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Contribution to the knowledge of the genus *Quedius* Stephens, 1829 of Vietnam and Laos (Coleoptera: Staphylinidae: Quediini)

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Abstract. New country records of *Quedius* are provided based on recently collected material from northern Vietnam and Laos. *Quedius covid* sp. nov. is described and illustrated from northern Vietnam.

INTRODUCTION

The genus *Quedius*, and entire tribe Quediini, is primarily a north temperate lineage and reaches its southern limits at higher elevations in the northern Oriental and Neotropical Regions (Brunke et al. 2016, Brunke et al. 2021). At these elevations, the staphylinid fauna is a distinct and interesting mix of classic Oriental and Palaearctic elements. At elevations above 1000 m, northern Vietnam and Laos support such habitats but *Quedius* species from these regions remain poorly known. To date, five species are known from Vietnam and only three from Laos (Smetana 1997, 2007, 2012a, 2019). Recently collected material from both countries has become available, resulting in new records and one new species.

MATERIAL AND METHODS

After dissection, specimens were glued to the usual mounting plate and the genitalia and terminal segments of the abdomen were placed in glycerin filled vials and pinned with their respective specimens. All imaging, including photomontage was accomplished using a motorized Nikon® SMZ25™ microscope and NIS Elements BR™ v4.5. Photos were post-processed in Adobe® Photoshop™ CC-2020. Measurements were made using the live measurement module within NIS Elements BR v4.5.

Acronyms used in the text when referring to the deposition of the specimens are as follows:
CASS Personal collection of V. Assing (Hannover, Germany);
ASC Aleš Smetana collection, deposited at the Museum of Nature and Science, Toshiba, Japan (S. Nomura);

CNC Canadian National Collection of Insects, Arachnids and Nematodes, Ottawa, Ontario, Canada;
NME Naturkundemuseum Erfurt, Germany (M. Hartmann);
NMW Naturhistorisches Museum Wien, Austria (H. Schillhammer).

TAXONOMY

Quedius (*Microsaurus*) *antennalis* Cameron, 1932

antennalis Cameron, 1932: 285 (*Quedius*; subgenus *Microsaurus*; description); Smetana 2017: 70 (*Quedius*; subgenus *Microsaurus*; redescription; synonymy; distribution)

Material examined: LAOS: Houaphanh: Mt. Phu Pane, 1200-1900 m, Ban Saluel vill. env., 20°12'N 103°59'E, 26.IV.-10.V.2013, leg. St. Jakl & local collectors, 1 ♀, (NMW).
VIETNAM: Cao Bằng: Phia Oac Nat. Park, ca. 500 m E main rd., 22.594° N 105.889° E, 1350 m, flight intercept, dist. mature secondary forest, 9-18.V.2019, Brunke & Schillhammer, LOT#CNC1641, 1 ♂, (CNC); Phia Oac, summit rd. below ruins, 22.606° N 105.874° E, 1600 m, flight intercept, treefall, mature secondary forest, 8-18.V.2019, Brunke & Schillhammer, 1 ♀, (CNC).

Comment. The species is at present known from numerous provinces of mainland China and Myanmar (Smetana 2017), India (West Bengal: Darjeeling) (Smetana 1988), and is newly reported from Laos and Vietnam.

Quedius (*Microsaurus*) *inquietus* (Champion, 1925)

inquietus Champion, 1925: 107 (*Velleius*; description); Smetana 2017: 91 (*Quedius*; subgenus *Microsaurus*; redescription; synonymy; distribution)

Material examined: VIETNAM: Lào Cai: Hoang Liang NP, Tram Ton Pass, 22°21.19' N 103°46.51' E, 1800-2050 m, 13-16.V.2015, leg. A. Weigel, 1 ♀, (NME).

Comment. The species is at present known from the Himalaya (India: Uttarakhand, through Nepal to Darjeeling district) and mainland China (Hubei, Shaanxi, Sichuan, Yunnan), and is newly reported from Vietnam.

