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Taxonomic and faunistic notes on *Canthydrus* SHARP, 1882. II. Revision of the Oriental and East Palearctic species (Coleoptera: Noteridae)

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Abstract

Faunistic and taxonomic notes on the Oriental and East Palearctic species of *Canthydrus* SHARP, 1882 (Coleoptera: Noteridae) are provided. Fifteen species are recognised. All the species are analysed, and illustrations of habitus and male genitalia are provided. *Canthydrus proximus* SHARP, 1882 is redescribed and illustrated for the first time. The male genitalia of *Canthydrus haagi* (WEHNCKE, 1876) are also described and illustrated here for the first time. *Canthydrus morsbachi* WEHNCKE, 1876 is here confirmed as a valid species, very close to *C. luctuosus* (AUBÉ, 1838), together with which it shares a similar distribution in India and Sri Lanka, although it was described from Vietnam, where it was never collected again. New records are provided for *C. birmanicus* GUIGNOT, 1956 (Laos, Thailand), *C. flavus* (MOTSCHULSKY, 1855) (Laos, Malaysia), *C. haagi* (WEHNCKE, 1876) (Cambodia, Laos, Malaysia, Vietnam), *C. luctuosus* (Nepal), *C. nitidulus* SHARP, 1882 (China: Guangxi), *C. politus* (SHARP, 1873) (China: Macao, Vietnam), *C. ritsemae* (RÉGIMBART, 1880) (Brunei, Cambodia, Laos), and *C. rocchii* WEWALKA, 1992 (India, Laos, Thailand). The presence of *C. flavus* in India is yet to be confirmed; the record for Manipur published by VAZIRANI (1969a) must be attributed to *C. rocchii*. Doubtful records, which could be attributed to mislabeling, are here reported for *C. luctuosus* (Thailand), *C. flammulatus* SHARP, 1882, *C. flavus* and *C. proximus* (West Papua). New synonymies: *Canthydrus antonellae* TOLEDO, 2003 syn.n. = *Canthydrus rocchii* WEWALKA, 1992; *Canthydrus festivus* RÉGIMBART, 1888 syn.n. = *Canthydrus laetabilis* (WALKER, 1858); *Hydrocanthus weisei* WEHNCKE, 1876 syn.n. = *Canthydrus luctuosus* (AUBÉ, 1838); *Canthydrus pseudomorsbachi* VAZIRANI, 1969 syn.n. = *C. luctuosus* (AUBÉ, 1838). Lectotypes are designated for *Canthydrus festivus* RÉGIMBART, 1888, *Canthydrus sexpunctatus* SHARP, 1882 and *Hydrocanthus luctuosus* AUBÉ, 1838. For two taxa, *Canthydrus bifasciatus* RÉGIMBART, 1889 and *C. testaceus* (BOHEMAN, 1858), it was not possible to access the type material and their status remains obscure. A new diagnosis of the genus is given, pointing out the importance of the morphology of the aedeagus. The recent record of the Neotropical *Hydrocanthus guignoti* YOUNG, 1958 for India (Manipur) (DEVI et al. 2013, 2016) is based on a misidentification of *Canthydrus rocchii*.

Key words: Coleoptera, Noteridae, *Canthydrus*, burrowing water beetles, taxonomy, new synonymies, lectotype designations, distribution, new records.

Introduction

This is the second contribution to the knowledge of the Oriental and East Palearctic species of the genus *Canthydrus* SHARP, 1882. In the first work (TOLEDO 2008) a diagnosis of *C. angularis* SHARP, 1882 was provided, together with the description of a new species, plus lectotype designations for 12 taxa. In a following paper, TOLEDO (2010) revised the species of Noteridae occurring in the Australian Region and Wallacea, including the species of the Indonesian islands of Sulawesi, Bali and Lombok.

Canthydrus is composed of small to medium sized Noteridae with glossy surface and, often, bright colours. The genus includes 65 species listed in the last version of the World Catalogue of Noteridae (NILSSON 2011), occurring mainly in the Old World tropics, with few species also in the Palearctic and Australian regions. *Liocanthydrus* GUIGNOT, 1957, formally established as a Neotropical subgenus of *Canthydrus*, is now recognised as a separate genus (MILLER 2009, BACA et al. 2014) and one of the species previously assigned to *Liocanthydrus* (*Noterus buqueti* LAPORTE, 1835) has been transferred to another genus (BACA & TOLEDO 2015, GUIMARÃES &

FERREIRA 2017). Hence, *Canthydrus* is at present definitely not known to occur in the New World.

The species of *Canthydrus* usually live in stagnant water, rich in debris and vegetation; less frequently in rain puddles or other temporary aquatic habitats. *Canthydrus* is a very uniform genus; size, body shape and colouration are often useful for identification, but in some species these features can be very variable or, on the contrary, very uniform. The examination of the aedeagus very often, but not always, allows the identification of certain species. In the present paper the known taxa of Oriental and East Palearctic *Canthydrus* are revised or anyhow treated. Besides, a new diagnosis of the genus *Canthydrus* is presented below.

Material and methods

This review of the East Palearctic and Oriental species of *Canthydrus* is based on about 3,200 specimens studied (also including TOLEDO 2003, 2008, 2010), deposited in the following institutions and private collections.

ASG	Coll. André Skale, Gera, Germany
CNM	Colombo National Museum (S.H. Ranjith)
CWBS	China Water Beetle Survey (material deposited in NMW and IAECAS)
GWW	Coll. Günther Wewalka, Vienna, Austria
HHR	Coll. Hans Hebauer, Rain, Germany
HNHM	Hungarian Natural History Museum, Budapest, Hungary (G. Makranczy)
IAECAS	Institute of Applied Ecology, Chinese Academy of Sciences, Shenyang, China (D. Bian, L. Ji)
IRSNB	Institut Royal de Sciences Naturelles de Belgique, Bruxelles, Belgium (W. Dekoninck)
JSL	Coll. Jaroslav Šťastný, Liberec, Czechia
LHM	Coll. Lars Hendrich, Munich, Germany
MNHNP	Museum National d'Histoire Naturelle, Paris, France (H. Perrin, A. Mantilleri)
MTP	Coll. Mario Toledo, Piacenza, Italy
NHMA	Natural History Museum, Amsterdam, Netherlands (B. Grob)
NHML	Natural History Museum, London, UK (B. Garner, M. Geiser)
NMNHS	National Museum of Natural History, Sofia, Bulgaria (Z. Hubenov)
NHRS	Naturhistoriska riksmuseet, Stockholm, Sweden (N. Apelqvist)
NMP	National Museum, Prague, Czechia (J. Hájek)
NMW	Naturhistorisches Museum Wien, Vienna, Austria (M.A. Jäch, H. Shaverdo)
NZC	National Zoological Collection, Zoological Survey of India, Kolkata (D. Banerjee)
OLM	Biologiezentrum, Oberösterreichisches Landesmuseum, Linz, Austria (F. Gusenleitner)
PMB	Coll. Paolo Mazzoldi, Irma (Brescia), Italy
RMBRS	Raffles Museum of Biodiversity Research [now Lee Kong Chian Natural History Museum], Singapore (W.S. Hwang)
SRF	Coll. Saverio Rocchi [property of the Natural History Museum "La Specola", Florence, Italy]
THNHM	Thailand Natural History Museum, Pathum Thani, Thailand (R. Okada)
ZMUM	Zoological Museum, Moscow State University, Moscow, Russia (K.B. Nikitsky)
ZSM	Zoologische Staatssammlung, Munich, Germany (M. Balke)

Specimens were studied with an Amscope SM-4T stereo microscope, with ring led illumination. Measurements were taken with a millimetre microscope slide. Dried specimens were rehydrated in clear water before dissection and then remounted on their original cards together with genitalia. These latter were studied in wet condition (glycerol) with an Amscope SME-F8BH compound microscope. Photographs of beetles and genitalia were taken with an Amscope MU100 digital camera, mounted on both stereo and compound microscopes. For each subject several images were taken at different levels, then stacked with CombineZP® software program. Ink drawings of genitalia were made tracing the photos with transparent paper from the computer screen, then scanned. Distribution maps were made by using SimpleMappr®. All illustrations were retouched with Adobe Photoshop Elements 2021® software.

Type labels are transcribed verbatim and indicated by quotation marks. A slash (/) separates single labels pinned under the same specimen. Personal comments are provided between square brackets.

Abbreviations in the text: TL = total length (head included); MW = maximum width; hw = handwritten.

Taxonomic part

Canthydrus SHARP, 1882

Canthydrus SHARP 1882: 269 (original description); type species: *Hydrocanthus guttula* AUBÉ, 1838: 410, by subsequent designation (GUIGNOT 1946).

DIAGNOSIS: Moderate to medium sized Noteridae (2.0–4.0 mm); dorsal surface smooth, glossy, without scattered punctation exception made for row of punctures along hind and fore sides of pronotum and longitudinal rows of dots on elytra, normally sparser on distal half.

HABITUS: Dorsal view (Figs. 1–16): body drop-shaped, maximum width at base of pronotum or close to it, gradually narrowed toward elytral tip, which is rather acutely rounded; body outline continuous, without gap between pronotum and elytra. Lateral view (Figs. 1–16): rather convex, maximum height in scutellar area or close to it. Sides of pronotum poorly to strongly rounded, visibly bordered, with more or less visible, fine denticulation along each edge. Side of each elytron at basal half from rather straight to visibly concave, running oblique toward distal half. Lateral side of pronotum + proximal side of elytron making more or less marked S-shaped line (pronoto-elytral sinuation), depends on species. Dorsal colouration totally brownish-yellow, totally black or with head and pronotum reddish and darker elytra; pronotum and elytra often with pale patterns variably developed.

UNDERSIDE: Head with midgular apodeme visible. Prosternum medially with rather sparse long and stiff setae (Fig. 17a), seldom or not at all longer and more robust than on prosternal process (but see exceptions, below). Prosternal process almost triangular, about three times longer than wide, broader and somewhat truncate apically, more or less uniformly covered with sparse, stiff setae. Noterid platform (median part of metaventrite and metacoxal process) rather uniformly covered with setae as on prosternal process; longer and thicker setae occur along hind sides of metacoxal process, specially on latero-apical angles. Abdominal ventrites glabrous, ventrites III and IV fused together, ventrites V and VI with single, transverse row of setigerous dots, starting from sides and interrupted median. Ventral colouration totally reddish, totally black or black with head, prosternum (but not prosternal process), proepisterna, hypomera, and epipleura reddish, depends on species or even individually within species.

APPENDAGES AND OTHER STRUCTURES: Eyes large, rather globose but not protruding from head outline. Antennae rather short and small, 11-segmented, scapus large and apparently bisegmented (as in all Noteridae), all segments but apical one, short and stout, long less than double of width, not particularly broadened except segments 9 and 7, which are often slightly expanded in both sexes; maxillary palpi apparently four-segmented (basal palpiger visible), with last segment almost as long as first three, subconical, apically truncate and shallowly bifid, with two distinct sensillar areas; palps of labium apparently three-segmented (basal palpiger hardly visible), with last segment as long as first two, broad, triangular with two distinct sensillar areas. Prothoracic legs short and stout, protibiae tapering distally ending with single, large, hooked spur, laterally with series of short comb-like setae; insertion of protarsus distal-lateral on protibia, first segment of protarsus triangular, almost as long as last four; mesothoracic legs more slender, with first segment of mesotarsi longer than other segments, but less compared to other

segments together; metathoracic legs natatorial, with femora and tibiae not particularly broad, length proportions variable from species, protibial spurs smooth, not serrate.

MALE: Three circular sucking hairs on first two segment of pro- and mesotarsi. Abdominal segment IX (gonosomite) (Fig. 18) oval; tergite with ring-like lateral walls, ending caudally in short extension deeply bilobed; ventrite composed of thin, semitransparent lamina ending in more slerotized lobe projecting backward, truncate with short, stiff setae. Aedeagus (Figs. 19–21) asymmetrical, very compact. Median lobe (Fig. 22) approximately sickle-shaped, composed of proximal (basal) portion with two strongly asymmetric projections (left and right) where the parameres are inserted, and distal portion, variable in shape and proportions, depending on species. Distal portion concave on left face (Fig. 22a), in most species with thin lamina protruding from dorsal side toward apex (left lamina, Fig. 22a); on right face convex with depression delimited dorsally by strong wall (Fig. 22b). Right paramere (Fig. 23a) shorter than median lobe, at least basally inflated, with large basal foramen; in almost all species bearing tuft of apical hairs; left paramere (Fig. 23b) smaller, short and flat, more or less triangular, without hairs, concave on inner face (facing to median lobe) with inward fold along dorsal side.

The male genitalia are here figured in lateral view: left and right faces of the median lobe and inner face (where the piece is in contact with the median lobe) of the parameres. The orientation of the aedeagus inside the abdomen at rest is shown in Fig. 19.

FEMALE: In some species average size larger. Without sucking hairs on pro- and mesotarsi. Gonocoxosternites (Fig. 24) arranged together in large V, typically abruptly narrowed toward apex. Each gonocoxosternite composed of long proximal segment, articulated with distal, shorter piece, triangular, smooth, without teeth, apically pointed but not sharp, with small tuft of short hairs (see also MILLER 2009 for more details on female genital structures).

TAXONOMIC POSITION: *Canthydrus* was redefined by MILLER (2009) using morphological criteria, placing it as "sister to the genus *Hydrocanthus* SAY, 1823, though with relatively low support". More recently, a study based mainly on molecular analyses (BACA et al. 2017) nests *Canthydrus* close to *Sternocanthus* GUIGNOT, 1948 (resurrected as valid genus) in a clade including *Hydrocanthus* (sensu auct.), *Mesonoterus* SHARP, 1882 and *Prionohydrus* GÓMEZ & MILLER, 2013. In this work the tribe Noterini is expanded to include Neohydrocoptini, Tonerini and Pronoterini, becoming thus the only tribe of the subfamily Noterinae. Despite this, *Canthydrus* externally looks like the New World genus *Suphisellus* CROTCH, 1873 and in the past several American species, now included in *Suphisellus*, were described as members of *Canthydrus* (e.g., RÉGIMBART 1889b, 1903b, SHARP 1882a, 1882b, ZIMMERMANN 1919).

MILLER (2009) used the following morphological characters to define *Canthydrus*: 1) prosternal process broad; 2) protarsus attached along the side of protibia instead of apically, this latter bearing 3) a single, large, curved apical spur; 4) anterior metatibial spur not serrate; 5) prosternum covered with conspicuous, stiff setae not organised into a series; and 6) lateral bead of pronotum relatively broad. Characters 2–4 and 6 are, in the status described above, widely distributed inside the former tribe Noterini, while to character 1) is given the same weight for both *Canthydrus* and *Hydrocanthus* (including *Sternocanthus* sensu auct.), although the prosternal process of *Hydrocanthus* is obviously much broader, most likely a derived situation. Finally, character 5) is not easy to focus due to morphological variability of the prosternum of the Noterini: in the New World genus *Canthysellus* BACA & TOLEDO, 2015 and in several species of *Suphisellus*, stiff setae on prosternum are modified forming few larger and thicker spines, arranged in a short regular transverse series, close to the base of the prosternal process, which is covered with smaller and thinner setae (Fig. 17c). In *Canthydrus* stiff setae on the prosternum are normally rather sparse or arranged along an irregular line, not very different in size to those covering the prosternal process, at most slightly thicker and longer (Fig. 17a).

Canthydrus ephemeralis WATTS, 2001 has larger spine-like stiff setae than on prosternal process, but arranged on prosternum along an irregular V-shaped line which goes from one coxa to another (Fig. 17b). It is not easy to give a polarity to this character, but likely sparse and weakly or not at all modified stiff setae, is a basal condition compared to larger and thick spines arranged in short series. Following MILLER (2009), *Canthydrus* is therefore defined by a combination of basal and common characters among Noteridae, and a strict morphological definition of the genus is difficult.

