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A STUDY ON THE CLADOCERAN FAUNA OF HYDERABAD AND ITS ENVIRONS, ANDHRA PRADESH

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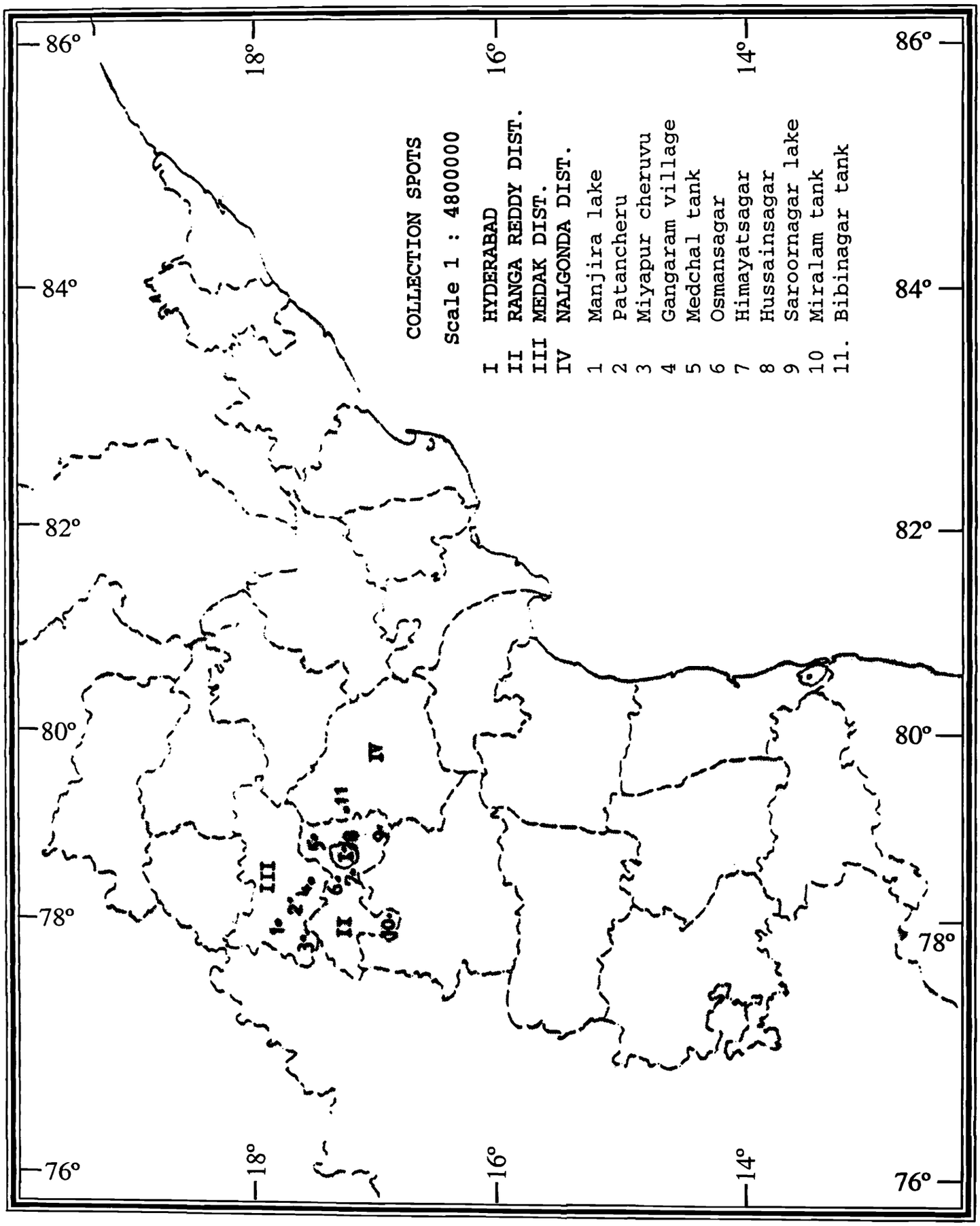
INTRODUCTION

