

Lecanid rotifers (Rotifera: Monogononta: Lecanidae) from North-Eastern India

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Abstract

Thirty-five species of the family Lecanidae are examined from Tripura state in North-Eastern India. Of these, *Lecane levistyla* and *L. scutata* are interesting cold-water forms; *L. batillifer* is an Australasian element; *L. acanthinula* and *L. sinuata* are Oriental endemics and *L. braumi*, *L. lateralis* and *L. simonneae* are palaeotropical species. The lecanid fauna also includes the pantropical *L. thienemanni* and *L. sola* while the remainder are cosmopolitan and tropicopolitan elements.

Introduction

The Lecanidae, an important family of the monogonont rotifers, are significant to the biogeography of the Rotifera (De Ridder, 1981; De Manuel, 1994; Dumont, 1983; Segers, 1993, 1995, 1996). They are a dominant component of littoral Rotiferan assemblages in India (Sharma, 1991). However, these are still inadequately studied in the North-Eastern region in particular. Sharma (1987a) documented only thirty species of lecanids from this region.

The present study, an attempt to fill up this lacuna, deals with thirty-five species of the genus *Lecane* from Tripura State. Some rare and interesting species are reported and briefly described. Comments are made on the composition of the examined taxocoenosis and on the distribution of various species.

Material and methods

Our observations were based on about 150 samples collected from different localities (Figure 1A–C) in Tripura (Long. 91° 10'–92° 20' E; Lat. 22° 57'–24° 22' N), North-Eastern India. The sampled tropical aquatic biotopes (altitude: 200–600 m asl) ranged from roadside ditches, paddy fields, ponds and swamps to lakes,

with pH and specific conductivity ranging between 6.5–7.8 and 110–285 $\mu\text{S cm}^{-1}$ respectively. The collections were obtained by a nylobolt plankton net (No. 25) and preserved in 5% formalin. Species were isolated with a Wild M 8 stereoscopic binocular microscope and mounted in Polyvinyl alcohol–lectophenol mixture. Drawings were made with a Leitz–Dialux phase contrast microscope using a drawing-tube attachment. All measurements are given in micrometers (μm).

List of species

- Lecane acanthinula* (Hauer, 1938)
- L. aculeata* (Jakubski, 1912)
- L. batillifer* (Murray, 1913)
- L. braumi* Koste, 1988
- L. bulla* (Gosse, 1851)
- L. crepida* Haring, 1914
- L. curvicornis curvicornis* (Murray, 1913)
- L. curvicornis f. nitida* (Murray, 1913)
- L. closterocerca* (Schmarda, 1859)
- L. hamata* (Stokes, 1896)
- L. hastata* (Murray, 1913)
- L. hornemanni* (Ehrenberg, 1834)
- L. inermis* (Bryce, 1892)
- L. inopinata* (Haring & Myers, 1926)

L. lateralis Sharma, 1978
L. levistyla (Olofsson, 1917)
L. leontina (Turner, 1892)
L. ludwigi (Eckstein, 1883)
L. luna (Müller, 1773)
L. lunaris (Ehrenberg, 1832)
L. monostyla (Daday, 1893)
L. nana (Murray, 1913)
L. obtusa (Murray, 1913)
L. ohioensis (Herrick, 1885)
L. papuana (Murray, 1913)
L. pertica Harring & Myers, 1926
L. pyriformis (Daday, 1905)
L. quadridentata (Ehrenberg, 1832)
L. scutata (Harring & Myers, 1926)
L. signifera signifera (Jennings, 1896)
L. signifera f. *ploenensis* (Voigt, 1902)
L. sinuata (Hauer, 1938)
L. simmonneae Segers, 1993
L. sola Hauer, 1936
L. thienemanni (Hauer, 1938)
L. unguitata (Fadeev, 1925)
L. ungulata (Gosse, 1887).

Taxonomic notes

Lecane braumi Koste, 1988 (Figure 2).

