

## A new species of *Copelatus* Erichson (Coleoptera: Adephaga: Copelatinae) from Tamil Nadu, Southern India

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### Abstract

A new species *Copelatus andersi* n.sp. is described in the genus *Copelatus* Erichson, illustrated compared to other species. Adult male and genitalia are figured. A key to the genus *Copelatus* currently known from India is provided.

**Keywords:** Dytiscidae, Copelatinae, *Copelatus*, male genitalia

### Introduction

*Copelatus* Erichson is a species-rich genus with members occurring throughout southern India. The genus *Copelatus* was first described by Erichson (1832) with type-species *Dytiscus posticatus* Fabricius. A world catalogue was prepared by Nilsson (2013) <sup>[10]</sup> in which 431 species occupied the delimitation of zoogeographical regions as applied in the Afrotropical, Australian, Nearctic, Neotropical, Oriental, Pacific and Palearctic. The subfamily Copelatinae was proposed by Branden (1885) with type genus *Copelatus*. The subfamily Copelatinae contains a single tribe Copelatini Branden (1885). Later Vazirani (1970) <sup>[12]</sup> treated Copelatini as a tribe under the subfamily of Colymbetinae and it is also described by Larson *et al.* (2000) <sup>[6]</sup>. Modern description of the genus was provided by Larson *et al.* (2000). Miller (2001) <sup>[6, 8]</sup> has been given the new status as indicated by Nilsson (2001) <sup>[9]</sup>. It is characterized by space between the metacoxal lines being very narrow, or metacoxal lines faint or reduced; often with longitudinal lines and or striae on elytra.

Vazirani (1970) <sup>[12]</sup> mentioned that the genus *Copelatus*, is having longitudinal rows of striae on elytra, under which 5 species were described namely *C. bangalorensis*, *C. assamensis*, *C. ceylonicus*, *C. mysorensis* and *C. neelumae*. The genus *Copelatus* was redescribed again with 10 species and prepared a dichotomous key for three groups *Haemorrhoides*, *Irinus* and *Duodecistriatus* by Vazirani (1973). Vazirani (1977) <sup>[13, 14]</sup> has been listed out 12 species of the genus *Copelatus* from India. Nilsson *et al.* (1996) <sup>[11]</sup> have been prepared a monograph of *Copelatus* which includes the male genitalia diagram of 199 species. Balke (1998) <sup>[2]</sup> was described 31 new species including *Copelatus (Papuadytes)*. A total of 468 species was listed from the genus *Copelatus* (Nilsson, 2001) <sup>[9]</sup>. A study on various species of *Copelatus* from Oriental region particularly from India is scanty. Manivannan and Madani (2011) <sup>[7]</sup> described the new species *Copelatus wayanadensis*.

### Materials and methods

The aquatic adephagan beetles *Copelatus* were collected from ponds near Kancheepuram District Tamil Nadu, India.

The D-Frame net (300 mm x 400 mm x 330 mm) with a mesh size of 0.5 mm was used for collection. The collected aquatic beetles were preserved in 70% alcohol. Observations were made with Zm 45 TM complete zoom stereo trinocular microscope. The abdomen was carefully detached and placed in a warm solution of 10% KOH for about 10 minutes and washed in distilled water before dissection. The male genitalia (penis and parameres) were mounted on a card along with the insect in euparal. The male genitalia diagrams were drawn for illustrations by using Camera Lucida. The genitalia were preserved in small vials together with the specimen in 70% alcohol as suggested by Biström (1996) <sup>[3]</sup>.

ZSI: Zoological Survey of India, Chennai. Z.S.I. Regd. No.: I/CL/9.

