


## A new species of *Sparsorythus* Sroka & Soldán, 2008 (Ephemeroptera: Tricorythidae) from Eastern Ghats of Southern India

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### Abstract

A new mayfly species, *Sparsorythus sivaramakrishnani* **sp. nov.** from the stream of Pullian cholai, Thuraiyur, Namakkal district, Tamil Nadu, India is described based on male and female nymphs. *Sparsorythus sivaramakrishnani* **sp. nov.** differs from the closely related *S. gracilis* by the shape of the left prostheca, the number of bristle-like processes at base of left prostheca, the ratio and shape of right prostheca, the ratio of femur length: width, the size of the female nymph, the mesonotum overlapping in fifth abdominal segment of the female, and by the shape of hypopharyngeal lingua.

**Key words:** India, mandible, prostheca, *Sparsorythus*

### Introduction

Tricorythidae (Ephemeroptera) are commonly known as little stout crawler mayflies. It includes five genera (*Tricorythus* Eaton, 1868; *Madecassorythus* Elouard & Oliarinony, 1997; *Ranorythus* Oliarinony & Elouard, 1997; *Spinirythus* Oliarinony & Elouard, 1998; and *Dicercomyzon* Demoulin, 1954) from the Afrotropical Realm (Barber-James 2008) and one genus (*Sparsorythus* Sroka & Soldán, 2008) from the Oriental Realm (Sroka and Soldán 2008). Some authors (e.g., Jacobus & McCafferty 2006) have included *Dicercomyzon* in the family Dicercomyzidae. *Sparsorythus* differs from other genera of Tricorythidae by the absence of the maxillary palps in the nymphs. Kluge (2010) recommended that all genera of family Tricorythidae ought to be considered as sub genera under the genus *Tricorythus* s.l. However, the lineages of Afrotropical *Tricorythus* are still inadequately known (Barber-James 2008) and for the present, due to the subject of this work being from an Oriental lineage, the assessment of Sroka and Soldán (2008) is continued with this paper. No new combination is established for Kluge's (2010) species, however. *Sparsorythus* was first described by Sroka and Soldán (2008). Since then, 10 species have been discovered so far. It includes *S. bifurcatus* Sroka & Soldán, 2008 (Vietnam); *S. buntawensis* Batucan, Nuneza & Lin 2016 (Philippines); *Tricorythus* (*Sparsorythus*) *celebensis* Kluge, 2010 (Indonesia: Sulawesi); *S. ceylonicus* Sroka & Soldán, 2008 (Sri Lanka); *S. dongnai* Sroka & Soldán, 2008 (Vietnam); *S. gracilis* Sroka & Soldán, 2008 (India); *S. grandis* Sroka & Soldán, 2008 (Indonesia: Java); *S. jacobsoni* Ulmer, 1913 (Indonesia: Java, Sumatra; Sri Lanka; Philippines); *S. multilabeculatus* Sroka & Soldán, 2008 (Vietnam) and *S. sescarorum* Garces, Bauernfeind & Freitag, 2018 (Philippines). *Sparsorythus jacobsoni* was originally described as *Tricorythus jacobsoni* by Ulmer (1913) based on male imago; the female subimago and nymph subsequently were discovered by Ulmer (1924, 1939). After that, *Tricorythus jacobsoni* was moved to *Sparsorythus* by Sroka and Soldán (2008). Of the 10 species, 7 species (*S. bifurcatus*, *S. dongnai*, *S. jacobsoni*, *Tricorythus* (*Sparsorythus*) *celebensis*, *S. buntawensis*, *S. sescarorum*, *S. multilabeculatus*) were described based on imagines, nymphs and eggs; whereas 3 species (*S. gracilis*, *S. grandis* and *S. ceylonicus*)

were described based on nymphs only. In India, only one species of the genus (*S. gracilis*) has been reported so far. In this paper *Sparsorythus sivaramakrishnani* **sp. nov.** from Tamil Nadu, South India is described.

## Materials and methods

The nymphs of the new species were collected from a stream of Pullian cholai, Thuraiyur, Namakkal district, Tamil Nadu (Fig. 23). The nymphs were collected using kick-net sampling and hand picking. Specimens were preserved in 80% ethanol. The specimens were studied via Magnus MSZ binocular stereo microscope and photographs were acquired using Canon EOS 1500D and editing of photographs was done using Adobe Photoshop 7.0. Specimens studied under Scanning electron microscope are first dehydrated using ethanol and dried by critical point drying and examined with an EVO-18 scanning electron microscope at 10 kV. Digital SEM photographs are made with SEM microscope and edited with Adobe Photoshop 7.0. Type specimens are deposited in The American College museum (AMC), Madurai, Tamil Nadu, India. We follow a morphological species concept. Sroka and Soldán (2008) and Garces *et al.* (2020) explicitly gave remarks about how adults are somehow not useful in differentiating species, so we made this species based on male and female nymphs only.