Quedius (*Microsaurus*) *adjacens* Cameron, 1926

adjacens Cameron, 1926: 368 (*Quedius*; subgenus *Microsaurus*; description); Smetana 2017: 69 (*Quedius*; subgenus *Microsaurus*; redescription; distribution)

Material examined: VIETNAM: Lào Cai: Hoàng Liêng National Park, Fan Si Pan Summit, 22.303° N 103.775° E, 3100 m, 27.VI.2017, R. Schuh, hand collected dead in puddle, LOT#CNC535, 1 ♂, (CNC).

Comment. The species is at present known from the Himalaya (Kashmir to Uttarakhand) and mainland China (Hunan, Shaanxi, Sichuan), and is newly reported from Vietnam.

Quedius (*Microsaurus*) *masatakai* Smetana, 2007

masatakai Smetana, 2007: 69 (*Quedius*; subgenus *Microsaurus*; description)

Material examined: VIETNAM: Cao Bằng: Pia [Phia] Oac Nature Reserve, Pia Oac top, 13.V.2014, 1400-1800 m, 22°36'50"N 105°52'21"E, leg. A. Weigel, 1 spec., (NME).

Comment. This is the first record of this species from Vietnam. It was previously known from northern Laos.

Quedius (*Raphirus*) *covid* sp. nov.
(Figs. 1A-F, 2A-H)

Type locality. VIETNAM: Cao Bằng: Phia Oac Nat. Park.

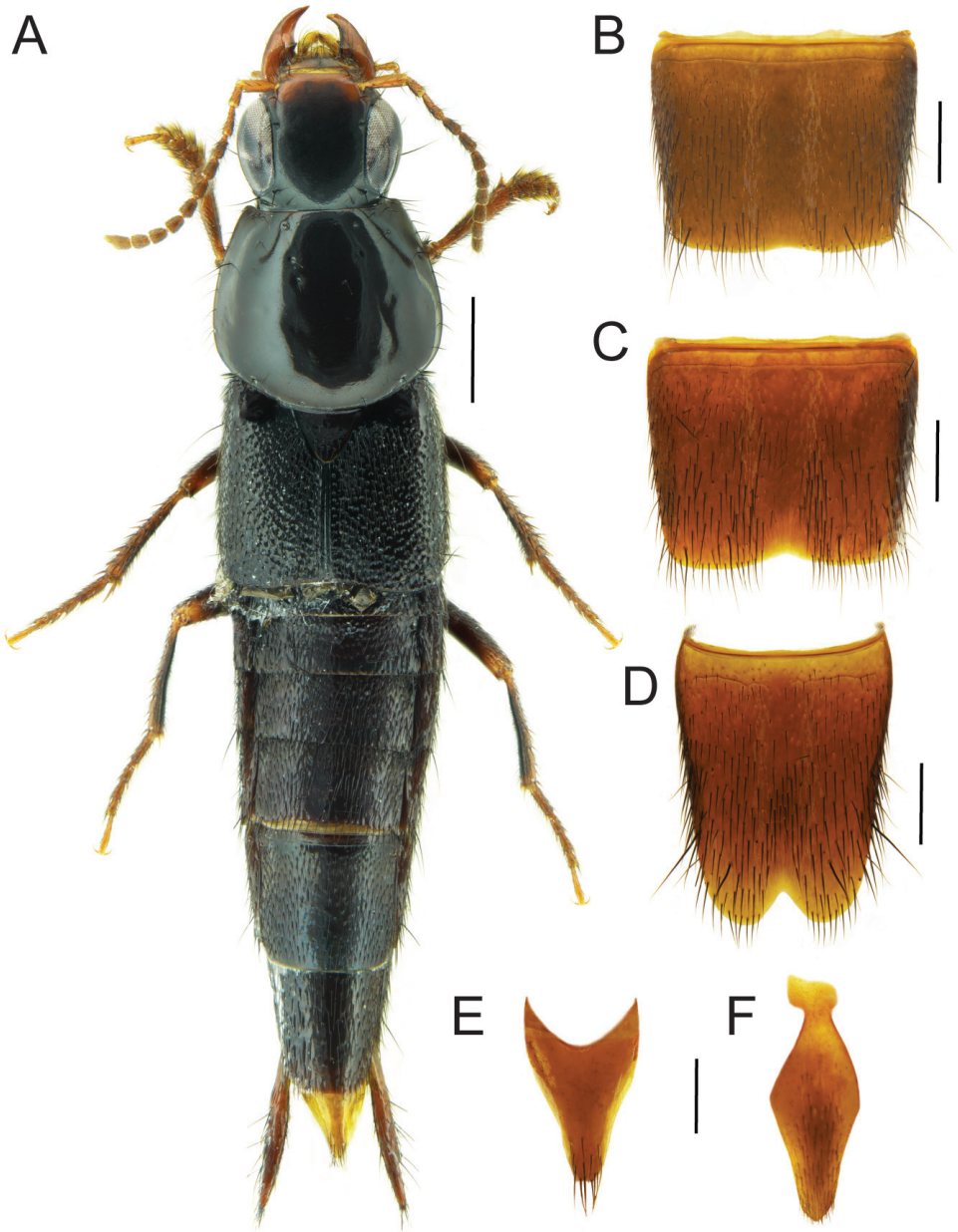
Type material. Holotype (♂): "Vietnam: [Cao Bằng] Phia Oac Nat. Pk., ~500 m E main rd., 22.594, 105.889, 1350 m, flight intercept trap, disturbed mature secondary forest, 9-18.V.2019, A. Brunke and H. Schillhammer, CNC1610392, (CNC). Paratypes (3 CNC, 2 CASS): same data as holotype, 3 ♂♂, (CNC); [Lào Cai] pass 8 km NW Sa Pa, 22°21'13" N 103°46'01" E, 2030 m, forest margin, 9.VIII.2013, V. Assing [10+2], 1 ♂, (CASS); [Lào Cai] pass 8 km NW Sa Pa, 22°21'10" N 103°46'01" E, 2010 m, second. forest, 12.VIII.2013, V. Assing [7b+2], 1 ♂, (CASS).

