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COMMUNITY ANALYSIS OF PREDATORY NEMATODE SPECIES FROM ALIGARH SOILS, INDIA

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Summary. Nematodes from 90 soil samples collected from Aligarh were identified and categorized into five trophic groups. A total of 64 species belonging to 54 genera were found. Predatory nematodes were the second most important group in the community, but in terms of biomass they dominated over the other groups. Among the predators, the dorylaims were the most important, *Aporcelaimellus nivalis* being the most prevalent and having the greatest intensity, as well as highest mean biomass. *Dorylaimus stagnalis* had the highest individual biomass.

The role of predatory nematodes in biological control of plant parasitic nematodes has recently been discussed (Jairajpuri *et al.*, 1990). Some studies on their ecology have indicated the effect of host on nematode community structure (Baird and Bernard, 1984; Niblack and Bernard, 1985). Recently Bongers (1990) has analysed nematode community structure using Maturity Index and Plant Parasitic Index. The population fluctuations of a predatory nematode under field conditions was studied by Ahmad and Jairajpuri (1982) where high populations of the predatory nematode, *Parahadronhus shakili* was correlated with low populations of *Trichodorus* sp. and *Hemicriconemoides* sp.

In the present work, nematode community structure of predatory nematodes from Aligarh was studied. The soil type is alluvial sand, annual precipitation is *C.* 70 cm and average temperature 37 °C in summer.

Materials and methods

Ninety samples from various field crops (paddy, wheat, mustard, etc.), fruit trees (mango, guava, citrus, etc.) and flowering ornamentals (rose, margosa, etc.) were collected in April and May of 1990 at a depth of 10-25 cm. The nematodes were extracted from 500 ml of soil by Cobb's sieving and decanting with final separation in Baermann funnel. Recovered nematodes were counted (mean values taken), fixed in TAF, dehydrated by the slow method and mounted in glycerine for species identification. Identified species were assigned to different trophic groups based on their feeding habits or those of related species (Yeates *et al.*, 1993). The various trophic groups considered are plant parasitic, predatory/omnivorous, saprophagus, mycophagus, and a group which included species whose feeding habits were not known. All the ecological parameters were calculated by the methods given by Norton (1978) and Boag (1993).

Results

Sixty four species of nematodes belonging to 54 genera were identified. These included 23

species of plant parasites, 18 of predatory/omnivorous, 8 saprophagus, 7 mycophagus and 8 species of the uncertain group. There were at least four, and at most eighteen, nematode species per sample. Of the 18 species of predatory/omnivorous nematodes, the majority belonged to the order Dorylaimida.

Prevalence. From Table I it is evident that *Aporcelaimellus heynsi* Baqri *et* Jairajpuri, was the rarest and a majority of the other dorylaim predators/omnivores occurred in less than 20% of samples. *Discolaimus major* Thorne, *D. silvicolus* Sauer *et* Annells were present in the greater number of samples but *A. nivalis* (Altherr) Heyns was the most frequent. The enoplid *Ironus* sp. was more frequent than many dorylaim predators/omnivores as well the mononchs, *Mononchus aquaticus* Coetzee and *Mylonchulus minor* (Cobb) Andrassy.

Mean intensity. Aporcelaimellus nivalis and *Aquatides thornei* (Schneider) Ahmad *et* Jairajpuri were the most abundant followed by *A. laevis* Tjepkema, Ferris *et* Ferris, *Dorylaimus stagnalis* Dujardin and *Discolaimus tenax* Siddiqi. All others including the enoplid and mononchids were never found in very large numbers. *Discolaimus tenax* and *Discolaimus silvicolus* had relatively high frequency but very low intensities.

