

BIODIVERSITY OF PLANT PARASITIC NEMATODE IN AURANGABAD REGION (M.S)

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ABSTRACT

A survey of plant-parasitic nematodes of vegetable and fruit crops was undertaken in Aurangabad (M S). From the 80 sample of soil and 55 roots sample, different plant-parasitic nematode species, belonging to 12 genera, were recovered and identified . Among these Meloidogyne is more destructive, whereas longidurous are least destructive species. The present work carried out from Jan. 2013 to Dec2013. During survey *Rotilenchulus sp*, *Pratilenchus sp*, *Heterodera sp*, *Xiphinema sp*, *Tylenchus sp*, were identified. The population density of Tylenchida is more whereas *dorylaimida* was found in least number .The investigation revealed large diversity of nematode in arched and agricultural area in Aurangabad ,which affects the productivity of crop in this region. The study encourages more research work to establish the economic importance and the management of the reported nematode pests.

Key word : Plant parasitic nematode, Biodiversity ,Diversity ,Population density, Orched.

INTRODUCTION

Plant parasitic nematodes have biological characteristics that distinguish them from other organisms that affect the growth of plants, viz, they are relatively immobile and spend at least part of their life cycle within the soil matrix (AlanF Birds *et al.*, 1988).abundance is highly dependent on the different environmental factors . However, they are also influenced, to the host plant a greater or lesser extent, by most of the biological, chemical and physical components of the soil atmosphere .(Patrice 1998). Plant-parasitic nematodes cause an estimate of annual crop losses approximately \$10 billion in the USA and \$125 billion globally (Nauiyashta *et al* 2014),Plant-parasitic nematodes are nearly microscopic, worm-shaped animals virtually invisible to the naked eye when in the soil. They can cause significant plant damage ranging from negligible injury to total destruction of the plant. (Nuzhat Ara *et al.*, 2011).

The climate of the Aurangabad region is characterized by a rainy winter and followed by a dry summer with high temperatures raising up to 40 cc. Due to favourable climatic condition Aurangabad is most important agricultural area of Marathwada region. Present work carried out at different fruit arched and agricultural yield area. The nematode populations change in response to the pressure and challenges imposed by external factors, and so they develop a structure and show properties of growth to such factors as rainfall, temperature, soil type and host plant and to show precisely how each factor affects biological processes (Fangfang Liu *et al*, 2011). There are several references from various countries on the influence of soil condition on animal activity. Taking nematodes as a distinct group, there is some evidence that different preferences as regards soil type (Chitwood, 2002).

MATERIALS AND METHODS

Sampling area and collection:

The nematode samples were collected from cultivated crops of a particular area of Orcheds and farms. This study area was selected due to repeated cultivation of the same crops cultivars round the year. To accomplish this study, several crop fields were surveyed during the winter season from January 2013 to December 2013. Soil and root samples were collected from the study fields where infection of nematodes were suspected considering visible symptoms described by (ZAFAR A. HANDOO *et al*2014)Samples were collected at random at depth of 5-15 cm surrounding roots and rhizospheres of crop plants(Amin, 2010). About 500 g soil along with roots was collected from each place. After collection samples were placed in airtight containers. Polythene bags were used for storing and carrying the samples to the laboratory. Then modified Baermann funnel technique was used to extract nematodes (Zeidan, 1989) in the laboratory of the Department of Zoology, Maulana Azad college .

Whole mount and microscopic slide

Three or four drops of clear fingernail polish were placed on a clean microscope slide in a triangular or rectangular pattern; it was arranged so that the cover slips will span all of them. Using the dropper, a small drop of water containing nematodes was placed in the space defined by the drops (Barker 1979). Then carefully pass out the slide over a slow flame six to eight times to relax the nematodes and observed under the dissecting microscope to be sure that the nematodes have stopped moving. Finally nematodes were observed using a compound microscope. The morphology and some internal structures were studied and identified up to genus level. Taxonomic keys are followed given by Bernard in 1980 and Dayrat in 2005. The percentage of prevalence find by following formula (Alan Bird, 1988)

$$\text{Percentage of prevalence} = \frac{\text{Number of positive samples}}{\text{Number of total soil sample}} \times 100$$

RESULTS AND DISCUSSION

The investigation shows, presence of 12 genera in different orchid and farming area.