Diagnosis. *Quedius covid* is distinguished from all members of the pluvialis group (see Smetana 2017), except *Q. egregius* Smetana, 2014 by the palisade fringe on tergite VII, elytra at middle about as long as pronotum (Fig. 1A) and the entirely impunctate tergite II. From *Q. egregius*, it differs mainly by the median lobe of the aedeagus in ventral view, which has an expansion before narrowing to the apex (Fig. 2G, H) (evenly narrowed in *Q. egregius*; fig. 8 in Smetana 2014) and with a distinctly more elongate apical part in lateral view (Fig. 2C,D, compared to fig. 9 in Smetana 2014). At the present state of knowledge, *Q. egregius* and *Q. covid* are allopatric.

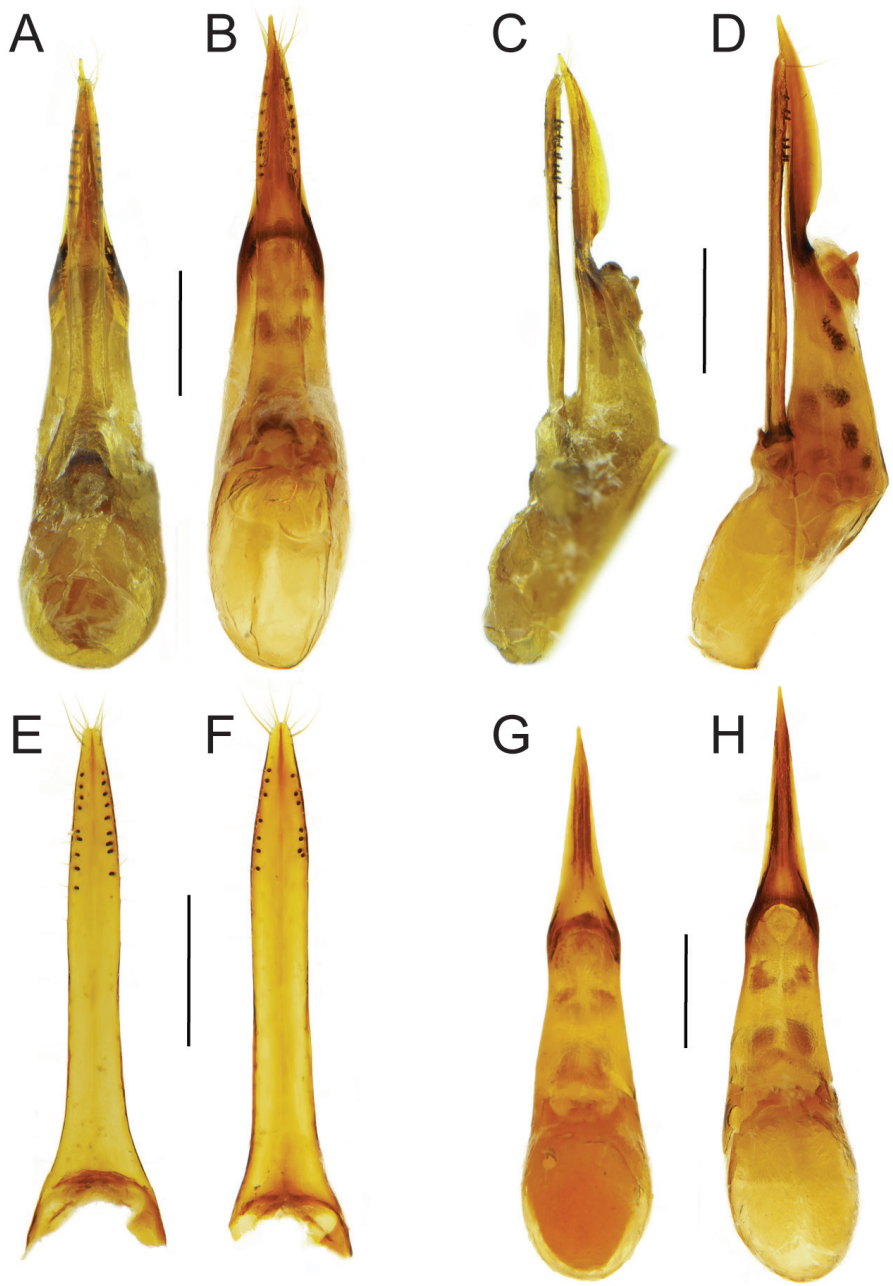
Description. Forebody length (apex of head to apex of elytra) 4.8-5.2 mm.

Extremely similar to *Q. egregius* from southern Yunnan, China (Smetana 2014) and differing mainly by the following:

Male sternite VII with median emargination varying from scarcely visible (type locality, population east of the Red river, Fig. 1B) to small but distinct (population west of Red river, Fig. 1C); sternite VIII with median emargination varying from acute V-shape (Fig. 1D) to more rounded (not varying by geography); tergite X (Fig. 1E) largely the same; sternite IX (Fig. F) with distinctly wider middle portion and with apical part slightly constricted, apex slightly broader than in *Q. egregius*; median lobe in ventral view not evenly narrowed to apex, with distinct bulge