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BRIEF REPORT



First report of gynandromorph mayfly, *Centroptella ghatensis* Kluge, 2021, from India

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ABSTRACT

In this contribution, we report a gynandromorph mayfly for the first time from India. The gynandromorph traits were visible in the subimaginal stage of the species *Centroptella ghatensis* Kluge, 2021 collected in the southern Western Ghats, Tamil Nadu. It is the second record of a gynandromorph mayfly from the family Baetidae in the Oriental Region.

ARTICLE HISTORY

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KEYWORDS

Baetidae; *Centroptella ghatensis*; India; intersex; Western Ghats

Introduction

The term ‘gynandromorph’ refers to individuals with a mix of phenotypically male and female bodily parts and the term ‘intersex’ refers to individuals with intermediate sexual phenotypic traits (Grant and Masteller 1987; Narita, Pereira, Kjellberg, and Kageyama 2010; Santos, Moreto, and Mariano 2019; Fusco and Minelli 2023). Ephemeroptera is one of the 16 insect orders where intersex and gynandromorph specimens have previously been documented (Rafael, Marques, and Engel 2017). There have been several reports of gynandromorphism or intersexuality in mayflies in the past. Most of these records were found in the family Baetidae (Santos et al. 2019). The first occurrence of sexual teratology in Ephemeroptera was documented by Lestage (1922) in an imago of *Baetis rhodani* (Pictet, 1843) of the family Baetidae. Soldán and Landa (1981) collated all the known records of gynandromorphism, intersexuality, and teratology during their time. It includes one species from the family Siphonuridae, thirteen species from the family Baetidae, four species from the family Heptageniidae, five species from the family Leptophlebiidae, and one species each from the families Ephemeridae, Ephemerellidae and Potamanthidae. After that, only a few reports were available in the families Baetidae, Polymitarcyidae, Leptophlebiidae, Ameletidae, and Heptageniidae (Hubbard and Flowers 1990; Domínguez 1984; Grant and Masteller 1987; Da-Silva and Pereira 1993; McCafferty and Bloodgood 1986; Wu, Gui, and

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Su 1993; Kluge 2015; Santos et al. 2019; Nascimento, Castelaci, and Hamada 2021; Yang, Li, and Zhou 2023). The majority of gynandromorph occurrences were reported from Europe and North and South Americas. However, only four occurrences of gynandromorphy or intersex have been documented in Asia: it includes *Rhithrogena* Eaton, 1881 (Heptageniidae) from Tajikistan (Kluge 2015), *Cinygmmina* Kimmins, 1937 (now *Afronurus* Lestage, 1924) (Heptageniidae) from eastern China (Wu et al. 1993), *Baetopus* Keffermüller, 1960 (Baetidae) from Mongolia (Soldán and Landa 1981), and *Choroterpes facialis* Gillies, 2009 (Leptophlebiidae) from southeast China (Yang et al. 2023). So far, no record of gynandromorph mayflies has been reported from India. In this contribution, we describe the gynandromorph individual of *Centropptella ghatensis* Kluge, 2021 for the first time from one of the Indian biodiversity hotspots, Western Ghats.

Material and methods

Gynandromorph specimen of *Centropptella ghatensis* was collected by hand picking from the banks of the Kottakudi River. After collection, it was immediately preserved in 80% ethanol. In the laboratory, the morphological characters were studied with the help of the LABOMED Luzeo 6Z stereo zoom microscope and LABOMED Lx400 microscope and photos were acquired using the AR 6 Pro digital camera and editing of photos was done by Adobe Photoshop 7.0. Identification was made based on the morphological characters following Kluge (2021). The gynandromorph specimen of *Centropptella ghatensis* is deposited in The American College Museum (AMC), Madurai, Tamil Nadu, India.

Results

Centropptella ghatensis Kluge, 2021

(See Figures 1–6).

Materials examined

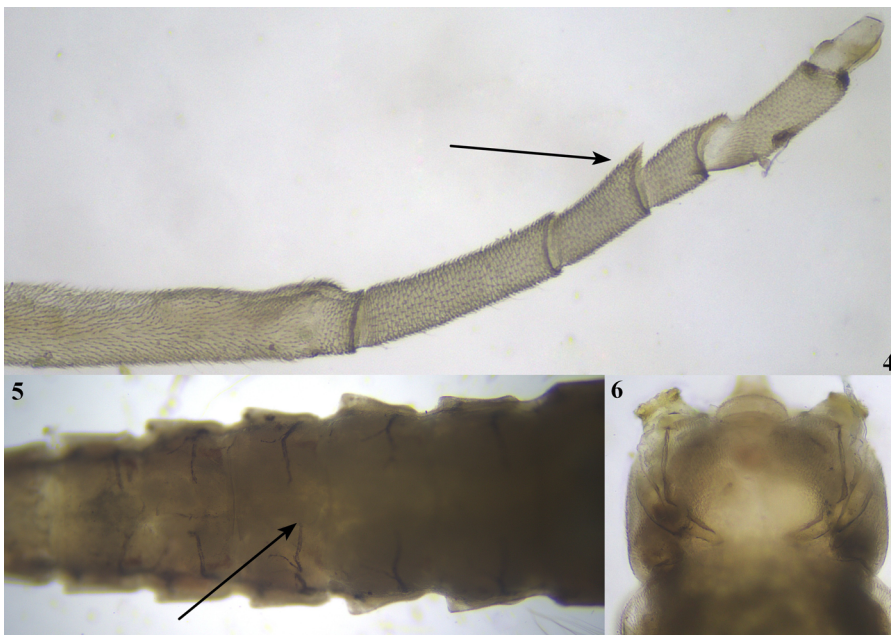
1 gynandromorph subimago, South India, Tamil Nadu, Theni District, Kurangani, Kottakudi River, 10°08.09'N, 77°25.52'E, ca. 632 m, 29.I.2023, leg. Srinivasan and Isack (AMC ZN 275).

Description of gynandromorph subimago

Predominantly female gynandromorph subimago (Figure 1). Head: left half of head with turbinate eye, typical for males and right half of head with female eye (Figures 2 and 3). Foreleg: foretarsus with apical spine on initial 3rd tarsomere, which is typical for females (Figure 4). Abdomen: mostly lacking eggs except one or two present in 5th and 6th abdominal segments (Figure 5). Genitalia: abdominal sternum IX without any traces of male genitalia (Figure 6).



Figures 1–3. Gynandromorph subimago of *Centroptella (Chopralla) ghatensis* Kluge, 2021: (1) entire view; (2) head and thorax; (3) closer view of head.



Figures 4–6. Gynandromorph subimago of *Centroptella (Chopralla) ghatensis* Kluge, 2021: (4) foretibia and foretarsus (arrow indicates apical spine in the 3rd tarsomere); (5) sterna (arrow indicates egg in the sternum V); (6) sternum IX.