Hyderabad, the historical city of lakes and gardens, can be called as 'Limnological capital of India', due to its sheer number of major and minor water bodies (approximately 170) in its metropolitan limits. The city of Hyderabad was founded on the bank of river Musi in the year 1591 AD by Sultan Mohd. Quli Qutubshah, the 5th ruler of Kutubsahi dynasty and today it is the 5th largest Metropolitan city in India. The Musi river flowing through the city is one of the major tributaries of the Krishna river. River Musi is heavily contaminated with domestic sewage and industrial effluents loaded with toxic chemicals and metals. The river traverses a distance of about 15 km through the heart of Hyderabad and lies between 17°21" to 17°24" N and 78°25" to 78°32" E. There is no regular flow of water in the river from the upstream due to the construction of two reservoirs like Osmansagar and Himayatsagar which are the major sources of supply of drinking water to the city.

Ahson Mohammed (1980), Jaya Devi (1985), Chandrasekhar (1997), Malathi (2002) made some of the major contributions on the ecological studies of the lakes in Hyderabad and its surroundings in which the composition of the cladoceran fauna was emphasized. Some major contributions on the cladoceran fauna in particular, of these water bodies have been confined to Patil (1986), Siddiqi and Chandrasekhar (1993), Chandrasekhar (1995, 1996 and 1998) and Chandrasekhar and Kodarkar (1994). Out of the 111 species available in India and 44 in Andhra Pradesh, 30 species have been reported from water bodies in and around Hyderabad.

Since, no comprehensive report on the cladoceran composition of the water bodies in and around Hyderabad, is available, the author has studied and reported here 30 species (including two subspecies) belonging to 17 genera spread over five families. The study had been carried out by the author from the plankton collections of the water bodies of Hyderabad and its neighborhood and also literature available in Freshwater Biological Station (FBS), Zoological Survey of India (ZSI), Hyderabad. These water bodies include Hussainsagar, Himayatsagar, Osmansagar, Mir Alam tank, Manjira lake, Patancheru tank, Saroornagar lake, Miyapur cheruvu, Gangaram village tank, Bibinagar tank, Medchal tank and some fish farms.

KEY WORDS : Cladocera, Water body, Environment, Hyderabad.


COLLECTION SPOTS
Scale 1 : 4800000
I HYDERABAD
II RANGA REDDY DIST.
III MEDAK DIST.
IV NALGONDA DIST.
1 Manjira lake
2 Patancheru
3 Miyapur cheruvu
4 Gangaram village
5 Medchal tank
6 Osmansagar
7 Himayatsagar
8 Hussainsagar
9 Saroornagar lake
10 Miralam tank
11. Bibinagar tank
86°
84°
82°
80°
78°
76°
18°
16°
14°

Map 1.

Hussainsagar : This lake situated between the twin cities of Hyderabad and Secunderabad, was excavated in 1562 AD mainly to store drinking water brought from Musi river by Balakpur canal. However, with the passage of time the lake lost its importance as a source of potable water. Nevertheless, it was extensively used for washing, bathing and recreation. The lake has got polluted due to industrialisation surrounding its basin and also urbanisation. Its water shed area is 275 sq km., length 3.2 km, width 2.8 km and maximum depth is 12.5m.

Himayatsagar : This water body was constructed in 1926 on the tributary of Musi river and its catchment (1,307 sq km) is made of rocky undulating ground. This water body is 19 km on the south-western side of the city. This is also one of the drinking water sources to the twin cities at present. Its surface area is 21 sq. km, maximum depth 23.9 m., length 7.8 km and width is 4.2 km.

