



A management strategy for the significant reduction of *Filenchus cylindricaudus* (Wu, 1969) Siddiqi, 1986 on *Allium cepa* (Onion)

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Abstract

The Phytonematode populations associated with *Allium cepa* were screened to analyse the density buildup and the study revealed that the Tylenchid genera buildup on *Allium cepa* were *Psilenchus*, *Helicotylenchus*, *Pratylenchus*, *Aglenchus* and *Filenchus* with their absolute frequency of 100%, 90%, 96.6%, 83.3% and 73.3% respectively. The effect of organic amendments including poultry manure, pigeon manure and saw dust was looked into in order to calculate their effects on *Filenchus cylindricaudus* (Wu, 1969) Siddiqi, 1986. Population densities reduced to a considerable extent on the application of organic amendments in the order of pigeon manure > Poultry manure > saw dust.

Keywords: management, *Allium cepa*, Kashmir, *Filenchus cylindricaudus*

Introduction

Nematodes are understood to cause a severe damage to the field crops world over. They utilize directly or indirectly, the living material of plants as sources of nutrition and often as habitat and sites for reproduction. They utilize chemical activity of bacteria, which hydrolyze carbohydrates, split proteins, cellulose and other organic substances of plant origin. The phytophagous nematodes are common pests of commercially grown crops and their yield loss is often due to their high densities. According to Sasser and Fackman (1987) crop losses by nematodes range from 8 to 20 % on major crops around the world. The efficacy of various organic amendments including sawdust was worked out by Dahiya (2003) [6] against *Heterodera avenae* in wheat. Wang *et al.* (2004) [22] estimated the effects of some organic amendments like sun hemp residues on nematodes associated with *Zea mays* and found significant effects on population density. Kimenju *et al.* (2004) [19] has worked on assessing the role of organic soil amendments in management of root knot nematodes on common bean. Plant parasitic nematode management. As suggested by Barman and Das (1996) good control of nematodes by organic amendments can be achieved but it requires large quantities in actual field conditions for effective management. It would therefore be advisable to evaluate a management schedule to apply organic amendments in combination with a nematicides /herbicides.

Materials and methods

A field plot in the outskirts of Srinagar was chosen for carrying out the study. The plot was divided into micro plots each with an area of 1m². Pretreatment soil samples were taken from the rhizosphere of Onion for determining the initial population expressed as number/100ml of soil. The soil samples were processed by Cobb's modified decantation and sieving techniques (1918). 300 mesh sieve of pore size 53 µm was used. Nematode suspension was killed and fixed in one

operation by using equal amount of double strength hot F.A.A. solution. The fixed material was left as such for 24 hrs. Nematodes were thus collected and dehydrated in glycerine-alcohol solution containing 95 parts of 70% alcohol and 5 parts of glycerine. Slides were prepared from the specimens. Nematodes were identified and counted under stereomicroscope.

In order to carry out another part of the programme, the experiment was conducted in a randomized complete block Design (RCBD) with three replication. The micro plots were treated with Poultry manure, Pigeon manure and Sawdust. These organic amendments were added at a rate of 800kg/ha to the soil. Untreated plots served as controls. Soon after the treatment the plots were watered for ensuring proper decomposition of the organic additives. Small seedlings of the host were transplanted. Final population of nematodes in treated and control micro plots was determined. The data was subjected to statistical analysis with the following formulas:

Absolute frequency (AF) = Number of samples containing a genus ÷ Total Number of samples collected × 100

Relative frequency (RF) = Absolute Frequency of a genus ÷ Sum of Absolute frequencies of all genera × 100

Density (D) = Number of nematodes of the genus in all samples ÷ Total number of samples collected.

Relative density (RD) % = Density of the genus ÷ Sum of densities of all nematode genera × 100

Absolute Density % = Density of the genus ÷ Volume or mass units of the sample × 100

Prominence value (PV) = Density √ absolute frequency

Relative Prominence Value (RPV) % = Prominence value of

the Genus ÷ Sum of Prominace value of all nematode genera × 100

Mean Intensity = Number of individuals of a genus collected ÷ Number of infected hosts with that genus.

Results and Discussions

The present study revealed that the Tylenchid genera buildup on *Allium cepa* were *Psilenchus*, *Helicotylenchus*, *Pratylenchus*, *Aglenchus* and *Filenchus* with their absolute frequency of 100%, 90%, 96.6%, 83.3% and 73.3% respectively. *Psilenchus* appeared in most of the samples collected with 100% frequency. Population of *Helicotylenchus* happened to be highest with the absolute density and mean intensity of 37% and 81% respectively. Among these five genera recorded (Table 1, Fig. 1) on *Allium cepa* the Relative prominence value of 14.4% is lowest for *Psilenchus* and 25% for *Helicotylenchus*. *Filenchus* was found with the highest mean intensity of 96% and the value was calculated to be the lowest for *Pratylenchus*.

The organic amendments had a significant effect on the population densities. On application of the poultry manure, the population of the nematode in question decreased to a considerable level of 43.5 from the initial density of 71.47 with the SD of 3.2. Pigeon manure was highly effective in controlling the parasite and the value decreased to 34.85 with the SD of 3. The saw dust had a least effect (Table 2) owing to its less decomposable texture.

Table 1: Community analysis of plant parasitic nematodes associated with *Allium cepa* (Onion)

Genus	AF (%)	RF (%)	RD (%)	AD (%)	RPV (%)	MI
<i>Psilenchus</i>	100	22.5	13.4	20.4	14.4	39
<i>Helicotylenchus</i>	90	20.3	24.3	37	25	81
<i>Pratylenchus</i>	96.6	21.7	15.4	23	16.3	48
<i>Aglenchus</i>	83.3	18.7	23	35	22.5	84
<i>Filenchus</i>	73.3	16.5	23.7	36	21.7	96

AF= Absolute frequency, RF= Relative frequency, RD= Relative Density, AD= Absolute density, RPV= Relative prominence value, MI= Mean Intensity.

Table 2: Effect of treatments on the nematode density. Population mean values follow by standard error

Nematode species	Initial density	Control	Poultry manure	Pigeon manure	Sawdust
<i>Filenchus cylindricaudus</i> (Wu, 1969) Siddiqi, 1986	71.47±3.2	93.05±3.9	43.5±4.2	34.85±3.0	48.15±6.2

AF= Absolute frequency, RF= Relative frequency, RD= Relative Density, AD= Absolute density, RPV= Relative prominence value, MI= Mean Intensity.

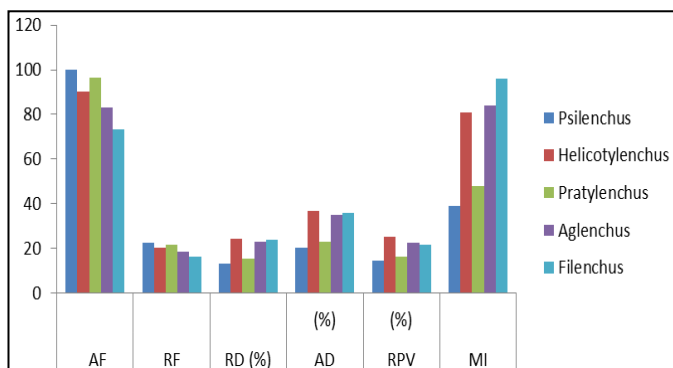


Fig1: Graphical presentation of various ecological parameters of different genera on *Allium cepa* (Onion).

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