New record for India. Only two specimens are obtained from a paddy-field in Kailashahar (North Tripura); they resembled those reported from Papua New Guinea (Segers & De Meester, 1994).

Measurements: Length dorsal plate: 150–152; width dorsal plate: 130–132; length ventral plate: 168–172; width ventral plate: 138–140; toes: 66–68; claws: 12–14.

Lecane lateralis Sharma, 1978 (Figures 3 and 4).

New for North-Eastern India. Five specimens examined from a pond in Agartala (West Tripura) are larger in size and have broader anterior and than specimens from the type – locality in West Bengal (Sharma, 1978).

Measurements: Length dorsal plate: 158–160; width dorsal plate: 130; length ventral plate: 150–152; width ventral plate: 138–140; anterior width: 70–72; toes: 55; claws: 15.

Lecane levistyla (Olofsson, 1917) (Figures 5 and 6).

New record for India. Only two specimens examined from a paddy-field in Teliamura (West Tripura) agreed with the details given by Koste (1978).

Measurements: Length dorsal plate: 95–97; width dorsal plate: 92–94; length ventral plate: 108–110; width ventral plate: 68–72; toes: 38–40.

Lecane simonneae Segers, 1993 (Figures 7 and 8).

This species is often confused with *L. rhytida* but can be differentiated from the latter by its robust foot pseudosegment and shape of the toes. Four specimens, collected from a road-side ditch in Kailashahar (N. Tripura), are identical with those examined from South India (Segers et al., 1994).

Measurements: Length dorsal plate: 90–92; width dorsal plate: 68–70; length ventral plate: 105–107; width ventral plate: 65–68; toes: 50.

Lecane sola Hauer, 1936 (Figures 9 and 10).

New report for North-Eastern India. A single specimen collected from a road-side ditch, Kailashahar (North Tripura) agreed with the description given by Hauer (1936).

Measurements: Length dorsal plate: 60; width dorsal plate: 62; length ventral plate: 70; width ventral plate: 55; toes: 26.

Lecane acanthinula (Hauer, 1938) (Figures 11 and 12).

New record for North-Eastern India. Only two specimens examined from a paddy-field, Udaipur (South Tripura) agreed with the recent report from Kerala (Segers et al., 1994).

Measurements: Length dorsal plate: 60; width dorsal plate: 62; length ventral plate: 70; width ventral plate: 52; toe: 22; claws: 8.

Lecane batillifer (Murray, 1913) (Figures 13–16).

New record for India. The examined material from Dharamnagar (North Tripura) included five specimens from a pond and nine specimens from Chandrapur lake.

Measurements: Length dorsal plate: 72–80; width dorsal plate: 59–74; length ventral plate: 83–91; width ventral plate: 52–68; toe: 29–32.

Lecane monostyle (Daday, 1893) (Figures 17 and 18).

