



Extended Distribution of Two Species of Testate Amoebae (Tubulinea: Centropyxidae) to Indian Fauna

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Author's contribution

The sole author designed, analyzed, interpreted and prepared the manuscript.

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ABSTRACT

Testate amoebae are a group of unicellular free-living protozoa which are characterized by morphologically distinct shells (tests) which play an important role in the natural ecosystems as bio-indicators. This communication reports 2 new additions of moss inhabitant testate amoebae viz., *Centropyxis lata* Jung, 1942 and *Centropyxis longispina* Decloitre, 1979 to Indian testate fauna from Sholayar forest reserve, Kerala and Singalila National Park, West Bengal.

Keywords: Moss; protozoa; testate amoebae; new records; Kerala; West Bengal.

1. INTRODUCTION

Testate amoebae are an extremely diverse group of phylogenetic eukaryotic microorganisms

characterized by the presence of an outer test. They inhabit marine and freshwater habitats, mosses, and soils. The test, formed from secreted organic or inorganic material or

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assembled from ingested particles, serves as an important taxonomic character, especially when used in taxonomy of species since it can be living and fossilized, and as a result is relevant to the diagnostics and classification of the species (Charman, 2001). The genus *Centropyxis* is a morphologically diverse group of testate amoebae in the family Centropxyidae. This unicellular eukaryote has a test that is normally oval, circular, or pear-shaped and is commonly made of organic material embedded with mineral particles or diatoms picked from its surrounding (Chardez, 1965; Meisterfeld, 2002). They adapt to different ecological niches owing to the variation in morphology and composition of the tests, allowing them to survive in varying habitat conditions (Smith *et al.*, 2008). This genus is well represented in acidic and oligotrophic environments, where it also plays a role in nutrient cycling and organic matter decomposition (Payne and Mitchell, 2011). The present communication reports two species of testate amoebae viz., *Centropyxis lata* Jung, 1942 and *Centropyxis longispina* Decloitre, 1979 as new additions to Indian testate fauna.

2. MATERIALS AND METHODS

The samples examined for the above cited species were collected from the moss habitats of Sholayar forest reserve, Kerala and Singalila National Park, West Bengal. Moss samples from Sholayar Forest reserve was provided by Kerala Forest Research Institute, Kerala and from Singalila National Park samples were obtained from Zoological Survey of India, Head Quarters, Kolkata. Moss samples (100-200gms.) from tree barks were collected by scraping the upper surface by quadrant sampling (1m²) and brought to the laboratory in polythene envelopes. The samples were cultured and processed in the lab with non-flooded petri dish method as described by (Foissner, 1992) and examined under the compound microscopes Nikon 50i and Leica DM 2000 for species level identification. Permanent slides were prepared for the identified specimens and deposited in the National Zoological collections of two regional centres of Zoological Survey of India viz., Marine Biology Regional Centre, Chennai, Tamil Nadu and Western Ghat Regional centre, Kozhikode, Kerala.

3. RESULTS

The details of new additions of testate species to India are provided below.

Phylum Tubulinea Smirnov *et al.*, 2005
Class Elardia Kang *et al.*, 2017
Order Arcellinida Kent, 1880
Family Centropxyidae Jung, 1942
Genus *Centropyxis* Stein, 1857

Test mostly discoid, membranous and encrusted with foreign particles or covered with sandy material, dorso-ventrally flattened, swollen at posterior portion and tapering towards apertural region, aperture eccentric, typically invaginated without a raised rim. At the posterior end or all around the periphery some spines may be present.

3.1 Description of Species

1. *Centropyxis lata* Jung, 1942 (Fig.1)

Material examined: Reg. No. INV.28743, 2 examples; date of collection, 31.xii.2021 (10.572°N and 76.5703°E); Tree moss, Sholayar Forest Reserve, Kerala.

3.2 Diagnostic Characters

Test large in size, coarse-scaled, embedded with a mix of diatoms and coarse materials; test is broad and tapering towards the posterior end, pseudostome large, ventral side mostly steeply sloping over the inner, pseudostomal edge is irregular, lip margin quite wide, covered with relatively thick plates. Length of the shell is 105-120 µm and width 86-96 µm.



Fig.1. *Centropyxis lata* Jung, 1942

2. *Centropyxis longispina* Decloitre, 1979 (Fig.2)

Material examined: Reg. No. Mi.886, 2 examples; date of collection, 10.iv.2019

(27.0653°N and 88.0016°E); Tree moss, Singalila National Park, West Bengal.

3.3 Diagnostic Characters

Test dark in colour, built of dark xenosomes, with thick cement; pseudostome almost semi-circular; spines are thin and very long, hollow, and placed irregularly on very different positions. Some spines are straight and some are slightly curved. Test spherical and slightly flattened in the apertural region. Test length is 46µm and spine length is 80-90 µm.



Fig. 2. *Centropyxis longispina* Decloitre, 1979

4. DISCUSSION

“The present communication reports the extended distributional range of two species of testate amoebae under the genus *Centropyxis* Stein, 1857 viz., *Centropyxis lata* Jung, 1942 and *Centropyxis longispina* Decloitre, 1979 to Indian testate fauna from Kerala and West Bengal respectively. Perusal of literature shows that 23 species under the genus *Centropyxis* have already been reported from various states of India” (Bindu *et al.*, 2014; Bindu, 2013; Bindu, 2019; Bindu, 2023; Bindu *et al.*, 2024; Chattopadhyay and Das, 2003; Das *et al.*, 1993; Das *et al.*, 1995; Das *et al.*, 2000; Nair *et al.*, 1971). “The present study adds 2 more species to the Indian testate fauna. There is difficulty with several groups of individuals which shared common features and thus some of the species are synonymised. Decloitre described *Centropyxis longispina* as *Centropyxis spinosa* in 1956 but this name was already preoccupied and in 1979 Decloitre changed the name to *longispina*. Even slight variations in the shell shape have resulted in the establishment of new

forms or species regardless of the range of variability that individual taxon exhibits. Intensive studies on testate amoebae in India initiated only in the 2nd half of the 20th century. The total number of testates in India is 209 as per the recent check list published by Zoological Survey of India” (Bindu *et al.*, 2024). Testate amoebae’s importance in monitoring ecosystem dynamics and environmental changes speaks to their remarkable utility. Their full ecological understanding and evolutionary history remain unsolved problems especially in the understudied countries like India. Studies should be made in a wide spectrum and more workers should come forward to explore the actual diversity of testate fauna in India.

5. CONCLUSION

The present communication reports two species of testate amoebae viz., *Centropyxis lata* Jung, 1942 and *Centropyxis longispina* Decloitre, 1979 are new records to Indian testate fauna. Intensive studies are required to explore the rich testate diversity in India.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (Chat GPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

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COMPETING INTERESTS

Author has declared that no competing interests exist.

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