

# The genus *Hygrocrates* Deeleman-Reinhold, 1988 (Araneae, Dysderidae) in Turkey

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## Abstract

A new species, *Hygrocrates deelemanus* Kunt & Yağmur **sp. n.**, is described on the basis of both sexes from the Mediterranean region of Turkey. Detailed morphological descriptions, diagnosis and figures of the copulatory organs of both Turkish species are presented. An identification key is presented for all the currently known species of *Hygrocrates*.

## Keywords

Dysderidae, *Hygrocrates*, new species, systematic key, Turkey

## Introduction

*Hygrocrates* Deeleman-Reinhold, 1988 is a small dysderid genus which contains only three previously described species: *Hygrocrates caucasicus* Dunin, 1992; *H. georgicus* (Mcheidze, 1972) and *H. lycaniae* (Brignoli, 1978). *H. caucasicus* and *H. georgicus* are

endemic to Georgia, while *H. lycaoniae* is known from Rhodes and Turkey. *Hygrocrates lycaoniae* was originally ascribed to *Harpactocrates* Simon, 1914. In their revision of Dysderinae spiders of the Mediterranean region, Deeleman-Reinhold and Deeleman (1988) transferred *H. lycaoniae* to the new genus *Hygrocrates*, which was differentiated from *Harpactocrates* as follows: posterior median eyes closer to each other; anterior cheliceral teeth smaller in the basal region, and the presence of a subapical apophysis on the male palp. *H. georgicus*, originally ascribed to *Harpactocrates*, was only provisionally transferred to the genus *Hygrocrates* by Deeleman-Reinhold and Deeleman (1988); see also Dunin (1992) who reported that the female holotype of this species was lost. Subsequently, the third, new species *H. caucasicus* was described by Dunin (1992), based on two male specimens from the Georgia.

To date, only *H. lycaoniae* has been recorded from Turkey based on only one male in a sample collected from outside Körükini Cave (Konya province, Beyşehir District, Çamlık town). After the original description by Brignoli (1978), Deeleman-Reinhold and Deeleman (1988) redescribed this species based on male and female specimens collected from Greece. During our surveys of the Turkish spider fauna we collected some specimens of *H. lycaoniae*, in addition to some specimens that were impossible to place in any of the known species of *Hygrocrates*. In this paper, a new species of the genus, namely *Hygrocrates deelemanus* sp. n., is described based on both sexes, collected from the southern region of Turkey. The characteristic features of both species, including photographs of the prosoma and of the copulatory organs, are provided for comparative purposes.

## Material and methods

All specimens were collected from two different localities in Turkey (Fig. 1). The specimens were collected by sifting of leaf litter and preserved in 70% ethanol. Digital images of the pedipalp and vulva were taken with a Leica DFC295 digital camera attached to a Leica S8AP0 stereomicroscope and 5–15 photographs were taken in different focal planes and combined. Photographic images were edited using Photoshop CS2 and Corel-DRAW X3 was used to create the plates. All measurements are in mm. Terminology for the body measurements and copulatory organ structures follows Deeleman-Reinhold and Deeleman (1988) and Chatzaki and Arnedo (2006). The following terminology is used for the male palp: apical apophysis of the male palp, **Embolus**; subapical apophysis of the male palp, **Apophysis<sub>a</sub>**; and posterior apophysis of the male palp, **Apophysis<sub>b</sub>**.

Material treated herein is deposited in the personal collection of Kadir Boğaç Kunt (**cKBK**, Ankara, Turkey) and in the Senckenberg Museum (**SMF**, Frankfurt am Main, Germany). The following abbreviations are used in the text: **AL**, abdominal length; **CL**, carapace length; **CW<sub>max</sub>**, maximum carapace width; **CW<sub>min</sub>**, minimum carapace width; **AME**, anterior median eyes; **PLE**, posterior lateral eyes; **PME**, posterior median eyes; **AMEd**, diameter of anterior median eyes; **PLEd**, diameter of posterior



**Figure 1.** Map showing the localities from which *Hygrocrates* specimens have been recorded. ★ the type locality of *H. deelemanus* sp. n.; ♦ the type locality of *H. lyconiae*; ● locality of *H. lyconiae* from Turkey; ■ locality of *H. lyconiae* from Rhodes island (Greece).

lateral eyes; **PMEd**, diameter of posterior median eyes; **ChF**, length of cheliceral fang; **ChG**, length of cheliceral groove; **ChL**, total length of chelicera (lateral external view); **Ta**, tarsus; **Me**, metatarsus, **Ti**, tibia; **Pa**, patella; **Fe**, femur; **Tr**, trochanter; **C**, coxa; **D**, dorsal; **Pl**, prolateral; **Rl**, retrolateral; **V**, ventral.

**Key to the *Hygrocrates* species**

- 1 Male ..... 2
- Female ..... 4
- 2 Bulbus straight, cylindrical; embolus lobe-shaped; apophysis<sub>a</sub> and apophysis<sub>b</sub> nearly same size..... *H. caucasicus*
- Bulbus pyriform; embolus hook-shaped; apophysis<sub>a</sub> and apophysis<sub>b</sub> smaller than embolus ..... 3
- 3 Transition between bulbus and distal continuation is gradual (Figs 30–33, 36).....*H. lyconiae*
- Transition between bulbus and distal continuation is abrupt, clearly curved over 90° (Figs 16–19, 35) ..... *H. deelemanus* sp. n.
- 4 Distalmost part of spermathecae linear ..... *H. georgicus*
- Distalmost part of spermathecae oval ..... 5
- 5 Proxialmost part of spermathecae oval (Fig. 20) ..... *H. deelemanus* sp. n.
- Proxialmost part of spermathecae circular (Fig. 34).....*H. lyconiae*

## Taxonomy

### *Hygrocrates Deeleman-Reinhold, 1988*

*H. Deeleman-Reinhold*, in Deeleman-Reinhold and Deeleman, 1988: 240, type *Har-pactocrates lycaoniae* Brignoli, 1978.

### *Hygrocrates deelemanus* Kunt & Yağmur sp. n.

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Figs 2–21, 35, 37

**Material Examined:** Holotype ♂ (SMF) **Antalya Province**, Alanya District, Taşatan Plateau [36°38'33.20"N; 32°4'44.40"E], 09.I.2010, leg. K.B.Kunt. Paratypes: 1♀ (abdomen heavily damaged during dissection) (SMF), 1♂ (cK BK) same data as holotype.

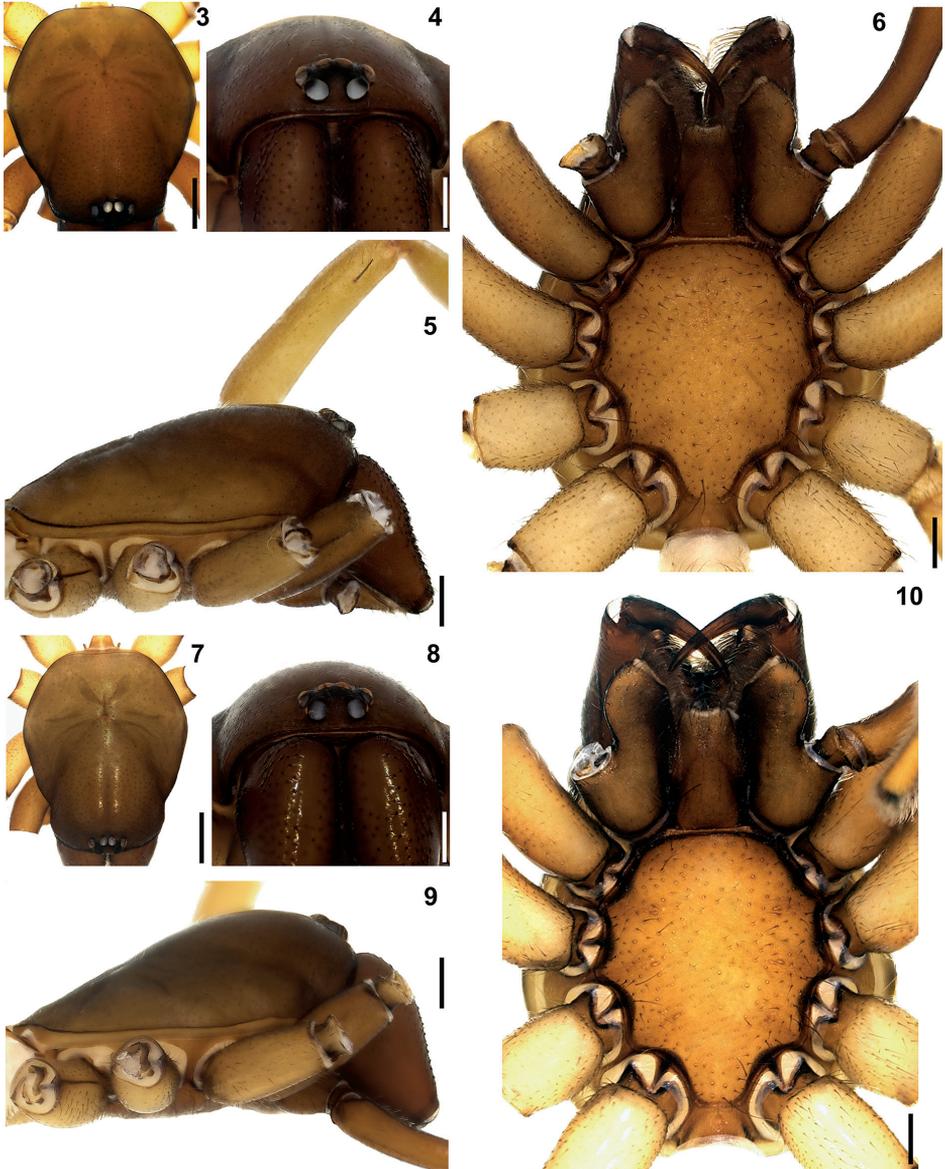
**Diagnosis:** The male palp of *Hygrocrates deelemanus* sp. n. is most similar to that of *H. lycaoniae*. Bulbal apophyses are shorter than the embolus in both species. However, the transition between the bulbus and distal continuation is more abrupt in *H. deelemanus* sp. n., clearly curved over 90°, whereas it is more gradual in *H. lycaoniae*. In the vulva, the proximalmost part of the spermathecae is larger and wider than in *H. lycaoniae*.



**Figure 2.** *Hygrocrates deelemanus* sp. n. (Holotype ♂); scale line: 1 mm.

**Derivatio nominis:** The specific name is given in honour of Dr. Christa L. Deeleman-Reinhold, a prominent Netherlander arachnologist who described the genus *Hygrocrates*.

**Measurements (Holotype ♂ / Paratype ♀):** AL 3.84 / ?; CL 2.76 / 3.04; CW<sub>max</sub> 2.28 / 2.40; CW<sub>min</sub> 1.40 / 1.76; AMEd 0.16 / 0.19; PLEd 0.12 / 0.14; PMEd 0.10



**Figures 3–10.** *Hygrocrates deelemanus* sp. n. **3** (♂), **7** (♀) carapace, dorsal view **4** (♂), **8** (♀) ditto, anterior view **5** (♂), **9** (♀) ditto, lateral view **6** (♂), **10** (♀) ditto, ventral view. Scale lines: (3, 5, 6, 7, 9, 10) 0.5 mm; (4, 8) 0.25 mm.



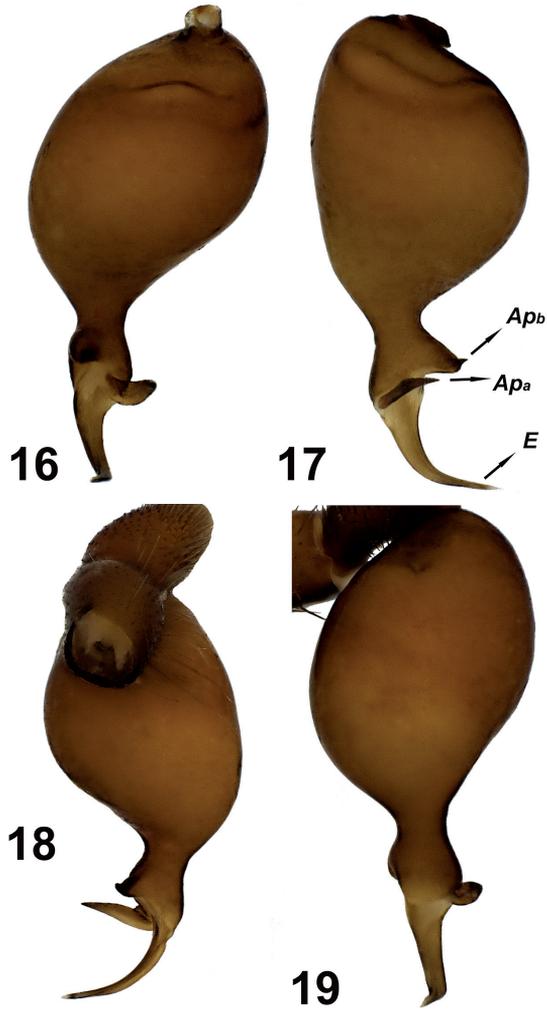
**Figure 11.** Cheliceral teeth of *Hygrocrates deelemanus* sp. n.



**Figures 12–15.** Tarsal and metatarsal scopulae of *Hygrocrates deelemanus* sp. n. (♂), **12** leg I, **13** leg II, **14** leg III, **15** leg IV. Scale lines: 0.25 mm

/ 0.11; ChF 0.77 / 0.82; ChG 0.46 / 0.52; ChL 1.20 / 1.50. Leg measurements are given in Table 1.

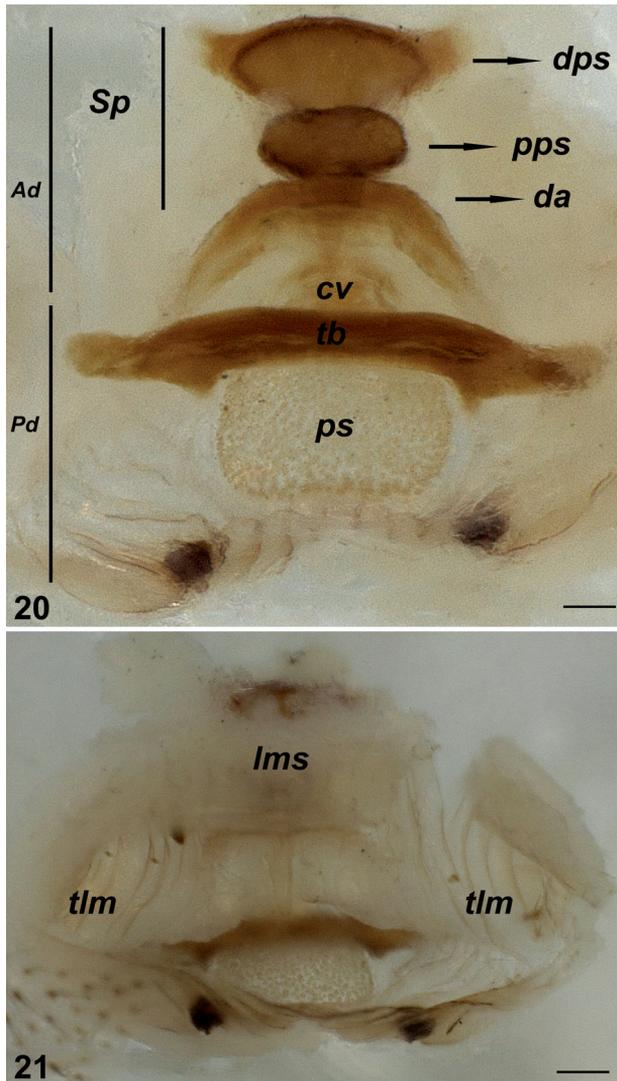
**Description:** Carapace hexagonal-shaped, reddish brown, surface of carapace with small dark shallow depressions. Cephalic region dark brownish, narrow and clearly higher than thoracic region (Figs 2, 3, 5, 7, 9). Chilum triangular-shaped, distinct, coloured as carapace and chelicerae and broader in females (Figs 4, 8). Fovea short, straight and longitudinal (Figs 2, 3, 7). AME, PLE and PME closely grouped. Distance of AME-PLE shorter than PLE-PME. AME separated (Figs 4, 8). Labium, gnathocoxae and chelicerae brown. Labium and gnathocoxae covered with dark hairs; more densely so on gnathocoxae. Labium wider at the base. Gnathocoxae rounded laterally,



**Figures 16–19.** Male palp of *Hygrocrates deelemanus* sp. n. Abbreviations:  $Ap_a$  apophysis<sub>a</sub>,  $Ap_b$  apophysis<sub>b</sub>,  $E$  embolus. Scale line: 0.1 mm.

with inwardly notched tips and blackish along the margins. Sternal border of gnathocoxae pentagonal-shaped, cheliceral region arrow-shaped with blunt tip (Figs 6, 10).

Chelicerae brownish with darker tubercles; basally broader in females and laterally swollen (Figs 4, 8). Cheliceral groove with four teeth: retromargin with four teeth, including one small and one large tooth at the base of the groove (Fig. 11). Sternum and abdomen yellowish brown, with thin blackish hairs over the entire surfaces. Legs yellowish brown. Palps and legs I and II darker than legs III and IV. Leg length formula: Leg I > Leg IV > Leg II > Leg III. Tarsi with two claws and claw tufts. All tarsi with fine tarsal scopulae. Legs III and IV with metatarsal scopulae (Figs 12–15). Coxae without spines. Details of leg spination are given in Table 2.