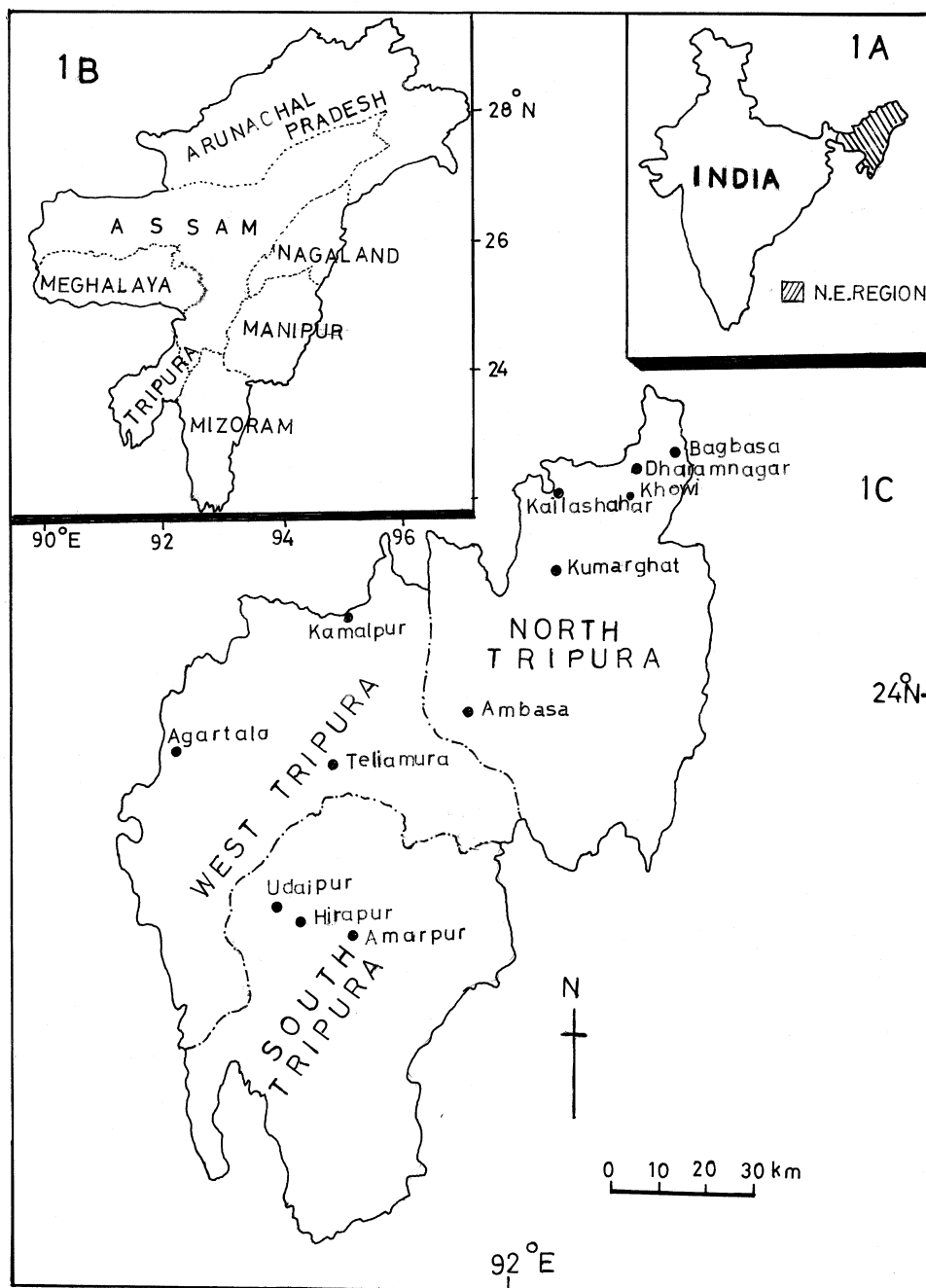


Figure 1. (A) Map of India showing North-Eastern Region; (B) Different states of North-Eastern India; (C) Map of Tripura State showing various sampling sites.

New record for North-Eastern India. Single specimen collected from a paddy-field in Khowai (West Tripura) agreed with the report by Koste (1978). It was listed recently as a new report from Kerala, South India

(Segers et al., 1994).

Measurements: Length dorsal plate: 50; width dorsal plate: 52; length ventral plate: 62; width ventral