Osmansagar : This reservoir built in 1920 on Musi river system was mainly to control floods and provide drinking water to the twin cities. This ecosystem is about 18 kms on western side of the city. This is one of the drinking water sources to the twin cities even today. This has scrub jungles and the forest of Anantagiri hills at its origin and aerable agricultural land along the course of the water body. Its catchment area is 740 sq km., surface area 22 sq km., maximum depth 31.7 m, length 8.8 km and width 5.1 km.

Mir alam tank : Constructed in 1806, was one of the oldest tanks created on Musi river system and the only multiarch (21 arches) dam of its kind in the world. It is about 7 km south-west of the city. The water body was used as a source of drinking water upto 1960 by the Rajendranagar surroundings. Presently the water has become the main source of water to the Nehru Zoological Park and its surroundings. Its surface area 1.7 sq km., maximum depth 13.41 m, and catchment area 16.5 sq km. The catchment is made of rocky undulating terrain.

Saroornagar lake : Impounded in 1626 AD Saroornagar lake was mainly meant for agricultural and drinking purposes and is one of the major aquatic ecosystems on the Vijayawada Highway in about 8 km on the eastern side of Hyderabad city. Its water spread area is 35 ha., maximum depth 6.1 m. Presently, due to growing urbanisation the catchment has undergone drastic changes with the consequent effects on the ecosystem. Scientifically speaking, the lake has got aquacultural, ecological and recreational potential.

Manjira lake : This water body is situated near the village, Kalabgur near Sangareddy town in Medak District of Andhra Pradesh and is about 58 km North-West side of Hyderabad city. After the construction of a barrage on Manjira lake near Sangareddy town in 1965, this has become a reservoir and one of the main sources of drinking water to the twin cities. Its catchment area is about 1680 sq km., maximum depth is 4.0 m approximately and the catchment area is about 1896 hectares.

Medchal Tank : This is an irrigation tank situated in Medchal Mandal of Ranga Reddy District, about 30 km. from Hyderabad city, on its north-west direction on Nagpur High way.

Patancheru, Miyapur tank and Gangaram Village tanks : These are small water bodies located at about 30–40 km. from Hyderabad city near its Mumbai High Way in Medak District. Bibinagar tank is also a small water body, situated at about 30 km. from Hyderabad city in Nalgonda district near Vijayawada High Way.

MATERIAL AND METHODS

The present study had been undertaken with the help of the plankton samples, collected since 1979 by the scientists of Freshwater Biological Station, Zoological Survey India, Hyderabad, available in the station and also from literature. In order to study the cladoceran fauna of the milieu, the author has limited the study to the collections of the water bodies located approximately with in 60 km. radius from the Centre point of Hyderabad city. These water bodies include Hussainsagar, Himayatsagar, Osmansagar, Mir alam tank, Patancheru tank, Saroornagar lake, Miyapur cheruvu, Gangaram village tank, Bibinagar tank, Medchal tank and some fish farms.

During the course of limnological investigations of water bodies of Hyderabad and its neighborhood, the scientists of Freshwater Biological Station (FBS), Zoological Survey of India (ZSI), Hyderabad, have collected since, 1979, some plankton samples and deposited in the National Zoological Collections of the station. These collections were made by towing the plankton net (No. 25) on the littoral zone of these water bodies and these plankton collections were preserved in 5% formaldehyde solution. The author had studied the cladoceran fauna from these samples with aid of standard literature on the group *viz.*, Michael and Sharma (1983), Battish (1992). A study on the cladoceran fauna of Hyderabad and its surroundings is given here from the results of this study as well as the available literature on the area.

LIST OF CLADOCERA IDENTIFIED

Family SIDIDAE Baird, 1850

Pseudosida bidentata Herrick, 1884

Material examined : Hussainsagar – 23.IV.92; Female; Coll. S. V. A. Chandrasekhar.

Status : Rare.

Length : 0.8 mm.

Distribution : INDIA : Burnihat, Nandalur and Karikal, Rajasthan.