In all the examined species of *Canthydrus*, the aedeagus has the same peculiar basal structure. The right paramere is short and inflated and fits closely with the right side of the median lobe, harboured in a specific dump along this side, delimited dorsally by a wall which houses the dorsal side and the apical portion of the paramere (Figs. 20–21). Therefore, the inner face of the right paramere and adjacent face of the median lobe perfectly fit together. The insertion of the parameres on the median lobe is strongly asymmetric, following in part the asymmetric shape of the base of the median lobe, with the right paramere connected in a higher position compared to the left one (Figs. 20–21). The aedeagus looks very compact. This structure is very distinctive among Noteridae, it is the most relevant and likely the most derived morphological character in *Canthydrus*. In all the other genera of Noteridae such aedeagal features have not been observed: the right paramere is never inflated and it is more or less as long as the median lobe, or even longer; besides, the insertion of both parameres could be slightly asymmetric or not, but rarely as strongly as in *Canthydrus* (only some species of *Suphisellus* have also strongly asymmetric insertions of parameres). At present, the peculiar structure of the aedeagus would represent the only unambiguous morphological autapomophy in *Canthydrus*.

Checklist of Oriental and East Palearctic species of *Canthydrus*

angularis SHARP, 1882	Bangladesh, Cambodia, China (Yunnan), Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, ?Taiwan, Thailand, ?Timor, Vietnam
birmanicus GUIGNOT, 1956	Laos, Myanmar, Thailand
flammulatus SHARP, 1882	China (Macao, Hong Kong), Indonesia, Laos, W Malaysia, Myanmar, Singapore, Thailand, Vietnam
flavus (MOTSCHULSKY, 1855)	China (Fujian, Guangdong, Hainan, Hong Kong, Hubei, Yunnan), Cambodia, Indonesia, Laos, W Malaysia, Myanmar, Singapore, Taiwan, Thailand, Vietnam
haagi (WEHNCKE, 1876)	Cambodia, Indonesia, Laos, W Malaysia, Thailand, Vietnam
laetabilis (WALKER, 1858)	Bangladesh, India, Iran, Myanmar, Nepal, Pakistan, Sri Lanka
luctuosus (AUBÉ, 1838)	?Cambodia, India, Nepal, Sri Lanka, ?Thailand, ?Vietnam
mazzoldii TOLEDO, 2008	Laos, Thailand
morsbachi (WEHNCKE, 1876)	India, Sri Lanka, ?Vietnam
nitidulus SHARP, 1882	?Cambodia, China, Japan (Ryukyu Islands), Taiwan, Vietnam
politus (SHARP, 1873)	China, Japan, South Korea, Vietnam
proximus SHARP, 1882	Thailand
ritsemae (RÉGIMBART, 1880)	Bangladesh, Brunei, Cambodia, China, India, Indonesia, Laos, Malaysia, Myanmar, Nepal, Singapore, Thailand, Vietnam
rocchii WEWALKA, 1992	China (Yunnan), India, Laos, Myanmar, Thailand
semperi (WEHNCKE, 1876)	Indonesia (Sulawesi, Sumatra), Philippines

unclarified taxa

bifasciatus RÉGIMBART, 1889	Cambodia (possibly a junior synonym of *C. nitidulus* – see ZIMMERMANN 1919)
testaceus (BOHEMAN, 1854)	China (type loc.)

Key to species of Oriental and East Palearctic *Canthydrus*

1	Colouration uniformly yellowish or reddish-brown, at most elytra seldom darker than head and pronotum, often with a paler submedian-lateral marking (Figs. 13d–e, 14–16)	2
–	At least elytra black or black-brownish, with or without paler markings (Figs. 1–13a–b)	6
2	Each elytron with at least one submedian, faint paler marking (Figs. 13d–e, 14–15); in lateral view sides of elytra more or less concave, never almost rectilinear; size often larger than 3.0 mm	4
–	Elytra without paler markings (Fig. 16); in lateral view sides of elytra seldom concave or almost rectilinear; size not reaching 3.0 mm	3
3	Median lobe narrowed apically, often ending with a short nipple-like tip, due to a small subapical emargination on dorsal side (Fig. 30–b); in lateral view sides of elytra at least seldom concave (Fig. 15)	***flavus*** (males)
–	Median lobe very broad apically (Fig. 38a–b); in lateral view sides of elytra seldom concave to almost rectilinear	***ritsemae***
4	Median lobe as in point 3.; size smaller (2.4–2.9 mm)	***flavus*** (mostly females)
–	Median lobe rounded apically, not narrowed nor with subapical emargination. Average size larger (2.8–3.4 mm)	5
5	Right paramere without setae (Fig. 28c); median lobe regularly rounded apically, with large depression on left side (Figs. 27a–b, 28a–b); elytra often also with subbasal paler markings (Fig. 14a–c)	***birmanicus***
–	Right paramere with apical tuft of setae (Fig. 23a); median lobe rounded apically with tip weakly but visibly bent down (Fig. 22); each elytron always with single submedian pale spot (Fig. 13)	***rocchii*** (in part)
6	Pronotum black or brown, with lateral sides or at least hind angles pale (Figs. 1–3, 11–13a); sometimes lateral pale patterns extended medially, but at least a thin dark area occurs on the disc (Fig. 11d)	7
–	Pronotum totally reddish or reddish-yellow, exception made for a dark, transverse marking along hind and, sometimes, fore sides (Figs. 4–10)	13
7	Elytra totally black, without pale markings (Fig. 3); median lobe gradually narrowed toward apex in distal third (Fig. 39a–b)	***semperi***
–	Elytra with at least a single submedian-lateral pale marking; median lobe different	8
8	Each elytron with only a single yellow or reddish spot in submedian-lateral position	9
–	Each elytron with at least one pale marking also in subbasal position (lateral, discal or both); very seldom subbasal markings missing, (in this case see comparison of *C. luctuosus* with *C. rocchii*)	11
9	Very large (3.5–4.0 mm), very convex and wide, almost hemispherical (Fig. 2); median lobe elongate and narrow, abruptly ending in a sort of long and slender beak (Fig. 26a–b); right paramere abruptly narrowed in a long and stiff apex (Fig. 26d)	***mazzoldii***
–	Average size smaller (2.6–3.8 mm); convex and wide but not almost hemispherical; aedeagal features completely different	10

10 Very convex, strongly tapering toward elytral apex (Fig. 1a–b); median lobe large and broad, apically ending in a sort of "dog's head" expansion (Fig. 25a–b); left paramere with characteristic dense mat of hairs on inner surface of distal half (Fig. 25d) ..... ***angularis*** (in part)

– Less strongly convex and body with lateral sides more regularly rounded; aedeagal features different Figs. 22–23 ..... ***rocchii*** (in part)

11 As in point 10 (above) ..... ***angularis*** (in part)

– Less strongly convex and body with lateral sides more regularly rounded; median lobe and left paramere very different 12

12 Median lobe ventrally slightly sinuated with narrowed tip slightly bent down (Fig. 34a–b); apex of right paramere obliquely truncate (Fig. 34c); each elytron with pale markings at most extended in a submedian and a subbasal transverse band, otherwise reduced into three spots (one subbasal-discal, one subbasal-lateral and one submedial-lateral) (Fig. 12) ..... ***morsbachi***

– Median lobe straight ventrally, with rounded apex (Fig. 32a–b); right paramere, apically narrowly rounded (Fig. 33d); each elytron normally with three pale markings, often very extended, otherwise reduced into three, two or (rarely) only one spot (Fig. 11) ..... ***luctuosus*** (in part)

13 Each elytron always only with a single, submedian-lateral, pale spot (Fig. 13b–c) .. ***rocchii*** (in part)

– Each elytron always with extended pale pattern in subbasal and submedian position (Figs. 4–10) 14

14 Smaller (2.1–2.3 mm); median lobe sabre-shaped, gently tapering to apex (Fig. 30a–b); right paramere elongate, almost as long as median lobe (Fig. 31d); body short and convex whith strongly waved reddish submedian band of elytra (Fig. 5) ..... ***haagi***

– Larger (2.4–3.6 mm); male genitalia different, right paramere much shorter than median lobe and less elongate 15

15 Median lobe widened apically with short, beak-like rounded tip (Fig. 37a–b); pronotum dark reddish, often with large triangular darker marking on disk; large, very convex species (Fig. 6) ..... ***proximus***

– Median lobe different; pronotum always without dark markings on disc, at most only with darker markings on hind and fore margins 16

16 Submedian band of elytra strongly waved (Fig. 4); right paramere elongate with narrowly rounded tip (Fig. 29d); median lobe as in Fig. 28a–b ..... ***flammulatus***

– Submedian band of elytra not strongly waved (Figs. 7–10); right paramere shorter with broader rounded tip; median lobe rather different 17

17 Pronotum with thick, black marking on anterior and posterior margins (Fig. 7); length: 3.4–3.6 mm; rather convex; elytral apex always black ..... ***nitidulus***

– Pronotum with darker marking along posterior margin only; average size smaller (2.4–3.5 mm); less convex 18

18 Elytral apex reddish or yellowish; pale lateral markings of elytra touching elytro-epipleural margin (Figs. 8–9); average size smaller (2.4–3.1 mm); median lobe with both dorsal and ventral sides sinuate or curved (Figs. 32, 36) 19

– Elytral apex black; at last submedial pale lateral marking of elytra not touching elytro-epipleural margin (Fig. 10); average size larger (2.6–3.5 mm); median lobe straight on both dorsal and ventral sides (Fig. 33a–b) ..... ***luctuosus*** (in part)

19 Median lobe narrowed in apical third (Fig. 32a–b); body more elongate and pronoto-elytral sinuation weak (Fig. 8) ..... ***laetabilis***

– Median lobe broadly rounded apically (Fig. 36a–b); body broader with marked pronoto-elytral sinuation (Fig. 9) ..... ***politus***

Systematic account

Canthydrus is a homogeneous genus. Arranging the species of *Canthydrus* in natural groups is therefore in most cases very hard. WEWALKA (1992) defined the *C. flavus* group, which includes the Oriental species *C. birmanicus* GUIGNOT, 1956, *C. flavus* (MOTSCHULSKY, 1855), *C. ritsemae* (RÉGIMBART, 1880) and *C. rocchii* WEWALKA, 1992, based on the uniformly reddish or reddish-yellow colouration in all these species. At first glance, in fact, body colouration seems to allow to group most of the Asian species of *Canthydrus*. Nevertheless, we noticed an extreme variability in several species, and no alternative valid characters have been found at present to define natural groups. For this reason, the species are here treated in alphabetical order.

Canthydrus angularis SHARP, 1882

Canthydrus angularis SHARP 1882a: 277 (orig. descr.); NILSSON 2011: 9 (cat., bibliography); FREITAG et al. 2016: 186; NILSSON & HÁJEK 2024: 3.
Canthydrus bakeri PESCHET 1921: 693 (orig. descr.): HÁJEK 2017: 844 (Taiwan).
Canthydrus bakei PESCHET 1921 (misspell.): HUA 2002: 34.
Canthydrus scapharius GUIGNOT 1948: 9 (orig. descr.).
?Canthydrus guttula (AUBÉ, 1838) (misident.): RÉGIMBART 1892: 980 (see NILSSON 2011: 9).
Canthydrus luctuosus var. *angularis* SHARP 1882a: RÉGIMBART 1889a: 148.
Canthydrus morsbachi (WEHNCKE, 1876) (misident.): RÉGIMBART 1899a: 247 (see NILSSON 2011: 9).

TYPE LOCALITIES: *C. angularis*: Singapore; *C. bakeri*: Philippines, Luzon, Laguna, Los Baños; *C. scapharius*: Zaire [Democratic Republic of the Congo], Musosa [mislabeled!].

TYPE MATERIAL: *C. angularis*: Lectotype (NHML) designated by TOLEDO (2008: 56); *C. bakeri*: Syntypes (MNHNP, IRSNB); *C. scapharius*: Holotype (MNHNP) not studied.

ADDITIONAL MATERIAL EXAMINED:

BANGLADESH: TOLEDO (2008: 56).
CAMBODIA: TOLEDO (2008: 56).
CHINA: YUNNAN: CWBS loc. 380 (TOLEDO 2003: 78).
INDONESIA (see also TOLEDO 2008: 58, 2010: 213): SUMATRA: W Sumatra, Fort De Kock [Bukittinggi], 920 m, 1925, leg. Jacobson (7 exs. GWW).
MALAYSIA: TOLEDO (2008: 58).
MYANMAR: TOLEDO (2008: 56).
PHILIPPINES (see also TOLEDO 2008: 58): LUZON: Laguna, Los Baños, lake margin, 16.XI.1993, leg. Zettel (1 ex. GWW).
SINGAPORE: TOLEDO (2008: 58).
THAILAND (see also TOLEDO 2008: 56): CENTRAL THAILAND: Ayutthaya Province, Bang Pa-in District, Bang Krasan, Station 234, 20 m, 2.V.2021, leg. Okada (1 ex. THNHM); Ayutthaya Province, Bang Sai District, Ratchakham, Station 191, 10 m, 7.XI.2020, leg. Okada (1 ex. THNHM); Pathum Thani Province, Lam Luk Ka District, Lam Sai, Station 201, 20 m, 12.XII.2020, leg. Okada (4 exs. THNHM); Samut Prakan Province, Bang Phli District, Bang Chalong, Station 270, 10 m a.s.l., 30.XII.2021, leg. Okada (2 exs. THNHM); EAST THAILAND: Chachoengsao Province, Bang Pakong District, Tambon Tha Kham, Station 15B, 10 m, 14.X.2018, leg. Okada (1 ex. THNHM); Chonburi Province, Si Racha District, Bang Phra, N of Ban Bang Phra, Station 3, 20 m, 17.VI.2018, leg. Okada (3 exs. THNHM); Si Racha District, Huai Saphan, Station 25, 80 m, 4.I.2019, leg. Okada (2 exs. THNHM); idem, Station 110, 20 m, 4.IV.2020, leg. Okada (2 exs. THNHM); Si Racha District, Bang Phra, Station 268, 60 m, 20.XI.2021, leg. Okada (1 ex. THNHM); Nong Yai District, Nong Yai, Station 114, 105 m, 25.IV.2020, leg. Okada (1 ex. THNHM); Bo Thong District, That Thong, pond, Station 115, 90 m, 1.V.2020, leg. Okada (1 ex. THNHM); Sattahip District, Bang Sare, Station 132, 50 m, 27.VI.2020, R. Okada (2 exs. THNHM); Bang Bueng District, Khlong Kiu, Nong Nam Khieo, Station 35, 80 m, 1.XII.2018, leg. Okada (1 ex. THNHM); idem, Station 76, 22.IX.2019, leg. Okada (1 ex. THNHM); idem, Station 322, 4.II.2023, leg. Okada (1 ex. THNHM); NORTH THAILAND: Chang Mai Province, Chom Thong District, Khuang Pao, Station 145, 300 m, 5.VII.2020, leg. Okada (3 exs. THNHM); NORTHEAST THAILAND: Buri Ram Province, Mueang Buri Ram District, Sawai Chik, 160 m, 11.II.2023, leg. Okada (1 ex. THNHM); Nakhon Ratchasima Province, on rd. Khon Kaen to Bangkok, ca. 150 km to Khon Kaen, 15°19'50"N 102°26'20"E, roadside ditch, 19.III.2017, leg. Shaverdo, 2017-Th-02 (3 exs. NMW); idem, Sida distr., 15°16'22"N 102°25'07"E, nr. road bridge across Kholong Sathaet, 21.III.2017, leg. Shaverdo, 2017-Th-07 (1 ex. NMW); Khon Kaen City, 21.V.1954, leg. Elbel

(1 ex. GWW); Udon Thani, Reisfeld [rice field], 6.III.1976, leg. Heckmann (2 exs. NMW); idem, 8.V.1976 (1 ex. NMW); SOUTH THAILAND: Phatthalung Province, Kong Ra District, Khlong Chaloem, Station 214, 40 m, 6.II.2021, leg. Okada (4 exs. THNHM); Ranong Province, Mueang Ranong District, Ratchakrut, Station 63, 10 m, 29.VII.2019, leg. Okada (3 exs. THNHM); Songkhla Province, Ranot District, Ban Khao, Station 216, 10 m, 7.II.2021, leg. Okada (1 exs. THNHM); WEST THAILAND: Prachuap Khiri Khan Province, Sam Roi Yot District, Sala Lai, Station 340, 10 m, 1.VII.2023, leg. Okada (2 exs. THNHM).
VIETNAM: TOLEDO (2008: 58).