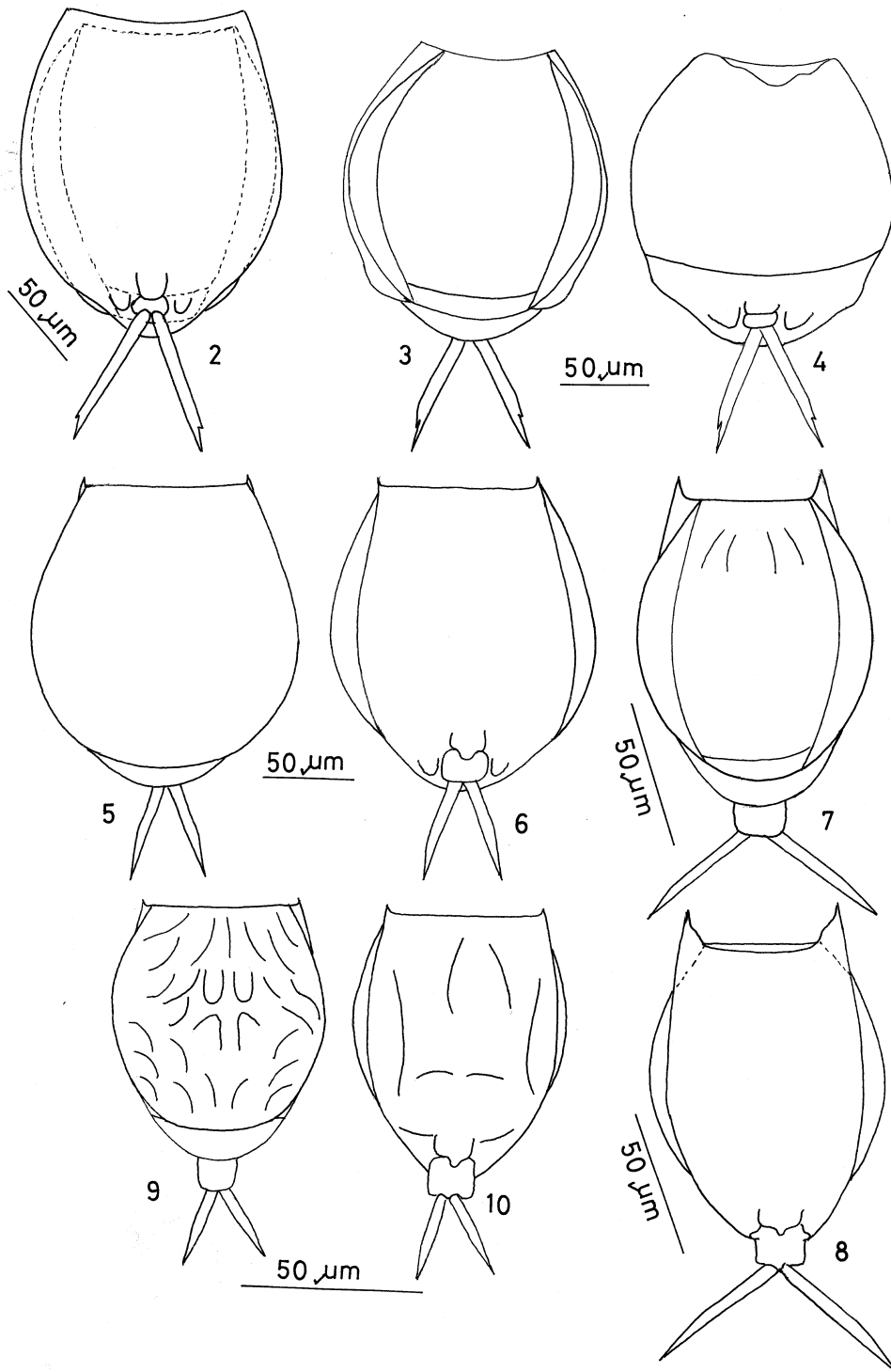
