DISCUSSION

The present study revealed some interesting facts about the nematode community of the park. The nematode counts over the sampling sites ranged drastically from 180-3260 per 400 ml of soil, showing some sites to be extremely dry for nematode survival. The wide range of nematode numbers i.e., 52 to 9,166 nematodes per 200 cm³ soil, has also been reported by Niblack and Bernard (1985).

Despite the extreme variability in nematode numbers, the nematode fauna of the park was found to be in dynamic equilibrium representing all trophic groups. The total generic diversity of nematodes in the park was high with eighty-two genera identified. However, the ‘r’-strategists bacterivores showed the greatest generic diversity and constituted 40% of the total genera of the park.

Ten most important genera Cephalobus, Mesorhabditis, Chiloplacus, Dorylaimus, Helicotylenchus, Hoplolaimus, Prismatolaimus, Eudorylaimus, Acrobeles and Tobrilus of the total eighty-two genera identified, constituted 61% of total nematode density. The high frequency and dominance of these genera also indicated their greater competence and cosmopolitan nature. Similar results were also published by other workers when six of twenty species represented 80% (Andrassy, 1959) and six of twenty-two species made up 91% of the nematode populations (Eder and Kirchengast, 1982). Furthermore, Ocana and Picazo (1991) observed fifteen of the sixty-eight species representing 98% of nematode population while seven of seventy-one nematode species constituted 71% of total nematodes as reported by Beier and Traunspurger (2003b).

Although extensive, the list of genera may not be complete due the fact that all genera may not have been recorded. They could have occurred in unextractable or
indeterminable life stages, at densities too low for detection, at restricted time of the year or in specialized microhabitats. One such example is the absence of serious pests like *Heterodera* and *Meloidogyne*. Their absence could be due to the fact that the nematodes were largely sampled from soils rather than roots. However, the juvenile of the above pests were not observed in the samples collected from around the roots. Such unusual results were also reported by Talavera and Navas (2002) who could not find root knot nematodes in grassland samples.

Omnivores surpassed the bacterivores in frequency as well as density, showing their greater adaptability and tolerance to edaphic factors in the park environment. Niblack and Bernard (1985) pointed out a high positive correlation between the highest number of omnivores with weed cover, in Dogwood and Peach nurseries. Weeds formed a characteristic component of the park vegetation in the present study as well though their relationship with omnivore population was not worked out. Omnivores particularly dorylaims are considered indicators of ecological change. Their relatively high percentage with respect to numbers and diversity indicates the park as less disturbed site as also elaborated by Johnson *et al.*, (1973).

The park habitat showed 6% dominants and 14.6% subdominant genera. Thus the recedents constituted a large proportion of 79.4%, in the total genera found. *Mesorhabditis* of family Rhabditidae was the most frequent genus closely toed by *Cephalobus* of family Cephalobidae. The latter family proved its dominance with two other highly numerous and frequent genera *Chiloplacus* and *Acrobeles*. The abundance of *Cephalobus* can be correlated with low moisture/ drought conditions (Dmowska, 2000 and Yeates, 2003). Rhabditidae despite the diversity, showed markedly low frequency and density due to their sensitivity to low moisture levels with the exception of *Mesorhabditis* that thrived well in such conditions with a
universal occurrence. Conclusively, these indicator organisms reflect the conditions of park, which is not getting enough water to fill its reservoirs the whole year through and thus shows a more or less dry substrate.

The plant parasites were the third numerous trophic group after the omnivores and bacterivores due to the dense vegetation of the park at places that comprise the grassland, bushes as well as woodlands. They were largely categorized as ectoparasites, which seem to be tolerated by the plants of the park and may have led to compensatory plant growth, instead. The presence of sensitive Longidoridae indicates stability of environment. Furthermore, the abundance of the nematodes with overlapping pharyngeal glands viz., *Helicotylenchus* also reflects a stable habitat as reported by Bongers (1990). The ratio of plant parasites/ herbivores to predators shows a unity thus, indicating towards a balanced type of ecosystem. The fair representation of the second degree consumers or so called carnivores, in the soil environment, is detrimental to their population build up.

Among predators *Tobrilus* remained the most frequent and abundant genus although it has also been reported with absolute abundance in oxygen stressed conditions by Beier and Traunspurger (2003a, b), Jacobs (1987) and Nuss (1984). Nevertheless, another genus *Monhystera*, tolerant to oxygen stress as reported by the above authors, showed low frequency and density in the park samples.

The algivores showed minimal representation. They can be opportunists relying on facultative type of feeding. As suggested by Ruess (2003) their classification is largely on the basis of observations on agar plates and hence should be reevaluated in field conditions.

A fair percentage of bacterivore *Rhabdolaimus*, reported from aquatic sites, is in conformity with the results of Dmowska (2000) and Beier and Traunspurger (2001).
The nematode is stated to survive as dauer larvae in warm dry and acidic soils. The features of *Rhabdolaimus* suited well to conditions of the park. Another more frequently observed aquatic genus *Chronogaster* was found with fairly small population size, perhaps due to its inability to propagate in moisture stress.

The superficial division of the park into zones A, B and C for the sake of making the analysis easy did not reveal much difference in nematode community characteristics. On comparing the three zones, mostly a positive high correlation was observed for the parameters viz., frequency, density and biomass of all trophic groups except the fungivores, which accounted for the inverse correlation between the zones. The difference is mainly due to the presence of lesser number of fungivores genera with low densities in zone C, which had a relatively smaller wetland area. Thus, their low frequency may be attributed to the low moisture levels of the zone, as fungi require significantly warm but humid conditions for growth. However, the high values of Sorensen’s similarity index indicated towards more or less similar nature of nematode communities in zones A, B and C.

The soil food web forms energy channels depending on the basal resources e.g., fungi, and bacteria. The relative abundance of bacterial and fungal feeders (Twinn, 1974; Wasilewska, 1979; Freckman and Ettema, 1993) is a parameter that helps in understanding the decomposition pathways or channels in an ecosystem, also an important factor for reproductive soils (Yeates, 2003). In the present study, bacteria seem to form the major bulk of food for these subterranean organisms with nematode channel ratio calculated to be 0.89±0.03. It is indicative of the fact that park habitat has predominant bacterial-based energy channels of decomposition and this analysis further confirms the results of Bardget et al. (2001). Increase in bacterivore nematode diversity probably resulted due to increased diversity of microbes and thus reflects the
nature and quality of soil environment. Such bacterial-based energy channels also reflect the nature of sampling sites, which are heavily grazed as also reported by Freckman and Caswell (1985), Griffith et al. (1994) and Wardle and Ghani (1995). Thus, fungivores with their low prevalence and abundance seem to contribute least to the total nematode community and also to the decomposition pathway.

The various indices calculated during the study also reveal high diversity and species richness, the attributes of a stable and undisturbed environment. The Plant Parasitic Index (PPI) was found to be 2.70±0.34 as the dominance was of the ectoparasites of c-p value 3 or higher. The herbivores accounted for the third highest value after bacteriovores and predators, thus, showing a correlation with the presence of various plant types. The MI of the park was 2.64±0.02 showing the undisturbed status of habitat which is apparently free from perturbations or pollution. A value > 2.00 seems to be common in relatively undisturbed and unpolluted systems, whereas in disturbed and polluted habitats values < 2.00 were observed (Zullini, 1976).