This species has been redescribed in TOLEDO (2008), and therefore only the most relevant characters are discussed here.

HABITUS (Fig. 1): Large, very convex, rather broad with maximum width at base of pronotum and strongly tapering towards elytral apex. Pronotum black, reddish colouration of lateral sides from reduced at hind angles to broadly extended, almost reaching disc. Elytra black with two, rather developed, markings in basal and submedian position; otherwise reduced into small submedian spots or almost completely missing. In lateral view, sides of pronotum rounded with lateral bead visible but not particularly strong, sides of elytra strongly concave at shoulders, pronoto-elytral sinuation well-marked. Transverse series of stiff setae on prosternum distinct, longer though not much thicker than on prosternal process. Prosternal process with setal punctation rather scattered, coarse to almost smooth; denser and uniform on noterid platform. Ventral microreticulation impressed on lateral expansions of metaventrite, metacoxae and first abdominal ventrites; hardly visible on last abdominal ventrites and noterid platform.

MEASUREMENTS: TL: 3.0–3.8 mm; MW: 1.65–2.0 mm.

MALE: Aedeagus very distinctive (Fig. 25a–b): median lobe apically with expansion resembling a dog head. Left paramere (Fig. 25c) with characteristic dense mat of hairs on inner surface of distal half.

FEMALE: Not differing externally from males.

VARIABILITY: Very variable in extension of paler patterns on head, pronotum and elytra (Fig. 1a–b). According to TOLEDO (2008), melanistic specimens are concentrated in the southeast of the range of the species.

DIFFERENTIAL DIAGNOSIS: This species can be easily distinguished from the other Oriental species by the large size and very convex body and by the colour patterns, although very variable. *Canthydrus proximus* (see below) seems closer to *C. angularis*, but it has a more extensively reddish pronotum and a subbasal reddish elytral band in different position. Both species have very distinctive and strongly different aedeagal features. In Sulawesi and in the Philippines, almost completely black populations co-exist with *C. semperi*, also completely black but visibly smaller and with totally different aedeagus (see also "Differential Diagnosis" for this species).

DISTRIBUTION (Fig. 46): Widespread in the Oriental Region: Bangladesh, Cambodia, China (Yunnan), Indonesia (Bali, Sumatra, Java, Kalimantan, Lombok, Sulawesi), Laos, Malaysia (West Malaysia, East Malaysia), Myanmar, Philippines (Luzon, Mindanao, Mindoro, ?Negros, Siquijor), Singapore, ?Taiwan, Thailand, Vietnam.

Most likely, the four specimens reported by TOLEDO (2008): "Philippines, Luzon, Dumaguete, Woltereck leg." (IRSNB) actually were collected in the island of Negros, because there seems to be no place named "Dumaguete" in Luzon. Therefore, we added Negros to the distribution of this species, although it still needs to be confirmed.

The only record for Kalimantan comes from HUA (2002) as *C. bakei* (sic!), without additional data. As much as we know, no precise localities are actually known for the Indonesian part of Borneo.

GUIGNOT (1956b) recorded *Canthydrus morsbachi* and *C. angularis* from Java (Batavia [Jakarta]), both collected by Dr. L. Biró at the end of the 19th Century and deposited in the HNHM. NILSSON (2011) affirmed that both of these records most likely should be attributed to *C. angularis*. György Makranczy (HNHM) kindly checked the collection of the museum and found five specimens from "Batavia" identified by Guignot as *C. angularis* and a single specimen identified as *C. morsbachi* from "Thichinopoly" (with all likelihood to be referred to Trichinopoly, India). It was most likely a mistake by GUIGNOT (1956b) to state that the specimen of *C. morsbachi* was collected in "Batavia". In fact, there is no specimen identified as *C. morsbachi* from the island of Java deposited in the HNHM.

The record of *Canthydrus guttula* (AUBÉ, 1838) for Taiwan by KANO (1931) has never been checked. This taxon was confused in former times with some *Canthydrus* species including *C. bakeri* (= *C. angularis*); the record of *C. guttula* for Taiwan might therefore be attributed to *C. angularis*, the presence of which in the island is not yet confirmed, although at least probable. Records of *C. guttula* for New Guinea and Timor (RÉGIMBART 1892, 1899), like that of *C. bakei* (sic!) for New Guinea (HUA 2002), most likely should be attributed to *C. serialis* FAUVEL, 1883 or other species of the *Canthydrus serialis* species group (TOLEDO 2010).

Canthydrus birmanicus GUIGNOT, 1956

Canthydrus birmanicus GUIGNOT 1956a: 452 (orig. descr.); WEWALKA 1002: 808; NILSSON 2011: 17 (cat.).
Canthydrus (s.str.) *birmanicus* GUIGNOT, 1956a: NILSSON 2005: 98 (cat.).

TYPE LOCALITY: Birmanie (Myanmar), Moulmein (Mawlamyine, Mon State).

TYPE MATERIAL: Holotype not found in MNHNP. Paratypes: "Moulmein, water-tank, 22.X.1934, Malaise / Museum Paris 1960 coll. Guignot" (1 ♀ MNHNP); "Tenasserim, Kawkareik. 65 km E of Moulmein, 22.–26.X.34, Malaise / Museum Paris 1960 coll. Guignot" (1 ♂ MNHNP); "Rangoon, Burma, 25.II [?], Malaise / Museum Paris 1960 coll. Guignot" (1 ♀ MNHNP); "Rangoon, 1.XII.34" (2 ♀♀ IRSNB); "Rangoon, 25.–30.XI.34, leg. Malaise" (1 ♀ IRSNB).

1 ♂ (IRSNB) without red "Type" label and locality not mentioned in the original description, but collected in the same year "Burma, Mytkyina, 175 m, 15.–30.VII.1934 / Canthydrus birmanicus Guignot, det Mouchamps 1963" belongs to *C. rocchii*.

ADDITIONAL MATERIAL EXAMINED:

LAOS: Bolikhamxai Province, Ban Nape Kaew Nua Pass, ca. 600 m, small stream, 18.IV.–1.V.1998 [collector unknown] (1 ♂ NMW).

THAILAND: NORTHEAST THAILAND: Bueng Kan Province, Bueng Khong Long District, Bueng Khong Long, Station 204, 190 m, 27.XII.2020, leg. Okada (3 exs. THNHM); Bueng Kan Province, Si Wilai District, Na Saeng, Station 205, 180 m, 28.XII.2020, leg. Okada (1 ex. THNHM).

VIETNAM: Nam Cat Tien Nat. Park, 1.–15.V.1994, leg. Pacholátko & Dembický (1 ♀ NMW).

HABITUS (Fig. 14): Medium sized; rather convex, regularly oval, maximum width at base of pronotum; in lateral view pronoto-elytral sinuation rather marked.

COLOURATION: Brownish, darker on elytra, testaceous or reddish-yellow on pronotum and head. On each elytron paratypes share testaceous patterns as follows: subcircular or squared subbasal-discal and submedian, transverse band, more or less developed and waved, starting directly from lateral yellow band of elytron. Male specimen from Laos with uniformly brown elytra with sharp, yellow submedian-lateral spot and poorly defined paler area at shoulders. Underside completely testaceous or reddish. Antennae testaceous. Legs uniformly reddish or reddish-brown.

STRUCTURES AND SCULPTURE: Microreticulation on head well visible. Pronotum, in lateral view, with lateral sides rounded and lateral bead rather strong; surface glossy, microreticulation fine but easily visible, arranged in small vermiculations. Elytra, in lateral view,

with sides rather concave at shoulders. Elytral surface shining, microreticulation finer than pronotum, more obviously arranged in vermiculations. Setal punctation on prosternum and noterid platform rather uniform. Microreticulation on metaventrite, metacoxal plates and metacoxal process well impressed, less on abdominal ventrites.

MEASUREMENTS: TL: 3.0–3.1 mm; MW: 1.5–1.6 mm.

MALE: Median lobe stocky, rounded apically (lateral view), depression on right side large and sharply outlined (Figs. 27a–b, 28a–b). Right paramere (Fig. 27c) broad, apically almost ogival, without setae. Left paramere as in Fig. 27c.

FEMALE: Not differing externally from males. Average size supposedly larger, but we have not examined enough material to affirm this.

VARIABILITY: At the light of the very few specimens available, two different colouration have been observed in this species. The paratypes share a paler pattern of markings and bands on brownish elytra, as described above (Fig. 14a); also the three specimens seen from Thailand share this colouration (Fig. 14b). The only specimen seen from Laos has more uniformly reddish-brown elytra, as described above (Fig. 14c). We have been able to see only three males of this species and some small differences can be observed in their median lobe but, despite the fact that more similarity was observed in the aedeagus of the Thai male with the paratype from Myanmar (Fig. 27a–b), compared to the male from Laos (Fig. 28a–b), not much can be said here due to the scarcity of available material.

DIFFERENTIAL DIAGNOSIS: This species was redescribed by WEWALKA (1992) based on the type material and treated as a member of the *Canthydrus flavus* species group due to its brown colouration, easily distinguishable from similar species, in particular *C. rocchii*, due to the extended paler patterns on elytra (*C. rocchii* shares only a single submedian spot). The single male specimen from Laos is almost undistinguishable externally from the typical form of *C. rocchii* except for the aedeagal features which are very different.

DISTRIBUTION (Fig. 48): Known from southern Myanmar, northern Thailand and central Laos. From southern Vietnam we have seen only a female with elytral markings very similar to the type specimens, likely belonging to the same taxon. Nevertheless, the presence of this species in Vietnam, although plausible, must be confirmed. First record for Laos and Thailand.

Canthydrus flammulatus SHARP, 1882

Canthydrus flammulatus SHARP 1882a: 278 (orig. descr.); NILSSON 2011: 11 (cat., bibliography).
Canthydrus (s.str.) *flammulatus* SHARP, 1882a: NILSSON 2005: 99 (cat.).
Canthydrus proximus SHARP, 1882a (partim misident.): RÉGIMBART 1899: 250; VAZIRANI 1977a: 7.
Canthydrus cf. *proximus* SHARP, 1882a: HENDRICH et al. 2004: 108.
Canthydrus sp.: JÄCH & EASTON 1998: 43 (Macao); TOLEDO 2003: 81 (Macao, Hong Kong, northern Vietnam).

TYPE LOCALITY: Thailand, Bangkok.

TYPE MATERIAL: Lectotype (NHML) designated by TOLEDO (2010: 214).

ADDITIONAL MATERIAL EXAMINED:

CHINA: MACAO (see also TOLEDO 2003: 81): Colôane Island, HacSa village, pond with Taro, 15.IX.1994, leg. Easton, Ramos & Ribeiro (5 exs. NMW); HONG KONG (TOLEDO 2003: 81).

INDONESIA: JAVA: S of Jakarta, 11.I.1987, leg. Jäch (1 ex. NMW); KALIMANTAN: E Kalimantan, Tabang Distr., Lalang [stream], near Ritan Baru, 27.VII.1995, leg. Mazzoldi (7 exs. PMB); E Kalimantan, Sungai Tanaik, tributary of Kedang Pahu in disturbed forest, 30.XII.2001, leg. Mazzoldi (1 ex. PMB); SIBERUT, Muara Siberut (19), 15.II.1991, leg. Jäch (1 ex. NMW); SULAWESI (TOLEDO 2010: 216); SUMATRA: Medan, VII.1920, leg. Mjöberg, Coll. A. Zimmermann (3 exs. ZSM); WEST PAPUA: Arfak Mts., Manokwari, 1300 m, 19.–30.X.2010, leg. Milko / Canthydrus flammulatus Sharp, det. Wewalka 2020 (1 ex. GWW).

LAOS: Champasak Province, ca. 50 km S Pakse, surroundings of Ban Phatoumphone, 50–100 m (1a), 23.–24.V.1996, leg. Schillhammer (2 exs. NMW).

MALAYSIA: WEST MALAYSIA: Kelantan State, 60 km NE of Tanah Rata, Tanah Kerajaan, 1000 m, 12.–30.IV.2007, leg. Čechovský (1 ex. NMW); Perak State, 25 km NE Ipoh, 1,200 m, Banjaran Titi Wangsa Mts, Korbu Mt., 1.–15.IV.2000, leg. Čechovský (2 exs. NMW); Pahang/Johor States, Endau Rompin NP, 100 m, Selendang, 28.II.–12.III.1995, leg. Štrba & Hergovits (23 exs. NMW); Pahang State, 50 km NE Kuala Rompin, Endau Rompin NP, 400 m, Mt. Keriung (Kebu Hitam), 9.–30.IV.2008, leg. Čechovský (41 exs. NMW); Selangor State, Sabak Bernam, Region 6, 16.III.1960 / C.H. Fernando, B.M. 1960–638 (1 ex. GWW).

MYANMAR: Sagaing Region, Chatthin Wildlife Sanctuary, 23°32'05"N 95°38'53"E, ca. 200 m, 5.–17.X.1998, leg. Schillhammer (3 exs. NMW).

SINGAPORE: Sungli, Bulon fishpond, 15.XI.1990, ZRC.6.15630 (1 ex. RMBRS); Lim Chu Kang, nr. Neo Tieo, 16.I.1991, leg. Yang et al. (18 exs. RMBRS); Nee Soon, swamp forest, 17.VI.1992, leg. Lua et al., NS22 (1 ex. RMBRS); Lorong Banir, pond 2, 16.VI.1995, leg. Yang & Loa, 6. 18329. NS192 (1 ex. RMBRS); nr. Kranji Reservoir, Turut Track, 18.VIII.2004, leg. Jäch (2 exs. NMW).