### Result

#### Key to the species of *copelatus*–*irinus* group from India

1. First stria near the suture very much reduced, present only in the apical portion. *C. latipes*
  - First stria near the suture never much abridged. 2
2. Submarginal stria extending beyond the 6th stria. *C. feae*
  - Submarginal stria not extending beyond the 6th stria. 3
3. Only dorsal stria 1 abridged at the base. 6
  - More than one dorsal stria abridged at the base. 4
4. Dorsal striae 1 and 2 abridged at the base. *C. bengalensis*
  - Three or more dorsal striae abridged at the base. 5
5. Dorsal striae 1, 5 and 6 abridged at the base. 9
  - Dorsal striae 1, 2, 3 and 5 abridged at the base. *C. andersi* sp. nov.
6. Elytra ferruginous-black, with some yellow markings. 7
  - Elytra testaceous-brown without distinct yellow markings; prosternum darker. *C. andamanicus*
7. Elytra with yellow markings commencing at the base near the suture, then leaving the sutural region, extending downward along the 3rd stria and reaching nearly the full length of the elytra. *C. bangalorensis*
  - Elytra with yellow markings confined to the sides and not extending inward to the 3rd stria. 8
8. Elytra in male with yellow markings covering the outer 2–3 striae, extending from the base to nearly the full length of the elytra, sometimes reaching the apex along the 6th stria; female sculpture moderately impressed. *C. indicus*

- Elytra in male with yellow markings commencing from the base and extending backward only along the 6th stria; female elytral sculpture moderate, covering only the outer 3 striae. *C. freudei*
- 9. Size 3.5–4.0 mm; elytra with a basal yellow transverse band. 10
  - Size 4.0–6.0 mm; elytra without a basal yellow band. 11
- 10. Dorsal striae 5 and 6 almost equally abridged at the base; striae 2, 4 and 5 only slightly abridged at the apex. *C. horni*
  - Dorsal stria 6 distinctly more abridged at the base than stria 5; striae 2 and 4 moderately abridged at the apex, and stria 5 distinctly extending beyond striae 2 and 4. *C. minutissimus*
- 11. Elytra testaceous; dorsal striae 5 and 6 almost equally abridged at the base. *C. malaise*
  - Elytra ferruginous to black; dorsal stria 6 distinctly more abridged at the base than stria 5. 12
- 12. Elytra with dorsal striae 2, 3, 4 and 5 almost equally abridged at the apex. *C. assamensis*
  - Elytra with dorsal striae 2 and 4 slightly shorter than stria 3 at the apex. 13
- 13. Size 4.1–4.5 mm; body rather oval; colour ferruginous-black. *C. tenebrosus*
  - Size 4.4 mm; body subparallel; colour rufo-ferruginous. *C. ceylonicus*

***Copelatus andersi*** Senthil Kumar, Kalaimagal & Madani species. nov.

**Type locality.** India, Tamil Nadu, Kancheepuram, Orikkai, 76 Km N Chennai.

#### Material examined

Holotype: ♂, India, Tamil Nadu, Kancheepuram District, Orikkai (Palar river) 76 Km N Chennai, (N 11° 00' to 12° 00' latitudes and 77° 28' to 78° 50' longitudes) 28. ix. 2004, 1 ex.; 28.ii. 2011, 6 ex.; 28. x. 2012, 2 ex.; Cheyyar, 27. viii. 2013, 6 ex.

#### Diagnosis

*Copelatus andersi* sp.n. species is very close to *C. andersi* in having moderate punctation on head separated by at least 2 times of their own diameter and transverse row of punctures along the anterior and posterior margins of pronotum. It differs from *C. indicus* in having a transverse row of punctures along the anterior and posterior margins of pronotum and also the structure of penis.

**Description. Length:** 5.7–5.9 mm, breadth: 2.1–2.3 mm. Form oval, slightly convex and a little attenuated posteriorly.

**Head:** Testaceous, anteriorly somewhat sub-rounded and slightly sloping in front; clypeus raised anteriorly, rebordered and truncate in the middle; a pair of distinct sutures on either side of the frontal region which converge backwards but do not meet; compound eyes are emarginated; the distance between dorsal surface of compound eyes not exceeding 3 times of the maximum width of one eye; labial palpus, maxillary palpus, mandible and antenna testaceous; punctation fine, moderate and separated by 2–3 times their own diameter; reticulation, distinctly with hexagonal meshes (Fig. 1).

**Pronotum:** Testaceous, antero-lateral angles slightly produced and anterior corner with sparse hairs and two spines at the apex, submedio-lateral margin with sparse long hairs; posterior angles are also produced backwards over the shoulder of the elytra, sides rebordered, transverse row of

punctures along the anterior and posterior margins, curved series of punctures at sub-lateral margin; punctation fine, dense and separated by about their own diameter; reticulation well-impressed, same as to head (Fig. 2).

