RESEARCH ARTICLE

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Impact of Root Knot Nematode *(Meloidogyne incognita)* on Some Plants in Aligarh Region

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ABSTRACT

We have investigated some plants nearby Aligarh. A field survey was conducted to not the impact of root knot nematodes [Meloidogyne incognita, Magenta, A.R. 1960] at 4 localities in and around Aligarh, U.P. The localities were Dhanipur, Sindholi, Harduaganj and some plants in D.S. College campus, Aligarh. The plant infested by root knot nematodes appears wilted and its growth was found stunted as the galls reduce nutrients and water uptake.
Key words: *Meloidogyne incognita*

INTRODUCTION

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 & Carter, 1985; Siddiqui, 2005). In Uttar Pradesh nematodes of agricultural crops have been reported by Baqri & Jairajpuri (1979). The plants most commonly attacked by root knot nematodes e.g. Carrots, corn, tomatoes, potatoes, lettuce, onions etc.

The root knot nematodes (*M. incognita*) are sexually dimorphic. The female looks globose, 0.4-1.3 mm long and usually embed in root tissues which are often swollen or galled. Its body is soft pearl white in colour and does not from a cyst. The male has long thin cylindrical shape and its tip region has a distinct head cap and include a labial disc surrounded by a lateral and medial lips.

There are four juvenile stages and four months life cycle. The first stage juvenile develops in the egg and the first moult usually occurs within the egg shell, giving rise to the second stage juvenile which emerges out into the soil and infest the root tissues.

REVIEW OF LITERATURE

Regarding the root knot nematodes, to understand the background it is necessary to realize that nematodes can be categorized into parasitic and free living forms the parasitic forms of nematodes observed are of the economic and social importance. Even in the parasitic forms there is a division into-those infecting man & animals and those infecting plants. (Hussey and Grander, 1998). The statement that nematodes include both free living and parasitic forms gives a little idea of diversity of their habits and habitats.

Root knot nematodes of genus Meloidogyne belongs to the family Meloidogynidae, having class and order Secementea and Tylenchida respectively. This genus belongs to phylum Nematode of kingdom Animalia. They exist in soil in areas with hot climates or short winters. About two thousand plant species are susceptible to infection by root knot nematodes and they cause approximately 5% of global crop loss (Sasser & Carter, 1985).

Root knot nematodes (*Meloidogyne* spp.) are one of the three most economically damaging generation of plant parasitic nematodes on horticultural and field crops (Bhatti

& Jain, 1977). Root knot nematodes are obligate parasites of the roots of thousands of plants species including monocotyledons and dicotyledons herbaceous and woody plants. The main host plants of Meloidogyne incognita are-Arusa (*Adathoda vasica*), Koa (*Acacia koa*), Green onion (*Allium fistulosum*), Pineapple (*Ananas comosus*), Tomato (*Lycopersicon esculentum*), Barbados Cherry (*Malpighia glabrea*), Banana (*Musca acuminata*), Moss rose (*Portulaca grandiflora*) etc.

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. We examined the soil samples which have 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 texure. From each block we take several sub samples, and mix them thoroughly to make a composite sample.

OBSERVATIONS

Root knot nematode larvae invade the roots of pants establish feeding sites and develop in to 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. Nematodes damage roots by feeding and moving through cortical tissues. They form characteristic swellings or galls on roots (Siddiqui et.al 2002). *M. incognita* causes bumps or warts on the surface of infected tubers mostly in outer 6mm 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, Sasser, 1989)

Highest frequency (85%) was found in Sindholi area. In Dhanipur Block, Harduaganj and D.S. College campus the frequencies were 75%, 70% and 65% 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 nematode resistant tomato varieties that can be used if *M. incognita* is a problem. 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.

RESULTS

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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