Diaphanosoma sarsi Richard, 1894

Material examined : Patancheru – 9.III.1983; Female; Coll. S. G. Patil.

Osmansagar – 4.III.1992; Female; Coll. S. V. A. Chandrasekhar.

Status : Common.

Length : 0.33–0.9 mm.

Distribution : INDIA : Bihar, Rajasthan, Meghalaya and West Bengal.

Diaphanosoma excism Sars, 1885

Material examined : Manjira lake – Female; 26.XI,1981; Coll. M. B. Rao.
Hussainsagar – Female; 30.IV.1992; Coll. S. G. Patil.
Osmansagar – Female; 12.XI.1992; Coll. S. V. A. Chandrasekhar.

Status : Common.

Length : 0.27–0.79 mm.

Distribution : INDIA : West Bengal, Rajasthan and Bihar.

Family DAPHNIIDAE Straus, 1820

Ceriodaphnia cornuta Sars, 1885

Material examined : Manjira lake – Female; 4.VI.1981; Coll. M. B. Rao.
Patancheru – Female; 9.III.1983; Coll. S. G. Patil.
Osmansagar – Female; 12.XI.1992; Coll. S. V. A. Chandrasekhar.

Status : Abundant.

Length : 0.32–0.38 mm.

Distribution : Widely distributed species.

Ceriodaphnia reticulata (Jurine, 1820)

Material examined : Osmansagar – Female; 4.III.1992; Coll. S. V. A. Chandrasekhar.

Status : Uncommon.

Length : 0.75 mm.

Distribution : INDIA : Rajasthan and Bihar.

Ceriodaphnia laticaudata P. E. Muller, 1867

Material examined : Saroornagar lake – Female; 4.V.1995; Coll. S. V. A. Chandrasekhar.

Status : Rare.

Length : 0.65 mm.

Distribution : INDIA : Pune, Simla, Rajasthan.

Daphnia carinata King, 1853

Material examined : This species had not been observed in the collections of the station, but collected by Dr. Bhimachar on 20.X.1970 from Hyderabad fish farm (Michael and Sharma, 1988, p. 60).

Status : Rare.

Length : ?

Distribution : INDIA : Simla, Mysore, Banaras, Meerut and Surat, Rajasthan, Tamilnadu, Bihar and West Bengal.

Daphnia lumholtzi Sars, 1885.

Material examined : This species had not been observed in the collections of the station, but collected by Fisheries Extension Unit from Hyderabad fish seed farm and Brehm, 1953 found from Hyderabad (Michael and Sharma, 1988, p. 64-66); Date ?

Status : Uncommon.

Length : ?

Distribution : INDIA : West Bengal, Cuttack (Orissa), Hyderabad and Golconda (A. P.), Rajasthan, Tamilnadu.

Scapholeberis kingi Sars, 1903b

Material examined : This species had not been observed in the collections of the station, but found by Jaya Devi (1985) from Himayatsagar and Osmansagar lakes; Date ?

Status : Uncommon.

Length : ?

Distribution : INDIA : West Bengal, Kashmir & Nilgiri Hills, Rajasthan, Meghalaya and Assam.

Simocephalus vetulus (O. F. Muller, 1776)

Material examined : Manjira lake – Female; 4.VI.1981; Coll. M. B. Rao.

Hussainsagar – Female; 23.IV.92; Coll. S. V. A. Chandrasekhar

Status : Common.

Length : 0. 75–1.3 mm.

Distribution : INDIA : Punjab, Kashmir, Mysore, Bihar and West Bengal.

Family MOINIDAE

Moina micrura Kurz, 1874

Material examined : Manjira lake – Female; 13.I.1982; Coll. M. B. Rao.
Saroornagar lake – Female; 23.IV.1994; Coll. S. V. A. Chandrasekhar.

Status : Common.

Length : 0. 6–0.9 mm.