**Elytra:** Testaceous with black markings and well developed 6 longitudinal striae; 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup> and 5<sup>th</sup> stria abridged at the base; 4<sup>th</sup> and 6<sup>th</sup> striae from the base to ante-apex; 1<sup>st</sup> and 4<sup>th</sup> slightly incurved around 2<sup>nd</sup> and 3<sup>rd</sup>; 6<sup>th</sup> stria short; marginal stria from middle up to post median area; black markings abridged at base condensed with suture through sub-apical and somewhat dilated up to 5<sup>th</sup> stria at basal region; punctation quite fine, dense and evenly distributed, a row of punctures along the sutural margin; reticulation distinct with polygonal meshes; apices not acuminate (Fig. 3).

**Ventral side:** Testaceous, reticulation as on elytra; with small stripes on abdominal sternites.

**Legs:** Proleg ferruginous, coxa elongate oval; trochanter small, ventrally with 4 spinulae; femur rather flattened, dorsally a row of small spines from proximal to distal with sparse swimming hairs, ventrally 10 spines in which 5 proximal, 5 distal; tibia long and distally dilated, ventrally a row of spinulae that are slightly concentrated distally, dorsal row of long hairs from proximal to median and 7 spines; first three tarsal segments weakly dilated, with concentrated sucker hairs, outer margin of each segment with sparse swimming hairs, distal tarsal segment with ventral row of spines, pair of equal claws (Fig. 6).

Mesoleg ferruginous, coxa more or less globular; trochanter triangular, smooth; femur long and slender, dorsally a row of small spines along with intermittent long hairs, ventrally with sparse spines; tibia long and slender dorsally and ventrally with a row of spines and long swimming hairs, distally with a long spur; first three tarsal segments dilated with a bunch of hair-like suckers, outer margin of each segment with sparse swimming hairs, distal segment possess a row of small ventral spines and bears a pair of equal claws (Fig. 7).

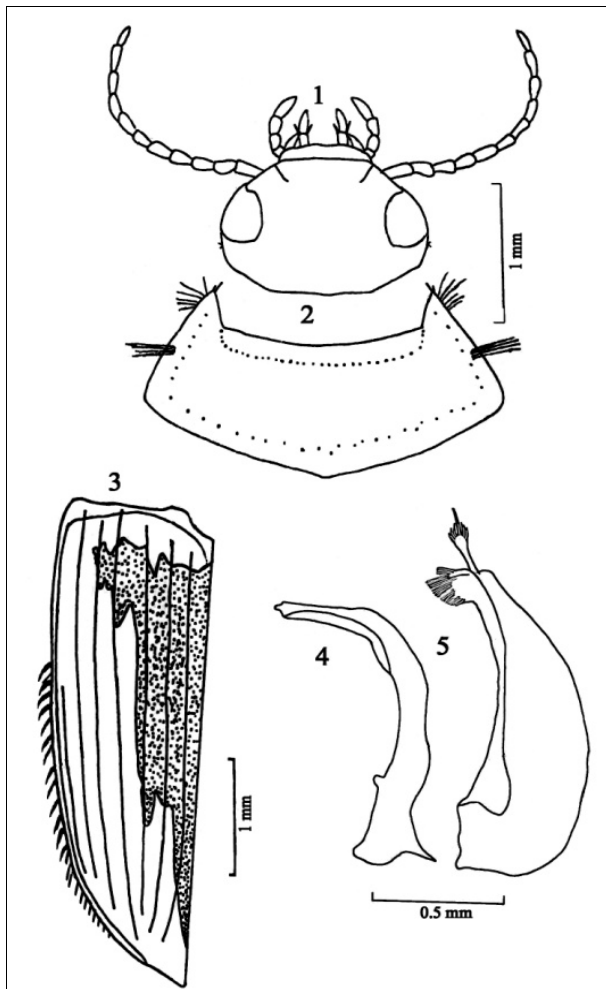
Hindleg ferruginous, coxae wide and flattened; trochanter somewhat triangular, smooth; femur strongly built and flattened, smooth; tibia long and slender, dorsally with a row of spines and long hairs, distally two long equal spines, ventrally a row of spines and swimming hairs and two long distal spurs strongly widened at the base; basal segment of tarsus longer than others; each segment provided with a group of spines and also a row of swimming hairs, a pair of equal claws (Fig. 8).