Table 1. Showing Plant Parasitic Nematode Isolated from Agriculture Yield.

Order	Sub order	Family	Genus
Tylenchida	Tylenchina	Pratylenchidae	<i>Pratylenchus</i>
		Hoplolaimidae	<i>Helicotylenchus</i> <i>Hoplolaimus</i> <i>Rotylenchulus</i> <i>Peltamigratus</i> <i>Scutellonema</i>
		Meloidogynidae	<i>Meloidogyne</i>
		Criconeematidae	<i>Hemicycliophora</i>
		Tylenchulidae	<i>Tylenchus</i> <i>Filenchus</i>
Dorylaimida	Dorylaimina	Tylenchorhynchidae	<i>Coslenchus</i> <i>Tylenchorhynchus</i> <i>Quinisulcius</i> <i>Pratylenchus</i>
		Paratylenchidae	<i>Pratylenchus</i>
		Longidoridae	<i>Longidorus</i> <i>Xiphinema</i>
Triplonchida	Diphtherophorina	Trichodoridae	<i>Paratrichodorus</i> <i>Trichodorus</i>

Plant parasitic nematodes were detected in nearly every sample but at varying frequencies and densities. *Paratrichodorus* and *Filenchus* spp. were present in all sample. *Pratylenchus* and *Helicotylenchus* spp. occurred in high frequencies. K.A. Ibrahim *et al* current status of phytonematode according to him pratilenches are more severe and abundant species in Egypt. Present study reveals that *Pratylenchus* spp. were present at an absolute frequency 85% in the soil samples. This lesion nematode occurred in high frequency in nearly all sampled area. Brown D.J.F *et al* 1980 noted that fruit plant are more infected by pratylenches. *Pratylenchus* was the most prevalent and abundant nematode in all the sample. This lesion nematode has a wide host range including cereals, legumes, fruits and vegetables (Shoko, 2005; Shoko, 2009). The result of this study revealed a large diversity of nematode associated with different fruit plant in Aurangabad, they include important nematode species such as *Helicotylenchus*,

Hoplolaimus , *Rotylenchus*, *Scutellonema* ,*Longidurous*,*Xiphinema trochodoros* have been frequently associated with yield reduction.

Table 2 Shows Monthly Percentage Of Prevalence Of Incidence Of Plant Parasitic Nematode (Jan 2013 - Dec 2013).

ORDER	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<i>TYLENCHIDA</i>	72	78	60	55	50	65	68	77	70	80	83	85
<i>DORYLAIMIDA</i>	88	81	78	65	55	70	75	80	78	81	84	85
<i>TRIPLONCHIDA</i>	55	59	65	40	44	44	50	51	49	66	65	68

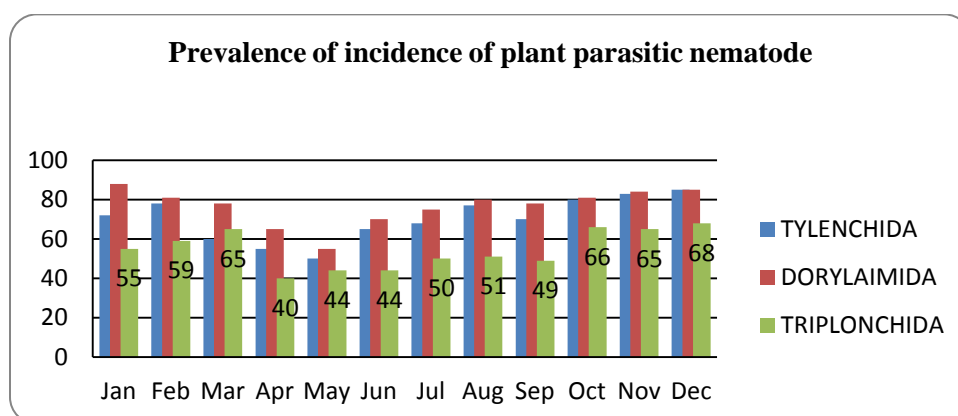


Figure- 1. Prevalence of incidence of plant parasitic nematode

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