

A new record of *Choroterpes (Euthraulius) latus* Kluge *et al.*, 2022 (Ephemeroptera: Leptophlebiidae) from the state of Jharkhand, India

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Abstract

This study contributes to the ongoing exploration of mayfly diversity in India by reporting a new record of *Choroterpes (Euthraulius) latus* Kluge *et al.*, 2022. Fresh larval collections were made from the streams and rivers of Jharkhand, India, expanding the known distribution of this species in the country. Additionally, the distribution map of this species in India is also provided.

Keywords: *Choroterpes*, Jharkhand, Larva, Mayfly, New Record

Introduction

The genus *Choroterpes* Eaton, 1881 comprises six subgenera, including *Euthraulius* s.l., which is distributed across Africa, Asia, and Europe, primarily in tropical regions, and is restricted to the Old-World areas of the Ethiopian and Oriental realms (Kluge *et al.*, 2022). Recent research in northern India has identified only two species within the subgenus *Choroterpes* s. str.: *Ch. (C.) kaegies* Selvakumar, Subramanian & Chandra, 2017 (Selvakumar *et al.*, 2017) and *Ch. (C.) girigangaensis* Kubendran & Vasanth, 2022 (Kubendran *et al.*, 2022). The subgenus *Euthraulius* Bernard, 1932 has been comprehensively reviewed concerning Indian *Euthraulius* species, and a junior synonym of *Monochoroterpes* Kluge & Jacobus, 2015 was transferred to *Euthraulius* due to the absence of ventral lamellae (Kluge *et al.*, 2022). Additionally, five new species have been described, along with one unnamed species from Mumbai, identified based on a single larva.

Currently, the subgenus *Euthraulius* includes 30 known species and one unnamed species worldwide. In India, eight known species and one unnamed species have been recorded so far. These include: *Choroterpes*

(*E.*) *parvulus* (Gillies, 1951), described based on imago from West Bengal; *Ch. (E.) alagarensis* (Dinakaran *et al.*, 2009), based on both larva and imago (Kluge *et al.*, 2022); *Ch. (E.) armillatus*, also based on larva and imago (Kluge *et al.*, 2022) from Udupi, Karnataka; *Ch. (E.) latus*, described from larva and imago (Kluge *et al.*, 2022) from Madurai, Tamil Nadu; *Ch. (E.) atelobranthis*, based on larva and imago (Kluge *et al.*, 2022) from Theni, Tamil Nadu; *Ch. (E.) unicolour*, based on larva and imago (Kluge *et al.*, 2022) from Udupi, Karnataka; *Ch. (E.)* sp. from Mumbai, based on larva and male subimago (Kluge *et al.*, 2022); *Ch. (E.) nambiyarensis*, described by Selva Kumar *et al.* (2013), based on larva and imago from the Southern Western Ghats (Kluge *et al.*, 2022); *Ch. (E.) angustifolius*, described based on larva and imago (Kluge *et al.*, 2022); and *Ch. (E.) nandini*, described by Selvakumar (2015) *et al.* (2015), based on larva and imago (Kluge *et al.*, 2022). In the present study, we report *Ch. (E.) latus* Kluge *et al.*, 2022 from the state of Jharkhand, India. The findings highlight the ecological significance of mayflies in freshwater ecosystems and underscore the need for further research to document the diversity and distribution of aquatic insects in India.

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Materials and Methods

Larval materials were collected from the streams of Surguja district, Jharkhand during an expedition conducted by the Zoological Survey of India. The larvae were collected by hand-picking, employing a fine brush, and subsequently preserved in 95% ethanol. Permanent mounts were prepared in Hoyer's medium and sealed with Canada Balsam to facilitate meticulous microscopic observations. The materials underwent examination, and photographs were captured using a Leica M205A stereo zoom microscope and a Leica D3000 microscope, accompanied by ZB montage software. Plates were produced utilizing Adobe Photoshop CS6. The type materials are deposited at the Southern Regional Centre (SRC) of the Zoological Survey of India (ZSI), Chennai, India.