THAILAND: CENTRAL THAILAND: Bangkok – Ayuttaya, 25.VIII.1988, leg. Schödl (14) (1 ex. NMW); Uthai Thani Province, Tap Tan, 200 m, I.1979, leg. Thielen (1 ex. NMW); NORTHEAST THAILAND: Loei Province, Wang Saphung, Mae Nam Loei, 8.III.1994, leg. Shepard (1 ex. NMW); Loei Province, in Ban Si Than, 16°52'48"N 101°52'00"E, large shallow water body-pond, 23.III.2017, leg. Shaverdo, 2017-Th-04 (6 exs. NMW); Udon Thani Province, 5 km E Udon Thani (32), 28.XI.1995, leg. Zettel (6 exs. NMW); Khon Kaen Province, Khon Kaen University, ponds at south enter, 17.II.1994, leg. Shepard (11 exs. NMW); idem, blackwater pool, 23.II.1994 (15 exs. NMW); idem, pasture pool, 23.II.1994 (12 exs. NMW); Khon Kaen Province, Ban Phai distr., road Khon Kaen – Bangkok, 16°6'18"N 102°44'21"E, large fishing pond, 22.III.2017, leg. Shaverdo, 2017-Th-06 (3 exs. NMW); Nakhon Ratchasima Province, road Khon Kaen – Bangkok, 15°19'53"N 102°26'19"E, roadside ditch, 19.III.2017, leg. Shaverdo, 2017-Th-02 (12 exs. NMW); idem, Sida Distr., 15°16'22"N 102°25'07"E, nr. road bridge across Kholong Sathaet, 21.III.2017, leg. Shaverdo, 2017-Th-07 (7 exs. NMW). WEST THAILAND: Kanchanaburi Province, Kwai River (5), 1.XII.1990, leg. Jäch (7 exs. NMW); EAST THAILAND: Chon Buri Province, Pattaya, 1.I.1987, leg. Schmid (1 ex. NMW); SOUTH THAILAND: Surat Thani Province, Koh Samui Island, 12.IX.1985, leg. Preuler (1 ex. NMW); Phuket (92), 24.I.–3.II.1992, leg. Holecova (3 exs. NMW); Songkhla Province, Tale Noi, 7°47'N 100°13'E, at light, 1.–2.V.1993, leg. Malicky (17 exs. NMW); Pattani Province, Sai Buri, 23.–28.IV.1993, leg. Strnad (3 exs. NMW); Yala Province, Betong, 26.III.–22.IV.1993, leg. Horák & Strnad (1 ex. NMW); idem., 25.III.–22.iv.1993, leg. Horák (1 ex. NMW). In addition, a total of 128 specimens kept in THNHM have been studied from the following provinces: Chiang Mai, Chiang Rai, Nan (NORTH THAILAND), Ayutthaya, Bangkok, Pathum Thani, Samut Prakan, Saraburi, Sukhothai (CENTRAL THAILAND), Bueng Kan, Buri Ram, Chayaphum, Nong Khai, Ubon Ratchathani, Udon Thani (NORTHEAST THAILAND), Kanchanaburi (WEST THAILAND), Chachoengsao, Chonburi, Rayong (EAST THAILAND).

VIETNAM: Hanoi, at light, 20.–30.IV.1991, leg. Jendek (1 ex. NMW); Tuyen Quang Province, 160 km NNW Hanoi, Pac Ban, 11.VI.1996, leg. Napolov (3 exs. LHM); Nam Cat Tien Nat. Park, 1.–15.V.1994, leg. Pacholátko & Dembický (100 exs. NMW); Nam Cat Tien, 18.VII.1995 (28 exs. NMW); idem, 27.V.1995 leg. Napolov (3 exs. NMW); Dac Lak Province, ca. 60 km S Buon Ma Thuot, pool nr. river ca. 700 m, 13.II.2012, leg. Wewalka (3 exs. GWW, NMW); Giadinh Province, Saigon [Ho Chi Min], 9.VI.1970, leg. Tyson (1 ex. GWW); "Cochinchina, Long-Xuyen [An Giang Province] (Dorr), *Canthydrus flammulatus* Shp. A. Mouchamps det." (3 exs. IRSNB).

This species has been redescribed by TOLEDO (2010), only the most relevant characters are discussed here.

HABITUS (Fig. 4): Rather broad to almost elongate, rather convex, maximum width at base of pronotum or very close to; in lateral view pronoto-elytral sinuation weak but appreciable. Pronotum reddish with dark line along hind margin, expanded into two lobes variably developed; dark, oval marking rarely visible on fore margin. Elytra black or dark brown, normally faded apically, with reddish ∩-shaped subbasal-discal marking and waved submedian band. In lateral view, sides of pronotum rather rounded with lateral bead visible but not particularly strong and sides of elytra weakly concave at shoulders. Transverse series of stiff setae on prosternum, above prosternal process distinct, not or only weakly thicker than on prosternal process. Prosternal process with setal punctation rather coarse and widely spaced: smooth area, without microreticulation and punctures, visible proximally, often extending over procoxae. Noterid platform with rather widely spaced setal punctation and visible microreticulation. Ventral

colouration variable from almost uniformly testaceous to extensively black on noterid platform, metaventrite, metacoxae and abdominal ventrites; most commonly underside reddish, with noterid platform slightly darker and abdomen blackish.

MEASUREMENTS: TL: 2.5–3.1 mm (average: 2.77 mm); MW: 1.3–1.6 mm (average: 1.46 mm). Ratio TL/MW: 1.73–2.0; average: 1.89.

MALE: Median lobe as in Fig. 29a–b, distal portion with dorsal and ventral sides straight or slightly curved, widely rounded apically, basal and distal portions divided by convex curve, forming wide angle; left face with sort of thick bridge extending from ventral side to inner surface of right face; left lamina absent. Right paramere (Fig. 29c) elongate, with apex narrow, bearing small tuft of short setae.

FEMALE: Not differing externally from males.

VARIABILITY: Rather variable in size and development of elytral patterns, however, foreseeable in a variegate species with such a wide distribution. All the specimens examined from Macao, Hong Kong and northern Vietnam are large, with a sharp black oval marking on fore margin of pronotum (very rare in other populations of *C. flammulatus*), broader pale markings on elytra with subbasal-discal almost rounded, rarely or not at all ∩-shaped (Fig. 4b) and dark underside. However, the male genitalia do not possess substantial differences compared to specimens from other areas. These are the most northeastern exemplars of this species known to us, and they might represent a distinct population related to the northern coast of the South China Sea. This is in accordance with the suggestion on the peculiarity of these beetles (TOLEDO 2003: 81). Nonetheless, no further systematic speculations can be made at present.

The three old specimens from Sumatra, Medan (ZSM) are very dark, with partially black head and completely black pronotum (hind angles of pronotum and elytral markings are bright reddish and this indicates that the dark colouration is not a consequence of the age of these specimens), though elytral patterns and aedeagal features are not different from typical *C. flammulatus*. This material represents an important exception in the colouration of this species, as far as we know never rediscovered, and it might be the source of the record of *Canthydrus ornatus* and/or *C. morsbachi* by ZIMMERMANN (1927) from Sumatra (see also discussions below, in *C. luctuosus*).

DIFFERENTIAL DIAGNOSIS: *Canthydrus flammulatus* can be easily distinguished from similar species by the strongly waved submedial band on each elytron and the ∩-shaped subbasal marking. *C. haagi*, although very different in size, body shape and male genitalia, is closely related to *C. flammulatus* on account of the similar elytral markings, the peculiar "bridge" structure and the absence of the right lamina in the median lobe.

DISTRIBUTION (Fig. 51): Widespread in the Oriental Region: southern China (Hong Kong, Macao), Indonesia (Java, Kalimantan, Siberut, Sulawesi, Sumatra), Laos, Malaysia (W Malaysia), Myanmar, Singapore, Thailand, Vietnam. The specimen from West Papua is probably mislabeled. First record for China. We saw a single specimen of *C. flammulatus*, which was obviously collected together with specimens of *C. proximus* and *C. flavus* in West Papua (see below). The presence of all these three species in New Guinea is at least unlikely and with any probability based on a labeling error of material collected from continental southeastern Asia, perhaps Thailand.

Canthydrus flavus (MOTSCHULSKY, 1855)

Hydrocanthus flavus MOTSCHULSKY, 1855: 83 (orig. descr.).
Canthydrus flavus (MOTSCHULSKY, 1855): NILSSON 2011: 12 (cat., bibliography); HÁJEK 2017: 844; NILSSON & HÁJEK 2024: 3.
Canthydrus fulvescens RÉGIMBART, 1889a: 149 (orig. descr.).

TYPE LOCALITIES: *H. flavus*: Indes orientalis; *C. fulvescens*: Annam, Cochinchine [Vietnam].

TYPE MATERIAL: *H. flavus*: Lectotype (ZMUM) designated by WEWALKA (1992: 804); *C. fulvescens*: Syntypes (MNHNP) not studied.

ADDITIONAL MATERIAL EXAMINED:

CAMBODIA: Siem Reap Province, Angkor, Banteay Srei, pool, ca. 20 m, 30.I.2012, leg. Wewalka (4 exs. GWW, NMW).

CHINA: YUNNAN (TOLEDO 2003: 77).

INDONESIA: JAVA: Bogor, Tji Manggu, rice fields, 6.V.1961, leg. "Pà Mani s+S" [sic] (1 ex. OLM); SUMATRA: Toba Lake, Samosir, ca. 900 m, 3.II.1990, leg. Schödl (4 exs. NMW); Aek Tarum, 2°40'30"N 99°18'30"E, 180 m, 21.II.1994, leg. Malicky (1 ex. NMW); Harau Valley, 400 m, 26.VIII.1992, leg. Barries & Cate (1 ex. NMW); Harau, Payakumbuh, I.1991 [collector unknown] (1 ex. MTP); Sumberdjaja, Bukit Rigia, 900 m, XI.1957, leg. Hamann (2 exs. OLM); WEST PAPUA: Arfak Mts., Manokwari, 1,300 m, 19.–30.X.2010, leg. Milko (2 exs. NMW).

LAOS: C. Laos, Bolikhamxai Province, Pakkading env., 18°19'N 103°59'E, 20-24.XI.2000, leg. E. Jendek & P. Patcholátko (1 ex. NMW); Khammouan Province, Ban Khoun, Ngeun env., 18°07'N 104°29'E, 250 m, 4.–16.XI.–25–30.XI.2000, leg. Jendek & Patcholátko (24 exs. NMW); N. Laos, Louangphabang Province,10 km N Louang Phabang / 240 km N Vientiane, 250 m, light trap, XI.1992, leg. Somsy (1 ex. LHM); S. Laos, Attapeu Province, Bolaven Plateau, 15 km SE of Ban Houaikong, Nong Lom (lake) env., 15°2'N 106°35'E, 800 m, 18.–30.IV.1999, leg. Jendek & Šauša (2 exs. NMW).

MALAYSIA: WEST MALAYSIA: Perlis State, Langkawi Isl., P. Lalang – U. Melaka, 13.II.1988, leg. Madl (1 ex. NMW); Perlis State, Langkawi isl., Pantai Kok, 30.I.1992, leg. Jäch (14) (1 ex. NMW); Perlis State, W Langkawi Isl., Air Telaga Waterfall, 20.XI.2006, H. Zettel (HZL1a) (1 ex. NMW); Perak State, 30 km SW Ipoh, Batu Gajah, Teronoh lakes, 100 m, 19.–21.III.2002, leg. Čechovsky (2 exs. MTP).

MYANMAR: Shan State, Shan Highland, Mong Hkok, 2006 (1 ex. ASG).

THAILAND: CENTRAL THAILAND: Nakhon Nayok Province, Khlong, Maduea, puddles (sun) in bed of dried up river, 14°21'17"N 101°16'22"E, 16.III.2017, leg. Shaverdo (4 exs. NMW); Phetchabun Province, Huai Sui Thong, Huai Su Nam, 27.III.1994, leg. Shepard (1 ex. NMW); Chai Nat Province, 10 km W Han-Kha, 150 km NW Bangkok, 90 m, at light, VII.1990, leg. Thielen (1 ex. NMW); Uthai Thani Province, Tap Tan, 200 m, I.1979, leg. Thielen (9 exs. NMW); EAST THAILAND: Chon Buri Province, Phanat, Nikhom, 24.I.1995, leg. Weigel (3 exs. ASG); Ko Chang Island, Than Mayom (10), 8.XII.1990, leg. Jäch (1 ex. NMW); Ko Chang Island, Klong Prao, pond (13, 1), 11.XII.1990, leg. Jäch (2 exs. NMW); NORTH THAILAND: Mae Hong Son Province, S. Pai, Mae Nam Pai, NE Ban Sop, Sa. at light, 500 m, 19°15'60"N 98°26'50"E (GPS), 13.IV.2000, 06/200, leg. Rausch (7 exs. OLM); Mae Hong Son Province, 19°19'N 97°59'E, 29.IV.1992, leg. Dembický (1 ex. NMW); Mae Hong Son Province, Huai Sua Tao, 11.–17.V.1992, leg. Strnad (1 ex. NMW); Chang Rai Province, Muang District, Agriculture Station, Mt. Phangan, 15.I.1995, leg. Chen (13 exs. NMW); Chiang Mai Prov., Mae Taeng, 13.IX.1988, leg. Yimyam (2 exs. NMW); Chiang Mai Prov., Chiang Mai, Zoo, 23.V.–1.VI.1988, leg. Malicky (1 ex. NMW); idem, Chiang Mai, 18°49'N 98°57'E, Zoo, light, 10.–17.IV.1989, leg. Malicky & Chantaramongkol (2 exs. NMW); idem, 1.–8.V.1989 (5 exs. NMW); Prov. Chiang Mai, Chom Thong, 18°26'N 98°41'E, 24.–27.IV.1991, leg. Dembický (38 exs. NMW); idem [but without coordinates], 24.–27.IV.1991, leg. Patcholátko & Horák (2 exs. NMW); 35 km NE Chiang Mai City, Maesa Pong Yan Resort, 600 m, 21.I.1995, leg. Chen (3 exs. NMW); Chiang Mai Province, NW Chiang Mai, Pai City, 29.IV.1993, leg. Pacholátko & Dembický (1 ex. NMW); Chiang Mai Province, Doi Inthanon Nat. Park, Mae Klang Falls, 4.XI.1995, leg. Zettel (6) (1 ex. NMW); NORTHEAST THAILAND: Loei Province, Chiang Khan (1), 12.II.1991, leg. Madl (1 ex. NMW); Loei Province, Wang Saphung, Mae Nam Loei, 8.III.1994, leg. Shepard (10 exs. NMW); Loei Province, Pha Baem, 8.III.1994, leg. Shepard (1 ex. NMW); Loei Province, Tha Li, Nam Kham, 8.III.1994, leg. Shepard (28 exs. NMW); Loei Province, 1 km S Kok Bak, Huai Nam Huai, 9.III.1994, leg. Shepard (7 exs. NMW); Loei Province, Nakhon Thai, 20.VI.1993, leg. Pacholátko & Dembický (1 ex. NMW); Loei Province, in Ban Si Than, large shallow water body - pond, 16°52'48"N 101°52'00"E, 20.III.2017, leg. Shaverdo (9 exs. NMW); Udorn Thani [sic!], Reisfeld [rice field], 8.IV.1976, leg. Heckmann (1 ex. NMW); Udon Thani Province, 5 km E Udon Thani, 29.XI.1995, leg. Zettel (32) (5 exs. NMW); Nakhon Province, 23.XI.1995, leg. Zettel (21) (1 ex. NMW); Khon Kaen Province, Khon Kaen University, ponds at south enter, 17.II.1994, leg. Shepard (2 exs. NMW); idem, blackwater pool, 23.II.1994 (8 exs. NMW); idem, pasture pool (5 exs. NMW); Khon Kaen University, 26.XI.1995, leg. Zettel (28) (9 exs. NMW); Khon Kaen Province, Ban Phai District, on rd. Khon Kaen to Bangkok, large fishing pond, 16°06'18"N 102°44'21"E, 22.III.2017, leg. Shaverdo (62 exs. NMW, MTP); Amnat Charoen Province, pond beside road #212, 26.XII.1994, leg. Chen (3 exs. NMW); Nakhon Ratchasima Province, 116 km S Khon Kaen, 26.XII.1994, leg. Chen (19 exs. NMW); Nakhon Ratchasima Province, Sida District, on rd. Khon Kaen to Bangkok, ca. 150 km to Khon Kaen, 15°19'53"N 102°26'19"E, 19.III.2017, leg. Shaverdo (45

exs. NMW); Nakhon Ratchasima Province, Sida District, on rd. Khon Kaen to Bangkok, nr. road bridge across Khlong Sathaet, 15°16'22"N 102°25'07"E, 21.III.2017, leg. Shaverdo (4 exs. NMW); SOUTH THAILAND: Phuket Province, Phuket, 24.I.–3.II.1992, leg. Holecova (4 exs. NMW); Krabi Province, Ao Nang (2), 22.II.1991, leg. Madl (5 exs. NMW); Pattani Province, Sai Buri, 26.IV.1992, leg. Horák (1 ex. NMW); idem, 23.–28.IV.1993, leg. Strnad (2 exs. NMW); idem, leg. Horák (10 exs. NMW); Yala Province, Betong, 25.III.–22.IV.1993, leg. Horák (1 ex. NMW); WEST THAILAND: Kanchanaburi Province, Kwai River (5), 1.XII.1990, leg. Jäch (1 ex. NMW); Kanchanaburi, (1), at light, 26.XI.1990, leg. Jäch (3 exs. NMW); Kanchanaburi Province, Tham Tharn Lot NP, N. Kanchanaburi (3), 28.–29.XI.1990, leg. Jäch (1 ex. NMW); Kanchanaburi, 30.XI.1990, leg. Forster (7 exs. NMW). In addition, a total of 104 specimens kept in THNHM have been studied from the following provinces: Chiang Mai, Lampang, Nan, Uttaradit (NORTH THAILAND), Lopburi, Phetchabun, Sukhothai (CENTRAL THAILAND), Kanchanaburi, Prachuap Khiri Khan (WEST THAILAND) Bueng Kan, Buri Ram, Nong Khai, Ubon Ratchathani (NORTHEAST THAILAND), Prachin Buri, Chonburi, Rayong, Sa Kaeo (EAST THAILAND), Nakhon Si Thammarat, Phuket (SOUTH THAILAND).