## Results

### Systematic account

*Sparsorythus sivaramakrishnani* Sivaruban, Srinivasan, Barathy, Bernath rosi & Isack **sp. nov.**  
Figs. 1–22.

**Materials Examined. Holotype** (in alcohol): Female mature nymph (AMC ZN 183), South India, Tamil Nadu, Namakkal district, Thuraiyur, Pullian cholai, 11.2668 N & 78.4361 E; 1190 m a.s.l; 11/I/2020, Bernath Rosi, Pandiarajan Srinivasan, Rajasekaran Isack. **Paratypes**: 1 male nymph (AMC ZN 184) and 2 female nymphs (AMC ZN 185) same data as holotype. Holotype and paratypes are deposited in the The American College museum, Madurai, Tamil Nadu, India.

**Mature nymph (in alcohol)**: Male body length: 2.95–3.05 mm, Female body length: 3.55–3.80 mm (Figs. 1, 2). Body colouration brownish yellow, ventral side of body pale creamy color.

**Head**: Head wider than long and dark blackish brown (ratio of length: width is 1:2.1). Head widths: 1.02 mm (male) and 1.25 mm (female). Antenna slightly longer than head length 1.8:1 (male) and 1.6:1 (female). Scapes about one half length of pedicels. Compound eyes black, ocelli greyish. Eyes of female slightly larger than male eyes. Ratio of distance between compound eyes to eye width of male = 3.1:1, female = 3.9:1. Labrum (Fig. 3) oval, ratio of width: length 2.6:1; dorsal surface entirely covered with scattered bristles and tiny bristles on ventral side. Hypopharyngeal lingua wider than long divided by long rill in middle and nick at anterior margin of lingua (Figs. 4, 5). Maxillae (Fig. 6) oblong shaped, approximately 1/3 longer than wide, apical part truncate. Maxillary palps absent. Labium: Glossae and paraglossae fused into rounded triangular plate and with two groups of setae on lateral submargin. Labial palps three-segmented. First segment oblong shaped, about by 1/3 shorter than second one, without any setation. Second segment curved, apical end pointed bluntly with row of stout marginal setae at its outer margin and tiny submarginal setae at its inner margin. Third segment very small, bluntly pointed at apex, without any setation. Labial plate (Figs. 7, 8) without small nick at middle of anterior margin. Mandibles (Figs. 9–12) robust and each with row of long filtering setae on outer margin; outer incisor of both mandibles triangular, with numerous bristles on ventral side; apex with pair of rounded projections; ventral side of inner incisor with bristles and dorsal side with tiny branched setae; left prosthema (Fig. 10) asymmetrically wider apically, with several pointed teeth and with three to four bristle-like processes at base; length of left prosthema subequal to length of inner incisor; right prosthema (Fig. 12) notched, extended apically with several pointed teeth, no setae on inner side; length of right prosthema approximately 2/3 as long as inner incisor.

