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***Epaphius bartolozzii* n. sp. from Vietnam**
(Coleoptera Carabidae Trechini)

Riassunto: *Epaphius bartolozzii* n. sp. del Vietnam (Coleoptera Carabidae Trechini).

Epaphius bartolozzii n. sp. è descritto dal Vietnam meridionale. Vengono discussi alcuni caratteri morfologici sui generi *Epaphius* Leach, 1819, *Epaphiopsis* Uéno, 1953, *Iga* Uéno, 1953 e *Tienmutrechus* Suenson, 1957.

Abstract: *Epaphius bartolozzii* n. sp. is described from Southern Vietnam. Some morphological characters of the genera *Epaphius* Leach, 1819, *Epaphiopsis* Uéno, 1953, *Iga* Uéno, 1953 and *Tienmutrechus* Suenson, 1957 are discussed.

Key words: Vietnam, *Epaphius*, new taxa, forest litter.

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INTRODUCTION

Presently, very few species of Trechina are known from Vietnam, all occurring in the Northern part of this country. Some of these, collected in caves, are specialized for subterranean life: *Lanxan-gaphaenops louisi louisi* Deuve, 2012, *L. louisi annamensis* Deuve, 2012, *Tonkinaphaenops marinae* Deuve, 2013, *T. anthonyi* Faille & Tian, 2019, *T. impunctatus* Faille & Huang, 2019. Among the edaphic species, we can find: *Agonotrechus amplicollis* Ueno, 1999, *A. campanulatus* Ueno, 1999, *A. nomurai* Ueno, 1999, *A. tonkinensis* Jedlicka, 1939, *A. vina* Ueno, 1999, *Paratrechiotetes ocydromoides* Ueno, 1995, *Trechiotetes luticola* Ueno, 1995, *T. perroti* (Jeannel, 1954), *T. tonkinicus* Deuve, 2005, *Trechus vietnamicus* Ueno, 1995, *Vietotrechus minutissimus* Ueno, 1995 and *Epaphiopsis hiekei* Belousov & Kabak, 2016 (Belousov & Kabak, 2016; Anichtchenko, 2021).

The discovery by our colleague Luca Bartolozzi of a Trechini beetle occurring in the southern part of the country and belonging to an unpublished species of genus *Epaphius* Leach, 1819 is therefore of great interest.

MATERIALS AND METHODS

The new species was collected in Southern Vietnam within the framework of a research Memorandum of Understanding (see Vu *et al.*, 2014) signed between the Natural History Museum of the University of Florence, Italy, and the Vietnam National Museum of Nature in Hanoi, Vietnam.

Macrophotographs were taken by the second author using a Nikon D2X or D800 digital camera, applied to a Nikon Labophot II binocular optical microscope, or a Nikon SMZ 1000 stereomicroscope, with diaphragmed lenses. Stacking was performed with Combine ZM software (<https://combinezm.en.lo4d.com/windows>).

The following abbreviation is used to indicate types and depository of specimens:

HT: Holotype

VNMN: Vietnam National Museum of Nature in Hanoi (Vietnam).