TABLE I - *Ecological parameters of predatory/omnivorous nematodes.*

Nematode Species	N	Prevalence	Mean intensity	Prominence value	Mean-biomass (µgm)	Importance value
Aporcelaimellus nivalis (Althery, 1952) Heyns, 1952*	42	46.6	25.5	174.0	97.9	64.3
Discolaimus major Thorne, 1939	28	31.1	6.5	36.2	8.9	18.5
Discolaimus silvicolus Sauer *et* Annells, 1985	27	30.0	8.5	46.9	4.6	18.0
Aporcelaimellus laevis Tjepkema, Ferris *et* Ferris, 1971*	22	24.4	19.5	96.3	33.3	32.0
Aporcelaimellus chauhani Baqri *et* Khera, 1975*	13	14.4	5.1	19.3	7.3	10.9
Discolaimus tenax Siddiqi, 1964	12	13.3	12.7	46.3	19.5	19.2
Dorylaimus stagnalis Dujardin, 1845*	10	11.1	14.2	47.3	56.8	31.0
Aquatides thornei (Schneider, 1973) Ahmad *et* Jairajpuri, 1982	10	11.1	22.5	74.9	23.4	26.0
Ironus sp.	10	11.1	2.7	8.9	11.4	9.4
Eudorylaimus sp.*	9	10.0	4.7	14.8	5.7	8.5
Laimydorus baldus Baqri *et* Jana, 1982*	9	10.0	7.2	22.7	20.8	14.9
Discolaimoides sp.	8	8.9	3.7	11.0	8.5	8.3
Discolaimium obtusum Husain *et* Siddiqi, 1967	8	8.9	2.3	6.9	2.0	5.4
Mesodorylaimus bastiani (Butschli, 1873) Andrassy, 1959*	8	8.9	4.5	13.4	5.5	7.9
Mononchus aquaticus Coetzee, 1968	8	8.9	2.5	7.4	3.8	6.1
Mylonchulus minor (Cobb, 1893) Andrassy, 1958	8	8.9	3.5	10.4	1.9	6.2
Labronema mauritiensis Williams, 1959*	7	7.8	4.0	11.2	4.3	6.8
Aporcelaimellus hyensi Baqri *et* Jairajpuri, 1968*	4	4.4	4.2	8.8	5.4	6.0

N = Number of samples containing species; * omnivorous as per Yeates *et al.* (1993).

Prominence value. Aporcelaimellus nivalis was most prominent followed by *A. laevis*, *Aquatides thornei* and *D. stagnalis*. Others predatory/omnivore nematode species were less prominent (Table I).

Biomass. D. stagnalis had the greatest individual biomass in the community primarily due to its large body size. However, mean biomass was greatest for *A. nivalis*. *A. laevis* and *Aquatides thornei* also had considerably high mean biomass values (Table I).

Importance value. Of all the predators/omnivores, *A. nivalis* was the most important species followed by *Dorylaimus stagnalis* and *A. laevis*. Predatory species belonging to the orders Mononchida and Enoplida appeared to be one of the least important in the community.

Discussion

Individual predacious species were not very frequent, but the predatory nematode group as a whole was quite prevalent. Despite the relatively high prevalence of the trophic group, the population of the predators in any locality was never very large and the relative intensity was far less than plant parasites. Prominence value showed that phytophagus species were more prominent than predators. These observations are in contrast to those of Johnson *et al.* (1972) and Yeates (1972) who found bacterial feeders were more prominent; this may be associated with the type of habitat(s) studied.

The intensity of nematodes also differed from the observations of other workers, but this may be due to the fact that most soil samples for this study were from cultivated areas, and tends to supports Yeates (1979) observation that diversity varies with habitat and cultivated fields contain less dense populations than natural habitats. Highly variable absolute intensities and low mean intensities of predatory nematodes may have resulted from unstable soil conditions that are generally prevalent in agricultural fields. Both these parameters are known to increase with time and stability of soils (Wasilewska, 1967). Diversity of predatory nematode species could not be compared due to lack of information but it may be assumed that diversity will vary considerably with habitat and the size of area studied.

Predatory/omnivorous nematodes were the most dominant group in terms of biomass as also observed by Vinciguerra and Gianetto (1988). The mean total biomass of dorylaim nematodes was much higher than other predators because of their larger body size. The mononchs had a smaller biomass than dorylaims probably because of their lower prevalence and intensity. Similarly the mean total biomass of other group of predators was also very low. It, therefore, seems apparent that the dorylaims play an important role, when compared to other predators, in the energy flow pattern in the soil.

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