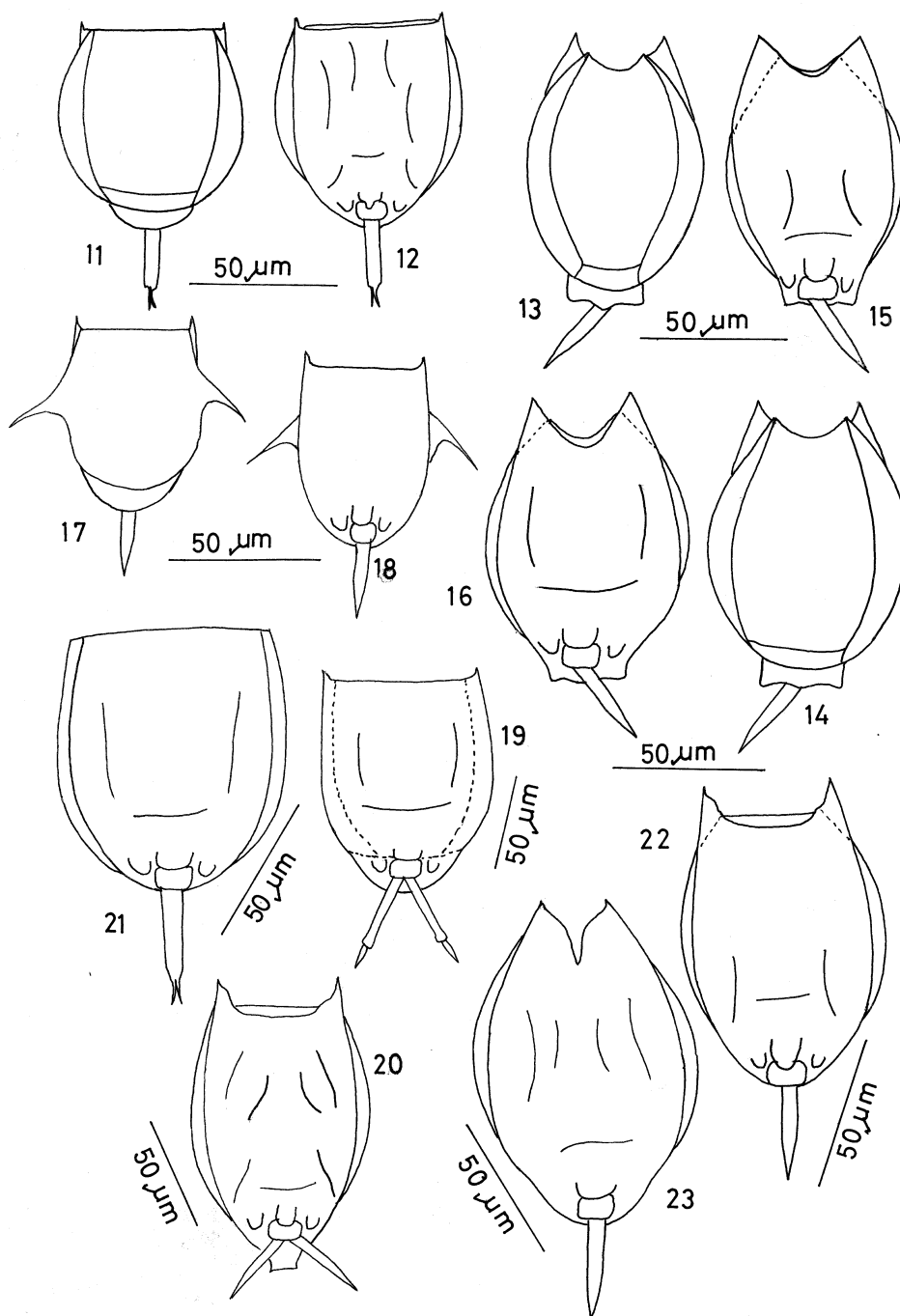


