc1aved soil using surface sterilized seeds treated with 1000ppm mercuric chlorides. When the seedling of chickpea attained 7-days age, they were inoculated with test fungus and nematode simultaneously as fallows: 1. Nematode alone, 2. Fungus alone, 3. Nematode 7 days prior to fungus, 4.

Fungus 7 days prior to nematode, 5. Fungus and nematode simultaneously and 6. Control. One thousand freshly hatched juveniles were surface disinfested with 1000ppm dihydrogen streptomycin sulphate for one minute and then inoculate 5g sorghum grains colonized with R. bataticola near the root zone of chickpea a as pathogenic inoculum. Nematode and test fungus were "inoculated prior to each other, the nematode and pathogenic inoculum were inoculated separately around the root zone by pulling out the glass tube already embedded in the soil at the time of sowing of seed. Dispensing the fungus - nematode as above, carried simultaneous inoculation of the nematode and fungus.

Observations were recorded for the plant growth parameters viz., shoot length, fresh and dry shoot and root weight, number of nodules and nematode gall in root. The isolation of the test fungus was carried out from roots of inoculated plants.

Results and Discussion

The plant was resulted in stunting, reduction of lamina size and yellowing on cotyledon leaves 40 days after inoculation due to injury of nematode, whereas concomitant inoculation showed yellowing of trifoliate leaves within 30 days from the inoculation. The plants inoculated with R. bataticola alone resulted in distinct lesions on collar region extending downwards on the tap root and then to lateral roots

and rootlets. Significant reduction in shoot length was exhibited with nematode alone or in combination with R. bataticola. Reduction in fresh root weight appeared more pronounced in nematode inoculated plants than R. bataticola. Development of nematode galls was adversely affected when nematode was associated with R. bataticola (Table-I). Maximum reduction in plant height was observed with inoculation of M incognita alone. Stunting effect remained less pronounced when inoculations were carried out simultaneously with M. incognita and R. bataticola. On concomitant inoculations with M incoginita and R., bataticola slight pallor remained evident throughout the experiment. Both the pathogen suppressed' nodulation significantly. Nematode infection and its development were adversely affected when the plants were colonized by R. bataticola. The association of R. bataticola has thus suggested its antagonistic affect on gall development. Inoculation of R. bataticola decreased nematode multiplication and root galling while root rotting increased in the combined inoculation of M phaseolina and M incognita. Pandey et al. (2005). Goswami et al. (2004). Bhagawati and Goswami (2000). Atkinson (1992). Similarly, Singh and Goswami (2001). Devi and Goswami. (1992). Singh et al. (1990). Powell (1971). Golden and Vangundy (1975), observed equal damage to plant growth when inoculated with M. incognita and R. bataticola, singly but two pathogens together caused more damage than the sum of total damage caused by both pathogens individually. Inoculation of pathogens prior to Bradyrhizobium resulted in more damage than 10 days prior to pathogens or simultaneous inoculation of Bradyrhizibium. Both M phaseolina and Bradyrhizobium had an adverse effect on nematode multiplication and gall formation. Both, nematode and fungus also had an adverse effect on nodulation.

Table 1. Effect of interaction of M.incognita and R.bataticola on development of chickpea

Treatments	Plant growth parameters						
	Shoot (cm)	Fresh Shoot (g)	Dry shoot (g)	Fresh root (g)	Dry root (g)	No. of Nodules	No. of galls
Nematode alone	10.20	4.71	2.24	6.34	1.97	25.00 (30.00)	60.00 (50.77)
Fungus alone	14.59	6.43	2.71	8.13	2.39	40.00 (39.23)	0.00(0.00)
Nematode 7 days prior to fungus	11.75	5.47	2.37	6.99	2.07	12.00 (20.27)	34.0 (35.67)
Fungus 7 days prior to Nematode	13.44	6.19	2.57	7.27	2.73	6.00 (14. 18)	20.00(26.57)
Fungus + Nematode simultaneously	12.21	5.82	2.44	7.00	2.10	16.00 (23.58)	25.0(30.00)
Check	16.66	7.10	2.89	9.23	2.97	46.00 (42.71)	0.00 (0.00)
CD (P=O.05)	1.64	0.77	0.36	0.86	0.19	4.10	3.03

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