

# Prevalence of Plant Parasitic Nematodes (Citrus Species) in Various Villages of Jammu Region

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**Abstract-** The present studies based on the survey conducted and assessment made by the frequency of occurrence of economically important plant parasitic nematodes associated with *Citrus* crop. Samples were collected from roots and soil rhizosphere from 10 localities representing 3 districts namely Samba, Kathua and Rajouri for the study of nematodes infestations. The frequency of occurrence and populations varied from place to place which is simply indicative of the fact that the studied area is highly infested with different varieties of nematode species which ultimately affect the *Citrus* plant species of high grade quality of Citrus plantations.

## I. INTRODUCTION

The *Citrus* nematodes viz., *Meloidogyne javanica*, *Hoplolamius*, *Xiphinema*, *Pratylenchus*, *Tylenchulus semipenetrans* are considered to be the inhabitants of *Citrus* rhizosphere. The above mentioned nematodes are considered as one of the factors responsible for *Citrus* die back disease (Khan and Khanna, 1997; Tiwari and Vadhera, 1999; Nandwana *et al.*, 2005 and Vyas *et al.*, 2008). The nematode infected root showed extensive necrosis which give rise an abnormal dark colored foliage (Cohn, 1972).

An extensive survey was undertaken in the *Citrus* growing villages of Jammu division to know at what extent the diversity of *Citrus* plant species is damaged by the stress of nematodes. Since nematodes are the inhabitant of *Citrus* plant species, so, the generated information in the present study would enlightened the actual status of *Citrus* plants damaged by the nematode species.

## II. MATERIALS AND METHODS

The present investigation was carried out on the occurrence of important plant-parasitic nematodes associated with Citrus crops during 2008-2009. Nematode samples from 10 localities of Jammu district were collected from around the roots of Citrus and soil upto the depth of 30-60cm. The samples were pooled to form one composite sample of about 250 cc of soil and 10 gm feeder roots. The samples thus collected were stored in BOD incubator at 15-20°C to avoid the decaying of specimens. These were processed within a week after collection. Approximately 10g soil from each sample was used for extracting the nematodes by Cobb sieving and decanting method (1918), followed by Baermann's funnel technique (Schindler, 1961). The nematodes specimens thus obtained were subjected to hot water treatment (65°C) for killing them and fixed in 4% formalin. The roots were stained in acid fuchsin-lactophenol and then observed for the

presence of root-knot nematodes which were dissected out from the galled roots and perineal sections were prepared for nematode communities of adult females of citrus nematode and stored for analysis of species and genera of plant parasitic nematodes were identified. The absolute frequency, relative frequency and prominence value were calculated following Norton's formulae (Norton, 1978). The results are listed in table 1.

## III. RESULTS AND DISCUSSION

### a) Morphological characters:

The symptoms of the attack are in the form of stunted growth, yellowing of leaves, heavy galling on roots.

### b) Variations in the population of nematode species:

Among the various nematodes found associated with *Citrus*, the nematode species which was found to have highest prominence value was *Xiphinema* and *Pratylenchus* species followed by *Hoplolamius*, *Tylenchulus semipenetrans* and *Meloidogyne javanica*.

The perusal of data in Table 1 depicted the variations in the frequency distribution of the above mentioned nematodes. From the data it was clearly concluded that the *Xiphinema* were reported from Samba district (Vijaypur, Dhainnsar, Bari-Brahmana), Kathua district (Barnoti and Hiranagar) and Rajouri (Siot) district where the population of *Xiphinema* was prevalent and were found to retard the growth of the plant and leads to various deformities (as mentioned above).

*Pratylenchus* species was reported from three villages from Dhainnsar, Bari-Brahmana and Ghagwal of Samba district. Among Kathua and Rajouri, this species was found to be prevalent from Barnoti, Hiranagar and Siot villages respectively. In comparison to *Xiphinema* and *Pratylenchus*, prevalence of the nematode namely, *Hoplolamius* was resited from Dhainnsar, Bari-Brahmana and Samba of Samba district and Barnoti and Siot of Kathua and Rajouri district respectively.

The minimum prevalence of root-knot nematode (*Meloidogyne javanica* and *Tylenchulus semipenetrans*) were revealed from two villages i.e. Vijaypur and Samba of district Samba and Rajouri district (Nowshera) (*Meloidogyne javanica*). No record of this particular species has been reported from Kathua district from Barnoti and Hiranagar villages.

However, the *Tylenchulus* species was encountered form 3 villages (Vijaypur, Dhainsar and Ghagwal) of Samba district. Among Rajouri district, the *sps.* was reported from Sunderbani,

while 2 villages of Kathua (Barnoti and Hiranagar) was not found to be infested with such nematode species.