Results

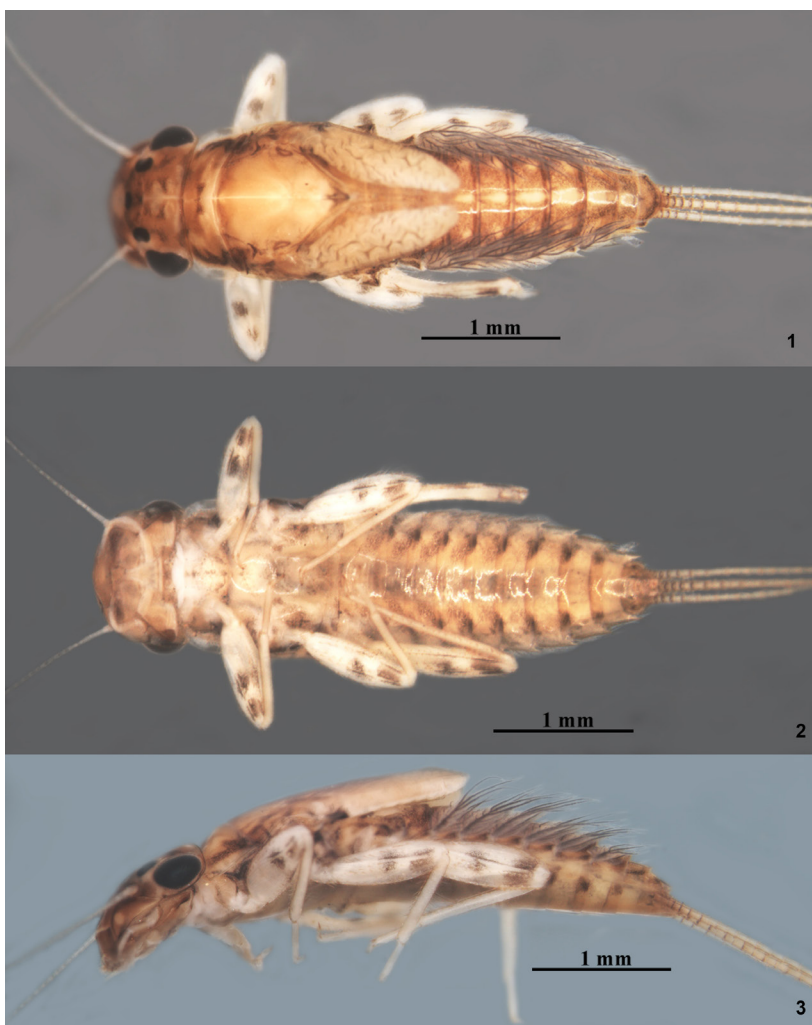
Choroterpes (Euthraulius) latus Kluge, Srinivasan, Vasanth, Sivaruban, Barathy & Isak, 2022 (*E. latus* Kluge, Srinivasan, Vasanth, Sivaruban, Barathy & Isak, 2022)

Material examined: 8 larvae, India, Jharkhand, Surguja District, Aurajhariya waterfall, 23.65641 N, 83.64483 E, Alt. 471 m. 25.x.2021, Coll. Ravi K. Kushwaha & party.

Mature larva (Figures 1-3). *Length:* body 4.8-5.2 mm; antennae 2.0-2.2 mm; cerci 7.0-7.5 mm; terminal filament, 6.0-6.5 mm.

Distribution: India (southern Western Ghats, Jharkhand shown in Figure 4) and Sri Lanka.

Diagnosis: *Ch. (E.) latus* Kluge et al. 2022 can be distinguished from all other known species by the



Figures 1-3. Larva of *Ch. (E.) latus* 1. Dorsal view; 2. Ventral view; 3. Lateral view.