at upper third of its length (Fig. 2A, B, G, H); median lobe in lateral view (Fig. 2C, D) with apical part more slender and apex narrower, greatly so in population west of the Red river (Fig. 2D); paramere similar but with pair of long subapical setae (Fig. 2E, F).



Figs. 1A-F. *Quedius* (*Raphirus*) *covid* sp. nov.: A, B, D-F- population from Cao Bằng, Vietnam; C- population from Lào Cai, Vietnam; A- habitus; B, C- male tergite VII; D- male sternite VIII; E- male tergite X; F- male sternite IX. Scale bars:A= 1 mm; B-F = 0.5 mm.



Figs. 2A-H. *Quedius* (*Raphirus*) *covid* sp. nov.: A, C, E, G- population from Cao Bằng, Vietnam; B, D, F, H- population from Lào Cai, Vietnam; A,B- aedeagus, ventral view; C, D- aedeagus, lateral view; E, F- paramere, underside; G, H- median lobe, ventral view (paramere removed). Scale bars: 0.5 mm.

Distribution. The species is at present known only from two localities in northern Vietnam.

Bionomics. Specimens were collected in or at the margin of montane forests (1350-2030 m). Some were collected in flight intercept traps.

Etymology. The species epithet 'covid' refers to the current COVID-19 pandemic caused by the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2). The first author had great difficultly to continue his taxonomic work for about 1.5 years of this pandemic but despite this, *Quedius covid* represents a final contribution to the taxonomic knowledge of *Quedius*. It is to be treated as a noun in apposition.