Figure 2. *Lecane braumi* Koste, ventral view; Figures 3 and 4: *L. lateralis* Sharma, dorsal and ventral views; Figures 5 and 6: *L. levistyla* (Olofsson), dorsal and ventral views; Figures 7 and 8: *L. simonneae* Segers, dorsal and ventral views; Figures 9 and 10: *L. sola* Hauer, dorsal and ventral views.



Figures 11 and 12. *Lecane acanthinula* (Hauer), dorsal and ventral views; Figures 13 and 14: *L. batillifer* (Murray), dorsal views; Figures 15 and 16: *L. batillifer*, ventral views; Figures 17 and 18: *L. monostyla* (Daday), dorsal and ventral views; Figure 19: *L. hastata* (Murray), ventral view; Figure 20: *L. ohioensis* (Herrick), ventral view; Figure 21: *L. obtusa* (Murray), ventral view; Figure 22, *L. thienemanni* (Hauer), ventral view; Figure 23: *L. sinuata* (Hauer), ventral view.

plate: 48; toe: 26.

Other species

These include *Lecane hastata* (Figure 19), *L. Ohioensis* (Figure 20) and *L. obtusa* (Figure 21) as new records for North-Eastern India. *L. thienemanni* (Figure 22) and *L. sinuata* (Figure 23) are other interesting species noticed in this study.

Discussion

Thirty-five species (37 taxa) from Tripura State (N.E. India) indicate a fairly rich and diversified taxocoenosis. Three species i.e., *Lecane batillifer*, *L. braumi* and *L. levistyla* are additions to the Indian Rotifera. Eleven species are new records from North-Eastern India. As a result, forty-one lecanid species are now known from this region.

Cosmopolitan and tropicopolitan elements are significant (68.6%) and represented by twelve species each. The remainder belongs to five zoogeographical groups (*sensu* Segers, 1996). The first group includes two interesting cold-water species namely *L. levistyla* and *L. scutata*. The former is a first record outside the Holarctic region. The latter, an arctic – temperate element (Segers *loc cit.*), has been reported earlier (Sharma, 1987a) from Meghalaya (N.E. India). The distribution of these Northern Hemisphere lecanids in North-Eastern region is hypothesized to the Himalayan mountain ranges and to unique location of this region in the Indo-chinese subdivision of the Oriental region.

The second group includes an Australasian element i.e., *Lecane batillifer* which is so far known from Australia (Murray, 1913; Koste & Shiel, 1990), China (Wang, 1961) and Thailand (Segers & Sanoamuang, 1994; Sanoamuang et al., 1995). *L. acanthinula* and *L. sinuata*, members of the third group, are typical Oriental elements. The former was described from Indonesia (Hauer, 1938), rediscovered from Oman (Segers & Dumont, 1993) and examined recently (Segers et al., 1994) from Delhi, North-Western India. The present report, second from this country, extends its distributional range to North-Eastern region.

The fourth interesting group (*vide* Segers, 1996) includes three palaeotropical species. Of these, *Lecane lateralis* was described from West Bengal (Sharma, 1978), subsequently reported from Orissa (Sharma, 1987b) and was believed to be an endemic species (Sharma, 1991). It has, however, been recently reported from Papua New Guinea (Segers & De Meester,

1994) and Thailand (Sanoamuang, personal communication) and is, therefore, distributed in tropical and subtropical regions of the Old World. *L. braumi*, another example of this group, has so far been recorded from Indonesia, Nigeria and Papua New Guinea (Segers & De Meester, *loc cit.*). *L. simonneae* is the third palaeotropical species. This was believed to be an endemic to the flood-plain of the river Niger (Segers et al., 1993) but has recently been examined from South India (Segers et al., 1994). The present study exhibits its second report from this country.

The pantropical *L. thienemanni* and *L. sola* belong to the last distributional group. The latter was described from Almati lake, Madras (Hauer, 1936) and reported from Gujarat (Wulfert, 1966) but Wulfert's specimens did not confirm with Hauer's description. Hence, the present study is the second report of this rare lecanid from India which in turn, is known from the Oriental and Neotropical regions (Segers, 1996).

Lecane monostyla, a warm-stenothermal cosmopolitan element (Maas et al., 1995) exhibits the second record from India and it has recently been reported from Kerala (Segers et al., 1994). The tropicopolitan *L. hastata*, *L. ohioensis* and *L. obtusa* are new records for North-Eastern region. In addition, *L. pertica*, *L. curvicornis* f. *nitida* and *L. scutata* are lecanids of regional distributional interest and are till now reported only from North-Eastern India (Sharma, 1987a).

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