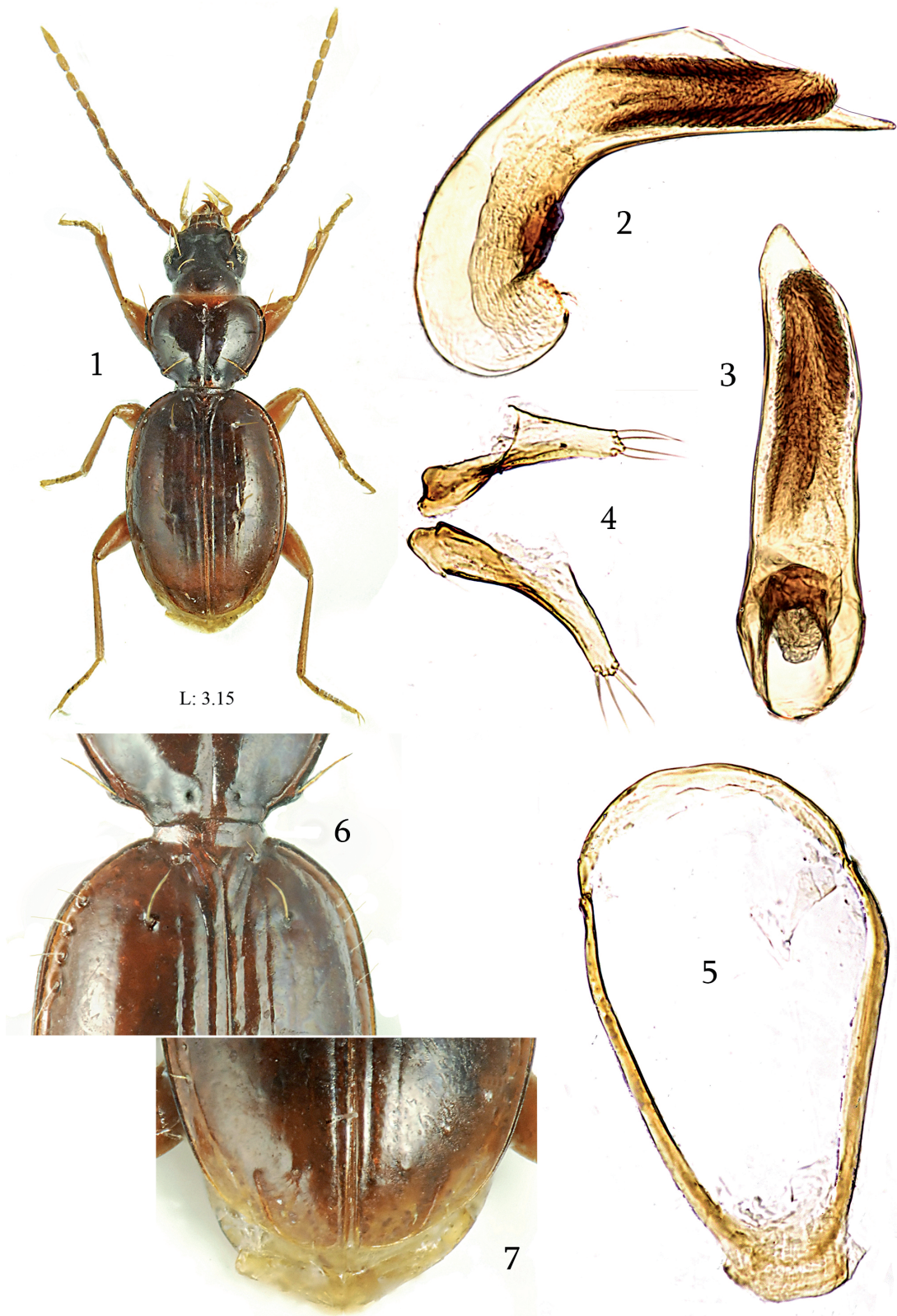
***Epaphius bartolozzii* n. sp.** (Figs. 1-7)

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Figs. 1-7. *Epaphius bartolozzii* n. sp., HT ♂. 1: habitus; 2: median lobe of aedeagus in lateral view; 3: median lobe of aedeagus in ventral view; 4: parameres; 5: IX invaginated segments; 6: pronotum foveae; 7: apex of elytra, with particular of apical triangle.

TYPE LOCALITY. S Vietnam, Lâm Đồng Prov., Lạc Dượng distr., Bidoup NuiBa Natl. Park, surr. Giang Li [Giang Ly] Ranger Station (1420-1460 m a.s.l.) [12°11'N 108°40'E].

TYPE SERIES. HT ♂, S Vietnam, Lâm Đồng Prov., Lạc Dượng distr., Bidoup NuiBa Natl. Park, surr. Giang Li Ranger Station (1420-1460 m a.s.l.), 16-21.VI.2015. Leg. L. Bartolozzi, G. Chelazzi, S. Bambi, E. Orbach, V. Sbordoni (n. magazzino 3023) (VNMN).

DIAGNOSIS. A species belonging to the genus *Epaphius* for the general body shape, distinctly convex, with shiny integuments and inner elytral striae much deeper than others, for the “bidentatae” tooth of the left mandible, for the glabrous temporae and for the endophallus without a true copulatory piece, but bearing large spiny bundles. It differs from the other species of Asian *Epaphius* by the pedunculated pronotum bearing two basal foveae, by the posterior discal seta set back at level of the end of the apical recurrent stria and by the shape of aedeagus.