Comment. The specimens from the type locality in Cao Bằng province (Fig. 1B, 2A, C, E, G), east of the Red river, consistently differ from those of Lào Cai province (Fig. 1C, 2B, D, F, H), west of the Red river, by the slightly shorter and less slender apical part of the median lobe, as seen in both ventral and lateral view, and the less distinct emargination of male sternite VII. The peg setae are also arranged slightly more regularly and densely in the Cao Bằng population (Fig. 2E) compared to the Lào Cai population (Fig. 2F). Although these differences are consistent, we tentatively consider these populations to belong to a single species until more specimens can be examined from additional localities.

Quedius (*Raphirus*) *muscicola* Cameron, 1932

muscicola Cameron, 1932: 295 (*Quedius*; subgenus *Raphirus*; description); Smetana 2017: 144 (*Quedius*; subgenus *Raphirus*; redescription, synonymy, distribution)

Material examined: VIETNAM: Lào Cai: pass 8 km NW Sa Pa, 22°21'10" N 103°46'01" E, 2010 m, secondary forest, 6.VIII.2013, P. Wunderle [7a+2], 1 ♂, (CASS); same but 13.VIII.2013, V. Assing, 1 ♂, (CASS); same but 12.VIII.2013 [7b+2], 1 ♀, (CASS); same but 22°21'13" N 103°46'01" E, 2030 m, forest margin, 9.VIII.2013, V. Assing [10+2], 1 ♂, (CASS); same but 5.VIII.2013, 2 ♀♀, (ASC, CASS); same but 22°21'19" N 103°46'03" E, 2070 m, degr. prim. For., 11.VIII.2013, V. Assing [11+2], 1 ♂, 1 ♀, (ASC, CASS).

Comment. *Quedius muscicola* is a widely distributed species known from the Himalayan region, mainland China, Myanmar (Smetana 2017) and northern Vietnam. The species was recorded from Vietnam by Smetana (2019) without providing any specimen data. This record was based on the above specimens.

Quedius (*Raphirus*) *tergimpressus* Smetana, 2012

tergimpressus Smetana, 2012b: 57 (*Quedius*; subgenus *Raphirus*; description); Smetana 2017: 144 (*Quedius*; subgenus *Raphirus*; redescription; distribution)

Material examined: VIETNAM: Lào Cai: pass 8 km NW Sa Pa, 22°21'10" N 103°46'01" E, 2010 m, secondary forest, 12.VIII.2013, V. Assing [7b+2], 1 ♂, (CASS); Hoàng Liên Nat. Pk., Tram Ton Pass, 22°20'42.36"N 103°46'30.72"E, 2020m, pond edges, pasture, treading, 22-26.VI.2017, Brunke, Schillhammer, Douglas et al., 1 ♂, 1 ♀, (CNC).

Comment. This is the first record of this species from Vietnam. It was previously known from Gaoligong Shan in northwesternmost Yunnan, west of the Salween river. One specimen of *Q. muscicola* was taken together with this species (see above).

CHECKLIST OF *QUEDIUS* SPECIES KNOWN FROM VIETNAM

Quedius (*Microsaurus*) *adjacens* Cameron, 1926
Quedius (*Microsaurus*) *antennalis* Cameron, 1932
Quedius (*Microsaurus*) *inquietus* (Champion, 1925)
Quedius (*Microsaurus*) *klapperichi* Smetana, 1996
Quedius (*Microsaurus*) *masasatoi* Smetana, 2007
Quedius (*Microsaurus*) *masatakai* Smetana, 2007
Quedius (*Microsaurus*) *zeuxis* Smetana, 1997
Quedius (*Raphirus*) *covid* Smetana & Brunke, sp. nov.
Quedius (*Raphirus*) *muscicola* Cameron, 1932
Quedius (*Raphirus*) *tergimpressus* Smetana, 2012
Quedius (*Raphirus*) *xeno* Smetana, 1997

CHECKLIST OF *QUEDIUS* SPECIES KNOWN FROM LAOS

Quedius (*Microsaurus*) *antennalis* Cameron, 1932
Quedius (*Microsaurus*) *holzschuhi* Smetana, 1999
Quedius (*Microsaurus*) *masasatoi* Smetana, 2007
Quedius (*Microsaurus*) *masatakai* Smetana, 2007

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