SUMMARY

The present work deals with the diversity of nematodes of one of the world’s important wetlands, the Ramsar site, ‘Keoladeo National Park’ Bharatpur, Rajasthan. The work done has been divided into two parts. Part A deals with the taxonomy of nematodes while Part B with community analysis and biodiversity of Park nematode fauna, estimated using various parameters and diversity indices. For the analysis of nematodes, sediment and water samples were collected and processed using Cobb’s sieving and decantation and modified Baerman’s funnel techniques. Fresh extractions were examined under the Olympus Stereoscopic Zoom Microscope SZX-12. Later, the nematodes were fixed, dehydrated and mounted in anhydrous glycerine on glass slides using wax method. Measurements were made with the ocular micrometer while the outline drawings and photography were done by using a drawing lube and a digital Camera Olympus C-3030, respectively, both mounted on Olympus DIC microscope BX-51.

During the faunal study of nematodes from the park eighty-two genera grouped under fifty-one subfamilies, forty-two families, twenty-six superfamilies, eighteen suborders and nine orders were identified. It was not possible to account them all in this thesis, hence, the systematic treatment is given to those nematode species, which are new to science or have been rare or reported for the first time from India. Therefore, present thesis includes the description of two new genera and twelve new species and a known species and their related higher taxa. These nematode species discussed here under, belong to seven subfamilies viz., Rhabditinae, Mesorhabditinae, Protorhabditinae, Peloderinae, Tricephalobinae, Cyatholaiminae and Wilsonematinae coming under four families viz., Rhabditidae, Panagrolaimidae, Cytholaimidae and Plectidae, which further belong to four superfamilies viz., Rhabdititoidea, Panagrolaimoidea, Cytholaimoidea and Plectoidea of four suborders.
Rhabditina, Cephalobina, Cytholaimina and Areaolaimina and **three orders**
Rhabditida, Chromadorida and Araeolaimida.

The Systematics positions of the genera and species, selected for the present
study are given hereunder:

**Order: Rhabditida** (Örley, 1880) Chitwood, 1933

**Suborder: Rhabditina** Chitwood, 1933

**Superfamily:** Rhabditoidea Örley, 1880

**Family:** Rhabditidac Örley, 1880

**Subfamily: Rhabditinae** Örley, 1880

1. **Genus:** *Cuticularia* Van Der Linde, 1938
   **Species:** *macrodentata* sp. n.

2. **Genus:** *Curviditis* (Dougherty, 1953) Andrássy, 1983
   **Species:** *longicaudata* sp. n.

3. **Genus:** *Curviditis* (Dougherty, 1953) Andrássy, 1983
   **Species:** *parilis* sp. n.

**Subfamily: Mesorhabditinae** Andrássy, 1976

1. **Genus:** *Distolabrellus* Anderson, 1983
   **Species:** *sudhausi* sp. n.

2. **Genus:** *Cruznema* Artigas, 1927
   **Species:** *uniquus* sp. n.
   Species: *andrassyi* sp. n.

**Subfamily: Protorhabditinae** Dougherty, 1955

   Species: *minutus* sp. n.

**Subfamily: Peloderinae** Andrássy, 1976

   Species: *sparsus* sp. n.

2. Genus: *Cirrorhabditis* gen. n.
   Species: *dimorpha* sp. n.

**Suborder: Cephalobina** Andrássy, 1974

**Superfamily: Panagrolaimoidea** Thorne, 1937

**Family: Panagrolaimidae** Thorne, 1937

**Subfamily: Tricephalobinae** Andrássy, 1976

   Species: *atypicus* sp. n.

   Species: *provulvus* sp. n.
**Order: Chromadorida** Chitwood, 1933

**Suborder:** Cyatholaimina De Coninck, 1965

**Superfamily:** Cyatholaimoidea Filipjev, 1918

**Family:** Cyatholaimidae Filipjev, 1918

**Subfamily:** Cyatholaiminae Filipjev, 1918

1. **Genus:** Achromadora Cobb, 1913

   **Species:** lacustris sp. n.

**Order: Araeolaimida** De Coninck and Schuurmans Stekhoven, 1933

**Suborder:** Araeolaimina De Coninck and Schuurmans Stekhoven, 1930

**Superfamily:** Araeolaimoidea De Coninck and Schuurmans Stekhoven, 1933

**Family:** Plectidae Örley, 1880

**Subfamily:** Wilsonematinae Chitwood, 1951

1. **Genus:** Neotylocephalus Cobb, 1913

   **Species:** inflatus (Yeates, 1967) Holovachov et al., 2002

**Community Analysis**

For a thorough survey and extensive sampling the park area was divided into three zones A, B and C and samples were collected each year from one zone. The division of the park area into these zones with different type of vegetation gave an
opportunity to study correlation between the substrata and nematode distribution patterns. For community analysis and biodiversity estimation, the freshly extracted nematodes were identified and counted up to generic level only, in view of the large number of juveniles present in samples. Counting was done thrice for each sample and finally the mean and standard errors calculated.