DESCRIPTION OF THE HT ♂. Overall length (from apex of mandibles to tip of elytra): 3.15; total length (from apical margin of labrum to tip of elytra): mm 3.02. Micropterous; brownish black, with legs, mandibles, palpi, antennae and elytral apex rufo-testaceous. Teguments smooth, shiny, glabrous, with very shallow microsculpture, more distinct on pronotum, consisting of very thin isodiametric meshes on pronotum, transverse on elytra.

Head small and stout; temples glabrous, long (as long as eyes), convex and converging on neck; frontal furrows deep and complete; eyes not reduced, convex and longer than genae; two supraorbital setae on each side and in lines not diverging backwards. Left mandibles with a “bidentate” tooth. Antennae thin and long, slightly exceeding basal third of elytra, with apical segment slightly longer than penultimate and antennomeres 7th-11th yellow-testaceous.

Pronotum slightly transverse (PW/PL = 1.16), cordiform, pedunculated, convex, widest at anterior third. Sides more arcuate at anterior third, posteriorly subrectilinear and slightly sinuate before hind angles, which are obtuse and not prominent. Front angles rounded and not projecting forwards; basal peduncle prominent, not bordered at posterior edge, transversal furrow lacking. Lateral keel and lateral furrow relatively narrow; median furrow deep and complete, reaching

base; basal impressions small and superficial, adjoining terminal part of lateral keel. Two lateral setae on each side, anterior one just before widest point, posterior one at basal angle. Disc with two basal, large and setigerous foveae at distal part of basal peduncle (Fig. 6).

Elytra oval, convex; lateral furrows broad, flattened, with salient and almost reflexed borders; shoulders completely rounded, not prominent. Elytral striae impunctate, only inner three striae distinct in central part, obsolete at base and apex; external striae completely obsolete; 4th stria only barely visible anteriorly, sutural stria complete. Basal striola present; recurrent stria and apical carina distinct and abruptly ended. Intervals flat. Chaetotaxis (Fig. 1, 6, 7): juxtascutellar pore present, two large discal pores, fovea-like, on 3rd stria, first one at basal sixth, second one just after middle; umbilicate series regular, humeral group with pores 1st to 4th almost equidistant (Fig. 6); preapical pore on 2nd stria, definitely moved backwards at level of end of apical carina (Fig. 7).

Legs short and slender; protibial furrow complete, narrow; metatibiae straight; two first protarsomeres poorly dilated.

Aedeagus (Figs. 2-4) relatively long and slender. Median lobe, in lateral view (Fig. 2), moderately curved in basal part, subrectilinear at apical part, apex triangular, acute and not curved upwards. Basal bulb normal, sagittal carina absent. In ventral view (Fig. 3), long and relatively slender, apex asymmetrical; apical blade subtriangular, turned to left. Endophallus provided with a long bundle of thorns, particularly distinct at apical two thirds. Parameres (Fig. 4) stout, each provided with four long apical setae.

Female unknown.

ETYMOLOGY. It is a pleasure for us to dedicate this new species to its collector, our friend Luca Bartolozzi, a well-recognized specialist of Coleoptera Lucanidae.

DISTRIBUTION AND ECOLOGY. At present *Epaphius bartolozzii* n. sp. is only known from the type locality, the surroundings of Giang Li Ranger Station, into Bidoup NuiBa Natl. Park, Lạc Dượng distr., Lâm Đồng Prov. (Vietnam). Luca Bartolozzi collected the only recorded specimen by sifting forest litter at an altitude between 1420 and 1460 m a.s.l.

FINAL REMARKS. The taxonomy of Asian Trechini is very confused and it is very difficult to understand phylogenetic relationships. Very recently Schmidt