Distribution : INDIA : Nilgiri Hills, Bijapur, Rajasthan, Punjab, Bihar and West Bengal.

Moina brachiata (Jurine, 1820)

Material examined : Hussainsagar – Female; 23.IV.1992; Coll. S. V. A. Chandrasekhar.
Osmansagar – Female; 12.XI.1992; Coll. S. V. A. Chandrasekhar.
Saroornagar lake – Female; 23.IV.1994; Coll. S. V. A. Chandrasekhar.

Status : Common.

Length : 0.29–0.75 mm.

Distribution : INDIA : Kashmir, Rajasthan and Meghalaya.

Moinodaphnia macleayi (King, 1853)

Material examined : Osmansagar – Female; 4.III.1992; Coll. S. V. A. Chandrasekhar.
Hussainsagar – Female; 23.IV.1992; Coll. S. V. A. Chandrasekhar.

Status : Rare.

Length : 0.3–0.8 mm.

Distribution : INDIA : South India and West Bengal.

Family MACROTHRICIDAE Norman and Brady, 1867

Macrothrix spinosa King, 1853

Material examined : Miyapur cheruvu and Gangaram village – Females; 2.III.1983; Coll. S. G. Patil.
Hussainsagar – Females; 23.IV.1992; Coll. S. V. A. Chandrasekhar.

Status : Uncommon.

Length : 0.45–0.9 mm.

Distribution : INDIA : Rajasthan and Manipur.

Streblocerus serricaudatus (Fischer, 1849)

Material examined : Mir alam tank – Female; 18.IX.1982; Coll. S. G. Patil.

Osmansagar – Female; 4.III.1992; Coll. S. V. A. Chandrasekhar.

Status : Uncommon.

Length : 0.5–0.8 mm.

Distribution : INDIA : Rajasthan and Manipur.

Family CHYDORIDAE Stebbing, 1902

Subfamily CHYDORINAE Stebbing, 1902

Pleuroxus aduncus (Jurine, 1820)

Material examined : Manjira lake – Female; 13.I.1982; Coll. S. G. Patil.

Jaya Devi (1985) collected from Himayatsagar and Osmansagar lakes.

Status : Uncommon.

Length : 0.24 mm.

Distribution : INDIA : Punjab and Rajasthan.

Alonella excisa (Fischer, 1854)

Material examined : Himayatsagar – Female; 10.VIII.1990; Coll. A. K. Pandey.

Status : Rare.

Length : 0.39 mm.

Distribution : INDIA : Madhya Pradesh and Kashmir.

Alonella nana (Baird, 1843)

Material examined : Himayatsagar – Female; 10.VIII.1990; Coll. A. K. Pandey.

Status : Rare.

Length : 0.45 mm.

Distribution : INDIA : Kashmir.

Chydorus sphaericus (O. F. Muller, 1776)

Material examined : Manjira lake – Female; 26.XI.1981; Coll. M. B. Rao.

Osmansagar – Female; 4.III.1992; Coll. S. V. A. Chandrasekhar.

Status : Common.

Length : 0.2–0.45 mm.

Distribution : INDIA : Kashmir.

Chydorus parvus (Daday, 1898)

Material examined : Himayatsagar – Female; 10.VIII.1990; Coll. A. K. Pandey.

Status : Uncommon.

Length : 0.45 mm.

Distribution : INDIA : Irinjalayakuda, Kerala; Chennai and Kolleru lake from Andhra Pradesh.

Chydorus reticulatus Daday, 1898

Material examined : Bibinagar tank – Female; 10.III.1983; S. G. Patil.
Jaya Devi (1985) collected from Himayatsagar and Osmansagar lakes.

Status : Rare.

Length : 0.28 mm.

Distribution : INDIA : Rajasthan and Hyderabad.

Subfamily ALONINAE

Alona quadrangularis (O. F. Muller, 1776)

Material examined : Medchal tank – Female; 12.I.1990; Coll. Ramakrishna.