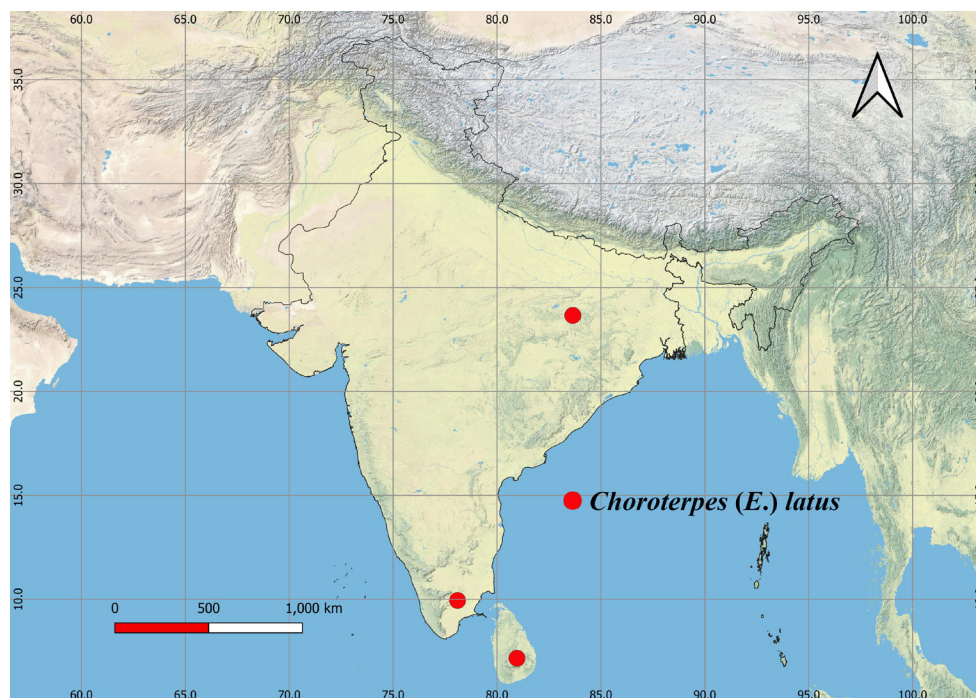


Figure 4. Distribution map of *Ch. (E.) latus* in India

following combination of characters: 1. Abdominal terga broadened and shortened of anterior part; 2. Emargination of labrum shallowly cleft with 5 blunt denticles medially; 3. Hypodermal colouration of abdominal terga; 4. maxillae with 10 comb-like setae, inner margin of palp segment II with 4 setae and single setae on segment III; 5. Labium broad, segment III of palp dorsally with 5 long setae and apically triangular with small stout setae; 6. Claw of all legs apically hooked with a row of 14 sharp denticles.

Ecology: The study locality is the Aurajhariya waterfall in Surguja district. The stream bed is primarily composed of 15% gravel, 40% cobbles, 30% boulders, 5% bedrock, 5% fine sand, and 5% silt. The Aurajhariya waterfall measures 4-4.5 m in width and has a depth of 30-35 cm, with a medium to high water current of 2.0 m/sec. Environmental conditions include an atmospheric temperature of 18-22°C, water temperature of 19-25°C, humidity at 55%, and a pH of 6.8. Larvae were collected from the small stones at the stream's bottom. The larvae were found under stones alongside *Cloeon* sp., *Baetis* sp., *Afronurus* sp., Plecoptera (stoneflies), and Hydropsychidae (Trichoptera).

Discussion

Kluge et al. (2022) discuss that *Ch. (E.) latus* is closely related to *Ch. (E.) signatus*, with both species distributed

in Sri Lanka; however, only *Ch. (E.) latus* is found in India (specifically in the Western Ghats). In the present study, we have surveyed and reported a new record of *Ch. (E.) latus* from the state of Jharkhand. This emphasizes the importance of thorough field exploration, along with morphological and genetic studies of all life stages of this genus. Such research will aid in identifying its origin, diversity, distribution, species delimitation, and evolutionary relationships, ultimately providing a better understanding of this fascinating group. These findings point to the vital ecological importance of mayflies in freshwater ecosystems and indicate the need for more research to thoroughly document the diversity and distribution of aquatic insects in India.

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