**Figures 20–21.** Vulva of *Hygrocrates deelemanus* sp. n. **20** dorsal view **21** ventral view. Abbreviations: *Ad* anterior diverticulum *Pd* posterior diverticulum *Sp* spermatheca *dps* distalmost part of spermatheca *pps* proximalmost part of spermatheca *da* dorsal arch *cv* central valve *tb* transverse bar *ps* membranous sac *lms* large membranous sac *tlm* twisted lateral membranes. Scale lines: 0.1 mm.

**Table I.** Leg measurements of *Hygrocrates deelemanus* sp. n.

(Holotype ♂ / Paratype ♀)	Fe	Pa	Ti	Me	Ta
Leg I	2.32 / 2.52	1.60 / 1.66	2.00 / 2.43	2.24 / 2.30	0.64 / 0.63
Leg II	2.08 / 2.32	1.48 / 1.44	1.80 / 1.84	2.08 / 1.96	0.56 / 0.60
Leg III	1.76 / 1.92	0.88 / 1.12	1.20 / 1.40	1.60 / 1.88	0.56 / 0.60
Leg IV	2.40 / 2.48	1.36 / 1.36	1.88 / 2.08	2.20 / 2.60	0.59 / 0.61

**Table 2.** Leg spination of *Hygrocrates deelemanus* sp. n.

♂ (Holotype)	Leg I	Leg II	Leg III	Leg IV
C	0	0	0	0
Tr	0	0	0	0
Fe	Pl 1	Pl 0–1	D 1	D 1, 1
Pa	0	0	0	0
Ti	0	0	Pl 1 Rl 1, 2 V 1, 2	Pl 2, 2 Rl 2, 1 V 1, 1
Me	0	0	Pl 1, 1 D 2, 2 Rl 1, 2, 1, 1 V 2, 2	Pl 5 Rl 5 V 2
Ta	0	0	0	0
♀ (Paratype)				
C	0	0	0	0
Tr	0	0	0	0
Fe	Pl 2	Pl 1	0	D 1, 1
Pa	0	0	0	0
Ti	0	0	Pl 1 Rl 1, 2 V 1, 2	Pl 2, 2 Rl 1, 1 V 1, 2
Me	0	0	Pl 1, 1 Rl 1, 1, 1, 1 V 1, 2	Pl 5 Rl 5 V 2
Ta	0	0	0	0

Palpal organ with pyriform bulbus and hook-shaped (tapering towards the tip) embolus. Bulbal apophyses are more strongly sclerotized than the embolus (Figs 16–19). Vulva with two parts: anterior diverticulum and posterior diverticulum (Fig. 20). Anterior diverticulum consists of a dorsal arch with spermathecae which have two parts (distalmost and proximalmost parts), a large membranous sac (clearly visible in dorsal view) and widened twisted lateral membranes (Fig. 21). Posterior diverticulum consists of a central valve with a transverse bar, a wide membranous sac and a couple of small lateral membranous pockets (Fig. 20).

### *Hygrocrates lycaoniae* (Brignoli, 1978)

Figs 22–34, 36, 38

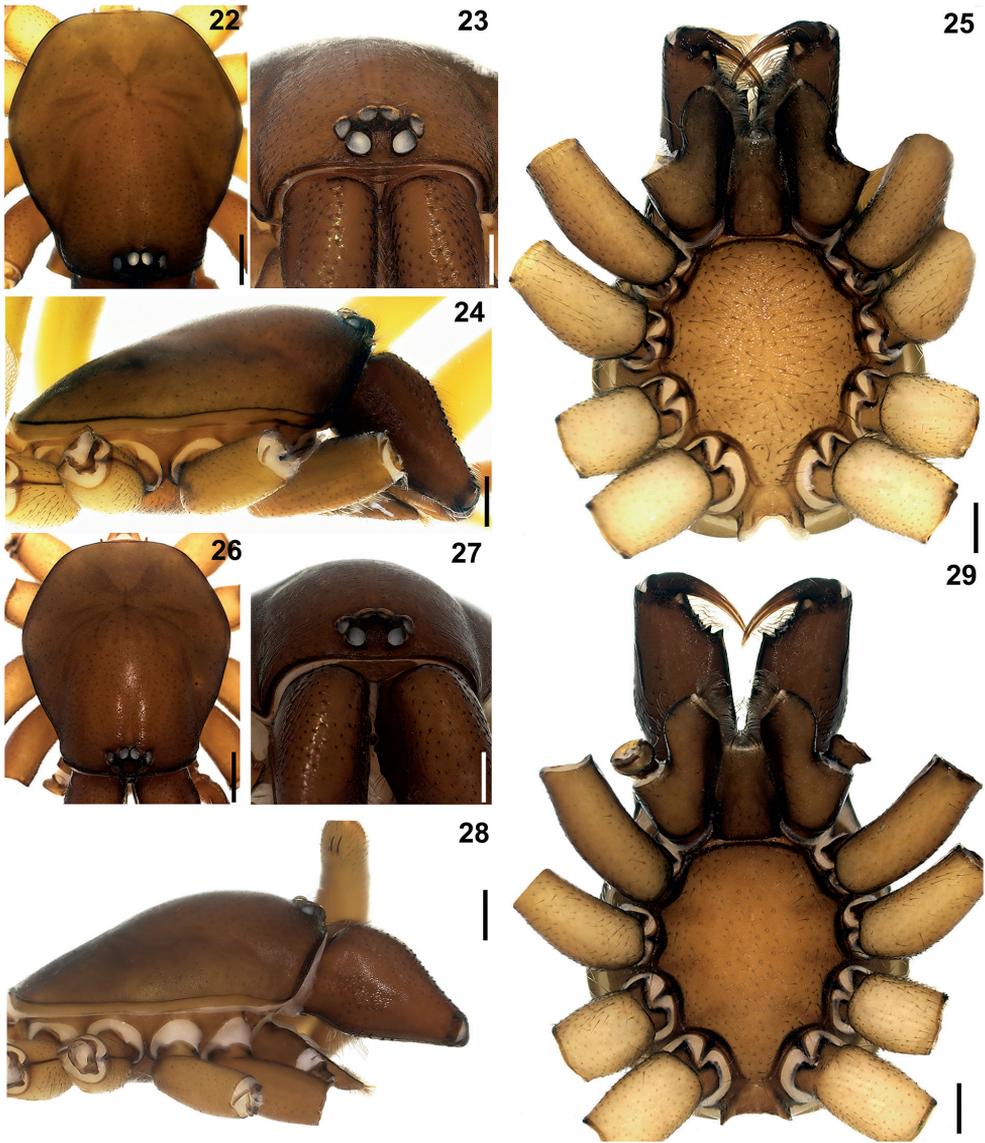
*Harpactocrates l.*: Brignoli, 1978: 463, f. 2, 8 (D ♂).

*H. l.*: Deeleman-Reinhold & Deeleman, 1988: 240, f. 13, 22, 320–325 (T ♂ from *Harpactocrates*, D ♀).

*H. l.*: Dunin, 1992: 41, f. 3 (♂ ♀).

**Material Examined:** 1 ♂, 1 ♀ (SMF) (abdomen heavily damaged during dissection) **Burdur Province**, Yeşilova District, side of Salda Lake [37°30'32.78"N; 29°41'56.66"E], 14.VII.2010, leg. E.A.Yağmur & M. Elverici.

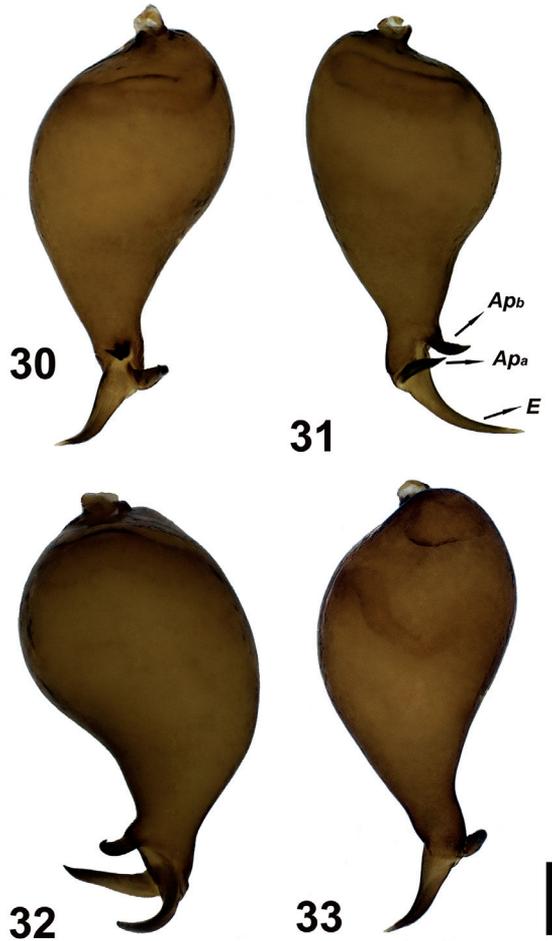
**Diagnosis:** *H. lycaoniae* can be distinguished from *H. caucasicus* by the pyriform shape of the bulbus (bulbus smooth and cylindrical in *H. caucasicus*) (see Dunin



**Figures 22–29.** *Hygrocrates lycaoniae* 22 (♂), 26 (♀) carapace, dorsal view 23 (♂), 27 (♀) ditto, anterior view 24 (♂), 28 (♀) ditto, lateral view 25 (♂), 29 (♀) ditto, ventral view. Scale lines: (22, 24, 25, 26, 28, 29) 0.5 mm; (23, 27) 0.25 mm

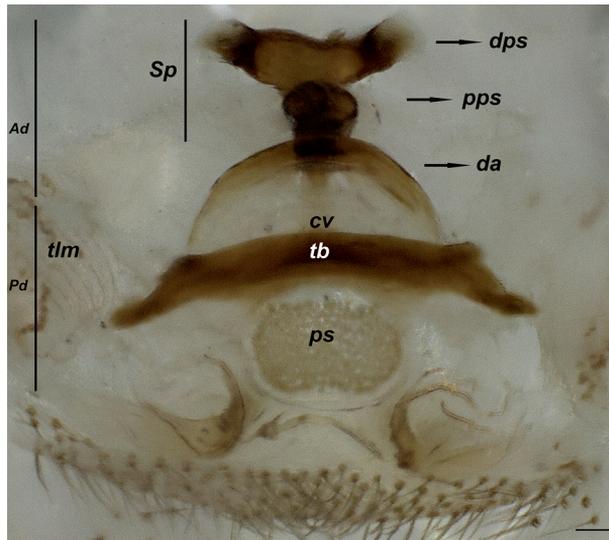
1992); and from *H. georgicus* by having apically oval-shaped spermathecae (see Mcheidze 1972).

**Note:** *H. caucasicus* was originally described on the basis of two males by Dunin (1992). The females of this species have not been collected yet, but the bulbal structures of the male palp were well illustrated by Dunin (1992). However, the information of *H. georgicus* is still insufficient. The following information was given by Dunin (1992:



**Figures 30–33.** Male palp of *Hygrocrates lycanoniae*. Abbreviations:  $Ap_a$  apophysis,  $Ap_b$  apophysis,  $E$  embolus. Scale line: 0.1 mm.

p. 60) in his review of the Caucasian Dysderidae (our translation!): “*H. georgicus* was described on the basis of the female holotype from Georgia: the vicinity of Tbilisi, Kodzhori, Udzho. The holotype was lost. The species was tentatively placed in *Hygrocrates* by Deeleman-Reinhold and Deeleman (1988). To confirm their placement additional material is required. This species is absent from my collection.” During the preparation of this paper, as a result of our correspondence with the Tbilisi Janashia Museum (Georgia) which retains the spider collection of Tamara Mcheidze, it is obvious that the holotype of this species is lost (S. Otto pers. comm.). Thus, we could not examine it, but on the basis of the original illustrations of the vulva by Mcheidze (1972), *H. georgicus* can be distinguished from the Turkish members of the genus by the linear distalmost part of spermathecae.



**Figure 34.** Vulva of *Hygrocrates lycaoniae*, dorsal view. Abbreviations: *Ad* anterior diverticulum *Pd* posterior diverticulum *Sp* spermatheca *dps* distalmost part of spermatheca *pps* proximalmost part of spermatheca *da* dorsal arch *cv* central valve *tb* transverse bar *ps* membranous sac *tlm* twisted lateral membranes. Scale line: 0.1 mm

**Measurements** (♂ / ♀): AL 3.36 / ?; CL 2.40 / 3.00; CW<sub>max</sub> 2.20 / 2.44; CW<sub>min</sub> 1.52 / 1.76; AM<sub>Ed</sub> 0.14 / 0.16; PLE<sub>d</sub> 0.13 / 0.15; PM<sub>Ed</sub> 0.11 / 0.12; ChF 0.77 / 0.79; ChG 0.45 / 0.50; ChL 1.30 / 1.46. Leg measurements are given in Table 3.

**Description:** General features of the body of *H. lycaoniae* closely resemble the new species (Figs 22–29), *H. deelemanus* sp. n., but the two are easily differentiated by their different body sizes and by structures of the male and female genitalia (Figs 30–33, 35–38). The males of the two species are easily distinguished in ventral view (90° angle) by the terminal part of the bulbus having the following characteristics:

1. Embolic base is pear-shaped in the two species, but the tip of the embolic base located at 12 o'clock in *H. deelemanus* sp. n. (Fig. 37) and at 10 o'clock in *H. lycaoniae* (Fig. 38).
2. Apophysis<sub>a</sub> and Apophysis<sub>b</sub> are short and blunt in *H. deelemanus* sp. n. (Fig. 37), but long in *H. lycaoniae* (Fig. 38).

**Table 3.** Leg measurements of *Hygrocrates lycaoniae*

(♂ / ♀)	Fe	Pa	Ti	Mt	Ta
Leg I	2.28 / 2.24	1.40 / 1.44	1.84 / 1.96	2.36 / 1.92	0.53 / 0.60
Leg II	2.08 / 2.00	1.44 / 1.40	1.85 / 1.72	1.92 / 1.80	0.50 / 0.56
Leg III	1.73 / 1.68	1.10 / 0.92	1.29 / 1.16	1.58 / 1.52	0.50 / 0.48
Leg IV	2.19 / 2.20	1.20 / 1.20	1.83 / 1.76	2.20 / 2.12	0.60 / 0.56



**Figures 35–38.** Comparison of the palps of the two species. **35, 37** *H. deelemanus* sp. n. **36, 38** *H. lycaoniae*. Abbreviations:  $Ap_a$  apophysis<sub>a</sub>,  $Ap_b$  apophysis<sub>b</sub>, *E* embolus.

3. Apophysis<sub>b</sub> originates near the tip of the embolic base in *H. deelemanus* sp. n. (Fig. 37), but originates from the central part of the tip of the embolic base in *H. lycaoniae* (Fig. 38).
4. Embolus is curved between Apophysis<sub>a</sub> and Apophysis<sub>b</sub> in *H. deelemanus* sp. n. (Fig. 37), but is raised from the embolic base and separated from Apophysis<sub>a</sub> and Apophysis<sub>b</sub> in *H. lycaoniae* (Fig. 38).

The females of the two species are easily distinguished by the form of the proximal-most part of the spermathecae which is oval in *H. deelemanus* sp. n. (Figs 20–21) and circular in *H. lycaoniae* (Fig. 34). Details of leg spination are given in Table 4.

### Habitat and distribution

The holotype of *H. lycaoniae* was collected from outside of Körükini Cave, which is located in Çamlık Village (Beşehir District, Konya Province). The vegetation surrounding the cave is the mixed forest composed of Taurus fir, juniper, oak and maple species. Annual and perennial herbaceous plants also grow very densely around the cave (Fig. 39). Although several field trips were conducted to the type locality, we failed

**Table 4.** Leg spination of *Hygrocrates lycaoniae*

	Leg I	Leg II	Leg III	Leg IV
♂				
C	0	0	0	0
Tr	0	0	0	0
Fe	Pl 2	Pl 1	D 1	D 2
Pa	0	0	0	0
Ti	0	0	Pl 1 Rl 1, 2 V 1, 2	Pl 2, 2 Rl 1, 1, 1 V 1, 2
Me	0	0	Pl 1, 1, 1 Rl 1, 1, 1 V 2, 2	Pl 1, 1, 1, 1 Rl 5 V 2
Ta	0	0	0	0
♀				
C	0	0	0	0
Tr	0	0	0	0
Fe	Pl 1–2	Pl 1	0	D 2
Pa	0	0	0	0
Ti	0	0	Pl 1 Rl 1, 2 V 1, 2	Pl 2, 2 Rl 2, 1 V 1, 2
Me	0	0	Pl 1 Rl 1, 1, 1 V 2, 2	Pl 1, 1, 1 Rl 1, 1, 1, 1 V 2, 2
Ta	0	0	0	0

to find any specimens of *H. lycaoniae*. However, our male and female specimens of *H. lycaoniae* were collected near to Salda Lake (Burdur Province), which is approximately 170 km apart from the type locality (Figs 40, 41). The specimens were collected in the leaf-litter of shrublands surrounding the Salda Lake. Deeleman-Reinhold and Deeleman (1988) collected their samples of *H. lycaoniae* from leaf litter and under stones of wetland areas in Rhodes island. Therefore, it is safe to conclude that *H. lycaoniae* prefers wetland habitats. We collected the samples of the new species, *H. deelemanus* **sp. n.**, from leaf litter under *Pinus nigra* trees (Fig. 42). Therefore it can be concluded that the two species are distributed in different habitat types of the Mediterranean.

