



PLANT AND SOIL NEMATODES: DIVERSITY AND INTERACTIONS

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Abstract

Community analysis of plant nematodes is an important criterion for assessment of their pathogenic potential in a particular region. This investigation involves a study of the community structure of phytonematodes associated with the *Citrus* plants in the various districts of Jammu, J&K. The predominant nematode species were *Meloidogyne javanica*, *Hoplolaimus* sp., *Pratylenchus* sp., *Xiphinema* sp. and *Tylenchulus semipenetrans*.

Key Words: *Meloidogyne javanica*, *Hoplolaimus* sp., *Pratylenchus* sp., *Xiphinema* sp. and *Tylenchulus semipenetrans*.

Introduction

Sustainability of agro ecosystems may be affected by alterations in soil biological properties. Soil nematodes respond rapidly to environment disturbance, since they are present at high diversity and abundance in the soil and survive differentially according to habitat conditions. One of the major pests of high valued agricultural crops are the phytonematodes which are highly diversified organisms exhibiting variations in distribution patterns. The degree of damage done depends upon the pathogenic potential and population growth of nematodes which are greatly influenced by their initial population densities (Chandra *et al.*, 2010). The abundance and distribution of the plant parasitic nematodes in turn are influenced by the soil texture, crop cycle and anthropogenic factors (Chirchir *et al.*, 2008). Thus, community analysis of plant nematodes is important not only to assess the pathogenic potential of the nematodes in a particular region, but is also an important criterion for identification of hot spots of nematode attack. Community analysis of plant parasitic nematodes have been studied by Ansari and Ahmed (2000), Nath *et al.* (2009), Patel *et al.* (2007), Roy *et al.* (2007), Zalpuri (2010) and Srinivasan *et al.* (2011). Very little work has been done regarding the community structure of the phytonematodes associated with the plant species in J&K district. So, present work encompasses the prevalence of nematodes species in Jammu region particularly which are related with the *Citrus* plant species.

Materials and Methods

Field distribution: The present investigation was carried out on the occurrence of important plant-parasitic nematodes associated with *Citrus* crops during 2008-2009. Nematode samples from 18 localities [Uheywala, Marh, Satwari, Kaluchak, R.S. Pura, Gharana, Tanda, Bishnah (Jammu district), Vijaypur, Dhainsar, Bari-Brahmana, Ghagwal, Samba (Samba district), Barnoti and Hiranagar (Kathua district), Sunderbani, Nowshera and Siot (Rajouri district) of Jammu division were collected from around the roots of *Citrus* and soil up to 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.

Identification of specimens: Approximately 10g soil from each sample was used for extracting the nematodes by Cobb's 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 were dissected out from the galled roots and perineal sections were prepared for nematode communities adult females of citrus nematode and stored for analysis of species and genera of plant parasitic nematodes were identified.

Results and Discussion

Occurrence and Community Structure of Nematodes on the *Citrus* Plants

The *Citrus* plant appears to be highly valuable regarding the Citriculture point of view. When diversity of phytonematodes was viewed among the *Citrus* plant species, it was found to be diversified with various nematode species. The various enlisted nematodes belonging to different families (Table 1) are enlisted below:

Table-1: Nematodes recorded on Citrus plants in the field.

S.No.	Name	Common Name	Order	Family
1.	<i>Meloidogyne javanica</i>	Root-knot nematode	Tylenchida	Meloidogynidae
2.	<i>Hoplolaimus</i> sp.	Lance nematode	Tylenchida	Hoplolaimidae
3.	<i>Xiphinema</i> sp.	Dagger nematode	Dorylaimida	Longidoridae
4.	<i>Pratylenchus</i> sp.	Root-lesion nematode	Tylenchida	Pratylenchidae
5.	<i>Tylenchulus semipenetrans</i>	Citrus nematode	Tylenchida	Tylenchulidae

From the overview of the above mentioned nematodes, it was found that even each and every district of (Jammu, Samba, Kathua and Rajouri) of Jammu region was infested with such nematode species. These not only degrade the quality but also cause various morphological anomalies. The various morphological anomalies include premature wilting, stunted growth and dieback of twigs and chlorosis. The diversity of nematodes found in district Jammu maximum diversity was found to be of *Xiphinema* species and lower diversity was of *Pratylenchus* species. Other species include like *Meloidogyne javanica*, *Hoplolaimus* sp. and *Tylenchulus semipenetrans* which also infest the *Citrus* plants and leads to total deformations and degradations of the plant species. The Citriculture appears to be the good commercial source for both the farmers as well as researchers. Due to the infestations caused by the nematode species, the entire biodiversity of *Citrus* plants is getting hampered.

Conclusion

The presented work represents the record of phytonematodes associated with the crop plants of this state. Most of the species recorded in the present study are highly pathogenic. Their occurrence may pose a serious threat to the affected *Citrus* plant species and need urgent attention of farmland owners and researchers. Special emphasis must be given to the hotspots of nematode attack identified in the present case.

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