As depicted from Tables 1 and 2 and Fig.1, the *Xiphinema* species was found to have higher absolute and relative frequency followed by *Pratylenchus*, *Hoplolaimus*, *Tylenchulus semipenetrans* and *Meloidogyne javanica* which is simply indicative of the fact that to what extent these nematodes become the causative of infection in the *Citrus* plantations. The work regarding the effect of nematodes on *Citrus* plantations in Jammu region has been done earlier by only few workers, Nehru *et al.*, (2005), Singh (2009), Zalpuri (2010).

IV. CONCLUSION

From the above results and discussion, the present author intends to infer that the various villages of Jammu province are in the light of various nematode infestations which are ultimately become the causative foe many diseases. So, it is high time that steps should be taken by the various departments of horticulture to keep a check to control the growth of these nematodes as the Citriculture in J&K is becoming a boon for farmers which are ultimately the source of income for farmers. Otherwise a day will come when these nematodes will totally destroy the *Citrus* plantations which finally affect the agriculture as well as economy of the state in general and farmers in particular.

**Table1: Plant parasitic Nematodes associated with citrus in Jammu province**

<i>Nematodes</i>	Absolute frequency (%)	Relative frequency (%)	Absolute density (%)
<i>Meloidogyne javanica</i>	30.0	12.5	1.2
<i>Hoplolaimus sp.</i>	50.0	20.8	2.0
<i>Xiphinema sp.</i>	60.0	25.0	2.4
<i>Pratylenchus sp.</i>	60.0	25.0	2.4
<i>Tylenchulus semipenetrans</i>	40.0	16.6	1.6

<i>Nematodes</i>	Prominence value
<i>Meloidogyne javanica</i>	0.06
<i>Hoplolaimus sp.</i>	0.14
<i>Xiphinema sp.</i>	0.18
<i>Pratylenchus sp.</i>	0.18
<i>Tylenchulus semipenetrans</i>	0.10

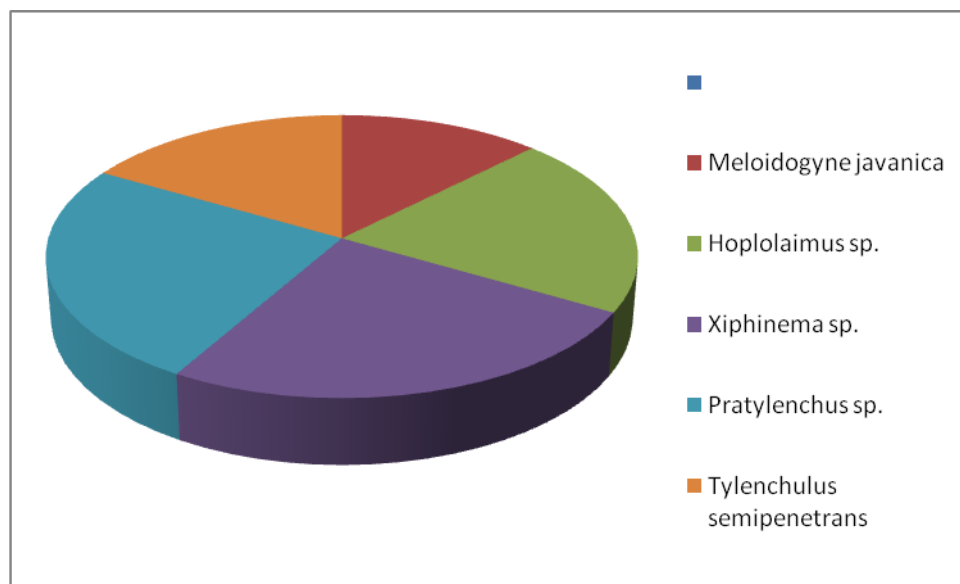
**Table-2: Survey of Citrus fields of different localities of Jammu Province.**

+ = Present , - = Absent

Locatio n	Plant parasitic nematodes						
	District	Village	Citrus species	<i>Meloidogyn e javanica</i>	<i>Hoplolaimus sp.</i>	<i>Xiphinema sp.</i>	<i>Pratylenchus sp.</i>
Samba	Vijaypur	<i>C. sinensis</i>	+	-	+	-	+
	Dhainsar	<i>C. limon</i>	-	+	+	+	+
	Bari-Brahmana	<i>C. reticulata</i>	-	+	+	+	-
	Ghagwal	<i>C. limon</i>	-	-	-	+	+
	Samba	<i>C. reticulata</i>	+	+	-	-	-
	Barnoti	<i>C. limon</i>	-	+	+	+	-

<b>Kathua</b>	Hiranagar	<i>C. limon</i>	-	-	+	+	-
	Sunderbani	<i>C. limon</i>	-	-	-	-	+
<b>Rajouri</b>	Nowshera	<i>C. limon</i>	+	-	-	-	-
	Siot	<i>C. sinensis</i>	-	+	+	+	-
<b>Total</b>			<b>3</b>	<b>5</b>	<b>6</b>	<b>6</b>	<b>4</b>

**Fig.1 Showing the occurrence of plant parasitic nematodes in studied sites of Jammu Division.**



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