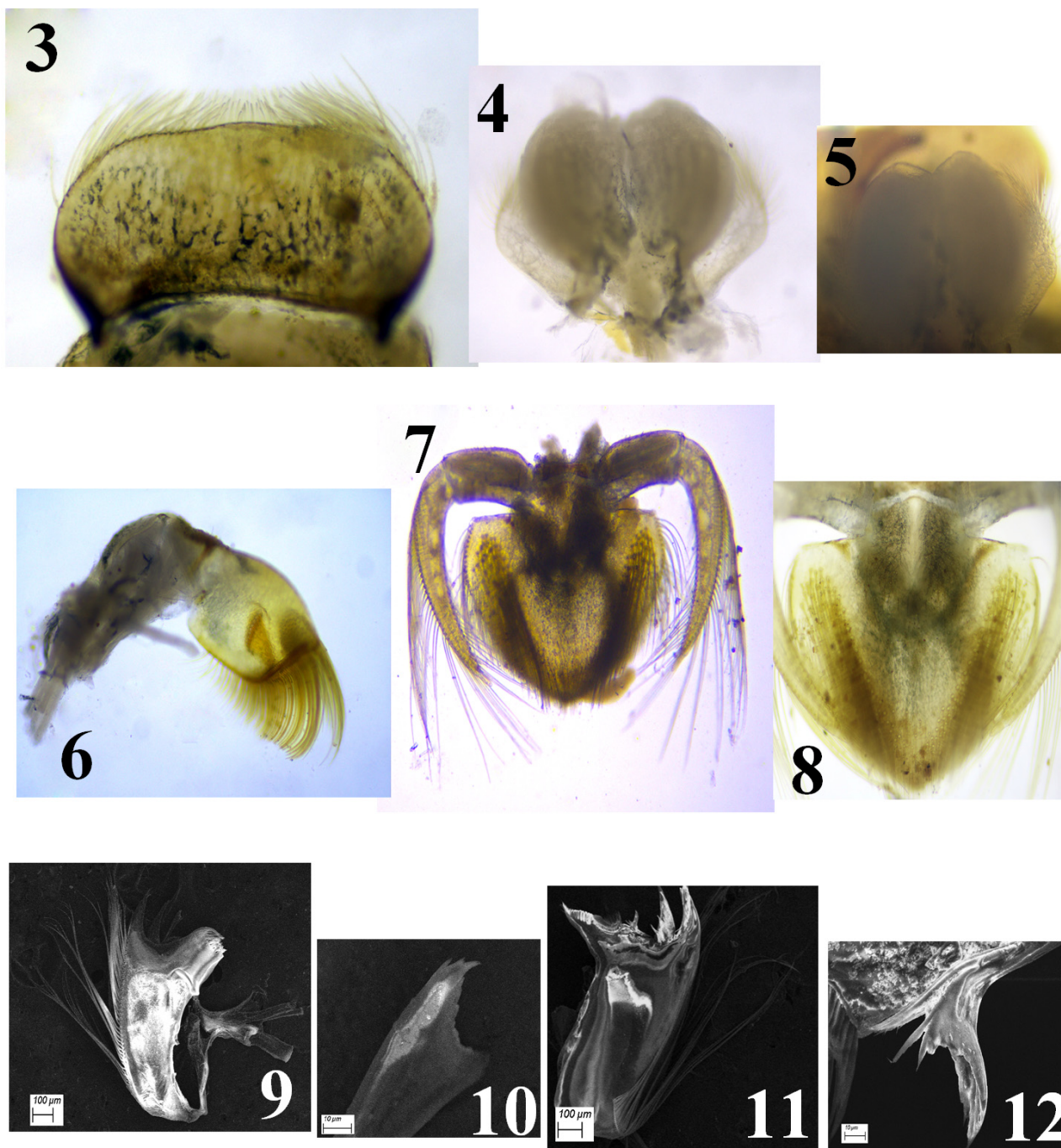
**Thorax**: Width of pronotum subequal to width of head; head about twice longer than wide. Posterior margin of mesonotum overlapping at segment V of female and segment VI of male. Length ratio of femur:tibia:tarsus =

1.8:2.3:1 (forelegs); 2.2:2.3:1 (midlegs); and 2.3:2.7:1 (hindlegs). Femora flat, shorter than tibiae. Hind legs larger than fore and midlegs (Figs. 13–15). Transversal row of setae on the fore femora bow-shaped (Fig. 16), with group of chaotically inserted setae near fore femoral posterior margin. Fore femoral setae about 4.5–5.5 times longer than wide with blunt apex (Fig. 17). Setae on fore tibiae very thin, spiky and about 0.080 mm in size (Fig. 18). Dorsal surface of middle and hind femora sparsely covered by spines of variable size (Fig. 19). Mid and hind femora each with short setae at inner margin and long stout setae at outer margin, row of stout setae along outer margin of mid and hind femora irregular. Inner margin of mid and hind tibia with longitudinal row of stout setae and about 0.020 mm in size. Tarsal claws hooked, bearing 2 median denticles and two lateral subapical teeth.



**FIGURES 1–2.** Nymph of *Sparsorythus sivaramakrishnani* **sp. nov.** 1—Male nymph 2—Female nymph





**FIGURES 3–12.** Mouthparts of *Sparsorythus sivaramakrishnani* sp. nov. 3—Labrum 4—Hypopharyngeal lingua 5—Medial nick on hypopharynx 6—Maxilla 7—Labium 8—Labium anterior without medial nick 9—SEM view of Left mandible 10—SEM view of Left prosthema 11—SEM view of Right mandible 12—SEM view of Right prosthema.

**Abdomen:** Abdomen not flat, lateral sides on segments II–VII concave, segments VIII–IX cylindrical. Denticles of hind margin of abdominal tergum VII short, either pointed or blunt (Fig. 20), or terminated by several points. Gills absent on abdominal segment I; gills present on abdominal segments II–VI. Gills each with dorsal lamella and ventral portion consisting of two branches with numerous lateral filaments (Fig. 21). Gills absent from segment VII. Caudal filaments: cerci as long as paracercus. Sexual dimorphism: cerci and paracercus of males much wider and compressed at base than those of females (Figs. 1, 2). Individual segments of caudal filaments each rounded at posterior margin with setae approximately as long as 1/4 of length of segment. Lateral margins with spiky setae as long as length of corresponding segments, with these setae present on both sides of paracercus and only on inner sides of cerci (Fig. 22).