



**RESEARCH ARTICLE**

**Effect of some species of Root Knot Nematodes of genus *Meloidogyne* on some Plants of Aligarh Region**

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**ABSTRACT**

A field survey in Aligarh region was conducted to note the effect of some species of Root Knot Nematodes belonging to genus *Meloidogyne* (Eisenback and Triantophyllon 1991) at five localities around the Aligarh. The localities were Kayampur, Dhanipur, Borna, Sindholi and Harduaganj. The plant infested by root knot nematodes appears wilted and its growth was found stunted as the galls reduce nutrients and water uptake. The main species of *Meloidogyne* infested the plants in this region are *M. arenaria*, *M. hapla* and *M. incognita* etc.

**Keyword:** *Meloidogyne*, Nematods

**INTRODUCTION**

Nematodes are the major component of the living communities inhabiting soil. Root knot nematodes are microscopic unsegmented worms which are major component of living communities inhabiting soil. They cause injury in root tips by forming knots or galls in their tissues and it can also cause excessive branching of roots. The population density, however does depends on host crop (Sasser and Carter 1985, Siddiqui 2005). In Uttar Pradesh nematodes of agricultural crops have been reported by Baqri and Jairajpuri (1979). The plants most commonly attacked by root knot nematodes e.g. Carrots, corn, tomatoes, potatoes, lettuce, onions etc.

Root Knot Nematodes are microscopic worms living in soil and feed on the roots of many common garden and field crops. Their feeding causes formation of galls on the roots of infested plants. Root Knot Nematodes are classified under the genus *Meloidogyne*.

The Root Knot Nematodes are sexually dimorphic. The females look mostly globose and usually embed in the root tissues which are often swollen/ galled. The male has long thin cylindrical shape.

In the lifecycle of *Meloidogyne* the first stage juvenile develops in the egg and first moult usually occurs within the eggshell giving rise to the second stage juvenile which emerges out into the soil and infests the root tissues.

**REVIEW OF LITERATURE**

Their main host plants are tomato, potato, arusa, koa, green onion, pineapple, barbados cherry, banana and moss rose, etc. The nematodes include both the free living and parasitic forms. They show a great diversity regarding their habits and habitats. To understand the background of root knot nematodes it is necessary to realise that Nematodes can be categorised into parasitic and free living forms. The parasitic forms observed are of the economic and social importance. Even in the parasitic forms there is a categorisation into – those infecting man and animals and those infecting plants (Hussey, R.S. and Grandner, F.M.W. 1998). As the Nematodes include both free living and parasitic forms they give an idea of diversity of their habits and habitats.

Root knot nematodes of genus *Meloidogyne* belongs to the family Meloidogynidae, having class-Secementea and order-Tylenchida. This genus belongs to nematoda of kingdom animalia. They exist in soil in areas with hot climates/short winters. Near about 2000 plant species are susceptible to infection by root knot nematodes. Due to this approximately 5%

loss of global crops occurs (Sasser and Carter, 1985). Root knot nematodes (*Meloidogyne* spp.) are one of the three most economically damaging generation of plant parasitic nematodes of horticultural and field crops (Bhatti and Jain 1977). Root knot nematodes are obligate parasites of roots of thousands of species including monocotyledons and dicotyledons herbaceous and woody plants.

### MATERIALS AND METHODS

A field survey has been made by the collection of soil samples in order to know the nematode species and their population estimates. Samples can be taken any time of the year when the ground is not frozen, sampling should be avoided after rain fall when soil is wet. We examined the soil samples which has been taken from the root zones of crops after harvest and just before harvest. We have divided the field in sampling blocks to examine the crop injury and soil texture. From each block we take several sub samples, and mix them thoroughly to make a composite sample.

### OBSERVATION

Parasitic nematodes are found in all agricultural crops, gardens, recreation turfs, golf course etc. These nematodes are small worm like animals usually around 1m.m in length, though some of nematodes are sedentary and spherical in shape. The mouth region of phytoparasitic nematodes has a spear like structure called stylet which is used to penetrate into and feed on plant tissues. Root knot nematode larvae invades the roots of plants-tomato, potato, arusa, green onion, banana, carrot, papaya, head lettuce, etc.

They establish feeding sites and develop into adult stage. Adult females lay eggs in a gelatinous matrix on or just below the root surface (Siddiqui 2005). After hatching from eggs larvae invade other roots and tubers. Root knot nematode feed and reduces the vigor of plant and cause blemishes on tubers.

The affected plants appears wilted. Nematodes damage roots by feeding and moving through cortical tissues. They form characteristic swellings/galls on roots (Siddiqui *et al.* 2002). *Meloidogyne* species causes bumps or warts on the surface of infected tubers mostly in outer 6 mm area. Numbers of galls in roots was recorded. The index of gall No. and egg mass were determined on the following scale: 0=0, 1=1-2, 2=3-10, 3=11-30, 4=31-100, 5 =>100 galls or egg mass/root system (Reddy 1985 and Sasser 1989). Highest frequency (88%) was found in Kayampur area. In Sindholi, Dhanipur, Harduaganj and Borna the frequencies recorded were 80%, 70%, 65% and 60% respectively.

### PREVENTION AND CONTROL

The measures to prevent the spread of nematodes in fields are-

1. Use of certified planting material.
2. Keeping irrigation water in a holding pond to settle down the nematodes present in it and pumping the water from near the surface of the pond.
3. We should prevent the movement of animals from infested to uninfested fields.
4. Composting the manure to kill the nematodes before applying it to field.

Crop Rotation is useful to reduce the nematode population in field. There are several nematodes resistant tomato varieties can be used. The crops of rapeseed, mustard, oilseed, radish and sudangrass reduce populations of root knot nematodes when incorporated as green manure. At present there are no nematode resistant potato varieties available.

### RESULT

Root knot nematodes can be controlled with least toxic methods through plant rotation (Siddiqui 1992) by using high quality compost, solarising the soil and by planting of marigolds or mustard as a cover crop.

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