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# *Sparedrus archaicus* n. sp., the first false blister beetle (Coleoptera, Oedemeridae) from Burmese amber

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*Sparedrus archaicus* n. sp. (Coleoptera Oedemeridae) from Cretaceous amber from Myanmar is described and compared with congeners of the Recent.

Key words: Calopodinae, fossil, Burmite, fossil resin

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## INTRODUCTION

Long-horned beetles seem to be an important or maybe simply attractive part of the beetles included in Burmese amber. Several “longhorn” species are present in the international market and are often offered as such, nonetheless, they are not all true long-horned beetles (Cerambycoidea) but belong to different families, especially Cucujdae *sensu latu*.

However, this provides an opportunity to study different groups, whose fossil representatives are still poorly known. In this paper, the first false blister beetle included in Burmite, as well the first known fossil member of the subfamily Calopodinae, is described.

## MATERIALS AND METHODS

This amber specimen originated from mines in the Hukawng Valley, Myitkyina District, Kachin State, Myanmar. Burmite is found in sedimentary facies, greenish-grey shale layers embedded in other sedimentary rocks like sand- and siltstones, micritic limestone and various organic materials, as well as thin layers of coal and amber bearing shale layers (Ross et al., 2000; Zherikhin & Ross, 2000; Cruickshank & Ko Ko, 2003; Kyaw Thu & Khin Zaw, 2017). Based on radiometric data, Burmese amber from this location is currently dated back to the earliest Cenomanian, Mid-Cretaceous, with an age of 98.79 ± 0.62 Ma (Shi et al., 2012). The amber was cut, cleaned and polished with a Struers polishing machine using wet silicon carbide abrasive papers with different grain sizes (500–6000) and then photographed with a Canon

EOS 750D camera mounted on Canon bellows and Mitutoyo M Plan Apo objectives. These sets of images were then processed with the Helicon Focus stacking software and edited with Photoshop.

## SYSTEMATIC PART

**Oedemeridae Latreille, 18010**
**Calopodinae Costa, 1852**
***Sparedrus* Dejean, 1821**

***Sparedrus archaicus* n. sp.**
(Figs. 1-4)

**Holotype.** Female, Burmite, Hukawng Valley, Myitkyina District, Kachin State, Myanmar, coll. F. Vitali. Age. Cenomanian, Mid-Cretaceous.

The specimen is embedded in a piece of amber having a shape of a triangular prism 16 mm long and 10 mm high. The amber includes some small bubbles as syninclusions. The beetle shows both left wings completely open.

**Differential diagnosis.** Tetramerous tarsi, antennae threadlike, neck lacking and pronotum without lateral margin point clearly to the family Oedemeridae, while the antennal pit placed on a tubercle is the peculiar character of the subfamily Calopodinae (Vázquez, 2002).

This taxon includes only two genera with Laurasian distribution: *Calopus* Fabricius, 1777 and *Sparedrus* Dejean, 1821. The former contains two relatively large species associated with Euro-Siberian and Vancouverian coniferous forests, while the latter contains 44 thermophilic small species, most focused in Asia, four relict in Southern Europe and four in Central America and Texas. This fossil beetle fits all characters of the Calopodinae (Vázquez, 2002), while small size and elytra without ridges point to the genus *Sparedrus*. Due to its securiform palpomeres and the simple antennae, this fossil belongs to the *S. unicolor* species group as defined by Švihla (2006a). This group includes *Sparedrus unicolor* (Švihla, 1982) from India and Pakistan, *S. alesiva*ni Švihla, 2006 from Nepal, S. karenorum Švihla, 2007 from Thailand (Švihla, 2006a; 2007) and, according to their descriptions (Champion, 1889; Vázquez, 2002; Švihla, 2006b), all European and American species. *Spaeredrus archaicus* n. sp. is characterised by uniform pubescence, cordiform pronotum and antennae not serrate surpassing the elytral apex in female.

**Description.** Body length 4.5 mm. Body thin, elongate, throughout densely covered with fine recumbent pubescence.

Head short; frons oblique; antennal tubercles widely separated and strongly elevated; interantennal space very narrow, as narrow as maximum width of antennomere III; eyes large, prominent, finely faceted and very strongly reniform; upper eye-lobes well developed; lower eye-lobes nearly occupying all space of genae. Palpomeres sub-equal; last palpomere securiform, longer than the previous one. Antennae 11-segmented, threadlike, surpassing the elytral apex at least with last antennomere; scape long, bowed at base; pedicel elongate, twice as long as wide, hardly one-fifth as long as scape; antennomere III a bit shorter than scape; antennomere IV longest, hardly longer than scape; antennomere V as long as scape, antennomeres IV-X decreasing in length; antennomere XI longer, as long as III or VI (antennomere proportions according to the formula:4.8: 1.0: 4.6: 4.9: 4.8: 4.6: 4.35: 4.1: 3.6: 2.9: 4.6).

Pronotum longer than wide, cordiform, parallel-sided at the basal two-fifth; apex one-third wider than base, anteriorly feebly convex; base bilobed, posteriorly convex in the middle, one-half as wide as elytral base, finely furrowed along its margin; disc feebly convex, covered with dense coarse punctures. Scutellum minute, apically truncate. Elytra moderately convex, inflated at the apical third, here one-fourth wider than at base, 3 times as long as wide at humeri and 4 times as long as pronotum; base straight; humeri rounded; lateral margins expanded after humeri; apices largely rounded together; disc covered with coarse punctures.

