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A new species of mayfly (Ephemeroptera: Leptophlebiidae) from the Western Ghats, India

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A new species of mayfly \textit{Choroterpes} (\textit{Euthraulus} nambiyarensis) sp. nov. is described from the nymphs collected in the southern Western Ghats, India. The types are deposited in the Zoological Survey of India, Kolkata, India.

\textbf{Keywords:} southern Western Ghats; Ephemeroptera; Leptophlebiidae; \textit{Choroterpes} complex; new species

\section*{Introduction}

The mayfly genus \textit{Choroterpes} Eaton and the closely related \textit{Neochoroterpes} Allen form the \textit{Choroterpes} complex (= \textit{Choroterpes} group of O’Donnell and Jockush 2008). Its distribution is from California through southern Europe to the Philippines, and down to the tip of Africa. This complex includes three subgenera: \textit{Choroterpes} s. str. Eaton (14 species), \textit{Choroterpes} (\textit{Euthraulus}) Barnard (27 species) and \textit{Choroterpes} (\textit{Cryptopenella}) Gillies (three species). The \textit{Neochoroterpes} until recently also considered a subgenus of \textit{Choroterpes}, contains four species in southwestern USA and Mexico (Flowers 2009). \textit{Choroterpes} (\textit{Euthraulus}) alagarensis Dinakaran et al. (2009) from south India, \textit{Choroterpes} (\textit{Euthraulus}) parvula from north India (Gillies 1951), one species each described from Sri Lanka (Hagen 1858), Pakistan (Ali 1967) and Myanmar (Eaton 1892) is the species known of the subgenus \textit{Euthraulus} from the Indian subregion. The genus \textit{Choroterpes} is also known from China (Wu et al. 1987; You and Su 1987; Kang and Yang 1994), Taiwan, Malaysia, Borneo, Sumatra and Java (You et al. 1980; You and Su 1987; Wu and You 1989, 1992; You and Gui 1995).

The \textit{Choroterpes} complex is recognised by the following characters (Flowers 2009): in the nymphs (1) first abdominal gill is a pair of slender filaments different from gills 2–6; (2) the apex of glossae provided with broad spatulate setae and (3) the posterior row of setae on the labrum arises close to its middle (except in some \textit{Neochoroterpes}); in the adults (1) in forewing, MP (Media Posterior) has a symmetrical fork while in MP\textsubscript{2} it is asymmetrical; (2) cubital area broad with four (sometimes three) intercalaries; (3) forceps in the male abruptly widened in its basal 1/4th–1/3rd and (4) penes as two simple lobes, very short to elongate and lacking spines or accessory lobes. The nymphs of the subgenus \textit{Choroterpes} s. str. are distinguished by a broad, terminal lobe on the lamina of gills 2–6; in contrast the subgenus \textit{Euthraulus} has gills

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2–6 bearing three narrow filaments on the apex of each lamina; while in the subgenus Cryptopenella – originally described as a genus (Gillies 1951) but placed as a subgenus by Zhou (2006) – penes is very short and do not protrude beyond the styliger plate.

The Neochoroteres of Allen (1974) described as a subgenus of Choroterpes – raised to generic rank without any explanation by Henry (1993) have short penes lobes – although not as short as in C. (Cryptopenella), with the nymphs resembling those of C. (Euthraulus), but without the row of setae across the middle of the labrum.

Recently, while inventorying the mayfly fauna of Kalakad-Mundanthurai Tiger Reserve (KMTR) of the southern Western Ghats, the nymphs of Leptophlebiidae belonging to a new species of Choroterpes were collected, and it is described herein. This new species falls under the subgenus Euthraulus, as its nymphs are with the gills 2–7 similar, with the dorsal and ventral lamellae plate like, terminating in three slender, subequal processes. This new species resembles C. (E.) alagarensis Dinakaran et al. (2009) from south India. The type material is deposited in the Zoological Survey of India, Kolkata (ZSI-K).

Figures 1–4. C. (E.) nambiyarensis sp. nov. 1, male nymph; 2, female nymph; 3, leg; 4, paraproct.
Choroterpes (Euthraulus) nambyarensis sp. nov. (Figures 1–16, 18–26)

Description

Male (mature nymph in alcohol) body length 3–4 mm; terminal filament: 7 mm; cerci: 4 mm (Figures 1, 2).

Head pale yellowish brown washed with brown, clypeus with yellowish and brownish spots anterior to median ocellus, and pale areas between lateral ocelli and eyes. Antennae yellow, basal segments pale yellowish brown. Mouthparts with labrum expanded and angulate laterally, slightly >0.5 × as long as total width, anteromedian emargination.

Figures 5–11. C. (E.) nambyarensis sp. nov. 5, labrum; 6, hypopharynx; 7, left mandible; 8, right mandible; 9, left maxilla; 10, right maxilla; 11, labium.
narrow and deeply cleft (‘V’ shaped), lateral margin broadly acute (Figures 5,18); mandibles with outer margin deeply angulate with a tuft of setae at angle (Figures 7,8,20,21); maxilla with palpi three segments, terminal segment smallest and with bristles (Figures 9,10,22,23); hypopharynx as in Figures 6 and 19; segment 2 of labial palpi $0.75 \times$ as long as segment 1, segment 3 slightly shorter than 1 and 2, with three large dorsal setae on segment 3 (Figures 11,24) and labrum yellowish brown, basal 2/3rd of mandibles brown and outer margin of maxilla, labium yellowish brown.

Thorax with terga brown, pronotum with crescent-shaped submedian spots, its lateral margin yellowish brown, mesonotum washed with brown on lateral margin; pleura washed
with yellowish brown, sterna yellowish brown. Legs yellowish white, femora with two dark brown spots on median and basal spots, tibiae and tarsi pale yellow (Figure 3) and claws with around 12 denticles similar in size (Figures 16, 26).

Abdomen with terga washed with brown, sterna yellowish brown, male with pale brown patches at base of each segment, female with sterna washed with yellowish brown, posterolateral spines present on segments II–IX; gills blackish white, trachea black, secondary trachea lacking, without side branches, caudal filaments yellowish brown and terminal filament longer than cerci (Figures 12–15, 25). Paraprocts smooth, without bristles or pores and their inner and outer marginal areas with chitinous thickening (Figure 4).
Holotype
m, mature nymph, India: Tamil Nadu: Tirunelveli district: Nambiyar River, near Forest check post, 227 m, 08°26’27.3’’, 77°31’37.9’’, 22.ii.2010. Coll. C Selva Kumar, KG Sivaramakrishnan, in alcohol, Ref. No. 4850/H13 dt. 16/12/11; paratypes, 1m, 2f, nymphs, 22.ii.2010. Coll. C Selva Kumar, KG Sivaramakrishnan, in alcohol, Ref. No. 4851 dt. 16/12/11 (ZSI-K).

Etymology
This species is named after the type locality, Nambiyar River, Tirunelveli district, Tamil Nadu, India.

Comments
This new species resembles C. (E.) alagarensis Dinakaran et al. but distinguished by (in the nymph) (1) the anteromedian emargination of labrum comparatively narrow and deeply cleft (‘V’ shaped), lateral margin broadly acute; (2) mandibles with outer margin comparatively deeply angulate with a tuft of setae at angle; (3) apical and median dark brown maculae at femora and (4) dorsal and ventral lamellae plate like, narrow, terminating in three slender subequal processes, with tracheae unbranched.

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