## Discussion

In general, the taxonomy of the subfamily Dysderinae is well defined (see Deeleman-Reinhold and Deeleman 1988; Dunin 1992). To date, 24 Dysderinae species, including the newly described species, have been recorded from Turkey in the following four genera: *Dysdera* Latreille, 1804 (20 species), *Dysderocrates* Deeleman-Reinhold & Deeleman, 1988 (1 species), *Harpactocrates* (1 species) and *Hygrocrates* (2 species) (Bayram et al. 2010; present data). The diversity of Dysderinae is not very high compared to neighbouring Greece (36 species: 34 *Dysdera* species, 2 *Dysderocrates* species) and Georgia (28 species: 3 *Cryptoparachtes* species, 21 *Dysdera* species, 1 *Harpactocrates* species and 2 *Hygrocrates* species). Nevertheless, the Turkish Dysderinae fauna includes more species than the other neighbouring countries, such as Azerbaijan (17 species), Bulgaria (14 species) and Armenia (4 species) (Otto and Dietzold 2006; Helsingding 2010).



**Figures 39–42.** Habitats of *Hygrocrates* species. **39** The type locality of *H. lycaoniae* in Konya province **40, 41** Localities of *H. lycaoniae* in Burdur province **42** The type locality of *H. deelemanus* sp. n.

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# *Euastacus morgani* sp. n., a new spiny crayfish (Crustacea, Decapoda, Parastacidae) from the highland rainforests of eastern New South Wales, Australia

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## Abstract

*Euastacus morgani* sp. n., is described from a highland, rainforest site in Bindarri National Park, in eastern New South Wales, Australia. *Euastacus morgani* is found living sympatrically with two more common species, *E. dangadi* Morgan, 1997 and *E. neohirsutus* Riek, 1956. Systematically, the species belongs in the ‘simplex’ complex of the genus that includes *E. simplex* Riek, 1956, *E. clarkae* Morgan, 1997, *E. maccai* McCormack and Coughran 2008 and *E. morgani*. This new species differs from its nearest congener, *E. simplex*, in having three mesial carpal spines. A key to the ‘simplex’ complex is presented.

## Keywords

*Euastacus*, Parastacidae, montane, rainforest, spiny crayfish, Australia

## Introduction

The Australian spiny crayfish genus *Euastacus* Clark, 1936 is the most species-rich of all genera in the family Parastacidae, the southern hemisphere freshwater crayfishes. Clark (1936) erected the genus based on the type species *Cancer serratus* Shaw,

1794, a junior homonym later corrected to *Astacoides spinifer* Heller, 1865 (see Morgan 1986). Although Clark (1936) initially recognized six species, subsequent work would clarify that there were seven species contained within the material at that time, each of which had been recognized by a different authority at varying times over the preceding century. Clark (1941) also revised the genus, in the process describing two new species. Notable taxonomic contributions were later made by Riek (1951, 1956, 1969), who described 14 of the currently recognized species, and shortly thereafter a single species was described from far north Queensland by Monroe (1977). More recently, a revision of the genus was undertaken by Morgan (1983, 1986, 1988, 1989, 1997), whose comprehensive works resulted in the description of 17 new species, and was followed by a dramatic increase in research on the taxonomy, biology and ecology of the genus. Since then, eight additional species have been discovered and described, all from restricted highland areas of eastern and northern Australia (Short and Davie 1993; Coughran 2002, 2005; Coughran and Leckie 2007; McCormack and Coughran 2008).

In this paper, we describe a further new species from a highland, rainforest site in central eastern Australia. In 2003, a single specimen of this new species of *Euastacus* was discovered during a field survey in Bindarri National Park near Lowanna, New South Wales. Although photographs were taken, the specimen itself was subsequently lost. After many attempts to obtain further specimens from the original site and in the surrounding area, survey efforts finally yielded new specimens in 2008. We now present a formal description for *E. morgani* sp. n.

## Methods

Morphological terminology, character descriptions, size references and ratios follow those described by Morgan (1986). Orbital or ocular carapace length (OCL) is the standard index measurement for this genus, and extends obliquely from the eye socket to the dorsal posterior of the carapace (Morgan 1986). Specimens are deposited in the collections of the Australian Museum (AM) and the Australian Crayfish Project (ACP).

## Taxonomy

### *Euastacus morgani* sp. n.

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Figures 1–2

**Material Examined.** HOLOTYPE. AM P.84263, Australia, New South Wales, tributary of Little Nymboida River, upstream of Eastern Dorrigo Way road crossing near Lowanna, on periphery of Bindarri National Park, rainforest, 30.2288°S 152.9203°E, 25 March 2008, J. Coughran and R. B. McCormack, 30.88 mm OCL, female. PARA-



**Figure 1.** *Euastacus morgani* sp. n. Female specimen, ACP 1103.

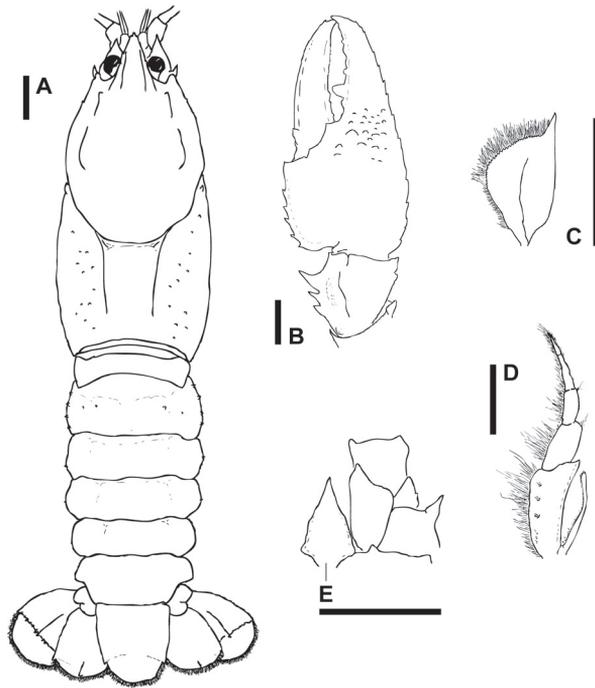
TYPES. AM P.84264–P.84266, type locality, 25 March 2008, J. Coughran and R. B. McCormack, 29.94–39.87 mm OCL, 2 females, 1 male.

**Other Material.** ACP 1101–1105, type locality, 25 March 2008, J. Coughran and R. B. McCormack, 22.41–31.65 mm OCL, 3 females, 2 males. ACP 1095–1096, type locality, 25 March 2008, J. Coughran and R. B. McCormack, 17.17–19.77 mm OCL, 1 male, 1 female. ACP 1098, type locality, 25 March 2008, J. Coughran and R. B. McCormack, 14.85 mm OCL, 1 male.

**Diagnosis.** Male cuticle partition present. Rostrum with 3 or 4 small marginal spines per side, extending to midlength. Suborbital spine of medium size. Thorax with 10–20 very small to small thoracic spines per side. Abdominal somites with tiny to small, moderately sharp to sharp Li and Lii spines. D-L and D abdominal spines present on somites 2–3 of some large specimens. Apical propodal spines absent. Ventral lateral propodal spine row moderately developed, usually with 4–5 centrally located spines. Spines above propodal cutting edge absent. Dactylus with 1 apical mesial spine and 1 dorsal mesial basal spine. Marginal dactylar basal spines absent. Dactylar finger with 1 or 2 tiny apical spines above cutting edge. Carpus with 3 mesial and 2 lateral spines. Ventromesial carpal spines smaller than ventral carpal spine. Setation light.

**Size.** The maximum size of specimens collected was 39.9 mm OCL.

**Description.** *Rostrum.* Rostrum short, usually reaching base of third antennal segment (occasionally not quite reaching base, and rarely extending as far as midlength of segment). Rostral sides slightly convergent to convergent, rostral bases divergent. Rostrum with 3 or 4 small marginal spines, extending to approximately rostral midlength,



**Figure 2.** *Euastacus morgani* sp. n. Dorsal view of body **A** and cheliped **B**, holotype specimen, AM P.84263. Dorsal view of antennal squame **C**, lateral view of third maxilliped **D** and ventral view of left hand side of cephalon showing interantennal scale **E**, specimen ACP 1103. Scale bars = 5 mm.

or beyond. Acumen similar in size to marginal spines. OCL/Carapace Length: 0.83–0.89. Rostrum Width/OCL: 0.16–0.19.

*Cephalon.* Numerous bumps and protrusions in cephalic region, with 1 (occasionally 2) on each side developed into more prominent, but small and blunt cephalic spine. First post-orbital ridge spine distinct but small. Second post-orbital ridge spine barely discernible to small; posterior to spine each ridge poorly developed initially, with large and swollen bump at posterior end. Suborbital spine medium in size, and acute.

*Antenna.* Basipodite spines small to medium. Coxopodite without distinct spines but with large, rounded development of coxopodal plate at mesial end. Interantennal spine of medium width and usually with slightly scalloped margins. Antennal squame lacking marginal spines, with near triangular inflation at midlength. Scale Length/OCL: 0.09–0.12.

*Thorax.* Thorax with 1–3 barely discernible to small cervical spines on each side, flattened and triangular in shape with moderate to sharp point. Dorsal thoracic spines present and numbering 10–20 on each side. Dorsal thoracic spines very small to small but distinct, and larger than general tubercles; spines highlighted against the

carapace by profile (raised, but blunt) and/or colour (yellow-brown, grey-brown, grey or blue-grey). General tubercles small to medium in size (very small on specimens <25 mm OCL), and of moderate density. Areola Length/OCL: 0.35–0.39. Areola Width/OCL: 0.16–0.21. Carapace Width/OCL: 0.53–0.62. Carapace Depth/OCL: 0.44–0.50.

*Sternal Keel.* Lateral processes to first pereopods (LPr1) slightly apart, slightly open to open in orientation, and with semi-abrupt posterior margins. LPr2 apart and with slightly open to open orientation. LPr3 narrow, and LPr4 of medium width. LPr2 to LPr4 all with distinctive, sharply defined margins, and sternal keel between both LPr2–LPr3 and LPr3–LPr4 entire and sharply developed.

*Abdomen.* Abdominal somite 1 lacking spines. Somite 2 with 3–5 tiny to small, moderately sharp to sharp Li spines. Somites 3–6 with 1 Li spine, decreasing in size posteriorly to be barely discernible on somite 6 (absent on some specimens <25 mm OCL). Frequently 1 or 2 small Lii spines on somites 3–6 of specimens > 20 mm OCL. Abdominal D-L spines present on somites 2–3 of one specimen, and on somites 2–6 of the largest specimen. Abdominal D spines also present on somites 2–3 of these two specimens only. Abdomen Width/OCL: 0.48–0.54 (male), 0.50–0.55 (female). OCL/Total Length: 0.39–0.43.

*Tailfan.* Standard tailfan spines small. Telson and uropods lacking surface and marginal spines. Telson Length/OCL: 0.33–0.37.

*First Cheliped.* Chelae usually intermediate in shape, occasionally elongate or stout.

*Propodus.* Dorsal lateral propodal spine row extending from apex to base of propodus. Ventral lateral propodal spine row less developed, with 1–6 (usually 4 or 5) more or less centrally located spines. Numerous bumps and protrusions lateral to dactylar base dorsally, of which 1 or 2 are usually distinctly larger. Bumps and protrusions also present on ventral surface of propodus lateral to dactylar base, often including 1–4 more prominently developed spines extending along propodal finger. Propodus with 5–7 mesial spines. Dorsal apical propodal spines absent. Two blunt spines at dactylar articulation. Propodal surface posterior to dactylar articulation lacking spines, with 2 or 3 distinctly deep punctuations. Pre-carpal area lacking spines, with occasional distinct punctuations. Spines above propodal cutting edge absent on both dorsal and ventral surfaces (2 barely discernible apical spines on dorsal surface of one specimen ACP1099). Prominent tooth near dactylar articulation. Propodus Length/OCL: 0.81–0.90 (male), 0.80–0.94 (female). Propodus Width/PropL: 0.46–0.50. Propodus Depth/Propodus Length: 0.26–0.31.

*Dactylus.* Usually 1 or 2 barely discernible to small apical spines above dactylar cutting edge (absent on one specimen). Spines above cutting edge absent on ventral surface. Dactylus with 1 apical mesial spine and 1 dorsal mesial basal spine. All other dactylar spines absent (one regenerate chela with a small marginal dactylar basal spine). Dactylar groove distinct. Dactylus Length/Propodus Length: 0.55–0.61.

*Carpus.* Carpus with 3 mesial spines, decreasing in size posteriorly; generally produced to sharp point. Lateral margin of carpus with 2 spines. Ventral surface of carpus with large, sharp ventral spine and 1 or 2 tiny to medium, blunt ventromesial spines. Dorsal surface

with deep groove; bearing 1–3 large, bluish-green, blunt bumps or spines (occasionally merging to effectively form raised ridge or boss) on dorsal surface mesial to groove.

*Merus.* Merus with 6 or 7 small to medium dorsal spines, and a barely discernible or small distolateral spine.

*Third Maxilliped.* Laterodistal corner of ischium produced to a distinct point. Exopodite shorter than or about as long as ischium (average  $0.93 \times$  ischium length).

*Gastric Mill.* Gastric mills were carefully extracted and examined for three specimens ranging in size from 29.94 to 39.87 mm OCL. Zygocardiac ossicle with 1.0–1.5 teeth anterior to ossicle ear (TAA), and 4.0–4.5 teeth anterior to posterior margin of ear (TAP), with tooth spread of 2.5–3.0. Urocardiac ossicle with 6 or 7 ridges.

*Setation and Punctuation.* Setae sparse and short. Sparse to moderate and fine punctuation on body. Chelae with occasional deep punctuations.

*Colouration.* Dorsally brown or green-brown with pale cream cephalic and cervical spines. Thoracic spines usually distinct from thorax background, and varying in colour (cream, grey, grey-brown or blue-grey). Abdominal somites marked heavily with blue laterally, with cream Li spines. First chelae mesially blue, with cream-tipped mesial propodal spines. Dorsal carpal bumps blue (often forming a raised, blue ridge). Walking legs blue-grey. Lateral propodal spines cream. Ventrally, a varying wash of pale blue-green, pink and orange, with a dull grey abdomen and tailfan. Merus of first cheliped and antennal bases vivid orange.

**Sexes.** Males with cuticle partition. Female specimens without fully mature gonopores. All female specimens have calcified gonopores that lack marginal setation. Gonopores of four largest female specimens (29.9–39.9 mm OCL) with slightly incised rims, those of largest specimen appear to be in state of decalcification, being partially membranous on mesial margins. Thus, it would seem that female maturity occurs close to 40 mm OCL.

**Etymology.** Named to honour Gary J. Morgan, whose landmark research on the Australian spiny crayfish genus *Euastacus* (Morgan 1983, 1986, 1988, 1989, 1991, 1997) has been pivotal to our understanding of these animals.

## Discussion

*Euastacus morgani* sp. n. is known only from the type locality, a highland (~600 m a.s.l.), rainforest site at the northern margin of Bindarri National Park, in a tributary to the Little Nymboida River (Figure 3). Two comparatively widespread species of *Euastacus* occur in the area, including a site in Little Nymboida River proximal to the type locality, *E. dangadi* Morgan, 1997 and *E. neohirsutus* Riek, 1956. We have surveyed numerous sites in the area, but our efforts yielded only these two more common species.

The species constructs a more or less horizontal burrow entrance from the water's edge back into the stream banks. The specimens were collected by probing these bank burrow systems by hand until the crayfish attempted to exit via another entrance hole,



**Figure 3.** Location of the type locality (black square) on the northern margin of Bindarri National Park, in central eastern Australia.

typically located 1–2 m further back from the creek on the adjacent forest floor. The successful sampling was undertaken at night.

Although the precise locality is uncertain, Gary Morgan collected juvenile *Euastacus* specimens at a nearby site ('Brimbin Creek', near Lowanna) that were too small for taxonomic determination, although they appeared to be different to all local species (Morgan 1983). Morgan (1983) collected these specimens in sympatry with *E. neohirsutus*, and observed differences to that species on the following taxonomic features: larger rostral carinae; larger antennal basipodite spine; better developed ventral lateral propodal spine row of the cheliped; lacking dorsal apical propodal spines; lacking spines above the cutting edge of the propodus. All of these characters are also true of *E. morgani*, and thus it is likely that the small specimens observed by Gary Morgan were juveniles of this new species.