Fig. 1. *Sparedrus archaicus* n. sp. lateral view (with reflection)

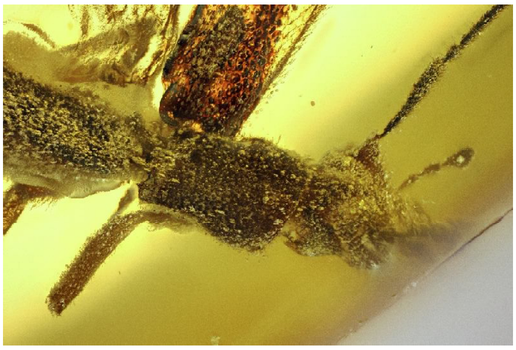

Fig. 2. *Sparedrus archaicus* n. sp. head and pronotum

Fig. 3. *Sparedrus archaicus* n. sp. left wings (ventral side)

Legs relatively long and thin; femora and tibiae linear; tibiae with two apical spurs; tarsi long; tarsomeres II-III strongly bilobate at apex; metatarsus as long as metatibia; metatarsomere I extremely long, metarsomeres II-IV subequal, each about one-fourth as long as first.

Fig. 4. *Sparedrus archaicus* n. sp. abdomen

Ventral side scarcely identifiable due to the presence of turbidity (laterally) and a dusty covering.

**Remarks.** Only one other fossil Oedemeridae has ever been described from amber: *Darwinylus marcosi* Peris, 2016 (Lower Cretaceous of Spain). Besides this species, Peris (2016) mentioned four other impressions on stone: *Ditylus lienharti* Theobald, 1937 (Oligocene of Kleinkembs); *Eumecoleus tenuis* Haupt, 1950 (Middle Eocene of Geiseltal); *Copidita miocenica* Wickham, 1914 and *Paloedemera crassipes* Wickham, 1914 (both Middle Eocene of Florissant). “*Saperda*” *absyrti* Heer, 1847 (Middle Miocene of Radoboj) was overlooked but should be added to this group (Vitali, 2015), while other species from Jurassic or Cretaceous impressions of Kazakhstan and China – *Necromera baeckmanni* Martynov, 1926; *Yanqingia jurassica* Hong & Xiao, 1997; *Glypta qingshilaensis* Hong, 1984 and *G. longa* Hong, 1984 – were excluded from false blister beetles (Kubisz, 2006; Peris, 2016).

In reality, all fossil species are doubtful attributions. *Paloedemera crassipes* seems to be a member of Chrysomeloidea (Kubisz, 2006): the descriptor himself had written that there needed to be caution with its assignment to Oedemeridae and actually, the stout habitus and femoral tooth are reminiscent of several *Bruchus* described some pages before. Both *Eumecoleus tenuis* and *Saperda absyrti* are simply elytra characterised by parallel sides and dorsal ridges. The taxonomic position of *Copidita miocenica* remains obscure since it was compared to "*C. obscura*" and "*C. bicolor*", which now belong to *Diasclera* and *Xanthochroina*, respectively. Moreover, judging from the reconstruction, this species seems to be related to neither of them: it might belong to *Ditylus* or even to some Tenebrionoidea. *Ditylus lienharti* was attributed with much difficulty to Oedemeridae, only because of its brown colour, but it was compared to Cucujdae and Scarabaeidae as well. Actually, it shows no resemblance to this genus (Kubisz, 2006). Finally, despite the phylogenetic analysis (Peris, 2016) and the putative reconstructions (Peris et al., 2016a; 2016b), the position of *Darwinylus marcosi* "must be considered as tentative" even inside the Tenebrionoidea since the metatarsomeres are not preserved (Batelka et al., 2018).

In conclusion, *Sparedrus archaicus* n. sp. appears to be the first and only Oedemeridae with a certain family assignment, confirming that Oedemeridae had already evolved by the Cretaceous.

This fossil belongs to the *Sparedrus unicolor* species group, confirming the basal position of this group inside of the genus.

The wide distribution of this group and the thermophilic preferences of *Sparedrus* suggest that the extant occurrence of this genus in America cannot be explained by some Pliocene migrations via Beringia. On the contrary, *Sparedrus archaicus* n. sp. proves that this genus had already evolved and possibly spread throughout the whole of Laurasia during the Mesozoic.

Since *Sparedrus* is absent from the Southern Hemisphere, it should have evolved after the separation of Gondwana occurred in the Lower Cretaceous (Aitchison et al., 2007). Then, the distribution of *Sparedrus* should have begun to fragment after the Eocene India-Asia collision and the formation of the Himalayan mountain systems (Aitchison et al., 2007). Finally, the late Pliocene climate cooling and the subsequent ice ages should have reduced the European taxa and concentrated them into the southern European glacial refuges (Iberia, Italy and Balkans).

Since Calopodini are not the most basal tribe of the false blister beetles (Švihla, 1986) and this family is also widespread in the Southern Hemisphere, Oedemeridae might be dated back almost to the Jurassic, before the Gondwana breakup.

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