VIETNAM: Cuc Phuong N.P., 100 km S Hanoi, 2.–12.V.1991, leg. Jendek (8 exs. NMW); Lao Cai Province, Sa Pa, 22°20'N 103°50'E, 25.V.–10.VI.1991, leg. Jendek (1 ex. NMW); Quang Ninh Province, ca. 10 km W Along City, pools, ca. 5 m, 4.II.2012, leg. Wewalka (2 exs. NMW); Than Hoa Province, 180 km SSW Hanoi, 40 km SW Than Hoa, Ben En NP, 50 m, 27.VIII.1997, leg. Napolov (3 exs. LHM); Thua Thien Hué Province, ca. 30 km SE Hué, pools, ca. 5 m, 7.II.2012, leg. Wewalka (2 exs. NMW); Tuyen Quang Province, Na Hang, 160 km NNW Ha Noi, NE env. of Na Hang, 150–200 m, 11. –13.1996, leg. Napolov & Roma (1 ex. NMW); Nam Cat Tien National Park, 1.–15.V.1994, leg. Pacholátko & Dembický (19 exs. NMW); Nam Cat Tien National Park, 18.VII.1995 [collector unknown] (7 exs. NMW); 40 Km NW An Khe, Buon Luoi, 620–750 m, 14°10'N 108°30'E, 28.III.–12.IV.1995, leg. Pacholátko & Dembický (15 exs. NMW, MTP); Vũng Tàu, 14.–26.IV.1989, leg. Snížek (7 exs. MTP).

This species has been redescribed by WEWALKA (1992) and TOLEDO (2003); here, only the most relevant diagnostic characters are given.

HABITUS (Fig. 15): Small to moderate; body rather to slightly broad, rather convex, maximum width normally behind shoulders, at first ¼ of elytral length; in lateral view sides of pronotum rather rounded and sides of elytra weakly but visibly concave; pronoto-elytral sinuation rather weak but appreciable. Colouration uniformly yellow or reddish-yellow, with irregular or seldom rounded, paler marking in submedian-lateral position of each elytron. Prosternum with stiff setae longer and thicker than on prosternal process.

MEASUREMENTS: TL: 2.4–2.9 mm (average: 2.67 mm); MW: 1.2–1.5 mm (average: 1.38 mm). Ratio TL/MW: 1.80–2.08 (average: 1.93).

MALE: Elytral light marking in most cases obscure or even missing. Median lobe (Fig. 30a–b) strongly narrowed distally, often ending in short, nipple-like tip, due a small preapical emargination on dorsal side. Right paramere (Fig. 30c) rather elongate, apex variable (tapered or more or less broadly rounded).

FEMALE: average size larger, submedial elytral light marking always visible, even if sometimes hardly discernable.

VARIABILITY: A rather uniform species; small differences have been observed in the development of elytral pale markings and in aedeagal features, but apparently with no relevant importance.

DIFFERENTIAL DIAGNOSIS: Externally, this species can be easily confused with other pale species (*Canthydrus flavus* group, sensu WEWALKA 1992), e.g., *C. ritsemae* above all (see below "Taxonomic Remarks" of this species), *C. birmanicus* and pale specimens of *C. rocchii*, though these two latter are larger. The examination of the aedeagus is needed in these cases.

DISTRIBUTION (Fig. 47): Widespread and common in most of eastern Asia: Cambodia, China (Fujian, Guangdong, Hainan, Hong Kong, Hubei, Yunnan), Indonesia (Java, Sumatra), Laos, Malaysia (W Malaysia), Myanmar, Singapore, Taiwan, Thailand, Vietnam. First records for Laos and Malaysia. The occurrence of *C. flavus* in India is yet to be confirmed as no precise data

are known for this country. The type locality "Indes Orientales" has been interpreted by former authors as "east India" (e.g., BRANDEN 1885: 16) but the name can be referred also to what now is considered southeastern Asia. VAZIRANI (1969a: 227) provided the first detailed record of *C. flavus* from India (Manipur, Imphal), giving a rather clear illustration of the median lobe and the left paramere, which, according to WEWALKA (1992) are definitely those of *C. rocchii*. The presence of this species in Papua New Guinea is at least unlikely and the two specimens "West Papua" are certainly based on a labeling error.

Canthydrus haagi (WEHNCKE, 1876)

Hydrocanthus haagi WEHNCKE, 1876: 222 (orig. descr.).
Canthydrus haagi (WEHNCKE, 1876): NILSSON 2011: 13 (bibliography).
Canthydrus (s. str.) *haagi* (WEHNCKE, 1876): NILSSON 2005: 101 (cat.).

TYPE LOCALITY: Siam [Thailand].

TYPE MATERIAL: Lectotype (MNHNP) designated by TOLEDO (2008: 64).

ADDITIONAL MATERIAL EXAMINED:

CAMBODIA: "Camboge" [Cambodia] (1 ex. IRSNB).

INDONESIA: SUMATRA: Riau Prov. Bukit Tigapuluh N. P., 0°50'S 102°26'E, 18–25.I.2000, leg. Bezděk (1 ex. MTP).

LAOS: S. Laos, Champasak Province, ca, 50 km S Pakse, surroundings of Ban Phatoumphone, 50–100 m, 23.–25.V.1996, leg. Schillhammer (1a) (7 exs. NMW).

MALAYSIA: WEST MALAYSIA: Perak State, 25 km NE Ipoh, 1200 m, Banjaran Titi Wangsa mts., Korbu mt., 1.–15.V.2000, leg. Čechovský (2 exs. MNW, PMB).

THAILAND: EAST THAILAND: Chonburi Province, Bang Bueng District, Khlong Kiu, Nong Nam Khieo, Station 7, 80 m., 22.VII.2018, leg. Okada (1 ex. THNHM); idem, Station 15, 14.X.2018, leg. Okada (7 exs. THNHM); idem, Station 94, 5.XII.2019, leg. Okada (1 ex. THNHM); idem, Station 109, 21.III.2020, leg. Okada (2 exs. THNHM); idem, Station 162, 8.VIII.2020, leg. Okada (3 exs. THNHM); idem, Station 281, 16.II.2022, leg. Okada (1 ex. THNHM); idem, Station 275, 23.I.2022, leg. Okada (1 ex. THNHM); idem, Station 322, 4.II.2023, leg. Okada (6 exs. THNHM);.idem, Station 353, 7.X.2023, leg. Okada (2 exs. THNHM); NORTHEAST THAILAND: Loei Province, in Ban Si Than, 16°52'48"N 101°52'00"E, large shallow water body-pond, 23.III.2017, leg. Shaverdo, 2017-Th-04 (6 exs. NMW); SOUTH THAILAND: Nakhon Si Thammarat Province, Tha Sala District, Tha Khuen, Station 350, 5 m, 16.IX.2023, leg. Okada (1 ex. THNHM); Phatthalung Province, Kong Ra District, Khlong Chaloem, Station 214, 40 m, 6.II.2021, leg. Okada (1 ex. THNHM).

VIETNAM: S. Vietnam, Nam Cat Tien, 19.VII.1995 (2 exs. MNW).

HABITUS (Fig. 5): Small, convex, shining. Maximum width close to base of pronotum; dorsal outline short, strongly tapering toward apex; in lateral view pronoto-elytral sinuation well marked.

COLOURATION: Head and pronotum entirely reddish, except for fine, darker band along basal margin of pronotum, medially broadened into two medial lobes around scutellar area. Elytra black or blackish, apical third or fourth reddish to brownish. Each elytron with subbasal-discal reddish ∩-shaped marking, subbasal-lateral subrectangular marking and waved submedian band (zig-zag shaped in lateral view). Underside black, except prosternum (but not prosternal process), proepisterna, hypomera, epipleura and apex of lobes of metacoxal process reddish; abdomen medially brown-reddish. Antennae and mouthparts testaceous. Legs uniformly dark reddish.

STRUCTURES AND SCULPTURE: Microreticulation on head extremely fine, almost invisible. Sides of pronotum, in lateral view, visibly rounded, with lateral bead rather strong. Surface glossy, microreticulation very fine, hardly discernable, somewhat arranged in vermiculations; weak silky sheen visible on surface. Sides of elytra in lateral view, rather concave at shoulders. Elytral surface shining, microreticulation as on pronotum but slightly stronger; weak metallic sheen visible on black surfaces. Transverse series of stiff setae on prosternum missing, except for

some dots. Setal punctation on prosternal process and noterid platform close and uniform on whole surface, without smoother areas; microreticulation poorly impressed.

MEASUREMENTS: TL: 2.1–2.3 mm (TL of lectotype. 2.1 mm); MW 1.1–1.3 mm (MW of lectotype 1.1 mm). Ratio TL/MW: 1.92–1.75; average 1.82.

MALE: Aedeagus very distinctive: median lobe (Fig. 31a–b) sickle-shaped, regularly tapering to apex; left face with sort of thick bridge extended from ventral side to inner surface of right face; left lamina absent. Right paramere (Fig. 31c) almost as long as median lobe, similarly shaped, with apex acutely rounded, bearing tuft of long hairs.

FEMALE: Not differing externally from males.

DIFFERENTIAL DIAGNOSIS: Together with some specimens of *C. ritsemae*, *C. haagi* is the smallest species of *Canthydrus* in Asia. It is obviously closer to *C. flammulatus* for the peculiar elytral patterns and for some features of the aedeagus (otherwise very different in shape). Compared to *C. flammulatus*, with which in some areas it is sympatric, *C. haagi* is smaller, more convex, with shorter dorsal outlines; in lateral view, the pronoto-elytral sinuation is more marked; prosternum and noterid platform with punctation more regular. Male genitalia are very different and unique among the Asian species of *Canthydrus*.

DISTRIBUTION (Fig. 51): Cambodia, Indonesia (Sulawesi, Sumatra), Laos, Malaysia (West Malaysia), Thailand, Vietnam. First records for Cambodia, Laos, Malaysia and Vietnam.

Erroneously, this species was not listed in TOLEDO (2010), although it had already been recorded for Sulawesi by RÉGIMBART (1899).

Canthydrus laetabilis (WALKER, 1858)

Hydroporus laetabilis WALKER, 1858: 205 (orig. descr.).
Canthydrus laetabilis (WALKER, 1858): NILSSON 2011: 13 (bibliography); FERY et al. 2012: 1062 (Iran: Sistan & Baluchistan); VONDEL et al. 2017: 237 (Iran); HÁJEK 2017: 844 (India, Iran, Nepal, Pakistan); NILSSON & HÁJEK 2024: 3 (idem).
Canthydrus (s. str.) *laetabilis* (WALKER, 1858): NILSSON 2005: 102 (cat.).
Hydrocanthus orientalis WEHNCKE 1876: 222 (orig. descr.).
Canthydrus orientalis (WEHNCKE): ZIMMERMANN 1920: 11 (syn.).
Canthydrus festivus RÉGIMBART, 1888: 610 (orig. descr.) **syn.n.**: NILSSON 2011: 11 (bibliography).
Canthydrus amiculus GUIGNOT 1948: 9 (orig. descr.); GUIGNOT 1951: 83 (syn.).
Canthydrus lactabilis (WALKER 1858) (misspell.): GUIGNOT 1954b: 563.

TYPE LOCALITIES: *H. laetabilis*: Ceylon [Sri Lanka]; *C. festivus*: Rangoon, Birmania [Myanmar]; *H. orientalis*: India, Madras [Chennai], Tranquebar; *C. amiculus*: Zaire [Democratic Republic of the Congo], Musosa [mislabeled!].

TYPE MATERIAL: *H. laetabilis*: Lectotype (NHML) designated by TOLEDO (2008: 65).
C. festivus: **Lectotype** ♂ (MNHNP), by present designation: genitalia and glued on pointed card, just above its original rectangular card, labeled "Rangoon Birmania Fea V.1885 [printed on white rectangular label except for "V" and the "5" of 1885 handwritten] / Museum Paris coll. Maurice Régimbart 1908 [printed on white rectangular label] / *festivus* Regb. [handwritten on small strip of paper] / Syntype" [modern red, printed label] (Fig. 45a).
H. orientalis: Syntypes (MNHNP) not studied.
C. amiculus: Holotype (MNHNP) not studied.

ADDITIONAL MATERIAL EXAMINED:
BANGLADESH: Tangail, 15 km SE Tangail, Gunotia, 24.0122°N 90.1312°E, 7 m, Lohojang, (B01LO021), 12.IV.2006, leg. Fliedl, Shah Alam & Shah (5 exs. NMW); Mymenshing, 11 km NW Mymenshing, Garaikuti, 24.7976°N 90.2984°E, Katakhali, (B01KC021), 10.IV.2006, leg. Fliedl, Shah Alam & Shah (1 ex. NMW); Mymenshing, 12 km NW Mymenshing, Tarakanda, 24.8576°N 90.4259°E, 12 m, Rangsha, (B01KX021), 10.IV.2006, leg. Fliedl, Shah Alam & Shah (1 ex. NMW); Mymenshing, 22 km NW Mymenshing, Amuakanda, 24.9490°N 90.3595°E, 12 m, Khurie DW, (B01Kx021), 10.IV.2006, leg. Fliedl, Shah Alam & Shah (2 exs.

NMW); Mymenshing, 25 km NW Mymenshing, Baliapara, 24.7000°N 90.1501°E, 13 m, Banar, (B01BR021), 10.IV.2006, leg. Fliedl, Shah Alam & Shah (1 ex. NMW).