*Euastacus morgani* appears most similar in morphology to *E. simplex* Riek, 1956. It can be distinguished among other characters by having: 3 instead of 2 mesial carpal spines on the cheliped; no spines above the propodal cutting edge of the cheliped; medium instead of barely discernible or small suborbital spines; poor development of the ventral lateral propodal spine row; a proportionally shorter interantennal scale; and a proportionally shorter exopodite and more pointed anterior terminus to the ischium of

the third maxilliped. Systematically, the species thus fits within the ‘*simplex*’ complex (Morgan 1997), which includes *E. simplex*, *E. clarkae* Morgan, 1997, *E. maccai* McCormack and Coughran, 2008, and *E. morgani*. A key is provided below to distinguish *Euastacus morgani* from other species in the ‘*simplex*’ complex.

The description of *E. morgani* increases the number of described species in this charismatic genus to 50 (Table 1). There are further taxa still awaiting formal description, and large areas of potentially suitable habitat that have yet to be surveyed. Unfortunately, 80% of *Euastacus* are considered to be threatened (Coughran and Furse 2010; Furse and Coughran in press a, b, c; IUCN 2010), and there is thus a sense of urgency for continued field surveys and taxonomic work on this genus. It would appear that *E. morgani* has a severely restricted, highland distribution, and may be susceptible to similar threats facing other species in the genus, particularly those relating to over-collection, exotic species and climate change (Furse and Coughran in press a, b, c). Further research into its ecology is warranted.

**Table 1.** Species of *Euastacus* and their current conservation status listing on the IUCN Red List of Threatened Species (IUCN 2010). Conservation status is provided in parentheses, as follows: **DD** Data Deficient; **LC** Least Concern; **VU** Vulnerable; **EN** Endangered; **CR** Critically Endangered.

<i>Euastacus armatus</i> (von Martens, 1866) (DD)	<i>Euastacus kershawi</i> (Smith, 1912) (LC)
<i>Euastacus australasiensis</i> (H. Milne Edwards, 1837) (LC)	<i>Euastacus maccai</i> McCormack & Coughran, 2008 (EN)
<i>Euastacus balanensis</i> Morgan, 1988 (EN)	<i>Euastacus madae</i> (Riek, 1956) (CR)
<i>Euastacus bidawalus</i> Morgan, 1986 (EN)	<i>Euastacus mirangudjin</i> Coughran, 2002 (CR)
<i>Euastacus bindal</i> Morgan, 1989 (CR)	<i>Euastacus monteithorum</i> Morgan, 1989 (CR)
<i>Euastacus bispinosus</i> Clark, 1941 (VU)	<i>Euastacus morgani</i> sp. n. (n/a)
<i>Euastacus brachythorax</i> Morgan, 1997 (EN)	<i>Euastacus neodiversus</i> Riek, 1969 (EN)
<i>Euastacus clarkae</i> Morgan, 1997 (CR)	<i>Euastacus neohirsutus</i> Riek, 1956 (LC)
<i>Euastacus claytoni</i> Riek, 1969 (EN)	<i>Euastacus pilosus</i> Coughran & Leckie, 2007 (EN)
<i>Euastacus crassus</i> Riek, 1969 (EN)	<i>Euastacus polysetosus</i> Riek, 1951 (EN)
<i>Euastacus dalagarbe</i> Coughran, 2005 (CR)	<i>Euastacus reductus</i> Riek, 1969 (LC)
<i>Euastacus dangadi</i> Morgan, 1997 (LC)	<i>Euastacus rieki</i> Morgan, 1997 (EN)
<i>Euastacus dharawalus</i> Morgan, 1997 (CR)	<i>Euastacus robertsi</i> Monroe, 1977 (CR)
<i>Euastacus diversus</i> Riek, 1969 (EN)	<i>Euastacus setosus</i> (Riek, 1956) (CR)
<i>Euastacus eungella</i> Morgan, 1988 (CR)	<i>Euastacus simplex</i> Riek, 1956 (VU)
<i>Euastacus fleckeri</i> (Watson, 1935) (EN)	<i>Euastacus spinichelatus</i> Morgan, 1997 (EN)
<i>Euastacus gamilaroi</i> Morgan, 1997 (CR)	<i>Euastacus spinifer</i> (Heller, 1865) (LC)
<i>Euastacus girurmulayn</i> Coughran, 2005 (CR)	<i>Euastacus sulcatus</i> Riek, 1951 (VU)
<i>Euastacus gumar</i> Morgan, 1997 (EN)	<i>Euastacus suttoni</i> Clark, 1941 (VU)
<i>Euastacus gurubgi</i> Coughran, 2005 (CR)	<i>Euastacus urospinosus</i> (Riek, 1956) (EN)
<i>Euastacus guwinius</i> Morgan, 1997 (CR)	<i>Euastacus valentulus</i> Riek, 1951 (LC)
<i>Euastacus hirsutus</i> (McCulloch, 1917) (EN)	<i>Euastacus woiwuru</i> Morgan, 1986 (NT)
<i>Euastacus hystricosus</i> Riek, 1951 (EN)	<i>Euastacus yanga</i> Morgan, 1997 (LC)
<i>Euastacus jagabar</i> Coughran, 2005 (CR)	<i>Euastacus yarraensis</i> (McCoy, 1888) (VU)
<i>Euastacus jagara</i> Morgan, 1988 (CR)	<i>Euastacus yigara</i> Short & Davie, 1993 (CR)

**Key to the ‘simplex’ complex of the genus *Euastacus***

- 1 Chelae with elongate, tapered fingers. Apart from one or two large molars, development of teeth on cutting edges of chelae distinctly reduced. Gape between fingers distinctly broad and lanceolate in shape ..... ***E. maccai* McCormack and Coughran**
- Chelae with stout fingers, without distinctive gape between fingers. Lesser cutting edge teeth of moderate size ..... **2**
- 2 Cheliped with 3 mesial carpal spines..... ***E. morgani* sp. n.**
- Cheliped with 2 mesial carpal spines..... **3**
- 3 Dorsal apical propodal spines present. Suborbital spine medium to large..... ***E. clarkae* Morgan**
- Dorsal apical propodal spines absent. Suborbital spine barely discernible to small..... ***E. simplex* Riek**

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# New records of *Caribbomerus* from Hispaniola and Dominica with redescription of *C. elongatus* (Fisher) and a key to species of the genus in the West Indies (Coleoptera, Cerambycidae, Cerambycinae, Graciliini)

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## Abstract

Three species of *Caribbomerus* Vitali are newly recorded for the Dominican Republic: *C. decoratus* (Zayas), *C. elongatus* (Fisher), and *C. asperatus* (Fisher). The first two also represent first records for Hispaniola. *Caribbomerus elongatus* (Fisher) is redescribed based on additional material, including the first known males. *Caribbomerus similis* (Fisher) is newly recorded for Dominica. A key to the species of the genus from the West Indies is provided.

## Keywords

Dominican Republic, Haiti, longhorned woodboring beetles, taxonomy, faunistics

## Introduction

Only one genus of Graciliini occurs in the West Indies, *Caribbomerus* Vitali (formerly known under the preoccupied *Merostenus* Walker and formerly placed in the Callidiopini) (Vitali and Rezbanyai-Reser 2003; Monné and Bezark 2010). *Caribbomerus* is most easily recognized by the following combination of characters: long, narrow body (4–11 mm long; 0.7–1.9 mm wide); elongate, usually parallel-sided elytra (elytron length 5–9 times its width); anterior coxal cavities closed posteriorly by a procoxal process which is extremely narrow between the procoxae and then abruptly widened

behind; coarsely faceted eyes; and antennae distinctly longer than body (in part, based on Martins and Galileo 2005). Other characters include: third antennomere distinctly shorter than all others (with exception of pedicel); elytral apex of most species impunctate and with integument smooth and distinctly paler than remainder; prothorax 0.16–0.25 length of body and widest at or near posterior third in most species.

Prior to Napp and Martins (1984), *Caribbomerus* was known only from the Antilles. With the species they described from Brazil, Mexico, and Jamaica, along with a species Micheli (2003) described from Puerto Rico, the number of species was increased to twelve.

Three species of *Caribbomerus*: *C. decoratus* (Zayas), *C. elongatus* (Fisher), and *C. asperatus* (Fisher) are recorded from the Dominican Republic (new country records) (unrecorded in Monné and Bezark 2010; Perez-Gelabert 2008). For the first two, Hispaniola represents a new island record. *Caribbomerus elongatus* is redescribed based on additional material (including newly discovered males) revealing broader morphological variation than reflected in the original description. All Hispaniolan *Caribbomerus* are restricted to the southern and southwestern parts of the Dominican Republic, along and southwest of the Cordillera Central (Fig 6). A key, table of measurements (Table 1), and photos (Figs 1–5) to all the species of *Caribbomerus* from the West Indies are provided.

## Methods

Most of the material examined in this study was collected by R. H. Turnbow, Jr. (RHTC), E. F. Giesbert (FSCA), J. Rawlins and R. Davidson (CMNH), and M. Ivie and K. Guerrero (WIBF). Holotypes are deposited in the Smithsonian Institution (USNM) and images are available in the online Smithsonian Primary Type database (Lingafelter et al. 2010).

Images were captured with a Zeiss AxioCam HRc camera mounted on a Zeiss Discovery V20 stereomicroscope with Sycop motorized zoom and focus control. Objectives used included a PlanApo S 1.0× and 0.63×. For illumination, a Zeiss KL 2500 LCD with ring light attachment was used. Axiovision software enabled preparation of montaged images and precise, automatically calibrated measurements.

In the course of this work, these collections and others were examined for *Caribbomerus* specimens. Nearns et al. (2006) was consulted for species in the Fernando Zayas collection as well as the online type image databases of the Museum of Comparative Zoology, Harvard University (MCZC 2010), and the American Museum of Natural History (AMNH 2010). The acronyms and contact persons are listed below:

**BMNH** The Natural History Museum, London, England (Sharon Shute, Max Barclay)

**CMNH** Carnegie Museum of Natural History, Pittsburgh, Pennsylvania, U.S.A. (J. Rawlins, R. Davidson, R. Androw)

- CNCI** The Canadian National Collection of Insects, Ottawa, Ontario, Canada (S. Laplante, O. Lonsdale)
- EFGC** Edmund F. Giesbert Collection (at FSCA), Gainesville, Florida, U.S.A. (M. Thomas, P. Skelley)
- FSCA** Florida State Collection of Arthropods, Gainesville, Florida, U.S.A. (M. Thomas, P. Skelley)
- FSPC** Frederick W. Skillman Private Collection, Pearce, Arizona, U.S.A. (F. W. Skillman)
- RHTC** Robert H. Turnbow, Jr. Private Collection, Ft. Rucker, Alabama, U.S.A. (R. H. Turnbow)
- USNM** National Museum of Natural History, Smithsonian Institution, Washington, DC, U.S.A. (S. Lingafelter)
- WIBF** West Indian Beetle Fauna Project, Bozeman, Montana, U.S.A. (M. Ivie)

***Caribbomerus elongatus* (Fisher)**

Figs 1–4, 5a,f, 6, Table 1

**Diagnosis.** Based on the availability of additional non-type material (including males), the variation within this species can now be more fully documented. Although the holotype female has uniformly pale testaceous antennae, the antennae of males are narrowly dark annulate at the apices of most antennomeres (except scape and pedicel). The pronotum of females is slightly swollen posteriorly and then moderately constricted at the base but in males it is nearly parallel-sided and not or barely wider at posterior third unlike most of the remaining species of the genus. The pronotum of both sexes is densely punctate throughout, but in some females there is a very small, vaguely defined median callus lacking punctures and surrounded by a slight depression. The pronotum and elytra have a coating of tawny, appressed pubescence which does not obscure punctures. The elytral apices are abruptly smooth and impunctate with the anterior margin of this region slightly depressed.

**Redescription.** Small size, 6.63–7.99 mm long; 1.19–1.82 mm broad; integument reddish-brown, with pronotum, head, and base of elytra slightly darker. Head with sparse, tawny pubescence not obscuring punctuation; sparsely but distinctly punctate. Eye lobe coarsely faceted; completely, widely separated; strongly protuberant laterally (nearly projecting as wide as humeri;) lower lobe occupying nearly all of head from lateral view; upper lobe much smaller; lobes connected by 5 facets at narrowest point; broadly separated by two-thirds width of pronotum on vertex behind antennal tubercles. Interantennal impression very deep with antennal tubercles strongly elevated in V-shape. Antennae of males extending approximately 1.5× length of body in males, 1.3× length of body in females; covered with fine, inconspicuous, short, translucent pubescence. Antennomeres 3–11 of males noticeably dark brown at extreme apices, otherwise, pale brown (antennomeres uniformly pale testaceous in females). Scape extending beyond anterior pronotal margin; integument smooth,



**Figure 1.** Habitus montage images of *Caribbomerus elongatus* (Fisher), male. **a** Dorsal **b** ventral.

not asperate. Other than antennomere 2, antennomere 3 shortest; remaining antennomeres successively increasing in length to 9; 9–11 subequal. Antennomere lengths as follows: scape: 0.59–0.95 mm; antennomere 3: 0.42–0.69 mm; antennomere 4: 0.75–1.14 mm; antennomere 5: 0.95–1.48 mm; antennomere 6: 1.21–1.86 mm. Pronotum distinctly longer than broad, cylindrical in male; distinctly narrower than elytral base (in female, less cylindrical, slightly swollen at posterior third); sparsely, tawny pubescent; distinctly punctate, but punctures small and non-contiguous; without distinct calli, but with small anterior and posterior depressions in male (female with small, vague middle callus surrounded by depression on pronotal disk). Pronotal length: 1.19–1.57 mm; pronotal width: 0.78–1.13 mm; pronotal length/width: 1.3–1.6. Pronotum about 0.18–0.19× length of body. Prosternum sparsely pubescent; densely, closely punctate. Elytron pale reddish brown, slightly darker at base

**Table 1.** Anatomical measurements (in millimeters) and proportions in West Indian *Caribbomerus* species. **BL** = body length; **EL** = elytron length; **EW** = elytron width; **PL** = pronotum length; **PW** = pronotum width.

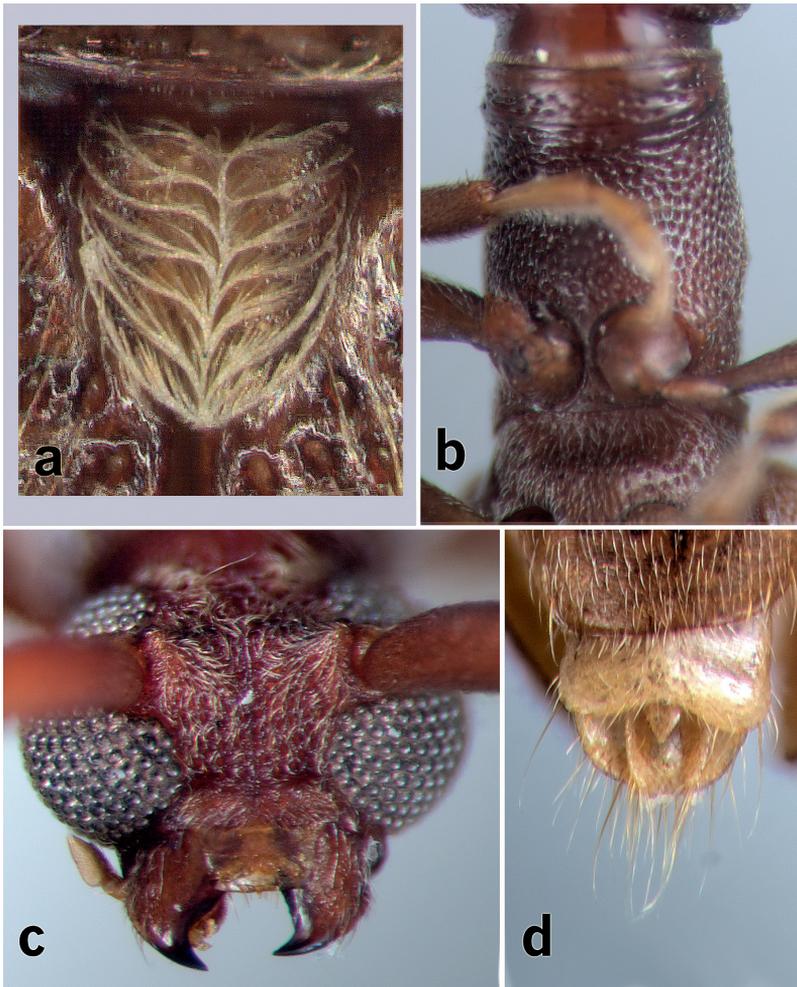
Taxon	BL	EL	EW	PL	PW	BL/PL	EL/EW	PL/PW
<i>asperatus</i>	4.27–6.53	2.50–3.73	0.46–0.78	0.94–1.61	0.78–1.32	4.5–5.6	4.8–5.4	1.2
<i>attenuatus</i>	4.08–5.38 <sup>1</sup>	2.67–3.52	0.46–0.56	0.84–1.26	0.74–0.90	4.3–4.9	5.8–6.3	1.1–1.4
<i>charynae</i>	5.81	3.71	0.53	1.05	0.88	5.53	7.0	1.1
<i>decoratus</i>	5.11 <sup>2</sup> –5.68	3.47–3.79	0.50–0.52	0.98–1.22	0.73–0.80	4.6–5.2	6.9–7.3	1.3–1.5
<i>elongatus</i>	6.63 <sup>3</sup> –7.99	4.62–5.49	0.49–0.76	1.19–1.57	0.78–1.13	5.1–5.6	7.2–9.4	1.3–1.6
<i>exiguus</i>	5.61 <sup>4</sup>	3.36	0.56	1.32	0.81	4.2	6.0	1.6
<i>picturatus</i>	4.4–4.5	2.8–2.9	0.40–0.45	1.00	0.60–0.65	4.4	6.4–7.0	1.6
<i>productus</i>	4.5–10.0	6.92	0.86	1.88	1.42	5.3	8.0	1.3
<i>similis</i>	5.92 <sup>5</sup>	3.78	0.54	1.18	0.99	5.0	7.0	1.1

- <sup>1</sup> Zayas (1975) reports on specimens from Cuba as large as 6.5 mm (outside the range I have seen).
- <sup>2</sup> Zayas (1975) reports the holotype as 4.5 mm (outside the range I have seen from Hispaniola).
- <sup>3</sup> Zayas (1975) reports a specimen as small as 5.5 mm (outside the range I have seen from Hispaniola).
- <sup>4</sup> Zayas (1975) reports a specimen as small as 4.0 mm.
- <sup>5</sup> Chalumeau and Touroult (2005) reports this species as large as 6.8 mm.