**Male genitalia:** Penis lateral aspect is quite slender without any lobe on its dorsal side, very regularly arched from the median to the apex, apically pointed (Fig. 4); base of parameres dilated in lateral aspect, apically with brush-like ciliae, apically bulb-like lobe with 7 spines in which one in the middle long, 3 small spines on either side of this (Fig. 5).

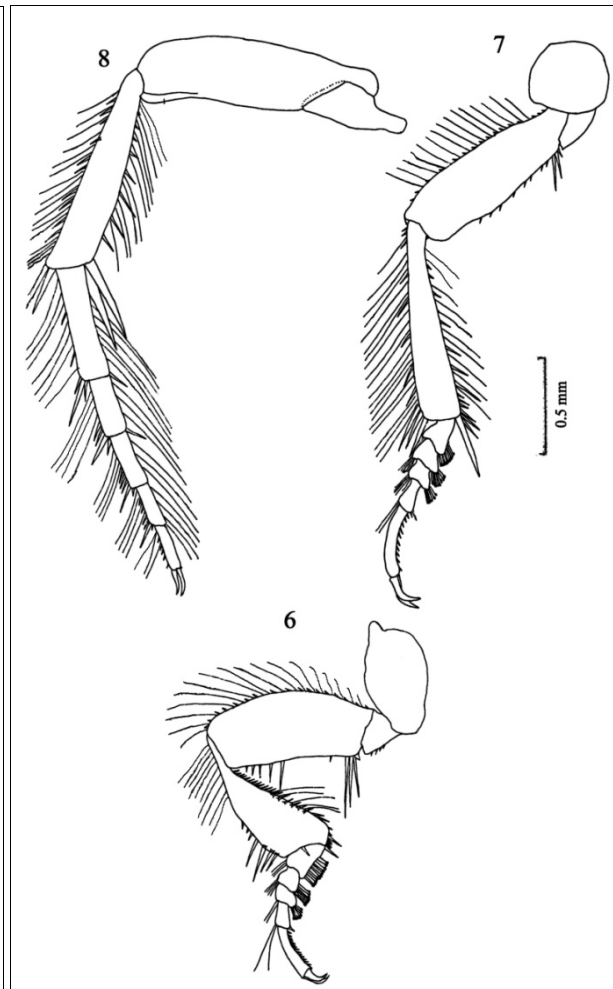
**Etymology:** This species is respectfully dedicated to Anders N. Nilsson of Umea University Sweden.

**Habitat:** This species was collected in small river line steams, river lets, mostly in shallow, stagnant shore parts.

**Distribution:** Orikkai, Kancheepuram District, Tamil Nadu India,



**Figs 1-5:** *Copelatus andersi* sp. nov. (Holotype- ♂)-1, head. -2, pronotum. -3, elytra. -4, penis. lateral aspect -5, paramere. lateral aspect.



**Figs 6-8:** *Copelatus andersi* sp. nov. -6, posterior face of proleg. -7, mesoleg. -8, hindleg.

### Discussion

A study on various species of *Copelatus* from Oriental region particularly from India is scanty. An attempt was undertaken to describe the new species *Copelatus andersi* sp. nov. in the present study. The species was collected in river let and steams, mostly shallow and stagnant water bodies. The new species *C. andersi* is very close to *C. indicus* and somewhat deviated from *Copelatus wayanadensis* it is having characterized by anteriorly raised clypeus, rebordered and truncate in the middle. The antero-lateral angles of pronotum slightly produced, anterior corner with sparse hairs and two spines at the apex, submedio-lateral margin with sparse long hairs, sides rebordered. The elytra is brownish markings, 6 longitudinal striae; 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup> and 5<sup>th</sup> striae abridged at the base. The penis quite slender without any lobe on its dorsal side; very regularly arched from the median to the apex; pointed tip at the apex; base of parameres dilated apically with brush-like ciliae, apical lobe with a 'bulb' having 7 spines in which one in the middle long, 3 small spines on either side.

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