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Original Research Article

Community analysis of plant parasitic nematodes associated with ornamental plants in Rajouri district (J&K), India

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Keywords

Ornamental plants; parasitic nematodes, Community structure.

A B S T R A C T

A survey of ornamental plants in Rajouri district of J&K was conducted to record the nematode community structure. Nine plant parasitic nematodes viz; *Aphelenchoides* sp., *Helicotylenchus* sp., *Hoplolaimus* sp., *Longidorus* sp., *Meloidogyne* sp., *Rotylenchulus* sp., *Tylenchorhynchus* sp., *Tylenchus* sp., and *Xiphinema* sp., were isolated and identified from 217 soil samples collected from the rhizosphere of ornamental plants. Out of these nematodes, the highest frequency of occurrence was recorded in *Meloidogyne* sp. (76.49%) followed by *Helicotylenchus* (54.83%), *Hoplolaimus* (37.32%), *Rotylenchulus* (42.39%), *Tylenchorhynchus* (25.03%), *Tylenchus* (19.81%), *Xiphinema* (16.58%), *Longidorus* (10.13) and *Aphelenchoides* (8.75%).

Introduction

Plant parasitic nematodes have been recognized as one of the limiting factors in the normal production of vegetable crops and ornamental plantations all over the world. Plant parasitic nematodes affect the economy of crop in diverse ways such as reduction in quality and quantity of crops, application of nematicides and impediment of production and trade by phytosanitary regulations (Weischer, 1968). Rajouri District is located in the foothills of Pir Panjal Range. The Districts Udhampur and Jammu surround the District in the East, Line of actual control passes on the Southern side, on the West it is bounded by Poonch District and Shopian District is on the North.

The climate of the region varies from semitropical to temperate. A number of floristic studies were carried out in this area to record the floristic composition from time to time. Main emphasis have been made on the ethno-botanical work (Azad and Asia, 2013; Azad, 2013 and Azad and Shah, 2012).

In today's world of consumer boom, role of ornamental plants have increased many folds. Interest is increasing in growing ornamentals as a profitable business. So far these plants have not yet received any desired attention regarding nematode problems from this area. To fill in the lacunae therefore, a survey was conducted

to assess community structure of phyto-nematodes with some ornamental plants.

Materials and Methods

Soil samples were collected from the vicinity of different ornamental plants- *Antirrhinium majus, Bougainvillea spectabilis, Dahlia variabilis, Hibiscus rosa-sinensis*, *Rosa indica* and *Tagetes erecta.* Samples were collected in polythene bags, properly labelled and stored at 5-10°C until processed for nematode extraction. The nematodes were extracted from the soil by using the Cobb's decanting and sieving method followed by Baermann funnel technique (Southey, 1986). The nematodes present in the suspension were identified upto generic level and population of each nematode in soil sample was estimated. Relative Density (RD), Relative Frequency (RF) and Absolute Frequency (AF) and Prominence value (PV) were calculated by using the formula proposed by Norton (1978).

Results and Discussion

The result revealed that a large number of plant parasitic nematodes were found to be associated with ornamental plants. Among them, nine plant parasitic nematodes were identified and listed in Table-1 with their respective host plant. The data presented in (Table 1-3) clearly showed that the highest density of root-knot nematode *Meloidogyne* was observed in *Rosa indica* (118/200cm ^{3}soil) and lowest in *Tagetes erecta* (90/200cm^3 soil). Similarly, the highest density of reniform nematode, *Rotylenchulus reniformis* was observed in *Dahlia variabilis* (42/200cm^3 soil) and lowest in *Bougainvillea spectabilis* (32/200cm^{3}soil).The highest density of spiral nematode, *Helicotylenchus* was found in *Tagetes erecta* (101/200cm^{3}soil) and lowest in *Antirrhinium majus* (35/200cm ^{3}soil). The maximum density of *Tylenchorynchus* was found in *Tagetes erecta* (42/200cm^{3}soil) and lowest in *Bougaiinvillea spectabilis* (20/200cm ^{3}soil). However, it was absent in *Antirrhinium majus* and *Dahlia variabilis*. The highest density of *Hoplolaimus* and *Tylenchus* was found in *Dahlia variabilis* (76/200cm^{3}soil) and *Tagetes erecta* (46/200cm^3 soil). The dagger nematode, *Xiphinema* was absent in *Dahlia variabilis*, however its highest density was found in *Antirrhinium majus* (30/200cm^{3}soil). *Aphelenchoides* was found in *Hibiscus rosa-sinensis* and *Dahlia variabilis* only.