**Figure 2.** Antenna of *Caribbomerus elongatus* (Fisher) male.

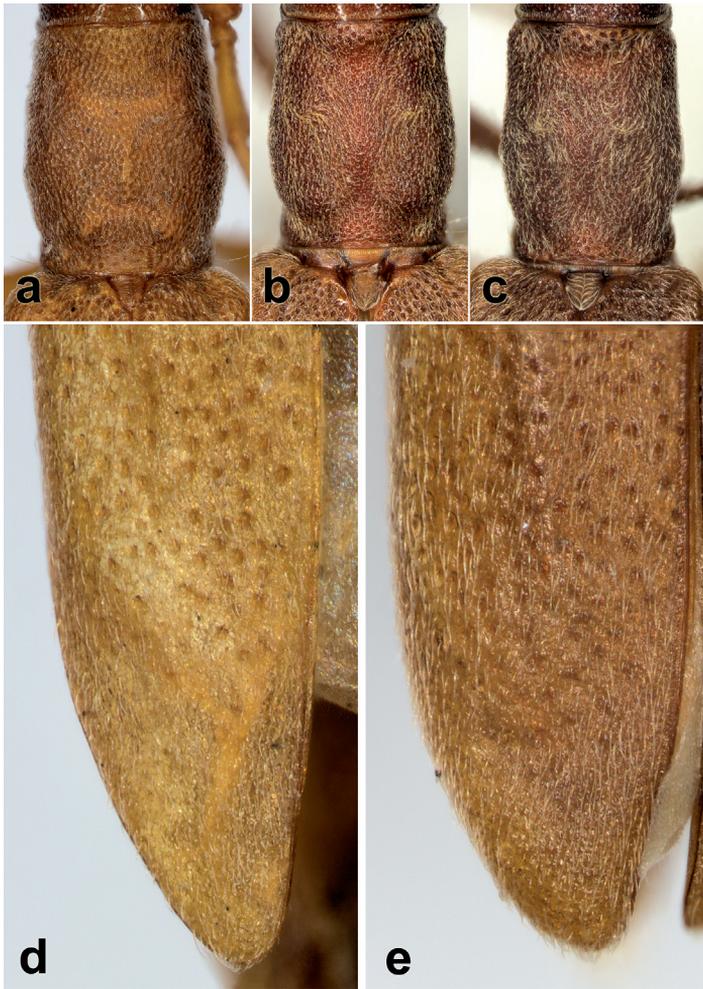
(with vague, darker areas at humerus, middle, and apical third in a few specimens); distinctly but separately punctate; punctures becoming slightly sparser posteriorly and then abruptly disappearing from apices; anterior margin of impunctate apices slightly depressed; sparsely tawny pubescent (pubescence becoming denser at apices); very long and narrow, narrowly rounded at apices. Elytron length: 4.62–5.49 mm; elytron width: 0.49–0.76 mm; elytral length/width: 7.2–9.4. Scutellum sparsely tawny pubescent; setae joining together and at middle; rounded posteriorly; not noticeably punctate. Hind Leg moderately long, but femur not attaining abdominal apex; reddish brown; sparsely covered in short pubescence, only weakly expanded apically. Tibiae (particularly metatibia) narrow, elongate, straight, somewhat darkened apically. Venter sparsely pubescent, darker than dorsum. Abdomen of both sexes with margin of fifth sternite evenly, broadly rounded.



**Figure 3.** *Caribbomerus elongatus* (Fisher) male. **a** Scutellum **b** Prosternum and mesosternum **c** head **d** apex of abdomen showing parameres.

**Discussion.** Using the key to *Caribbomerus* of Vitali and Rezbanyai-Reser (2003), this species would run nearest *C. howdeni* (Napp and Martins), a Mexican species, based on the coloration, and shape and pubescence of the pronotum. However, their key is incorrect in coding *C. elongatus* as having a glabrous pronotum. The holotype of *C. elongatus* (and all of the new material seen) clearly has translucent pubescence on the pronotum as noted in Fisher's (1932) description. This species, previously known by the female holotype from Cuba (Fisher 1932; Monné and Bezark 2010) and an unspecified number from Oriente, Las Villas, and Pinar del Rio provinces in Cuba as mentioned by Zayas (1975), is now documented for the Dominican Republic (new island & country record).

**Specimens.** Holotype (female): Cuba, Wajay, Havana, 15 December, 1930, S. C. Bruner, coll. (USNM). Dominican Republic: San Juan Prov., Sierra de Neiba, trail to Sabana de Silencio, 10 km SSW of El Cercado, 1650–1700 m, 10–11 July, 2006, A.



**Figure 4.** Pronotum. **a** *Caribbomerus elongatus* (Fisher) holotype female **b** *C. elongatus* (Fisher) female **c** *C. elongatus* (Fisher) male. Elytral apex. **d** *C. elongatus* (Fisher) holotype female **e** *C. elongatus* (Fisher) male.

Konstantinov, coll. 18°39.935'N; 71°31.964'W (1 male, USNM); Dominican Republic: Independencia Prov. P. N. Sierra de Bahoruco around Caseta no. 1, 18°16.038'N; 71°32.691'W, December 11-12, 2003, D. Perez, R. Bastardo, B. Hierro, RD#191 (1 male, USNM); Dominican Republic: Independencia, Sierra de Bahoruco, north slope, 13.5 km SE Puerto Escondido, 18°12'24"N, 71°30'54"W, 1807 m, 24-26 Mar 2004, R. Davidson, J. Rawlins, C. Young, C. Nuñez, M. Rial, broadleaf *Pinus* dense woodland, hand collected, Sample 41243 (1 male, CMNH); Dominican Republic: Independencia, Sierra de Bahoruco, Lomo del Toro, 18°17'16"N, 71°42'46"W, 2310 m, 7-8 November 2002, W. A. Zanol, C. W. Young, C. Staresinic, J. Rawlins, meadow in pine woods, hand collected, Sample 40149 (1 female, CMNH); Dominican Republic: Pedernales, 5 km NE Los Arroyos, 18°15'N, 71°45'W, 1680 m, 17-18 July 1990, J. E. Rawlins, S. Thompson (1 female, CMNH); Dominican Republic: La Vega Prov., Cor-

dillera Central, Loma Casabito, 15.8 km NW Bona, 19°02'12"N, 70°31'08"W, 1455 m, 28 May 2003, J. Rawlins, C. Young, R. Davidson, C. Nunez, P. Acevedo, evergreen cloud forest, east slope, UV light, sample 21312 (3 females, CMNH).

### *Caribbomerus decoratus* (Zayas)

Figs 5e, 6, Table 1

**Diagnosis.** This species is recognized by the densely, coarsely punctate pronotum with a distinct (and sometimes paler), mostly impunctate median longitudinal callus surrounded by less distinct and mostly punctate peripheral calli (one on either side). *Caribbomerus decoratus* (Zayas) is very similar to *C. picturatus* (Napp and Martins) which is known only from Jamaica. In both species, the elytra have a vague, pale macula at the middle near the suture and have the elytral apices impunctate and pale. The leg color of *C. decoratus* ranges from uniformly pale yellow to reddish-brown with the clavate portions of the femora darker than the rest of the legs (in *C. picturatus* (Napp and Martins) the legs are uniformly pale yellow and much paler than the dorsum). *Caribbomerus picturatus* also can be distinguished from *C. decoratus* by the heavy surface sculpture and contiguous punctation of the frons, vertex, and antennal tubercles. In *C. decoratus*, the punctures are sparse and not contiguous.

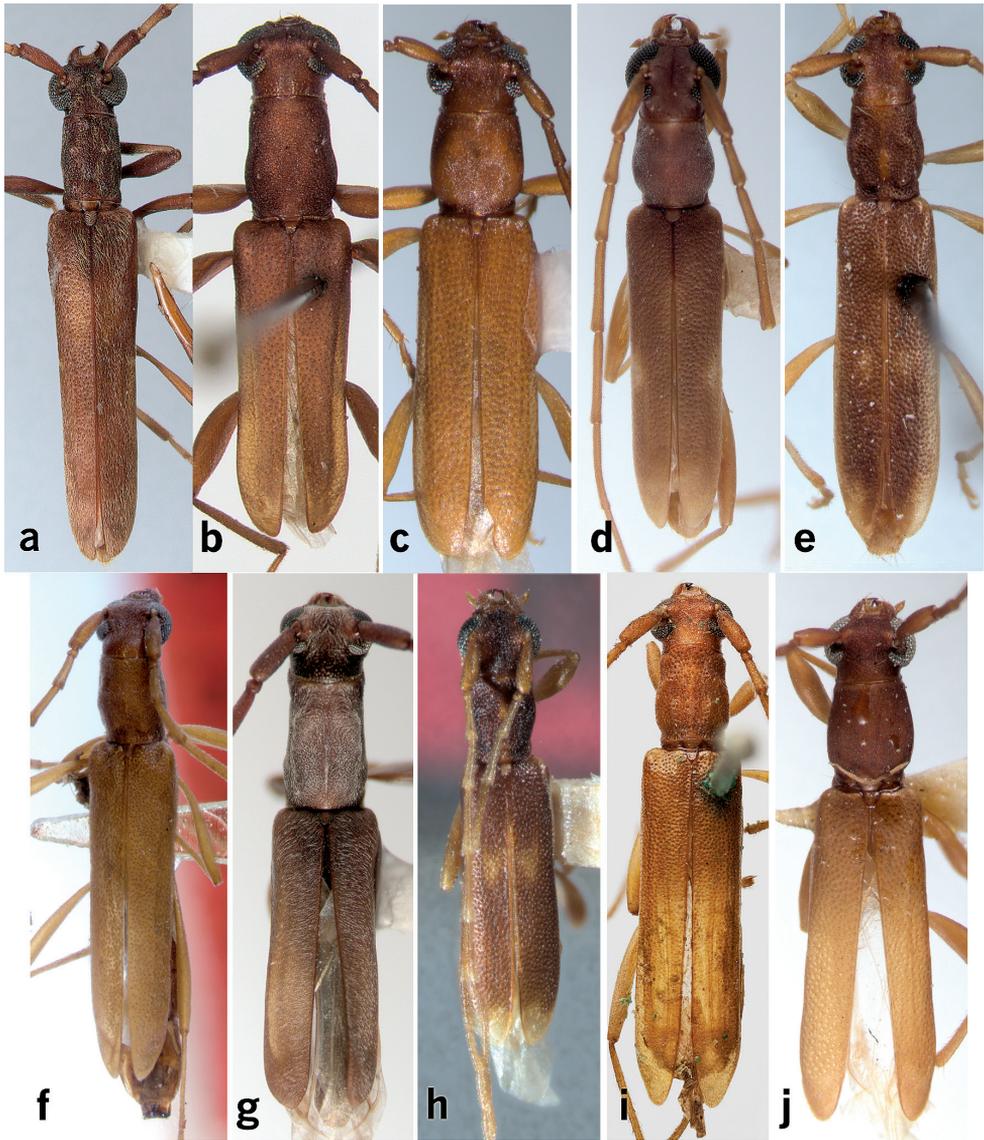
**Discussion.** This species was described by Zayas (1975) from Cuba. His description of the pronotum and exposed terminal tergites, among many other features, suggests that the photograph of this species is mislabeled in Nearn et al. (2006). In that paper, figure 5a should be *C. exiguus* (Zayas) and figure 5b should be *C. decoratus* (Zayas) (E. Nearn, pers. comm). This species, previously known only from Cuba (Zayas 1975; Monné and Bezark 2010), is now documented for the Dominican Republic (new island & country record).

**Specimens.** Dominican Republic: Prov. Barahona, nr Filipinas, Larimar Mine 26 June – 7 July 1992, Skillman, Skelley, Woodruff, blacklight (FSPC, donated to USNM); Dominican Republic: Barahona, vic. Filipinas, 1700', May 5-6 1985, E. Giesbert, coll (EFGC [FSCA]); Dominican Republic: Barahona, 2 km E. Payaso, 460 m, mv + bl, 13 July 1996, R. Turnbow (RHTC); Dominican Republic: Pedernales, Sierra Baoruco, 19 May 1992, R. Turnbow (RHTC).

### *Caribbomerus asperatus* (Fisher)

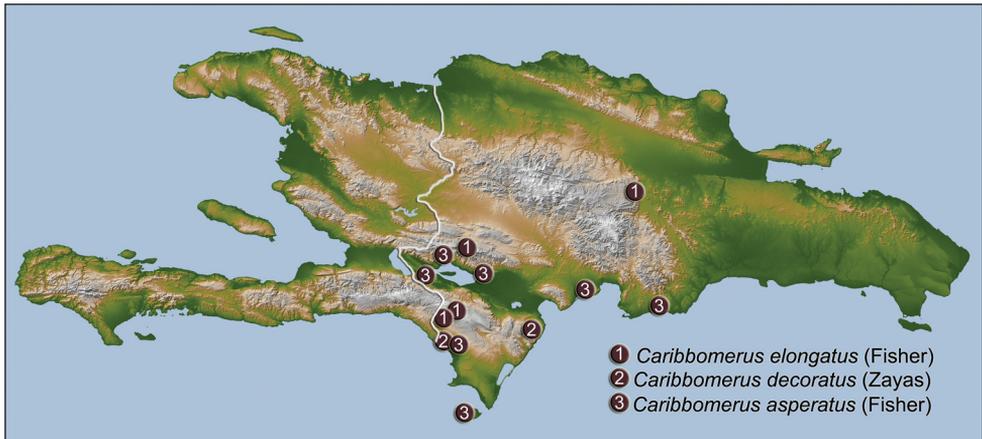
Figs 5b, 6, Table 1

**Diagnosis.** Like *C. attenuatus* (Chevrolat) and *C. similis* (Fisher), *C. asperatus* has a very diagnostic rugulose pronotum that lacks calli and pubescence. It is recognized by a combination of features that include the matte finish on the elytra, micropunctation between elytral punctures, relatively uniform reddish-brown coloration above, distinctly elevated antennal tubercles, and elytral apices not distinctly impunctate.



**Figure 5.** Dorsal habitus photographs of West Indian *Caribbomerus* species. **a** *C. elongatus* (Fisher) male **b** *C. asperatus* (Fisher) **c** *C. attenuatus* (Chevrolat) **d** *C. charynae* (Micheli) **e** *C. decoratus* (Zayas) **f** *C. elongatus* (Fisher) holotype female **g** *C. exiguus* (Zayas) **h** *C. picturatus* (Napp and Martins) **i** *C. productus* (White) **j** *C. similis* (Fisher).

**Discussion.** This is the most common species of *Caribbomerus* in Hispaniola. It was originally described based on specimens from Haiti, and has not been previously recorded from the Dominican Republic (Fisher 1932, Monné and Bezark 2010). With numerous collection records listed below, this species is now documented for the Dominican Republic (new country record).



**Figure 6.** Distribution map for the three *Caribbomerus* species known from Hispaniola.

**Specimens.** Dominican Republic: Pedernales Prov., 12 km N of Cabo Rojo, 18°03'N 71°38'W, 250–350 m, blacklight, 9 July 2004, Daniel Perez / Steve Lingafelter (5, USNM); Dominican Republic: Independencia Prov., 3 km up road from La Descubierta to Los Pinos, 15 July 2004, blacklighting, S. W. Lingafelter (4, USNM); Dominican Republic: Azua Prov., entrance to Boca Vieja Marina near Biyeya Beach, 23.iv.2004, 19°25'N 69°51'W, D. Perez, B. Hierro (night) RD#241 (3, USNM); Dominican Republic: Pedernales Prov., Cabo Rojo, Alcoa (EFGC [FSCA]); Dominican Republic: Pedernales Prov., 10.2 km N Cabo Rojo (EFGC [FSCA]); Dominican Republic: Bahoruco, 5.8 km SW Neiba, eastern playa of Lago Enriquillo, 3 April 2004, collector: J. Rawlins, R. Davidson, C. Young (CMNH); Dominican Republic: Isla Beata, near Pedernales, October (MCZC); Dominican Republic: Bani, August (MCZC); Dominican Republic: Pedernales Prov., Cabo Rojo, sea level, 22 August 1988, beating veg., M. A. Ivie, T. K. Philips, & K. A. Johnson colrs (WIBF); Dominican Republic: Independencia Prov., ESE Jimani, La Florida 18°24'N, 71°4'W, 20 m, at uv light 14 April 1993, M. A. Ivie, D. Sikes, W. Lanier (WIBF); Dominican Republic: Pedernales, 9.5 km N. Cabo Rojo, 33 m, 18°00.042'N, 71°38.793'W, 08 August 1999, lights and beating, M. A. Ivie, and K. A. Guerrero (WIBF).

