PREFACE

Copepods are very ancient arthropods and the diminutive relatives of crabs and shrimps. In terms of their size, diversity and abundance, they are often called “water fleas” in common with many other small Crustacea. Vast majority of copepods are confined to marine and brackish waters; only a small fraction of them inhabit freshwaters. Till now over 10,000 copepod species are known to science. Copepods are substantial primary and secondary consumers in aquatic food chains. They can be used as biological agents in mosquito control and for environmental monitoring purposes, both in the field and the laboratory. They also find practical application in aquaculture industry since they can be raised under laboratory conditions to a mass scale and used as live feed in nurseries. Most important, copepods can be used as ideal model organisms for any general biological approach. Their ubiquity makes them readily available.

The focal theme of this thesis concerns the study of morphology, taxonomy, ecology, biogeography, and conservation status of Indian diaptomid copepods, which constitute a major group of planktonic microcrustaceans in inland water bodies.

A perusal of the existing literature shows that there are about 470 diaptomid species in 59 genera in the world whereas the Indian tally is 45 species in 13 genera. No taxonomic work has been done on the Indian diaptomids since the description of Phylldiaptomus wellenkensae by Dumont & Ranga Reddy in 1993. Considering the fact that a good, constantly updated taxonomy is sine qua non for biodiversity studies and conservation measures, the present study has been undertaken. About 2000 plankton samples were collected from temporary and permanent ponds, roadside trenches, quarry pools, paddy fields, rivers and canals, particularly in peninsular India, during November 2002-October 2011. Analysis of these and some additional samples present in the Department of Zoology, Acharya Nagarjuna University, has yielded 25 diaptomid species
including three new species of the genus *Tropodiaptomus*. Additionally, another new species of the same genus from Nepal is described in the thesis. Morphology of all the species found in the present samples has been studied in detail, bestowing special attention on intraspecific variation. Morphological differences between the Indian species of six genera, viz. *Paradiaptomus*, *Heliodiaptomus*, *Allodiaptomus*, *Neodiaptomus*, *Phyllodiaptomus*, and *Tropodiaptomus* are tabulated. Dichotomous keys are also constructed for identifying the species of all the polytypic genera. For such of the Indian species that were not met in this study, diagnostic characters and figures are given based on published works. Biogeographic evolution and species richness of the Indian Diaptomidae are briefly discussed.

Another important consideration about diaptomids is that their existence is presently threatened by a host of anthropogenic activities. For example, the widespread hypertrophication process of inland waters, owing to increased nutrient enrichment, has become a widespread threat to their existence. This is because most diaptomids cannot tolerate the extremes of physico-chemical variables in hypertrophicated systems. Aquatic toxicology resulting from pesticides, herbicides, heavy metals, etc., is also implicated in the local extinction of certain diaptomids. Habitat destruction is yet another highly alarming cause of depletion of diaptomid species, especially those inhabiting temporary water bodies like ponds and pools. As a result, as many as 62 known diaptomid species in the world, which include 11 Indian species, have already been included in the 2000 IUCN Red List of threatened animals, as recommended by Species Survival Commission (SSC). Hence the conservation status of all the Indian diaptomid species is assessed based on the previous and present records, following IUCN criteria.

It is hoped that the data presented in this thesis and interpretations made thereon would pave way for a better understanding of the taxonomy, biogeography and biodiversity concerns of Indian diaptomid copepods.