A rich nematode faunal diversity had been observed in the park with representation of every trophic group. The samples analysed for community analysis and biodiversity showed high variation in frequency and density of nematodes. About 2-13 genera of different trophic groups were identified per sample while the total number of individuals found in each sample ranged from 180-3260. Bacterivores showed greatest generic diversity with 36 genera, followed by predators (15 genera) and herbivores (14 genera). While Fungivores (6 genera) and algivores (2 genera) were least represented. Most prevalent nematode trophic group was that of omnivores (28%) followed by bacterivores (26%), whereas algivores were least frequent (6%). Among all genera of different trophic groups, Mesorhabditis (AF = 30.7%, RF = 13.9%) was most prevalent followed by Cephalobus, Dorylaimus and Chiloplacus. While Hofmaenneria, Monhystrella and Cruznema were least frequent bacterivore genera.

Of the samples of the three zones, ten genera with highest density were identified as Cephalobus, Mesorhabditis, Chiloplacus, Dorylaimus, Helicotylenchus, Hoplolaimus, Prismatolaimus, Eudorylaimus, Acrobeles and Tobrilus. The genera representing very few nematodes in the samples included Neoactinolaimus, Ditylenchus, Monhystrella Cirrorhabditis gen. n. and Hirschmaniella.

The bacterivores, omnivores and herbivores were ranked as first three groups with respect to Prominence Values. Zone A had the bacterivores taking a lead while omnivores were ahead in zone B and C. Herbivores remained the group with third
highest Prominence Value in all zones. *Cephalobus* dominated all genera in terms of Prominence Value and Relative Prominence Values while the other five prominent genera included *Mesorhabditis,* *Dorylaimus,* *Chiloplacus,* *Helicotylenchus,* *Prismatolaimus* and *Tobrilus.* Among bacterivores the other genera with high values were *Prismatolaimus* and *Acrobeles.*

Omnivores surpassed any other group in Total Biomass (TG) and reflected 87% of the total nematode biomass of the park. The representation of the predators, herbivores, bacterivores and fungivores in the total biomass was 6%, 4%, 2% and 1% respectively. The genus with the highest Total Biomass (TG) of individuals was found to be *Dorylaimus* ($1.78 \times 10^5 \mu g$).

The area of the park showed omnivores to be the most important trophic group with 40% importance value while other groups were less important e.g., bacterivores (18%), predators (16%), herbivores (14%), fungivores (7%) and algivores (5%). Among bacterivores, *Cephalobus* had the maximum Intensity (I) i.e., 13,600 individuals in thirty-nine samples followed by *Mesorhabditis* with 11,900 individuals in forty samples.

The dominant genera were *Cephalobus,* *Mesorhabditis,* *Chiloplacus,* *Dorylaimus* and *Helicotylenchus* while the genera found to be subdominants were *Hoplolaimus,* *Prismatolaimus,* *Acrobeles,* *Eudorylaimus,* *Tobrilus,* *Mesodorylaimus,* *Rhabdolaimus,* *Eucephalobus,* *Panagrellus,* *Panagrolaimus,* *Chronogaster* and *Cervidellus.* The remaining genera were recedents. The bacterivores dominated in species richness ($SR= 91.82\pm 7.61$), followed by predators ($34.39\pm 6.67$), herbivores ($33.20\pm 1.54$), omnivores ($21.33\pm 2.97$), fungal feeders ($10.61\pm 1.32$) and algal feeders ($2.00\pm 2.00$).

The Shannon index of diversity ($H'$) was calculated $2.83 \pm 0.09$ for bacterivores. The index values were found to be $2.13\pm 0.15,$ $2.03\pm 0.07$ and $1.02\pm 0.23$ for predators, herbivores, omnivores and fungal feeders respectively.
Simpson's index of dominance ($\lambda$) value was highest in algivores ($0.75\pm 0.25$) among all trophic groups, followed by fungivores ($0.43\pm 0.10$), omnivores ($0.32\pm 0.07$), predators and herbivores ($0.16\pm 0.02$) while Index of Shannon's equitability ($J$) ranged from 0.8-0.9 in different trophic groups. Calculated value of the Maturity Index (MI), an important pollution index, was found to be $2.64\pm 0.02$ while PPI values for plant parasites have been calculated $2.70\pm 0.34$. Nematode Channel Ratio (NCR) was calculated to be ($0.89\pm 0.03$) showing bacterial based decomposition pathway.