### *Caribbomerus similis* (Fisher)

Figs 5j, Table 1

**Diagnosis.** Like *C. attenuatus* (Chevrolat) and *C. asperatus* (Fisher), *C. similis* (Fisher), has a rugulose pronotum that lacks calli and pubescence. It is distinguished from *C. asperatus* by having the integument mostly light reddish-brown in color with the elytra distinctly paler than the pronotum, having the antennal tubercles unelevated, and in

having the elytral apices distinctly impunctate. It is distinguished from *C. attenuatus* in having a matte integument with micropunctuation between punctures.

**Discussion.** This is an uncommonly collected species. It was originally described from two specimens from Antigua (Fisher 1932). Monné and Bezark (2010) record it from Barbuda. One specimen was examined in the USNM from Dominica and this is a **new country record**.

**Specimens.** Dominica: Grande Savane, February 3, 1965, J. F., G. C., and T. M. Clarke (USNM).

### Key to *Caribbomerus* of the West Indies

- 1 Pronotum with impunctate, non-rugulose, or non-asperate median callus..2
- Pronotum without impunctate, non-rugulose, or non-asperate median callus.....4
- 2(1) Elytra with pale spot near suture at middle .....3
- Elytra nearly uniformly colored, without pale spot at suture near middle. Cuba, Hispaniola..... *elongatus* (Figs 1–4)
- 3(2) Frons, vertex, and antennal tubercles with dense, contiguous punctation. Jamaica..... *picturatus* (Fig. 5h)
- Frons, vertex, and antennal tubercles with sparse punctation. Cuba, Hispaniola ..... *decoratus* (Fig. 5e)
- 4(1) Pronotum with distinct punctures .....5
- Pronotum without distinct punctures (either asperate or rugulose) .....6
- 5(4) Pronotum with dense, contiguous punctures throughout. Scutellum with distinct pubescence joining together at sides, apex, and middle as in Fig. 3a. Cuba, Hispaniola..... *elongatus* (Figs 1–4)
- Pronotum with punctures mostly separated by at least their diameter. Scutellum glabrous or with reduced pubescence (not as in Fig. 3a). Jamaica..... *productus* (Fig. 5i)
- 6(4) Pronotum coated with sparse, fine pubescence.....7
- Pronotum glabrous .....8
- 7(6) Pronotum much longer than wide (at least 1.5× width) with a narrow strip at middle that is devoid of pubescence; microsculptured and rugulose, but lacking asperites. Cuba..... *exiguus* (Fig. 5g)
- Pronotum only little longer than wide (about 1.1× width) without a narrow strip at middle that is devoid of pubescence; not microsculptured or rugulose, but with distinct asperites. Puerto Rico..... *charynae* (Fig. 5d)
- 8(6) Elytra with matte integument; with micropunctuation between punctures ...9
- Elytra with glossy integument; without micropunctuation between punctures. Cuba, Puerto Rico, Bahamas ..... *attenuatus* (Fig. 5c)

- 9(8) Light reddish-brown in color with elytra distinctly paler than pronotum; elytral apices distinctly impunctate; antennal tubercles not elevated, without noticeable depression between. Antigua, Barbuda, Dominica.....*similis* (Fig. 5j)
- Darker reddish-brown in color with elytra usually no lighter than pronotum; elytral apices not distinctly impunctate; antennal tubercles elevated with distinct depression between them. Hispaniola.....*asperatus* (Fig. 5b)

## Acknowledgments

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# New subgenus and new species of Oriental *Omophorus* (Coleoptera, Curculionidae, Molytinae, Metatygini)

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## Abstract

The genus *Omophorus* Schoenherr, 1835 is recorded for the first time from the Oriental Region and a new subgenus and species, *O. (Sinomophorus* **subgen. n.**) *rongshu* **sp. n.** is described from Yunnan province (P.R. China). The new subgenus differs from the subgenus *Omophorus* by the longer antennal club, the bifid vestiture of the ventral parts, the elongate subtrapezoidal scutellum, the very small size of sclerotizations in the endophallus, the absence of styli in the ovipositor and the absence of the spiculum ventrale on the VIII female sternite, and from the subgenus *Pangomophorus* Voss, 1960 by the developed metatibial uncus and the lack of a subhumeral tubercle. A detailed description and figures are provided to allow interpretation of characters in ongoing phylogenetic analyses.

## Keywords

Weevils, morphology, systematics, phylogeny, *Sinomophorus*, new species, Yunnan, China

## Introduction

The superfamily Curculionoidea Latreille, 1802 is a very speciose group of Coleoptera, and probably the family Curculionidae Latreille, 1802 (in its different limits) the most speciose in the Animal Kingdom; weevils, as they are known, currently comprise some 62,000 known species and an approximate analysis ranks the number of total species close to 220,000 (Oberprieler *et al.*, 2007). Consequently it is not strange to find undescribed taxa, particularly in provinces like Yunnan (P.R. China), a territory including part of two biodiversity hotspots, the Indo-Burman and the Mountains of Southwest China (Mittermeier *et al.*, 2000).

The tribe Metatygini was named by Pascoe (1888) as a subfamily of Curculionidae and included the type genus *Metatyges* Pascoe, 1865 (now a junior synonym of *Omophorus* Schoenherr, 1835) and the genus *Zantes* Pascoe, described as new then, apparently on the grounds only of the sharing of the “short outline” of the body in dorsal view.

Alonso-Zarazaga & Lyal (1999) placed the tribe Metatygini Pascoe, 1888 in the subfamily Molytinae Schoenherr, 1823 and recognised five genera in it, namely, *Omophorus* Schoenherr, 1835, *Physarchus* Pascoe, 1865, *Sternechosomus* Voss, 1958, *Teluropus* Marshall, 1917 and *Zantes* Pascoe, 1888. The last two are not members of this tribe and should be placed elsewhere (C.H.C. Lyal and R. Oberprieler, *pers. comm.*). *Physarchus* and *Sternechosomus* differ from *Omophorus* by the presence of projecting dentiform humeral calli, and also by the presence of 2 apical teeth on the underside of onychia (C.H.C. Lyal and R. Oberprieler, *pers. comm.*). At present, the genus *Omophorus* includes 5 African species in the subgenus *Omophorus* s. str. and one Papua New Guinean species in the subgenus *Pangomophorus* Voss, 1960. *Physarchus* includes 3 Oriental and Polynesian species, and *Sternechosomus* includes one species from Fujian (China) (see Appendix I for a species checklist with distributional data). However, some other undescribed species in the three genera have been found in collections (H. Kojima, C.H.C. Lyal, R. Oberprieler, *pers. comm.* and unpublished data). Even if *Teluropus* is not considered contribal, an evaluation of its placement should take into consideration that its type species has been recorded as damaging buds of *Artocarpus heterophyllus* (Moraceae) (Jha & Sen-Sarma, 2008), the same family of plants on which *Omophorus* feeds (Marshall, 1944; Taylor, 1978).

The discovery of a new member of this tribe in the collections of the Institute of Zoology of the Chinese Academy of Sciences (IOZ-CAS), that we consider a new species of *Omophorus*, and a second representative of this tribe in China, leads us to the following description.

## Materials and methods

Specimens of a new species were found while sorting out and identifying specimens in the collection of IOZ-CAS (Beijing, P.R. China). Some of them were dissected after

soaking them overnight in lukewarm soapy water and later rinsed with de-ionized water. Lukewarm 10% potash solution overnight was used for digestion of soft tissues. One defective male was completely dissected and mounted to study and photograph notal areas, metendosternite, wings, terminalia and genitalia. Description of these parts follows Davis (2009) and the references therein. Metendosternite nomenclature follows Velázquez de Castro (1998) and that of wings follows Zherikhin & Gratshev (1995); other special terminology follows the “Glossary of characters” hosted on the International Weevil Community Website (<http://weevil.info>).

The holotype of *O. rongshu* has not been dissected to avoid damage, since there were enough specimens collected with it. The holotype and some paratypes have been unpinned and glued to bristol pointcards, their parts mounted in DMHF (5,5-dimethyl hydantoin formaldehyde resin) in acetate cards pinned under each specimen. Other paratypes are as they were mounted after collecting, pinned through the right elytron base.

Descriptions were made using a binocular Zeiss Stemi SV11. Photographs were taken with a CCD Qimage MircoPublisher 5.0 RTV mounted on a Zeiss SteREO Discovery V.12. Extended focus images were generated with Auto-Montage Pro 5.03.0061 and edited with Adobe Photoshop CS 5.0 if required. Microscopic slides were studied under a Leica DM 2500 microscope and photos were taken with a Nikon CoolPix 5400.

Label data are given as they are (in Chinese), with pinyin romanization and comments in square brackets; labels are separated by semicolons and lines by slashes.

## Taxonomic treatment

### Genus *Omophorus* Schoenherr, 1835

**Type species.** *Omophorus stomachosus* Boheman, 1835. For a complete synonymy, check Appendix I. This genus includes two subgenera: *Omophorus* s.str., with five species showing an Afrotropical distribution and *Pangomophorus* Voss, 1960, with a single species described from Papua New Guinea. A new subgenus and species from China are described below:

### *Sinomophorus* subgen. n.

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**Type species.** *Omophorus rongshu* n. sp.

**Diagnosis.** It differs from subgenus *Omophorus* s.str. by the longer antennal club, the bifid vestiture of the ventral parts, the elongate subtrapezoidal scutellum, the very small size of sclerotizations in the endophallus, the absence of styli in the ovipositor and

the absence of a spiculum ventrale on the VIII female sternite, and from subgenus *Pan-gomophorus* by the metatibial uncus developed and the lack of a subhumeral tubercle.

**Etymology.** From Latin *Sina* (China) and genus *Omophorus*. Gender masculine, as *Omophorus*.

***Omophorus (Sinomophorus) rongshu* sp. n.**

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Figs 1–23

**Description** (holotype, except where indicated). *Measurements* (in mm): Standard length: 4.95. Rostrum: length: 1.08, maximum width: 0.43. Pronotum: median length: 1.09, maximum width: 2.01. Elytra: median length: 4.10, maximum width: 3.70.

*Integument.* Reddish brown, base and apex of elytra, a broad sutural band, venter of femora, parts of meso- and metasternum and their pleurites, and part of the 1<sup>st</sup> ventrite dark brown; apical margin of 2<sup>nd</sup>-4<sup>th</sup> ventrites and the whole 5<sup>th</sup>, antennal scape and funicle testaceous.

*Vestiture* on elytra of scarce, short, very fine, pale piliform scales, most numerous on extreme base of 2<sup>nd</sup>-3<sup>rd</sup> interstriae, on head and pronotum formed by the same scales, but denser and thicker, creamy to tan, on disc directed cephalad, on sides directed to midpoint of pronotum; on legs as on head and rostrum, but larger and whiter; on ventral areas, coxae, trochanters and ventral part of femora, vestiture of bifid piliform scales, each scale with a common stalk hardly longer than basal width of each branch. Sclerolepidia absent. Remnants of waxy-pulverulent, creamy to tan exudate in some parts of elytra and pronotal base.

*Rostrum* (Figs 3–4) 0.99 × as long as pronotum, in dorsal view 2.51 × as long as wide, with apex slightly bisinuate, sides subparallel, densely punctate, except smooth and shiny apical tenth, metarostrum with a median sulcus prolonged basad to hind margin of eye, ending apically at antennal insertion level; in side view metarostrum dorsally depressed, prorostrum a little narrowed to apex, ventral margin straight, forming a soft curve with underhead. Scrobes dorsally visible at apex, in side view almost straight, deep, narrow, upper margin directed towards lower angle of eye, but not reaching it, becoming obsolete, lower margin convergent with upper and evanescent; scrobes in ventral view not convergent, obsolescent against under margin of eye. Underside of rostrum densely punctate, with three low keels, the lateral ones ending at insertion level, the median one distally fusing with the submentum. Labium ca. 1.5 × as long as wide, sides weakly rounded, medially longitudinally impressed, apically truncate to weakly emarginate, 1.5 × as long as labial peduncle, labial palps invisible; maxillary palp 3-segmented. Mandibles tridentate, overlapping. No postmandibular sensory setae.

*Head* in dorsal view subglobular, densely and subrugosely punctate, medially sulcate up to occiput, frons narrow, ca. 0.5 × as wide as rostral apex, in side view frons weakly convex; eyes moderately large, slightly convex, ca. 1.5 × higher than long, transversely elliptical, some 16 ommatidia in longitudinal diameter.

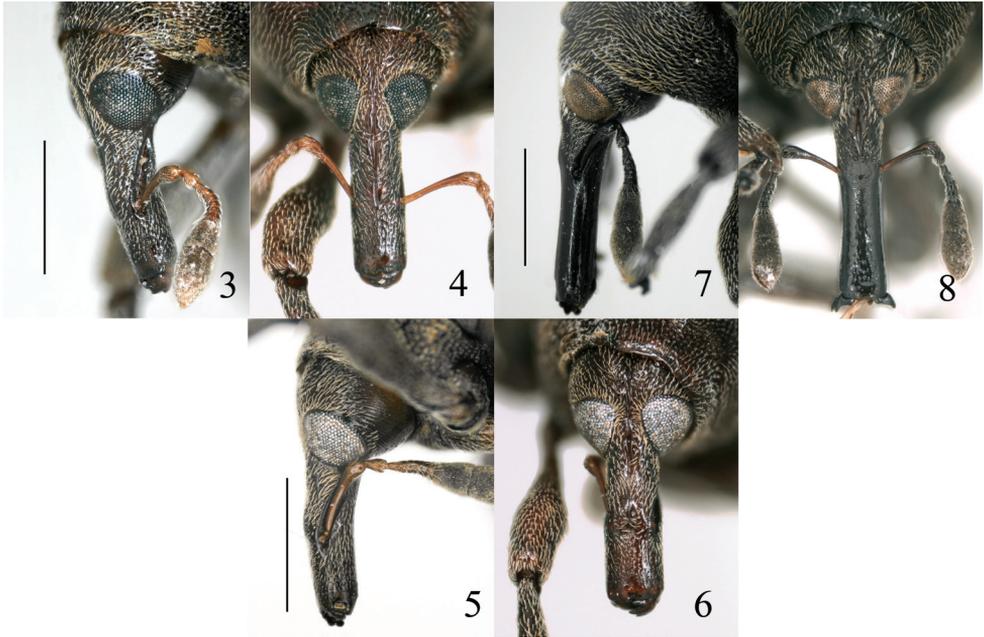


**Figures 1–2.** *Omophorus* (*Sinomophorus*) *rongshu* sp. n., male holotype, habitus. **1** dorsal view **2** lateral view. Scale: 1–2: 2 mm.

*Antennae* inserted at basal 0.49 of rostrum, with scape  $5.58 \times$  as long as wide and  $1.09 \times$  as long as funicle, slightly clubbed and bent at apex, glabrous except pubescent apical club, 1<sup>st</sup> desmomerite  $1.7 \times$  as long as wide, obconical, well separated from 2<sup>nd</sup>, this also obconical and  $1.56 \times$  as long as wide, but slightly narrower than 1<sup>st</sup> and  $0.82 \times$  as long as it, desmomeres 3<sup>rd</sup>–6<sup>th</sup>  $2.0 \times$  as wide as long, tightly packed and increasing in width apicad, 7<sup>th</sup> annexed to club,  $3.0 \times$  as wide as long and covered with a denser vestiture than others; club of 3 segments, suture between 1<sup>st</sup> and second obliterated, almost invisible, that between 2<sup>nd</sup> and 3<sup>rd</sup> narrow but visible, so that apparently the club is bisegmented, last segment  $1.3 \times$  as long as remainder of club, whole club  $2.54 \times$  as long as wide,  $1.69 \times$  as long as funicle.

*Pronotum* in dorsal view  $1.85 \times$  as wide as long, its base  $1.79 \times$  as wide as apex, bisinuate, with marginal keel, median lobe weakly and widely emarginate, surface densely punctate at base and on disc, punctures oblong, ca.  $60 \mu\text{m}$  long, separated half their diameter or less, on sides and apical third smaller,  $30 \mu\text{m}$  or less, widely spaced, a small median smooth and shiny tubercle just behind the faint collar constriction. Basal angles rounded-subtruncate.