Status : Rare.

Length : 0.72 mm.

Distribution : INDIA : Kali Pokhri, West Bengal and South India.

Alona rectangula rectangula Sars, 1862

Material examined : Mir alam tank – Female; 18.X.1982; Coll. S. G. Patil.
Osmansagar – Female; 4.III.1992; Coll. S. V. A. Chandrasekhar.

Status : Uncommon.

Length : 0.31–0.36 mm.

Distribution : INDIA : Ladakh, Gujarat, Rajasthan, Meghalaya, Kashmir and West Bengal.

Alona rectangula richardi (Stingelin, 1895)

Material examined : Manjira lake – Female; 4.VI.1981; Coll. M. B. Rao.
Saroornagar lake – Female; 27.XI.1994; Coll. S. V. A. Chandrasekhar.

Status : Common.

Length : 0.24–4.0 mm.

Distribution : INDIA : West Bengal.

Alona davidi davidi (Richard, 1895)

Material examined : Manjira lake – Female; 26.XI.1981; Coll. M. B. Rao.

Status : Rare.

Length : 0.2 mm.

Distribution : INDIA : West Bengal.

Alona davidi punctata (Day, 1898)

Material examined : Manjira lake – Female; 4.VI.1981; Coll. S. V A. Chandrasekhar.

Status : Uncommon.

Length : 0.23 mm.

Distribution : INDIA : West Bengal.

Alona pulchella King, 1853

Material examined : Saroornagar lake – Female; 20.XII.1984; Coll. Uday Vaikunth.

Status : Rare.

Length : 0.36 mm.

Distribution : INDIA : West Bengal.

Graptolebris testudinaria (Fischer, 1851)

Material examined : Himayatsagar – Female; 10.VIII.1990; Coll. A. K. Pandey.

Status : Rare.

Length : 0.72 mm.

Distribution : INDIA : Kashmir and Kumaon (Western Himalaya).

Biapertura affinis (Leydig, 1860)

Material examined : Manjira lake – Female; 13.I.1982; Coll. M. B. Rao.

Status : Uncommon.

Length : 0.23 mm.

Distribution : INDIA : Kashmir, Gujarat and West Bengal.

Kurzia longirostris (Daday, 1898)

Material examined : Medchal tank – Female; 12.I.1990; Coll. Ramakrishna.

Status : Rare.

Length : 0.4 mm.

Distribution : INDIA : West Bengal.

Among the above 30 species, Brehm (1953) first recorded *Moinodaphnia macleayi* as rare species in India. *Streblocerus serricaudatus, Alonella excisa, A. nana, Alona rectangula rectangula, A. rectangula richardi, A. davidi davidi, A. davidi punctata, A. pulchella* and *Graptolebris testudinaria* have extended their distribution to South India. The relative abundance of cladocerans, particularly the members of Chydoridae indicates the eutrophic conditions of a water body, resulting from organic pollution (Khan and Seshagiri Rao, 1981). According to Das (1989) *Chydorus sphaericus* and *Simocephalus* sp., are the chief representatives of Oligotrophic lakes and the presence of genera *viz.*, *Daphnia, Moinadaphnia, Ceriodaphnia* and *Diaphanosoma* indicates eutrophic state. By going through the cladoceran composition, most of these lakes can be classified as eutrophic.

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SUMMARY

The author has made studies on the cladoceran fauna of Hyderabad and its environs with the aid of plankton collections from the water bodies (Hussainsagar, Himayatsagar, Osmansagar, Mir alam tank, Patancheru tank, Saroornagar lake, Miyapur cheruvu, Gangaram village tank, Bibinagar

tank, Medchal tank and some fish farms) and also from the literature available. The study revealed 30 species (including two subspecies) belonging to 17 genera spread over five families of Cladocera from the environment, available at FBS, ZSI, Hyderabad. Details of material examined, status, Distribution ... *etc.*, have been discussed.

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