Looking at the different parameters used in the study, it is revealed that *Meloidogyne* and *Helicotylenchus* were the most common plant parasitic nematodes associated with ornamental plants in Rajouri district. Most of the ornamental plants infested with plant parasitic nematodes showed symptoms of yellowing of leaf and stunting of plant growth. The data also revealed that the diversity and the population of nematodes in all the soil samples taken were non-uniform. This may be attributed to certain factors such as soil moisture, temperature etc. These results are also in agreement with those of Saba *et al*. 2003 who reported that the diversity of nematodes was found to be fluctuated at different times, at different stages of plants and in soils having different type of plants. Thus the present investigations have clearly indicated that the associations of plant parasitic nematodes are highly pathogenic in nature. Therefore, their occurrence in high densities may pose a threat to some ornamental plants. Hence, it needs immediate attentions of the growers and researchers.

Table.1 Occurrence of plant parasitic nematode in ornamental plants

Nematode	Ornamental plants						Total No. of samples 217	General frequency of occurrence (%)
	***A.majus* (40)**	***B. spectabilis* (25)**	***D.variabilis* (35)**	***H. rosa sinensis* (45)**	***R.indica* (42)**	***T.erecta* (30)**		
Aphelenchoides	-	05	14	-	-	-	19	8.75
Helicotylenchus	15	10	20	34	20	20	119	54.83
Hoplolaimus	12	22	10	10	15	12	81	37.32
Longidorus	-	08	-	02	08	04	22	10.13
Meloidogyne	22	30	35	37	20	22	166	76.49
Rotylenchulus	-	15	20	25	14	18	92	42.39
Tylenchorhynchus	-	-	10	18	19	16	63	29.03
Tylenchus	08	-	04	12	14	05	43	19.81
Xiphinema	05	-	04	10	11	06	36	16.58

Table.2 Nematodes (per 200gm cm^3 soil) associated with ornamental plants in Rajouri

	Nematode								
Ornamental plants	***Aphelen-choides***	***Helico-tylenchus***	***Hoplo-laimus***	***Longi-dorus***	***Meloido-gyne***	***Rotylen-chulus***	***Tylencho-rhynchus***	***Tylen-chus***	***Xiphi-nema***
A. majus	-	35	24	-	102	-	-	24	30
Bougainvillea spectabilis	-	64	54	12	110	32	20	16	08
Dahlia variabilis	12	44	76	18	105	42	-	-	-
Hibiscus rosa-sinensis	64	69	47	-	98	34	29	11	14
Rosa indica	-	59	22	08	118	37	23	21	19
Tagetes erecta	-	101	74	36	90	38	42	46	24
Total	**76**	**372**	**297**	**74**	**623**	**183**	**114**	**118**	**95**

Table.3 Community analysis of plant parasitic nematodes associated with ornamental plants

Nematode	Average No./200 cm^3 soil	Absolute frequency	Relative frequency	Absolute density	Relative density
Aphelenchoides	13	8.75	2.96	6.5	3.9
Helicotylenchus	62	54.83	18.56	31	18.9
Hoplolaimus	50	37.32	12.63	25	15.2
Longidorus	12	10.13	3.43	6	3.6
Meloidogyne	104	76.49	25.89	52	31.8
Rotylenchulus	31	42.39	14.35	15.5	9.4
Tylenchorhynchus	19	29.03	9.82	9.5	5.8
Tylenchus	20	19.81	6.70	10	6.1
Xiphinema	16	16.58	5.61	8	4.8

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