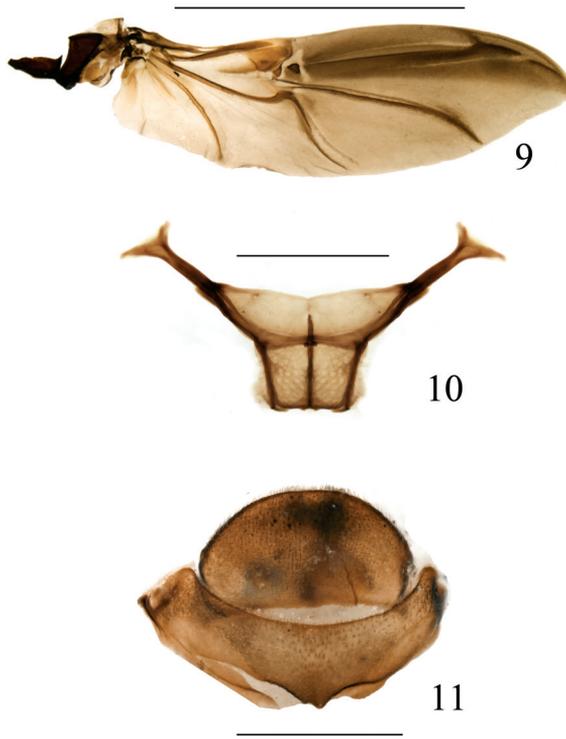
*Mesonotum* (Fig 18). Scutellum  $0.82 \times$  as long as wide, large, trapezoidal, wider at base, sides sinuate, apex subtruncate, slightly bituberculate, each tubercle with short setae, surface densely and rugosely punctate, punctures as small as those on apex of pronotum. Prephragma well developed, strongly prominent, antecostal sutures straight, meeting at middle in an obtuse V, mesoscutum smaller than scutellum. Axillary cord laterally prominent as a round lobe, joining in a soft curve the postero-lateral margin of mesonotum.



**Figures 3–8.** *Omophorus (Sinomophorus) rongshu* sp. n., head and rostrum. **3** male holotype, dorsal view **4** male holotype, lateral view **5** male from Xinping, dorsal view **6** male from Xinping, lateral view **7** female paratype, dorsal view **8** female paratype, lateral view. Scale: 3–8: 1 mm.

*Metanotum* (Figs 14–15). In general shape, anterior part forming a vertical wall with a very narrow, transversal opening. Anterior margin of prescutum with a pair of prominent teeth and a deep median notch. Antero-medial margin of allocrista rounded. Scutellar groove wide, its anterior margin widely open with a small elevation on each side, without anterior bridge, with a median longitudinal obtuse elevation, not keeled. Metascutum about as large as metascutellum, separated from it by a straight postero-medial margin. Postero-lateral margin of metanotum with a strong, laterally and slightly caudally pointing tooth, and a round lobe in front of it bearing two teeth. Postnotum small, strongly transverse, well separated from metascutum and metascutellum.

*Elytra* (Fig 1) 1.11 × as long as wide, base of interstriae 2–4 convergent and prominent cephalad, covering base of pronotum, humeri moderately convex, sides of elytra widening from under the calli, widest at middle, uniformly rounded to apex, apices very narrowly rounded separately, sutural angle small, subacute. Striae 10, widely sulcate, with rows of small inner punctures, forming irregular aggregates separated by bridges uniting interstriae, giving a moderately foveolate aspect, each puncture with a subarcuate seta hardly as long as half the interstitial ones, and finer; interstriae weakly convex, subequal in width, with 2–3 irregular rows of extremely minute punctures (less than 6 μm in diameter), surface almost smooth, weakly microreticulate, first interstria strongly microreticulate, transversally rugose, more convex behind scutellum. Striae at apex join 1+10, 2+9, 3+8, 4+5, 6+7, 10<sup>th</sup> marginal and obsolete in apical fourth, with



**Figure 9–11.** *Omophorus* (*Sinomophorus*) *rongshu* sp. n. **9** paratype, metathoracic wing **10** male paratype, metendosternite **11** female paratype, VII-VIII tergite, dorsal view. Scales: 9: 5 mm; 10–11: 1 mm.

a strong outer keel in basal  $\frac{3}{4}$ , 11th interstria completely facing ventrally from base up to level of abdominal suture III; at base, 1<sup>st</sup> shortened and reaching the level of apical third of scutellum, 2<sup>nd</sup>-4<sup>th</sup> convergent towards basal lobe of elytron. Internal submarginal fold well developed, strongly curved. Sutural flanges dissimilar, that on the left elytron wider, in basal part turned vertical, that on the right elytron narrower, parallel to elytral surface in its whole length. Underside with small, inconspicuous superficial file of stridulatory system type 1 (Lyal & King, 1996) near apex.

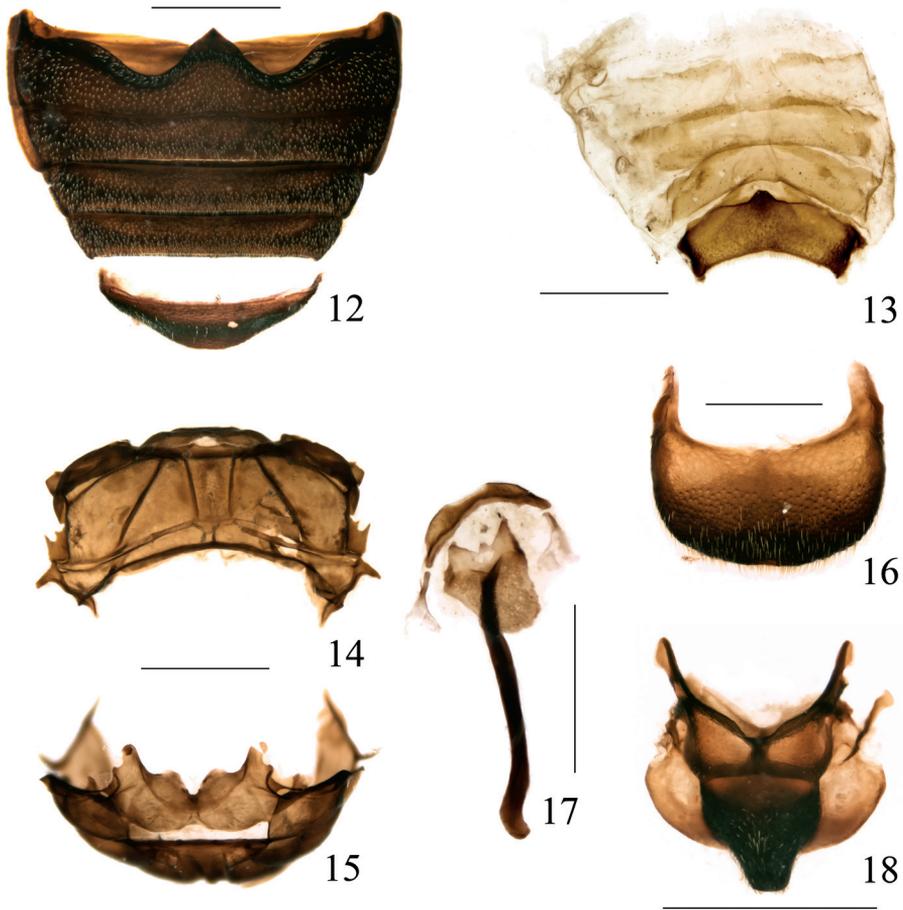
*Metathoracic wing* (based on 2 paratypes) (Fig. 9). A typical curculionid wing, ca.  $3.1 \times$  as long as wide, with the surface covered with microtrichia. C, Sc and R without special characters. Rr undifferentiated in the apical half, rm and rms appearing as a single unit, rfi, rcm and rc forming a single plate in which rcm is weakly distinguishable as a small elongate trait. 1rs and 2rs form separate plates, united posteriorly to rsc. R3 present, thin, incomplete; anterior stripe thinner than the postradial stripe. M1 thin, parallel to mst, and joining it near apical third of mst length. Cu uniting to Cu1 with a strongly arched loop, Cu1 following to near margin as af. 1A1 and 1A2 absent. A strong, weakly arched, not reaching margin, 3A very weak, stripe-like, not closing ac. Basal sclerites: Br and Bsc fused.

*Ventral area.* Procoxal cavities separated from front margin of prothorax a distance twice that separating them from hind margin. Mesosternum very short, vertical in front, forming a steep angle in side view; meso-metasternal median suture not evident, replaced with a weak transverse sulcus; mesepisternum fused to mesosternum, mesosternal suture indicated by a small depression; mesepimeron triangular, fused to mesepisternum, mesopleural suture visible, anteriorly deepened, not functional. Metasternum fused medially to mesosternum, suture not visible, replaced with a weak sulcus, this joined in middle by a median longitudinal sulcus running from base to apex of metasternum, deeper at apex; a prominent transverse tubercle in front of metacoxae, forming a vertical step; metepisternum elongate-trapezoidal, apical angles a little produced laterally, the upper angle fitting in a small notch on the elytral costal margin, basal margin rounded; metasternal suture visible, complete, functional; metepisternum much reduced, covered by elytron. Abdomen (Fig 12) with 2<sup>nd</sup> ventrite as long as 3<sup>rd</sup> medially, 4<sup>th</sup> shorter (0.9 ×), 5<sup>th</sup> 1.19 × as long than 4<sup>th</sup> and 4.97 × as wide as long, 1<sup>st</sup> ventrite 1.94 × as long as second in median length, 1.11 × as long as 2<sup>nd</sup> in postcoxal length. First ventrite strongly raised across basal margin, 5<sup>th</sup> weakly depressed across middle. Suture I deep, weakly bisinuate, sutures II-IV functional, straight, slightly curved backwards at outer angles.

*Metendosternite* (based on 1 paratype) (Fig 10): Stalk weakly trapezoidal and transverse, anterior part of longitudinal flange shorter than posterior, hemiductus robust, projection as long as wide, furcal arms long, apically clearly bifurcate, anteroventral branch shorter than laterodorsal one. Insertions of anterior tendons at the same distance as angles formed by margins of stalk and sheath.

*Legs.* Procoxae contiguous, subconical. Mesocoxae separated by a distance 1.4 × the mesocoxal diameter. Mesocoxae and metacoxae separated 0.8 × the mesocoxal diameter. Metacoxae separated 0.5 × the distance between mesocoxae. Metacoxae transversely elongate, reaching the outer front angles of 1<sup>st</sup> ventrite, outer part covered by meeting lobes of metasternum and 1<sup>st</sup> ventrite, thus apparently very narrow. Trochanteral seta present. Femora edentate, robust (profemur 3.38 × as long as wide). Tibiae robust (protibia 4.06 × as long as wide), sides subparallel, inner margin very weakly bisinuate, not crenulate. Tibial unci raising from middle part of talus, leaving an outer angle and an inner praemucro, metatibial uncus shorter than others. Tibial comb complete, on almost transverse margin of talus. Front tibiae with a patch of dense golden setae near front inner apical angle, above comb, a grooming area also present in apical inner margin. Tarsomeres moderately robust, 1<sup>st</sup> protarsomere 1.67 × as long as wide, 2<sup>nd</sup> 0.73 ×, 3<sup>rd</sup> 0.65 ×, with complete ventral sole, except for narrow glabrous midline, onychium 3.7 ×, surpassing lobes of 3<sup>rd</sup> by 0.38 × length of onychium. Claws free, simple, divaricate, short and robust, as long as onychium height in side view.

*Abdominal tergites* (based on 1 paratype) (Fig 13). Tergites I-III weakly sclerotized, submembranous; spiracular sclerites a little more sclerotized, round; tergites IV-VI more sclerotized, mostly in two marginal fasciae on each side of front margin; tergite VII (prepygidium) trapezoidal-semilunate, front median area with a



**Figures 12–18.** *Omophorus* (*Sinomophorus*) *rongshu* sp. n., male paratype. **12** ventrites, ventral view **13** tergites II-VII, dorsal view **14** metanotum, dorsal view **15** metanotum, frontal view (dorsum below) **16** tergite VIII, dorsal view **17** sternites VIII and IX, dorsal view **18** mesonotum, dorsal view. Scales: 12–15, 17: 1 mm; 16, 18: 0.5 mm.

transverse keel, the keel triangularly prominent at middle and apex of prominence bearing 2 small tubercles (pectra of stridulatory system type 1 of Lyal & King (1996)), the left one more developed than the right one, one transverse binding patch near the front angles; tergite VIII (pygidium) (Fig 16) more or less semicircular, front angles prominent, with one basal binding patch each, the apical area densely punctate, hispid.

*Male genitalia and terminalia* (based on 1 paratype). Sternite VIII (Fig 17) undivided, semilunar, apex widely emarginate, more sclerotized basally, the membrane between this and the sternite IX with 2 very small, dot-like sclerotizations. Sternite IX with hemisternites fused between them and to the front margin of the spiculum

gastrale to form an irregular subpentagonal plate, widely notched caudad; spiculum robust, directed towards left side of abdomen, almost straight, apex weakly hooked. Penis (Fig. 20) in dorsal view with tube 1.32 mm in length and temones 1.17 mm, tube ca.  $3.2 \times$  as long as wide, apex ogival, subacute, sides rounded, with a small apical peg, widest at basal 4<sup>th</sup>, temones fused; in lateral view moderately and uniformly curved at sides, highest at basal 3<sup>rd</sup>, apical peg rounded; a subobtusate ventral longitudinal keel present. Endophallus without large sclerotized structures, covered with very dense, minute ( $2.5 \mu\text{m}$  long) teeth, some longer teeth forming several diffuse longitudinal streams. Tegmen (Fig. 19) with ring narrow, manubrium about as long as parameroid lobes, these widely spaced at base, lanceolate, slightly asymmetrical, apex and inner margin desclerotized, covered with minute translucent microchaetae, those at apex ca.  $25 \mu\text{m}$  long.

**Variation. Male paratypes.** Measurements (in mm) (n=7): Standard length: 4.40–5.30 (mean= 4.85). Rostrum: length: 1.08–1.22 (mean= 1.15), maximum width: 0.38–0.46 (mean= 0.42). Pronotum: median length: 0.91–1.20 (mean= 1.06), maximum width: 1.90–2.20 (mean= 2.05). Elytra: median length: 3.70–4.30 (mean= 4.00), maximum width: 3.05–3.95 (mean= 3.50).

*Rostrum*  $0.98\text{--}1.11 \times$  as long as pronotum, in dorsal view  $2.57\text{--}2.88 \times$  as long as wide, sides varying from subparallel to visibly but weakly widened towards apex in an almost straight line. *Pronotum*  $1.79\text{--}2.09 \times$  as wide as long in dorsal view. Scutellum with sides more or less straight and apex more or less rounder to weakly notched, the apical tubercles more or less separated and variably prominent. *Elytra*  $1.08\text{--}1.25 \times$  as long as wide.

**Female paratypes.** Measurements (in mm) (n=7): Standard length: 4.60–5.30 (mean= 4.95). Rostrum: length: 1.42–1.56 (mean= 1.49), maximum width: 0.38–0.44 (mean= 0.41). Pronotum: median length: 1.04–1.28 (mean= 1.16), maximum width:



**Figures 19–21.** *Omophorus (Sinomophorus) rongshu* n.sp., male paratype. **19** tegmen, dorsal and lateral views **20** penis, dorsal and lateral views **21** male from Xinping, penis, dorsal and lateral views. Scales: 19: 0.5 mm; 20–21: 1 mm.

1.95–2.30 (mean= 2.13). Elytra: median length: 3.70–4.55 (mean= 4.13), maximum width: 3.20–3.90 (mean= 3.55).

As males, but *rostrum* (Figs 7–8) 1.21–1.37 × as long as pronotum, in dorsal view 3.55–3.74 × as long as wide, in dorsal view pronotum glabrous, with sides gently curved, constricted at middle, minutely and sparsely punctate, punctures weak, metarostum with sides weakly converging to mesorostum, punctate and pubescent as in male; in side view straight, dorsal and ventral margins of pronotum parallel; underside almost impunctate, subglabrous. *Head* with frons ca. 0.63 × as wide as rostral apex. *Antennae* inserted at basal 0.42 of rostrum, shorter, scape about as long as funicle, club 1.25 × as long as funicle.

*Pronotum* 1.79–1.95 × as wide as long in dorsal view. *Elytra* 1.05–1.25 × as long as wide.

*Tergites* VII and VIII (Fig 11) similar to those of male, tergite VIII less convex, semicircular, rather flat, with one small (functional?) spiracle on each side.

*Female genitalia and terminalia* (based on 2 paratypes) (Fig 22): Sternite VIII heart-shaped, with a wide apical sinus, most of it membranous and thin, laterally sclerotized, setose and with multiple sensilla, medially broadly membranose to base; basal convergent margins a little folded and sclerotized; spiculum absent. Ovipositor with gonocoxites robust (ca. 3.5 × as long as maximum width), moderately curved, weakly constricted at middle, rounded at apex, without styli, a small apicomedial fovea carrying a short, thick tuft of setae; dorsal surface with a membranous elongate triangular area, pointing apicad; ventral surface with a rounded longitudinal finlike flap; outer surface covered with moderately dense sensilla. Bursa irregular, large, wrinkled, with some small irregular sclerotized areas near the point of union of the spermathecal duct and of the oviduct. Spermatheca C-shaped, large (ca. 0.43 × as long as the 8<sup>th</sup> sternum wide), with a long, apically rounded cornu not clearly differentiated from the spermathecal body



**Figure 22.** *Omophorus (Sinomophorus) rongshu* sp. n., female genitalia. Scale: 1 mm.

(nodulus), except for the dorsal gibbosity, collum about as long as nodulus, ramus absent. Spermathecal gland ca.  $3.2 \times$  as long as maximum length of spermatheca.