INDIA: ARUNACHAL PRADESH: West Siang District, Along [Aalo], 30.V.2006, leg. Rougemont (6 exs. NMW); BIHAR, Patna District, S Patna, JVG–East, Trapa-field, 27.X.2000, leg. Nesemann (1 ex. NMW); DELHI: New Delhi, Oberoi Hotel, Lichtfang [light trap], 1.VIII.1970, leg. Franz (1 ex. GWW, 2 exs. NMW); MADHYA PRADESH: Bhopal District, Kalia Sood, Southern part of Bhopal City, 490 m, 23°12'00"N 77°24'29"E, 3.III.2008, leg. Jäch & Sharma (MP20) (2 exs. NMW); Bhopal District, near Amchhakala, ca. 40 km SSE Bhopal, N of Ratapani Sanctuary, pools ca. 440 m, 22°57'06"N 77°35'45"E, 22.II.2008, leg. Jäch & Sharma (MP2) (1 ex. NMW); Hoshangabad District, Bandrabhan, ca. 60 km SSE Bhopal, ca. 5 km NE Hoshangabad, River Narmada, ca. 280 m, 22°47'29"N 77°46'50"E, 23.–24.II.2008, leg. Jäch & Sharma (MP4) (2 exs. NMW); Hoshangabad District, Solah Mile Daria (pond), 5 km SSE Matkuli, Matkuli–Pachmarhi road, Saptura Range, 430 m, 22°34'31"N 78°28'32"E, 28.II.2008, leg. Jäch & Sharma (MP12) (3 exs. NMW); Hoshangabad District, River Denwa, ca. 8 km SSE Matkuli, Saptura Range, ca. 400 m, 22°34'29"N 78°29'43"E, 28.II.2008, leg. Jäch & Sharma (MP13) (1 ex. NMW); MEGHALAYA: West Garo Hills District, Bagmara, ca. 100 m, 25°11.5'N 90°38.5'E, 19.–21.5.1996, leg. Jendek & Šauša (1 ex. NMW); ODISHA: Puri District, 2 km S Konark (91), 5.II.1999, leg. Boukal (7 exs. NMW); Bhadrak District, Chanbali [Chandabali], at light, 28.X.2006, leg. Rougemont (21 exs. NMW); RAJASTHAN: Bharatpur District, Bharatpur, 11.VIII.1989, leg. Riedel (25 exs. LHM, NMW); Bharatpur District, Keoladeo N.P., 29.X.1997 leg. Šťastný (6 exs. JSL); TAMIL NADU: Madras [Chennai], IX.1962, Nathan / Museum Frey, Tutzing (1 ex. GWW); road Coimbatore–Attappadi, nr. Pudur [Perambalur District?], small stream, 29.XII.1994, leg. Mazzoldi (4 exs. PMB); WEST BENGAL: Birbhum District, Bolpur City, Santiniketan (92), 8.II.1999, leg. Boukal (5 exs. NMW).

MYANMAR: Kachin State, Indawgyi Lake, Lonton vill., lake shore (50), ca. 250 m, 20.–25.V.1999, leg. Schillhammer & Schuh (1 ex. NMW).

NEPAL: CENTRAL NEPAL: Chitawan District, Narayani Zone, Chitawan NP, Sauraha-Thati-Bagh Mara, 200–500 m, 17.–21.V.1996, leg. Čechovský (7 exs. MTP); Citwan District, Sauraha, 20.–25.V.1992, leg. Jeniš (1 ex. NMW); Narayani Province, Sauraha, 2 km W Kayar Khola, Fluß [flowing water], 27°34'N 84°29'E, 180 m, 18.IV.2000, leg. Weigel (2 exs. ASG); Narayani Province, Sauraha, Ufer Rapti River [riverbank of Rapti River], 27°34'80"N 84°29'49"E, 1350 m, 18.IV.2000, leg. Weigel (1 ex. ASG); Dolaghat District, Cha Khola, 7.XI.1993, leg. Moog et al. (9 exs. NMW); Kabrepalanchowk District, Jhikhu Khola, Panchkhal (S 2), 5.XI.1993, leg. Moog et al. (15 exs. NMW); Kathmandu Valley (1), 2.II.1981, leg. Jäch (10 exs. NMW); Kathmandu District, Nagapokhri, City Pond, 8.XI.1993, leg. Moog et al. (5 exs. MNW); Kathmandu Valley, Kupandole, Bagmati River (135), 1311 m, 14.XII.1995, leg. Sharma (1 ex. NMW); Kathmandu Valley, Tinkune, Bagmati River (129), 1315 m, 13.XII.1995, leg. Sharma (1 ex. NMW); Kathmandu Valley, Pashupatinath, Bagmati River (130), 13.XII.1995, leg. Sharma (2 exs. NMW); idem, 27°43'N 85°21'E, 1350 m, 14.IV.2000, leg. Skale (1 ex. ASG); Kathmandu Valley, Gokarna, Bagmati River (133), leg. S. Sharma [without date] (5 exs. NMW); Kathmandu NW, Gorkhana [=Gokarna], Bagmati River Ufer [riverbank], 27°43'22"N 85°22'59"E, 1350 m, 14.IV.2000, leg. Skale (2 exs. ASG); Kathmandu Valley, Tekudovan, Bagmati River (B 43), leg. Pradhan [without date] (6 exs. NMW); Kathmandu Valley, Chabahil, Dhobi River (149), leg. Sharma [without date] (1 ex. NMW); Kathmandu Valley, Budhanilkantha, Dhobi River (150), leg. Sharma [without date] (1 ex. NMW); Kathmandu Valley, Hattiban, Khodu River (158), leg. Sharma [without date] (1 ex. NMW); Kathmandu Valley, Bagmati, above Dhobi Khola, leg. Pradhan [without date] (2 exs. NMW); Kathmandu Valley, Indrayani, Indrayani River (B 20), leg. Pradhan [without date] (2 exs. NMW); Kathmandu Valley, Bishnumati River confluence, leg. Pradhan [without date] (7 exs. NMW); Kathmandu Valley, Ringroad Bishnumati River, leg. Pradhan [without date] (4 exs. NMW); Kathmandu Valley Bramhakhel, Manohara River (B 21), leg. Pradhan [without date] (1 ex. NMW); Kathmandu Valley, Chabel, Dhobi River (B 6), leg. Pradhan [without date] (2 exs. NMW); Kathmandu Valley, Koteswar, Manahara River (B 9), leg. Pradhan [without date] (1 ex. NMW); Kathmandu Valley, Khasi Bazar, Balkhu River (142), leg. Sharma [without date] (1 ex. NMW); Kathmandu Valley, Pashupatinath, Bagmati River, 1300 m NN, 14.X.1992, leg. Weigel (2 exs. LHM); Kathmandu, Manohara Khola (9), 28.III.1998, leg. Khanal (3 exs. NMW); Bhaktapur District, Purano–Thimi rd., Khasyang Khusyung River (124), leg. Sharma [without date] (3 exs. NMW); Rautahat District, Chandranigahapur, Chandi Khola, 27.II.1994, leg. Sharma & Nesemann (18 exs. NMW); Rautahat District, S Chandranigahapur, 28.II.1994, leg. Sharma & Nesemann (1 ex. NMW); Rautahat District, Shivpur, Lamaha Khola, 26.II.1994, leg. Sharma & Nesemann (6 exs. NMW); Rautahat District, 4 km W Gaur Municipality, 26.8247°N 85.3163°E, 8.V.2006, 579 m, Jahjh, leg. Shah (1 ex. NMW); Lalitpur Distr., Khodku Khola (4), 1280 m, 2.V.1998, leg. Khanal (2 exs. NMW); Kabhre Palanchok Distr., Dhulikel, Kheti Khola, ca. 1520 m, 27°37'00"N 85°33'50"E (12), 16.III.1998, leg. Khanal (1 ex. NMW); Kabhre Palanchok District, Gosithan Khola, SE Ratmate, 12.XI.2000, leg. Nesemann (5 exs. NMW); Kabhre Palanchok District, 20 km ESE Kathmandu, 1480 m, 11 km NE Dhulikel, Ashi Khola, 27°37'11.4"N 85°32'41.1"E, 18.XI.2005, leg. Jäch (11 exs. NMW); Kabhre Palanchok District, 26 km E Kathmandu, 880 m, 11 km NE Dhulikel, Ashi Khola, 27°42'19.5"N 85°35'32.4"E, 20.XI.2005, leg. Jäch (2 exs. NMW); Kahbre

Palanchok District, 27 km E Kathmandu, 830 m, 11 km NE Dhulikel, Ashi Khola, 27°42'17.9" N 85°36'50"E, 20.XI.2005, leg. Jäch (57 exs. NMW); Kabhre Palanchok District, Cha Khola, nr. Kunta, 27°43'05"N 85°37'00"E, 805 m, 1.III.2005, leg. Nesemann (10 exs. NMW); Makwanpur District, surroundings of Hetauda (19), 18.II.1981, leg. Jäch (2 exs. NMW); EAST NEPAL: Jhapa District, Ninda Khola near Dhulabari, 25.I.2000, leg. Khanal (1 ex. NMW); Jhapa District, Nagardubba Khola at Dhulabari, 25.I.2000, leg. Khanal (13 exs. NMW); Sunsari District, Surroundings of Dahran (11), 13.II.1981, Leg. Jäch (3 exs. NMW); MID-WEST NEPAL: Bheri Zone, Banke District, Nepalgunj, Hotel Sneha, 28°02'53"N 81°36'54"E, 5.VII.2009, leg. Hartmann (1 ex. ASG); Dang District, Amiliya, Rapati Nadi (53), 22.XI.1993, leg. Sharma (1 ex. NMW); W NEPAL, Lamjung District, Annapurna Region, sourr. of Besisahar, 800 m NN, 18.IX.1992, leg. Weigel (2 exs. LHM); Annapurna Region, Pokhara, Phewa Lake, ca. 900 m, 25.IV.2000, leg. Skale & Weigel (2 exs. ASG); Tanahu District, Bimalnagar, Chudi Khola (13), 350 m, 10.XI.1993, leg. Moog et al. (3 exs. NMW); Tanahu District, Kharenitar, Kumla Khola (16), 11.XI.1993, leg. Moog et al. (2 exs. NMW); Rupandehi District, Butwal, Sukaura Khola (25), 14.XI.1993, leg. Sharma (2 exs. NMW); Rupandehi District, Sunauli, Danda Khola, 23.II.1994, leg. Sharma & Nesemann (9 exs. NMW); Rupandehi District, Khaerani, Kachara Khola, 24.II.1994, leg. Sharma & Nesemann (2 exs. NMW); Syanja District, Putalikhet, Andhi Khola (64), ca. 860 m, 4.I.1994, leg. Sharma (1 ex. NMW); Gorkha District, Gorkha 26.–31.V.1992, leg. Jeniš (20 exs. NMW).

PAKISTAN: Baluchistan, 105 km SE Quetta, Sibi, 16.II.1995, leg. Hauck & Čižek (19 exs. NMW); Sindh, Kalri Lake, 12.I.1975, leg. Heiss (1 ex. GWW).

SRI LANKA: Colombo, 8.–12.XI.1980, leg. Jäch (25 exs. NMW); Polonnaruwa, 28.XI.1980, leg. Jäch (3 exs. NMW); Weligama, 15.XII.1980, leg. Jäch (1 ex. NMW); Kitulgala, 29.XII.1980, leg. Jäch (1 ex. NMW).

HABITUS (Fig. 8): Small to moderate, elongate-oval, maximum width at about first fourth of elytral length, shining, poorly convex, elytra narrowed on last third; in lateral view, pronoto-elytral sinuation weak.

COLOURATION: Head reddish-yellow, rarely with dark area behind eyes; pronotum same colour as head, often with thin dark line on hind side. Elytra from deep black to pitch-brown, in some cases paler; extreme tip of elytra yellowish or brown-reddish. Reddish markings on each elytron as follows: subbasal band, normally fragmented into two almost squared markings, discal and lateral, the latter starting from elytro-epipleural margin, not prolonged caudally in direction of submedian band; submedian band elongate, almost rectangular, never fragmented, also starting from elytro-epipleural margin, ending towards disc before parasutural area. Underside black, exception made for yellow or reddish-yellow prosternum (but prosternal process black), proepisterna, hypomera and proximal portion of epipleura. Antennae and mouthparts reddish. Legs uniformly reddish.

STRUCTURES AND SCULPTURE: Dorsal surface of head smooth and shining, microreticulation hardly visible, composed of shallow meshes; very fine dots scattered on the surface. Sides of pronotum, in lateral view, slightly convex with lateral bead rather weak; pronotum dorsally without dots, microreticulation hardly visible, arranged in small and shallow vermiculations. Elytra elongate and poorly convex; in dorsal view lateral sides rather rounded, narrowed on apical third; in lateral view, sides almost straight at shoulders. Microreticulation slightly more impressed and discernable than on pronotum, visibly arranged in vermiculations; dark surface often with feeble metallic iridescence. Transverse series of stiff setae on prosternum, above prosternal process, poorly to visibly thicker than on prosternal process. Setal punctation on prosternal process rather coarse and spatiated: smooth area, without microreticulation and almost without punctures, normally visible proximally, before procoxae. Noterid platform with rather spatiated setal punctation and visible microreticulation. Microreticulation on metaventrite and metacoxae rather impressed, abdominal ventrites smoother.

MEASUREMENTS: TL: 2.4–3.1 mm (average: 2.72 mm); MW: 1.2–1.6 mm (average: 1.37 mm) (lectotype of *H. laetabili*s TL: 2.5 mm: MW:1.3 mm; lectotype of *C. festivus* TL: 2.6 mm, MW: 1.3 mm). Ratio TL/MW: 2.13–1.86; average 1.96.

MALE: Median lobe (Fig. 32a–b) short but tapered, shortly narrowed at about half length on dorsal side of distal portion. Right paramere (Fig. 32c) regularly triangular, with apex narrow and rounded, bearing a tuft of hairs.

FEMALE: not differing externally from males.

VARIABILITY: Quite variable in size and colouration. Normally, the subbasal elytral band is fragmented into two spots. We have seen specimens with entire bands from Sri Lanka, which are on average smaller and have a paler underside, with elytra often brown or even reddish-brown and the pale pattern very extended. Rarely, the subbasal-discal marking produces an extension along the disc, connecting it with the submedial marking. Very large specimens exist in Nepal (3.0–3.1 mm), with the dark area on the head often more developed and sharper compared with other localities. An increase of size from south to north was already hypothesized by VAZIRANI (1969a) comparing specimens from Sri Lanka with specimens from Kashmir. In the lectotype of *C. festivus*, the subbasal lateral yellow marking of the elytra is extended caudally along the margin between the elytra and the epipleura and it is fused with the submedial one. We never saw such a pattern in any other specimens of *C. laetabilis*.

DIFFERENTIAL DIAGNOSIS: Externally similar to any other bicoloured species, with which it could be confused without the examination of the aedeagus. From *C. flammulatus* and *C. haagi* it can be distinguished also for the characteristic waved submedial band of these latter and for the small size and short and convex body of *C. haagi*. *Canthydrus politus* is quite similar in colouration and size, but its body shape is broader and more convex; *C. nitidulus* is visibly larger and with a thick dark band on both fore and hind sides of pronotum, elytral apex black. Exception made, perhaps, for *C. flammulatus* in Myanmar, none of these species are sympatric with *C. laetabilis*. In Nepal and northern India, *C. laetabilis* coexists with specimens of *C. luctuosus* sharing completely reddish pronotum and similar elytral patterns (Fig. 10). These are larger than *laetabilis* and, on the contrary of this latter, at least the submedian (but often also the subbasal-lateral) marking of the elytra does not touch the elytro-epipleural margin and the subbasal-lateral one is always extended posteriorly, not rarely touching the submedian band; besides, the subbasal-discal band is closer to the pronotum, whereas in *C. laetabilis* it is separated by a wider gap. The aedeagi of these two species are very different.

DISTRIBUTION (Fig. 48): Bangladesh, India (Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Delhi, Gujarat, Kerala, ?Jammu and Kashmir, Madhya Pradesh, Maharashtra, Meghalaya, Odisha, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh, West Bengal), Iran (Sistan and Baluchestan), northern Myanmar (Kachin, Yangon), Nepal, Pakistan (Baluchistan, Punjab, Sindh), Sri Lanka. VAZIRANI (1969a: 231) affirmed to have studied specimens from Kashmir, although he did not list these in the material examined. The type locality of *Canthydrus amiculus* (Democratic Republic of the Congo) is definitively a labeling error. First record for Arunachal Pradesh.

Canthydrus luctuosus (AUBÉ, 1838)

Hydrocanthus luctuosus AUBÉ 1838: 408 (orig. descr.): GEMMINGER & HAROLD 1868: 444 (India).