(2021), for the Himalayan fauna, started to define a “true” *Trechus* based on synapomorphies, but he suggested that most of the species out of this clade are closely related to *Epaphius*. Actually, there are no certain synapomorphies for *Epaphius* phylogenetic lineage because of the many homoplasies and reversals of character states used by different authors (Schmidt, 2022 pers. com.). Even the belonging of this new taxon to the genus *Epaphius* rather than to *Epaphiopsis* raises doubts and perplexities. Part of the diacritic characters used are in fact present alternately, or simultaneously, in these two genera. Following Deuve (2022, pers. com.) in *Epaphius* teeth of left mandible are “bidentate” (as in some *Trechus*) and temporae are glabrous, whereas in *Epaphiopsis* (and related genera) the left mandible teeth are “tridentate” and temporae are finely pubescent. In the “tridentate” type the pre-molar tooth is distinct and the anterior tooth of the retinaculum is strongly displaced forward (see Deuve *et al.*, 2016). Many authors have never used this character because it is difficult to observe on specimens prepared in collections, but this examination is necessary as this character is the only one that can be used to distinguish *Epaphius* from *Epaphiopsis* with certainty (Deuve, 2022 pers. com.). By the way, Queinnec *et al.* (2021) recently discussed such kind of character for the Ethiopian *Trechini*.

For this reason, we opted for a more conservative approach, avoiding the description of a new genus and assigning the new species to the genus *Epaphius*.

The phylogenetic lineage of *Epaphius* (sensu Casale & Laneyrie, 1982 and Lorenz, 2005) or “*Epaphiopsis* complex” of Deuve *et al.* (2016) (pars) is composed of the following genera: *Ushijimaella* Uéno, 1980, *Epaphius* Leach, 1819, *Epaphiopsis* Uéno, 1953 and *Tienmutrechus* Suenson, 1957. It is characterized by the following set of characters: eyes normally developed, two dilated protarsomeres in male, furrowed protibiae, posterior discal seta placed far from elytral apex so as not to form an “apical triangle”, endophallus equipped with bundles of thorns (see also Uéno, 1953).

As specified in the diagnosis, the new species falls into the genus *Epaphius* by the following set of characters: tooth of left mandible “bidentate”, temporae glabrous, distinctly convex general body shape; shiny integuments and inner elytral striae much deeper than others; endophallus without a true copulatory piece, but bearing large spiny bundles.

It differs from the other species of *Epaphius* by this set of characters:

- Pronotum strongly pedunculated (much more than in *E. secalis* (Paykul, 1790), where it is slightly pedunculated) and devoid of basal sulcus.
- Pronotum bearing two deep basal foveae with a very short seta in center. This character is present not only in some species of the genus *Epaphiopsis* of the same phylogenetic lineage (Belousov & Kabak, 2003) but also in genera phylogenetically distant, as *Allotrechiana* Uéno, 1970 or *Iga* Uéno, 1953.
- Posterior discal seta set back at level of end of apical recurrent stria.
- Male protarsi poorly dilated and with thin asymmetrical internal lobe.

However, these same characters, far from being considered in an absolute way, deserve a careful discussion.

Although the combination of elytral deep inner striae and shallow or even evanescent outer striae is really rather typical of *Epaphius*, this is not always the case, especially in southern China where many species of *Epaphius* have rather distinct external striae quite similar to those of some *Trechus* (Belousov, 2022 pers. com.).

The anterior position of the preapical elytral pore is considered a more reliable character for distinguishing *Trechus* and *Epaphius*. Therefore, the unusual position of the preapical pore in *E. bartolozzii* n. sp. is worth noting. We have to remember that there are a few *Epaphius* with “posterior” position of preapical pore (e.g., *E. shushensis* Belousov & Kabak, 1994) and there are some species of *Trechus* with “anterior” position of preapical pore (Belousov, 2022 pers. com.).

It should be remembered that the thorny structure of endophallus of the new species (and of all *Epaphius*) is very similar to that of *Tienmutrechus* Suenson, 1957. The species inside this genus, however, differ from *E. bartolozzii* n. sp. by evident external characters such as, among others, the particular chaetotaxis of pronotum and elytra, provided with numerous supranumerary setae (Uéno, 1976). In addition, there are many *Trechus* and *Epaphiopsis* with “scaly-spiny” bundles, such as many *Trechus* inside Caucasian and Siberian groups and even a few Chinese species (Belousov, 2022 pers. com.).

The discovery of *E. bartolozzii* n. sp. is of considerable zoogeographical interest since it is the first Trechina species recorded from Southern part of Vietnam. This species extends to this part of the Indochinese peninsula the presence of *Epaphius*, which was previously known from China (Deuve, 1992, 2011; Uéno, 1978, 1998) but not from Vietnam and neighboring Cambodia (Jeannel, 1927; Casale & Laneyrie, 1982; Anichtchenko, 2021, 2022).

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