**Common variability.** The specimens show some variation in colour, mostly a lesser presence of the dark brown colouration on elytra, restricted to some basal spots and an apical patch, or to a lining of the bottom of the elytral striae, the apical margin of the ventrites, the sides of pronotum and the basal two thirds of the rostrum, the other areas remaining reddish brown, or all the head and rostrum may become also of the same colour. Legs may also show different variations. No variation has been noticed in vestiture, but the pronotal median tubercle may be more or less covered with punctures in different individuals.

**Material examined.** Holotype: ♂: (white, handwritten): 云南路西 [Yúnnán Lùxī] / 1958.6.26; (white, handwritten): 中国科学院, 榕树 [Zhōngguó Kēxuéyuàn, róngshù] 575; (white, printed): IOZ (E) 909962. Paratypes (12♂, 7♀): same data as holotype: 2♂ labeled IOZ(E) 909960, IOZ(E) 909961 and 1♀ labeled IOZ(E); 1♂, same data as holotype except date 1958.6.27 and IOZ(E) 909962 with same data as holotype except for collecting date: 1958.VI.27; 8♂, same data as holotype except date 1958.6.30 and IOZ(E) 909948, IOZ(E) 909949, IOZ(E) 909950, IOZ(E) 909954, IOZ(E) 909957, IOZ(E) 909958, IOZ(E) 909959, IOZ(E) 909963; 6♀, same data as holotype except date 1958.6.30 and IOZ(E) 909946, IOZ(E) 909951, IOZ(E) 909955, IOZ(E) 909956, labeled IOZ(E)1799147, IOZ(E)1799150; 1♂: (white, handwritten): 云南瑞丽 [Yúnnán Ruìlì] 1958.7.6; (white, handwritten): 中国科学院, 榕树 [Zhōngguó Kēxuéyuàn, róngshù] 688; (white, printed): IOZ(E) 909964.

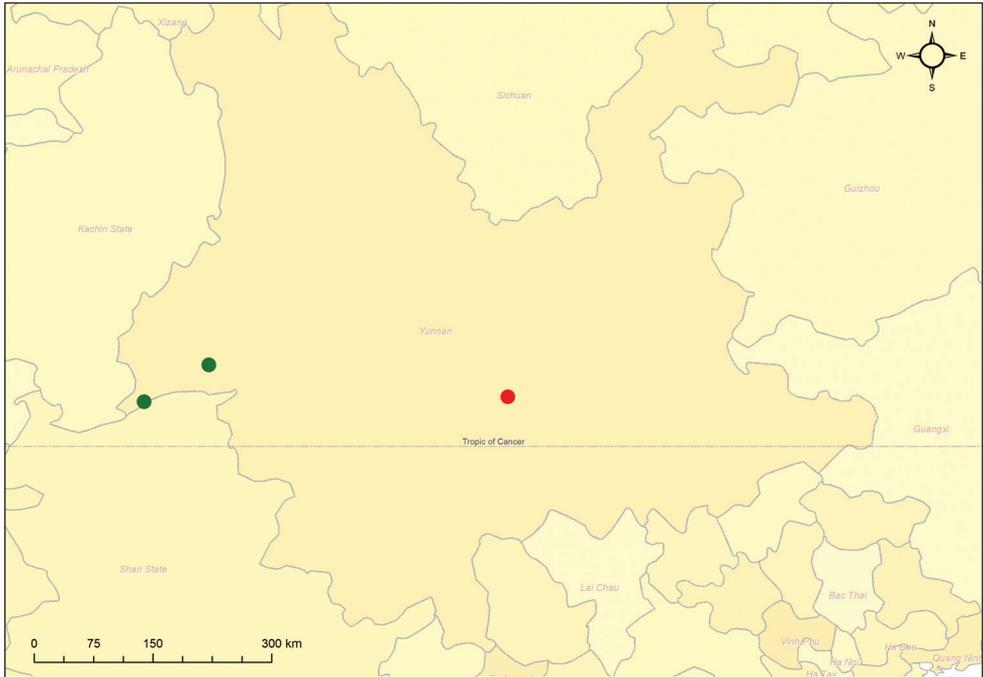
Holotype and all paratypes to be conserved in IOZ-CAS, except one male and one female paratype to be deposited in MNCN-CSIC (Madrid) and another paratype couple in the NHM (London).

The first character used to write the second place name (Lùxī) is incorrect. It should have been 潞. The only Yunnanese locality named 路西 is found at more than 2,000 m height.

**Etymology.** The specific epithet is a pinyin transliteration (without diacritics) of the indication of the host plant on the labels, róngshù (榕树), which is applied to *Ficus microcarpa* L.f. (Moraceae) (Zhou & Gilbert, 2003). It is used as a noun in apposition.

**Distribution and habitat.** The species is known from two close localities in Yunnan province (P.R. China): Lùxī (575 m) and Ruìlì (688 m), separated by 87 km, but see below (Fig 23). No exact data about the biology of this species are known, except the identity of the host plant on which the specimens were captured, a common tree below 1900 m in the area, and widely planted as a shade tree (Zhou & Gilbert, 2003).

**Note.** One male has not been included in the type series, because it differs from the specimens collected in the two above mentioned localities as follows: *Rostrum* (Figs 5–6) more visibly widened towards apex, more robust ( $2.49 \times$  as long as wide,  $0.93 \times$  as long as pronotum). Scape more robust ( $5.30 \times$  as long as wide) but longer ( $1.23$



**Figure 23.** *Omophorus* (*Sinomophorus*) *rongshu* sp. n., distribution map. Red dot is Xīnpíng.

× as long as funicle), 2<sup>nd</sup> desmomere more robust (1.36 × as long as wide), 3<sup>rd</sup>-6<sup>th</sup> desmomeres 2.7–3.7 × as wide as long, club more robust (2.39 × as long as wide) and shorter (1.42 × as long as funicle). *Pronotum* narrower, in dorsal view 1.67 × as wide as long. *Scutellum* as long as wide. *Abdomen* with 2<sup>nd</sup> ventrite 1.2 × as long as 3<sup>rd</sup>, 4<sup>th</sup> as long as 2<sup>nd</sup>, 5<sup>th</sup> 4.65 × as wide as long, 1<sup>st</sup> ventrite 1.66 × as long as 2<sup>nd</sup> in median length, 0.89 × as long as 2<sup>nd</sup> in postcoxal length. *Mesocoxae* separated by a distance 1.2 × the mesocoxal diameter. *Profemur* more robust, 3.0 × as long as wide, protibia more slender (5.43 × as long as wide). *Onychium* surpassing lobes of 3<sup>rd</sup> tarsomere by 0.5 × length of onychium. *Penis* (Fig 21) similar, but more constricted medially in dorsal view, and ventral angle sharper (in cross-section).

Label data for this specimen are as follows: (white, two marginal faded red lines, pencil handwritten): 黑尾棕象甲 [Hēi Wěi Zōng Xiàng Jiǎ] / 新平 [Xīnpíng]; (white, faded red lined, field names printed, handwritten): 新平 [Xīnpíng];, 80年; (white, printed): IOZ(E)1799122. The first label corresponds to an intent of identification in Chinese (the brown weevil with black tail) and the locality; the second repeats the locality Xīnpíng (Yunnan, China) and includes only the year of collection [19]80. This locality is separated from the closest one, Lùxī, by ca. 347 km (Fig 23).

Although some of the differences, notably those of the proportions of the ventrites and of the antennomeres, could be taken as enough to describe a different species, we prefer to wait until a series from the latter locality can be studied. These differences may be individual or populational, and the erection of a new taxon unjustified.

## Discussion

The genus *Omophorus* was placed in its original description between *Tylomus* Schoenherr, 1835 and *Rhinaria* W. Kirby, 1819, in Schoenherr's Divisio Erirhinides, a conglomerate of unrelated long-nosed weevils with contiguous procoxae. The first genus is now a member of the tribe Sternechini Lacordaire, 1863 (Curculionidae: Molytinae) and the second is in Aterpini Lacordaire, 1863 (Curculionidae: Cyclominae) (Alonso-Zarazaga & Lyal, 1999; Oberprieler, 2010), two widely different and distantly related subfamilies. Lacordaire (1863) did not know the genus. In his description of its synonym *Metatyges*, Pascoe (1865) could not find a close relative, although he suggested a similarity to *Haplonyx* Schoenherr, 1836 (Curculionidae: Curculioninae, Cryptoplini) because of the short, stout form. Marshall (1917) placed his new genus *Teluropus* and *Physarchus* Pascoe, together with *Omophorus*, in a new subfamily Omophorinae, without mentioning the characters on which this taxonomic decision was based. This placement was also recorded in the World Catalogue (Schenkling & Marshall, 1936). Kuschel (1987) placed Omophorini as a tribe of Molytinae, and synonymized Sternechosomini Voss, 1958 with it, without any further comment on the characters which substantiated this action, although this rank had already been used by Voss (1967).

Neither of the above mentioned authors made reference to H. Jekel (1873), who was the first to compare this genus with other taxa (which have remained similarly poorly known): Gonipterini Lacordaire, 1863, *Rachiodes* Schoenherr, 1835, *Physarchus*, and Sternechini Lacordaire, 1863, and with the more distant, in his opinion, *Paipalesomus* Schoenherr, 1847 and *Peribleptus* Schoenherr, 1843 (now considered to be synonyms), although based on characters which still need an evaluation.

There are no known detailed descriptions of the members of the genus *Omophorus* or of any other Metatygini. The most modern description is that of *O. boxi* by Marshall (1944), who only gave a dorsal picture of the whole animal, the description being aimed at species recognition. We have benefited from the available quantity of material and completely dissected one male that lacked head and pronotum, to procure details on structures that, even if they are not useful for species recognition, may cast light on the phylogenetic relationships to other groups, a subject now in debate among specialists in the group.

Among the characters that can be of phylogenetic use, we want to emphasize the wing, the meso- and metanotal structures and the peculiar conformation of the female tergite VII.

The wing of *O. rongshu* is very similar to that figured for *Trigonocolus curvipes* by Davis (2009, fig. 839), except for the strong loop of the union Cu-Cu<sub>1</sub>, the shortening of af, that does not meet the wing margin and is not bisinuate, the absence of 1A<sub>1</sub> and 1A<sub>2</sub>, the longer rm and the more sclerotized 1rs and 2rs. They share the strong weakening of 3A. The apparent presence of 1A<sub>1</sub> and 1A<sub>2</sub> in *T. curvipes* could be an artefact of Davis's picture and could correspond in fact to thin folds, as they usually appear in wing preparations, since the wing surface is never perfectly flat. A strong loop in the

union Cu-Cu<sub>1</sub> is also visible in the wing of *Cyllophorus fasciatus*, a species probably not very close phylogenetically.

The meso- and metanota present similarities to some other taxa presented by Davis (*l.c.*). The broadly developed mesonotal axillary cord is a character commonly found in Baridinae, *Trigonocolus* and some Conoderinae, while a reduced axillary cord is found in some Curculioninae, Cossoninae, Ceutorhynchinae and some Conoderinae (the latter having been already considered probably paraphyletic in a phylogenetic analysis by Davis (2011)). The metanotum shows a peculiar widely rounded union of the posteromedial margin of metascutum and the allocrista, so that the anterior meeting point is distant from the front margin of the scutellar groove (in most species pictured by Davis the union forms an acute angle and the meeting point is precisely the point where allocrista and margins of scutellar groove meet anteriorly). This particular character is also found in *Trigonocolus* in a lesser degree. The strongly prominent, dentate axillary areas are, however, distinctive.

The dorsally uncovered VIII tergite of females (similar to that of male) is a distinctive character. It is exposed by the VII tergite being widely notched apically, an uncommon feature. So far, an uncovered female VIII tergite has been recorded only in Brachyceropseini, Ulomascini, Ectemnorhinini and Sitonini (Thompson, 1992). The first tribe has been related to Lithinini in Molytinae (Oberprieler, 2010), while the second is usually placed in Curculioninae. The third and fourth are in Entiminae, although the placement and rank of the latter have been questioned (Morimoto *et al.*, 2006). The configuration of the terminal segments of abdomen in most of the hypothetically related taxa is unknown, and maybe this is an autapomorphy of the genus.

The distribution of some characters used in the systematics of Curculionidae is, so to speak, erratic and there is no certainty that their presence or absence is a proof of monophyly. Unci on the three pairs of tibiae are a common feature in several tribes in Curculioninae and they have been lost in some other groups (Cossoninae, Molytinae) in at least one pair (usually the hind one). Thus the presence of unci alone is a questionable synapomorphy to delimit monophyletic taxa (Curculioninae vs. Molytinae). The same can be said of the type 1 of stridulatory system (Lyal & King, 1996) and of the sclerolepidia (Lyal *et al.*, 2006). The hypothesis of the placement of the tribe Metatygini in Molytinae (Kuschel, 1987) cannot be falsified with the data here presented. Some of the characters here presented point to possible relations to other tribes in and out of the Molytinae. McKenna *et al.* (2009) showed a phylogenetic tree based on Bayesian analysis in which the sister group of Scolytinae was a poorly resolved set of species belonging to several subfamilies of higher Curculionidae: Baridinae (*s.l.*), Curculioninae, Molytinae and Cossoninae. Even if the sampling was not complete, this result points out the complexity of a further analysis of the subdivisions. The two main branches of this higher group lacked support, the Molytini were found closely related to *Curculio* (no support) and to *Cossonus* (no support), while the Lixinae were placed near *Baris*. If this division into two groups deserves recognition, the Molytini Schoenherr, 1823 would have to be downgraded to a tribe of Curculioninae Latreille, 1802, and the Baridini Schoenherr, 1836 (*s.l.*) to a tribe of an extended Lixinae Schoenherr,

1823. However, no morphological characters are known supporting this division. On the other hand, a further effort should be made for the inclusion in the molecular phylogenies of species of the genus *Rhamphus* Clairville, 1798 and its relatives of the tribe Rhamphini Rafinesque, 1815, which has priority over the latter two family-group names, to achieve some nomenclatural stability when the molecular phylogenies had to be considered.

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## Appendix I

Checklist of tribe Metatygini. The countries are in bold, the provinces in small capitals, general localities in inverted commas.

Genus *Omophorus* Schoenherr, 1835: 479 [type species: *O. stomachosus* Boheman, 1835, by original designation]

*Metatyges* Pascoe, 1865: 424 [type species: *Metatyges turritus* Pascoe, 1865 by subsequent designation by Pascoe, 1870: 444; syn. Marshall, 1917: 195]

(*Omophorus*)

*boxi* Marshall 1944: 350

*cupreus* Pascoe 1870: 443 (*Metatyges*)

*nicodi* Hustache 1925: 22 (syn.: Marshall 1944: 351)

*hacquardi* Chevrolat 1881: 89 (*Metatyges*)  
comb. n. (1)

*indispositus* Boheman 1845: 447

*parvus* Faust 1899: 416 (*Metatyges*) (syn.: Marshall, 1917: 195)

*occidentalis* Fairmaire 1902: 135 (syn.: Marshall 1944: 351)

*stomachosus* Boheman 1835: 480

*turritus* Pascoe 1865: 424 (*Metatyges*) (syn.: Marshall 1917: 195)

**Kenya:** EASTERN: Kabete; NAIROBI: Nairobi

**Benin; Ghana;** “widely distributed in West Africa” [Marshall 1944: 351]

**Tanzania:** MOROGORO: Mhonda

**Angola:** BENGUELA: Benguela; **D.R. Congo:**  
BAS-CONGO: Boma, Banana-Boma; SUD-  
UBANGI: Zambi

**South Africa:** “Caffraria, Cafferland”

(*Pangomophorus*) Voss 1960: 344 [type species: *O. biroi* Voss, 1960, by original designation]

*biroi* Voss 1960: 344

**Papua New Guinea:** MOROBE: Sattelburg (= Sattelberg)

(*Sinomophorus*) Alonso-Zarazaga, Wang, Ren & Zhang, *h.o.*

*rongsu* Alonso-Zarazaga, Wang, Ren &  
Zhang, *h.o.*

**China:** YUNNAN: 潞西 (Lùxī), 瑞丽 (Ruìlì), 新平 (Xīnpíng) (?)

Genus *Physarchus* Pascoe 1865: 425 [type species: *P. pyramidalis* Pascoe, 1865, by monotypy]

*castaneipennis* Faust 1891: 285

*conspicillatus* Fairmaire 1878: 286

*pyramidalis* Pascoe, 1865: 425

**India:** SIKKIM

“Polynesia”

**Fiji**

Genus *Sternechosomus* Voss 1958: 46 [type species: *S. octotuberculatus* Voss, 1958, by original designation]

*octotuberculatus* Voss 1958: 46

**China:** FUJIAN: Guàdūn 挂墩 (= Kuantun)

<sup>1</sup> This species was overlooked by Schenkling and Marshall (1936). Moreover the species was named after the Père A. Hacquard, thus the original spelling *hocquardi* is incorrect and is corrected here under Art. 32.5.1 of the Code