Canthydrus luctuosus (AUBÉ, 1838): SHARP 1882a: 276 (India); 1890: 340 (Sri Lanka); BRANDEN 1885: 17 (India or.); RÉGIMBART 1889a:148 (Cambodia, India, Vietnam); 1895: 125 (Réunion); 1899a: 248 (India, Indochine); SEVERIN 1890: CLXXXVII (India); ZIMMERMANN 1920a: 11 (India); VAZIRANI 1953: 424 (Arabia, India, Iran, Iraq, Syria); 1968: 100 (India); 1969a: 231 (India, Iran, Sri Lanka); 1969b: 399 (Sri Lanka); 1972: 117 (India); 1974: 16 (India); 1977a: 6 (India, Iran, Sri Lanka); 1981: 258 (India); WEWALKA 1973: 84 (India, Iran, Sri Lanka, Syria); ROCCHI 2001: 65 (Iran, Iraq, India, Sri Lanka, Syria); NILSSON 2003: 34 (Iran), 2004: 17 (Iraq, "South Arabia", Syria); NILSSON 2011: 14 (cat.); HÁJEK 2017: 844 (Iran, Iraq, Saudi Arabia, Syria); NILSSON & HÁJEK 2024: 3 (idem).

Canthydrus (s. str.) *luctuosus* (AUBÉ, 1838): NILSSON 2005: 102 (cat.).

Canthydrus frontalis SHARP, 1882a: 276. (orig. descr.): MARSEUL 1882: 40 (Arabia); BRANDEN 1885: 16 (Arabia, India); TOLEDO 2008: 64 (lectotype des.).
Canthydrus luctuosus var. *frontalis* SHARP, 1882a: RÉGIMBART 1899: 249 (Arabia, India).
Canthydrus luctuosus ab. *frontalis* SHARP, 1882a: ZIMMERMANN 192a: 11 (Arabia, India, Mascarene Islands).
Canthydrus luctuosus frontalis SHARP, 1882a: BRANCUCCI 1985: 241 (?Arabia).
Canthydrus ornatus SHARP, 1882a: 275 (orig. descr., Iran); ZIMMERMANN 1927a: 9 (Iran, Iraq, Sumatra) (misident.).
Canthydrus sexpunctatus SHARP, 1882a: 276 (orig. descr.); BRANDEN 1885: 18 (India); SHARP, 1890: 340 (syn.).
Canthydrus luctuosus ab. *sexpunctatus* SHARP, 1882a: ZIMMERMANN 1920: 11 (India, Iran).
Canthydrus luctuosus var. *sexpunctatus* SHARP, 1882a: RÉGIMBART 1899a: 249 (India).
Hydrocanthus weisei WEHNCKE, 1876: 222 (orig. descr.) **syn.n.**
Canthydrus weisei (WEHNCKE, 1876): SHARP 1882a: 277 (Cochin China); BRANDEN 1885: 18 (Cochinchina); RÉGIMBART 1899: 251 (Cochinchine); 1903a: 333 (India); ZIMMERMANN 1920: 14 (Cochinchina); VAZIRANI 1970b: 442 (India); 1977a: 8 (India, Vietnam); TOLEDO 2008: 66 (lectotype des.); NILSSON 2011: 19 (cat.).
Canthydrus (s. str.) *weisei* (WEHNCKE, 1876): NILSSON 2005: 109 (cat.).
Noterus luctuosus DEJEAN, 1833:56 (nomen nudum, India orient.).
Noterus quadrimaculatus ZAITZEV, 1915: 258 (nomen nudum, East India).
Canthydrus pseudomorsbachi VAZIRANI, 1969b: 399 (orig. descr.) **syn.n.**; VAZIRANI 1977a: 8; NILSSON 2011: 16 (cat.).
Canthydrus (s.str.) *pseudomorsbachi* VAZIRANI, 1969b: NILSSON 2005: 106 (cat.).

TYPE LOCALITIES: *H. luctuosus*: Bombay [Mumbai, Maharashtra]; *C. frontalis*: Arabia; *C. sexpunctatus*: S. India, Tranquebar [Tharangambadi, Nagapattinam District, Tamil Nadu]; *H. weisei*: Cochinchina [Vietnam]; *C. pseudomorsbachi*: Ceylon [Sri Lanka], Battaramulla.

TYPE MATERIAL: *H. luctuosus*: **Lectotype** ♂ (MNHNP), by present designation: specimen found already disarticulated in five parts (head + pronotum, elytra, abdomen and meso-metathorax: these latter two visible by ventrites) glued on same card, labeled "*Noterus luctuosus*. mihi. h. in India orient. D. Schüppel [long folded paper strip, photographic reproduction of original handwritten label] / Ex Musaeo Dejean [small rectangular printed label; text included in frame] / 120.G12 mihi [illegible] DS *Hydrocanthus luctuosus*. [Sharp's handwriting on rectangular white label] / D. Sharp monogr. [small rectangular printed label; text included in frame] / Syntype" [modern red, printed label] (Fig. 45b).
C. sexpunctatus: **Lectotype** (NHML), by present designation, sex not examined: "Type [red, circular label, added subsequently] / S. India: [printed white label, with central yellow stripe] / Sharp Coll 1905–313 [printed] / *Hydrocanthus sexpunctatus* Tranquebar [Sharp's handwriting] / type 486 *H. sexpunctatus* Tranquebar" [Sharp's handwriting] plus our designation label.
C. frontalis: Lectotype (NHML) designated by TOLEDO (2008: 64).
H. weisei: Lectotype (MNHNP) designated by TOLEDO (2008: 66).
C. pseudomorsbachi: Holotype ♂ not studied (CNM).

ADDITIONAL MATERIAL EXAMINED:

INDIA: BIHAR: "Bihar, Pusa [Samastipur Distr.] / Samml. A. Zimmermann" (1 ex. ZSM; Fig. 40c); "Chapra [Saran District] / Mackenzie / Samml. A. Zimmermann" (2 exs. ZSM); GOA: South Goa, Varca, 21.–24.II.1994, leg. Heiss (5 exs. NMW); South Goa, Canacona, Raj Baga Beach, at light, 16.–29.XI.2010, leg. Schmidt (2 exs. ASG); JHARKHAND: Konbir [Gumla District], P. Cardon (24 exs. IRSNB; Fig. 40h–j) [the specimens bear identification labels of different authors as follows: "Canthydrus luctuosus Aubé, Sharp det. 1890"; "Canthydrus luctuosus Aubé var. frontalis Sharp" (hw); "Canth. luctuosus Aubé v. 6-punctatus Sharp" (anonymous, printed); "Canthydrus luctuosus var. frontalis Shp., Guignot det."; Canthydrus luctuosus Aubé, R. Mouchamps det '63"; "Canthydrus luctuosus var. frontalis Shp., R. Mouchamps det '63"]; Cetara [Chatra], P. Cardon (16 exs. IRSNB; Figs. 40k–l, 41k) [the specimens bear identification labels of different authors as follows: "Canthydrus luctuosus Aubé, Sharp det. 1890"; "Canthydrus luctuosus Aubé" (anonymous, perhaps Sharp's hw); "Canthydrus luctuosus Aubé var. frontalis Sharp, Sharp det, 1890"; "Canthydrus luctuosus Aubé var. frontalis Sharp" (hw); "Canth. luctuosus Aubé v. 6-punctatus Sharp" (anonymous, printed)]; KARNATAKA: Kodagu District, Coorg, Madikeri env., Abbi Falls Road, 12°30'N 75°45"E, 900–1200 m, 20.XII.1998, leg. Boukal (8) (11 exs. NMW; Figs. 11e, 40m); Coorg, Kakkabe env., 12°15'N 75°35'E, 900–1200 m, 20.XII.1998, leg. Boukal (18) (4 exs. NMW; Figs. 40n, 42n); KERALA: Pathanamthitta District, 5 km S of Rani, 76°47'E 9°21'N, 1.I.1994, leg. Boukal & Kejval (63 exs. NMW, LHM, MTP; Figs. 11d, 40o, 41o); Palakkad District, Malampuzha, 10°50.1'N, 76°39.1'E, 28.IV.2005, leg. Halada (1 ex. OLM); MADHYA PRADESH: Hoshangabad District, Solah, Mile Daria (pond), 28.II.2008, leg. Jäch & Sharma (1 ex. NMW; Fig. 40d); Jabalpur District, Papagar nr. Jabalpur, water tank, 14.III.1967, leg. Topál (3 exs. NMW; Figs. 40e, 42e); MAHARASHTRA: Kolhapur District [with no other information, collecting date between 2013–2017], leg. S. Sheth (2 exs. MTP); Nashik District [with no other

information, collecting date between 2013–2017], leg. S. Sheth (2 exs. MTP; Figs. 11c, 42); Sindhudurg District [with no other information, collecting date between 2013–2017], leg. S. Sheth (1 ex. MTP); ODISHA: Teypore [Jeypore, Koraput District], 1,775 ft., Nathan, IX.–X.1958 (4 exs. IRSNB) [the specimens bear three different identification labels made by Mouchamps 1963: "Canthydrus luctuosus Aubè"; "Canthydrus luctuosus var. frontalis Shp."; "Canthydrus luctuosus var. sexpunctatus Shp."]; PUDUCHERRY: Nedungadu [Karaikal Dist.], VI.1934, leg. Nathan (1 ex. IRSNB); Karikal [Karaikal], 1963, leg. Nathan / Museum Frey, Tutzing (15 exs. NMW, GWW); RAJASTHAN: Bharatpur District, Keoladeo N.P., 29.X.1997, Šťastný leg. (1 ex. JSL); TAMIL NADU: Tanjore District [Thanjavur] Nedungad[i?], 29.II.[19]36, P.S. Nathan, R. Mus. Hist. Nat. Belg. I.G. 11.082 / Canthydrus angularis Sharp, Dr. F. Guignot det. 1948 (22 exs. IRSNB; Figs. 40p–q, 42q); same data / Canthydrus morsbachi Wehncke, Dr. F. Guignot det. 1949 (10 exs. IRSNB); Kanyakumari District, 5 km NE Nagercoil, 16.I.1994, 77°28'E 8°12'N, leg. Boukal & Kejval (70 exs. NMW, LHM, MTP; Figs. 11a, 40r–s, 42r–s); Madras [Chennai], IX.1962, Nathan / Museum Frey, Tutzing / Canthydrus luctuosus sexpunctatus Sharp, det. Wewalka 1971 (1 ex. GWW); Coimbatore, V.1932, leg. Nathan (1 ex. IRSNB); idem, IV.1934 (1 ex. IRSNB); idem, 1957, leg. Nathan / Museum Frey, Tutzing (2 exs. NMW, GWW); Salem Dist., 1934, leg. Nathan (1 ex. IRSNB); WEST BENGAL: Birbhum Dist., Santiniketan, 8.II.1999, leg. Boukal (92) (4 exs. NMW; Fig. 40f–g).

NEPAL: CENTRAL NEPAL: Citwan Dist., Sauraha, 20.–25.V.1992, leg. Jeniš (6 exs. NMW); Chitwan Dist., Dhungre Khola, 13.XI.1993, leg. Moog et al. (S 22a) (8 exs. NMW); Chitwan, Sauraha, Dhungre Khola, 13.XI.1993, leg. Moog et al. (22) (3 exs. NMW); Citwan Dist., Sauraha, Hotel Sweet Home, 27°35'10"N 84°29'29"E, 190 m NN, 5.–7.VII.2022, leg. Kopetz (1 ex. ASG); Chitwan Nat. Pk, Sauraha, 3.–6.VI.1983, M.J.D. Brendell, B.M. 1983–222 (9 exs. NHML); Narayani Zone, Chitawan Dist., Chitawan NP, Sauraha – Thati-Bagh Mara, 200–500 m, 17.–21.V.1996, leg. Čechovský (19 exs. MTP; Figs. 10, 40a–b, 42a); Narayani Prov., Sauraha, Rapti River, 180 m, 27°34'80"N 84°29'49"E, 16.–18.IV.2000, leg. Skale (1 ex. ASG); Nayarani Prov., Chitwan Dist., 3 km N Bharatpur, 27°43'61"N 84°27'42" E, 220 m, 2.VII.2011, leg. Küssner, #60 (1 ex. ASG); Makwanpur Dist., Hetauda, Karna Khola, 28.II.1994, leg. Sharma & Nesemann (12 exs. NMW); Shermathang-Malemche Bridge, leg. Franz, Pa 376 (1 ex. NMW); Rautahat Dist., Shivpur, Lamaha Khola, 26.II.1994, leg. Sharma & Nesemann (1 ex. NMW); EAST NEPAL: Jihapa Dist., Deune Khola near Deune, 25.I.2000, leg. Khanal & Nesemann (2 exs. NMW); Jihapa Dist., Nagardubba Khola near Dhulabari, 25.I.2000, leg. Khanal & Nesemann (2 exs. NMW); Jihapa Dist., Ninda Khola at Dhulabari, 25.I.2000, leg. Khanal & Nesemann (1 ex. NMW); Jihapa Dist., Rekha Khola, Buttabari, 26.I.2000, leg. Khanal & Nesemann (1 ex. NMW); MID-WEST NEPAL: Bake Dist., Bheri Prov., Nepalgunj, Hotel Sneha, 28°02'53"N 81°36'54"E, 125 m, 5.VII.2009, leg. Hartmann, #64 (1 ex. ASG); idem, Hotel Kitchen Hut, 28°04'97"N 81°38'56"E, 140 m, 23.–26.VI.2011, leg. Küssner, #02 (1 ex. ASG); WEST NEPAL: Rupandehi Dist., Sinauli, Danda Khola, 23.II.1994, leg. Sharma & Nesemann (8 exs. NMW); Rupandehi Dist., Butwal, Sukaura Kola, 14.XI.1993, leg. Sharma (25) (1 ex. NMW); Rupandehi Dist., Khaereni, Kachara Kola, 24.II.1994, leg. Sharma & Nesemann" (2 exs. NMW); Rupandehi Dist., Bhaluhi, Rohini Khola, 24.II.1994, leg. Sharma & Nesemann (1 ex. NMW); Rupandehi Dist., Gundi, Dano Nadi, 23.II.1994, leg. Sharma & Nesemann (2 exs. NMW).

SRI LANKA: Deniyaya, Thaninita Falls, 12.XI.1970, leg. Starmühlner (1 ex. GWW); Kitulgala, XII.1980, leg. Jäch C45b (5 exs. NMW); idem, 29.XII.1980, leg. Jäch C46 (7 exs. NMW, GWW; Figs. 40t–u, 42t); Colombo, 10.XI.1980, C1g (1 ex. NMW); idem, 11.XI.1980, C1c (1 ex. NMW); idem, 12.XI.1980, leg. Jäch C5 / Canthydrus luctuosus Aubé, det. Wewalka 82 (5 exs. NMW, GWW); idem, 13.XI.1980, leg. Jäch C1d (5 exs. NMW; Figs. 11b, 40v–w); Sinharaja Rain Forest Res., 7.I.1993, leg. Rautenstrauch (7 exs. PMB) Puttalam District, Siyambalakotuwa, We-Wa-Kinyankali (tank), nr. Mundel, 19.IX.1997, leg. Bahir & Lim (4 exs. LHM); Talangana, Bolgoda Lake, ca. 20 km S Colombo, 20 m, 19.I.2017, leg. Wewalka / Canthydrus morsbachi (When.), leg. Wewalka 2017 (2 exs. NMW; Figs. 40x, 42x).

THAILAND: NORTHEAST THAILAND: Khon Kaen University, pasture pool, 23.II.1994, leg. Shepard, WDS A1 020 (1 ex. NMW; Figs. 39y, 41y).

HABITUS (Figs. 10–11): Very variable. Moderate to rather large, poorly to almost strongly convex, shining, elongate-oval to rather broad, maximum width usually behind base of elytra, but often also near base; in lateral view pronoto-elytral sinuation hardly visible to well-marked.

COLOURATION: Head from almost completely black with labrum testaceous or clypeus and labrum paler to completely reddish with or without dark areas around eyes. Pronotum from totally black with only hind angles or at most lateral sides paler, to completely reddish, with wide degree of intermediate forms occurring. Elytra black, dark brown or brown. Each elytron typically with three yellow or reddish markings as follows: subbasal-discal, subbasal-lateral and submedian-lateral; subbasal markings never fused together. Extension of elytral markings very variable; in some specimens more developed, often with subbasal-lateral extended toward or

even fused with submedian, this latter in shape of transverse band instead of isolated spot; in other specimens reduced in smaller spots, sometimes subbasal-discal and, rarely, subbasal-lateral missing. Normally specimens with extended black pronotum have reduced spots on elytra and specimens with widely or totally pale pronotum have elytra with extended pale patterns. Underside colouration also variable: head and most of underside black, exception made for dark brown epipleura and proepisterna, or head, prosternum (except prosternal process) and epipleura testaceous, with rest of ventral surface black, brown or dark reddish. Legs dark brown to reddish-yellow.

STRUCTURES AND SCULPTURE: Microreticulation on head faint but visible. Pronotum, in lateral view, with lateral sides rather regularly rounded and lateral bead rather strong; surface glossy, microreticulation fine but visible, arranged in faint vermiculations. Elytra, in dorsal view regularly rounded laterally, with maximum width at about 1/5–2/5 of length. In lateral view sides from almost straight to rather concave at shoulders: pronoto-elytral sinuation from weak to rather marked. Elytral surface shining, microreticulation fine as on pronotum, more obviously arranged in wrinkles, very weak metallic sheen sometimes visible in black areas. Setal punctation on prosternal process rather coarse, with stiff and thick setae slightly smaller than on prosternum. Punctation on rest of noterid platform weakly less coarse. Microreticulation on metaventrite, metacoxal plates and metacoxal process well impressed, less on abdominal ventrites.

MEASUREMENTS: TL: 2.6–3.5 mm; MW 1.3–1.8 mm (lectotype of C. *frontalis* TL: 3.0 mm, MW: 1.15 mm, paralectotypes TL: 3.2–3.3 mm, MW: 1.6 mm; lectotype of *C. sexpunctatus* TL: 3.0 mm, MW: 1.6 mm; lectotype of *H. weisei* TL: 2.7 mm, MW: 1.4 mm. Measurements on lectotype of *H. luctuosus* impossible). Ratio TL/MW: 2.31–1.64; average 1.91–1.89.

MALE: Median lobe (Fig. 33a–b) typically with dorsal and ventral sides of distal portion straight, gently diverging through apex, this last ending with wide, oblique curve toward dorsal side. Right paramere (Fig. 33c) rather short, apically rounded, with tuft of setae on entire apical side. Left paramere as in Fig. 33d.

FEMALE: Not differing externally from males.

NOTES ON TYPE MATERIAL: The comparison of the primary type specimens confirms the synonymy of *Hydrocanthus weisei*, *Canthydrus sexpunctatus* and *C. frontalis* with *C. luctuosus*. The lectotype of *C. sexpunctatus* is a typical *luctuosus* as in Fig 11a; the lectotype of *H. weisei* (Vietnam) shares similar colouration and size of the specimens with extended pale patterns on elytra and pronotum, commonly collected in southern India and Sri Lanka, as in Fig. 11d) ("morphotype II", see below); the lectotype of *C. frontalis* (Arabia), has patterns shared also by several specimens from north-central India, with extended pale markings on elytra and diffuse black pronotum (e.g. Fig. 40h–i, k–l from Jharkhand). *Canthydrus ornatus* SHARP, 1882 has been removed from the synonyms of *C. luctuosus* being junior subjective synonym of *C. diophthalmus* (REICHE & SAULCY, 1855) (TOLEDO 2022).

According to VAZIRANI (1969b) the holotype and nine paratypes of *Canthydrus pseudomorsbachi* should be deposited in the CNM, three paratypes should be in the NCZ (not the holotype as quoted in NILSSON 2011) and three in MNHNP. It was not possible to access the type material in any of these museums, nevertheless, the characters listed in the original description and the median lobe illustrated in the same paper, confirm that *C. pseudomorsbachi* is conspecific of *C. luctuosus*, hence being a junior subjective synonym of the latter.

VARIABILITY AND TAXONOMIC REMARKS: *Canthydrus luctuosus* is an extremely variable species. A wide range of habits has been observed in the Indo-Himalayan territory, especially regarding colouration, but also size, body outline and convexity. Four basic morphotypes can be recognized, though not always sharply outlined. **I**) The types of *C. luctuosus*

and *C. sexpunctatus* are wholly black, exception made for yellowish clypeus, lateral sides of pronotum and three distinct spots on each elytron (see above in description). These beetles are medium sized within *luctuosus* measurements range and rather convex and can be considered typical *C. luctuosus* (Fig. 11a–b). We have seen specimens with these features from Jharkhand, Odisha, Madhya Pradesh, Rajasthan, Tamil Nadu and Sri Lanka and likely this morphotype is widespread in India and Sri Lanka, often occurring together with other morphotypes. The two specimens from the Nashik District (Maharashtra) have both typical *C. luctuosus* patterns but the dorsal and ventral surface are reddish-brown instead of black (Fig 11c); however, their teguments are well sclerotized externally as like their genitalia and, therefore, they are not immature. **II**) The type of *Hydrocanthus weisei* represents a second morphotype, characterised by yellow head with dark frons and V-shaped yellow median spot between the eyes, widely brown-reddish pronotum, except for a dark discal area normally joined posteriorly to the dark line along the fore margin, and by extended pale patterns on elytra (Fig. 11d). These beetles are often smaller and less convex than the other morphotypes in *C. luctuosus*, and they are common in southern India (Kerala, Goa, Tamil Nadu) and Sri Lanka. **III**) In northern India *C. luctuosus* is commonly represented also by bicoloured specimens with widely or completely reddish pronotum and extended pale markings on elytra (Fig. 10). These beetles differ from the preceding morphotype being larger and, normally, with completely reddish head (or at most darker around the eyes) and normally without median dark areas on pronotum; it seems that the two morphotypes do not live in the same areas, whereas they both co-exist with *C. laetabilis* with which they might be confused, in particular if the specimens of *C. luctuosus* have wholly reddish pronotum. The two species can be readily separated after the examination of male genitalia, but specimens of *C. luctuosus* with completely reddish pronotum have the subbasal-lateral marking on elytra extended caudally, often jointed with the submedian-lateral and at least this latter does not reach the elytro-epipleural margin (Figs. 10, 40); besides, the apex of elytra of *C. luctuosus* is black, not reddish as in *C. laetabilis*. These patterns normally distinguish *C. luctuosus* with extended pale markings on elytra from *C. laetabilis* (see also "Comparative Diagnosis" of this species). We have seen specimens of morphotype III from Bihar, Jharkhand, Madhya Pradesh, West Bengal, where this form is widespread (see Figs. 40a–d, g, i–j, l), together with typical *C. luctuosus*, and specimens intermediate between these two morphotypes (pronotum in part or almost totally darkened but extended pale elytral patterns). In Nepal, where it is also common, *C. luctuosus* is represented by the morphotype III only. **IV**) In central-southern India (roughly along the border between Karnataka, Kerala and Tamil Nadu) live the larger and more convex specimens of *luctuosus*; completely black, often only with hind corners of pronotum pale and with elytral markings reduced in small spots, often missing subbasally (Figs. 11e, 40m–n, s). The single specimen labeled Thailand (Khon Kaen) has the same features of this morphotype in shape, size, colouration (the discal-subbasal marking is missing and the lateral is hardly visible; Fig. 40y) and the male genitalia are not different compared to average *C. luctuosus* (Fig 42y). Large, convex and dark specimens of *C. luctuosus* are externally very similar to specimens of *C morsbachi* with same size and colouration, occurring in Karnataka and in Sri Lanka (see below), but we did not yet see specimens of this latter species with any of the three elytral spots missing. When co-existing in the same locality, the dark and large form of the two species can be separated by examining the male genitalia.

Despite of such a variability in external features, male genitalia are rather uniform in shape and only small differences can be observed, mainly on the broadness and angle made by the apical curve (Fig. 42).

Canthydrus luctuosus is likely a complex of sibling species, originated and radiated from India. *Canthydrus morsbachi* (with its own forms) is obviously one of them. Nevertheless, this is not

the place for an in-depth investigation of the issue, but it would be interesting and desirable to take up this topic again in the future, with the help of molecular studies.

DISTRIBUTION (Fig. 49): This species was misidentified and misinterpreted several times and its distribution is still rather unclear. In NILSSON (2011) it includes "Arabia", Cambodia, India, Indonesia (Sumatra), Iran, Iraq, Sri Lanka, Syria, Vietnam. It is obviously common and widespread in the Indo-Himalayan region, but its presence outside this area is based only on old historical records, in part retaken from the type locality of its synonyms: Arabia (type locality of *C. frontalis*), Vietnam (type locality of *H. weisei*) and Iran (type locality of *C. ornatus*). It has been recently proved that *C. ornatus* is a junior subjective synonym of *C. diophthalmus* (TOLEDO 2022) and, therefore, all the data of *C. luctuosus* for Middle Orient must be rejected. From Arabia and Vietnam no further data are known after the original description of, respectively, *C. frontalis* and *H. weisei*. Mislabelings in the past are not improbable, although hard to verify. The single specimen labeled as collected in northern Thailand in 1994 is also puzzling, being the only one found up to now from an area deeply investigated several times and very far from any known population of *C. luctuosus*; likely this specimen is another case of mislabeling (M.A. Jäch, personal communication). Finally, some records of *C. morsbachi* in India given in VAZIRANI (1969a) likely belong to *C. luctuosus*.

Records for Cambodia and Sumatra go back to the synonymy of *C. angularis* with *C. luctuosus* suggested by RÉGIMBART (1889), though rejected later by the same author (1899), who reduced the distribution of the latter to India and Indochina (Penang, currently Malaysia). ZIMMERMANN (1927a) recorded *Canthydrus morsbachi* and *C. ornatus* for Sumatra, on the basis of some specimens from Medan, collected by Dr. Mjöberg. Most likely this is consequence of the misidentification of a small series of *C. flammulatus* with black pronotum, preserved in his collection in ZSM (see above). Records of *C. luctuosus* from Indonesia must be rejected and its presence in Malaysia should be considered at least improbable (although we were not able to check the data from Penang). We would exclude also its occurrence in Réunion (RÉGIMBART 1895), which is surely a misidentification with *C. guttula*.

At the light of the material studied, in our opinion the distribution of *C. luctuosus* includes only India, Nepal and Sri Lanka. Likely, it occurs in the whole India, except, perhaps, the very northwest. We have seen material from Bihar, Goa, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Odisha, Puducherry, Rajasthan, Tamil Nadu, West Bengal; in VAZIRANI (1969a) it is recorded from Andhra Pradesh, but this should be checked, due the possible confusion with *C. morsbachi*. First record for Nepal.

Canthydrus mazzoldii TOLEDO, 2008

Canthydrus mazzoldii TOLEDO, 2008: 60 (orig. descr.): NILSSON 2011: 14 (cat.).

TYPE LOCALITY: Thailand, Phetchabun Prov., Thung Salaeng Luang NP, 80 km E Phitsanulok, small pond near river Kheg, 700 m.

TYPE MATERIAL: Holotype ♂ (NMW); paratypes (NMW, PMB, MTP, HHR).

HABITUS (Fig. 2): Very large, strongly convex, very broad with maximum width at base of pronotum and visibly tapering toward elytral apex. Completely black, yellow on distal part of clypeus and labrum, hind angles of pronotum and a more or less circular, submedian-lateral spot on each elytron. In lateral view, sides of pronotum broadly rounded and sides of elytra deeply concave; pronoto-elytral sinuation, very marked. Underside visibly concave. Transverse series of stiff setae on prosternum, above prosternal process distinct, longer though not much thicker than on prosternal process. Prosternal process with setal punctation dense and uniform, as like as on noterid platform. Ventral microreticulation impressed on lateral expansions of metaventrite,

metacoxae and first abdominal ventrites; hardly visible on last abdominal ventrites and noterid platform.

MEASUREMENTS: TL: 3.5–4.0 mm; MW: 2.0–2.35 mm.

MALE: Aedeagus very distinctive: median lobe slender, gradually narrowed from base to apex, abruptly ending in a sort of long and slender beak (Fig. 26a–b). Right paramere wide basally and abruptly narrowed at about mid-length, ending with a long and stiff apex, bearing a tuft of short hairs (Fig. 26d). Left paramere as in Fig. 26c.

FEMALE: Not differing externally from males.

TAXONOMIC REMARKS: A very peculiar and unmistakable beetle, apparently with no close relationships with other species of *Canthydrus*. It is also the only Asian species with an apparently restricted distribution.

Canthydrus mazzoldii might be confused with large and almost completely black specimens of *C. angularis*, but populations with this habitus do not occur in the same area of *C. mazzoldii*. At any rate, *C. mazzoldii* is even larger and more convex and has a broader body outline than *C. angularis*. Both species have very distinctive and strongly different aedeagal features.

DISTRIBUTION (Fig. 46): Northern Thailand, northeastern Laos. Apparently restricted to higher altitudes.

Canthydrus morsbachi (WEHNCKE, 1876)

Hydrocanthus morsbachi WEHNCKE 1876: 222 (orig. descr.).
Canthydrus luctuosus var. *morsbachi* (WEHNCKE, 1876): RÉGIMBART 1889a: 148 (Cochinchina)
Canthydrus morsbachi (WEHNCKE, 1876): SHARP 1882a: 276 (Vietnam); BRANDEN 1885: 17 (Cochinchina); RÉGIMBART 1899: 247 (Cochinchina); ZIMMERMANN 1920: 12 (Cochinchina); 1927a: 8 (Sumatra, Vietnam); VAZIRANI 1969a: 232 (India, Indo-China, Burma, Indonesia (Sumatra, Java), Singapore, Belgian Congo); BRANCUCCI 1979: 194 (Sri Lanka); WEWALKA 1982: 119 (Andaman Islands, Cambodia, India, Indonesia (Sumatra), Malaysia, Thailand, Vietnam, Sri Lanka); TOLEDO 2003:78 (Vietnam); TOLEDO 2008: 65 (lectotype des.); NILSSON 2011: 15 (cat.); HÁJEK 2017: 844 (misident. China).
Canthydrus (s.str.) *morsbachi* (WEHNCKE, 1876): NILSSON 2005: 103 (cat.).

TYPE LOCALITIES: Cochinchina [Vietnam].

TYPE MATERIAL: *H. morsbachi*: Lectotype (MNHNP) designated by TOLEDO (2008: 65).

ADDITIONAL MATERIAL EXAMINED:

INDIA: GOA: South Goa, Varca, 21.–24.II.1994, leg. Heiss (24 exs. NMW, MTP); South Goa, Canacona, Raj Baga Beach, at light, 16.–29.XI.2010, leg. Schmidt (16 exs. ASG, MTP; Figs. 41b, 43b); KARNATAKA: Mysore State [actually Karnataka], Shimoga District, Shimoga, 1865 feet, 8.V.1936, P.S. Nathan / R. Mus. Hist. Nat. Belg. I. G. 11.174 (4 exs. IRSNB); idem, 1865 feet, River Tunga, 14.V.1936, P.S. Nathan / R. Mus. Hist. Nat. Belg. I. G. 11.174 / morsbachi Wehncke [recent strip of paper, handwritten, without additional information] (21 exs. IRSNB); Shimoga Et. Mysore, V.1936 [without additional data] / angularis [old strip of paper handwritten in pencil without additional information] (6 exs. IRSNB); Mysore, 22.IX.1936, P.S. Nathan / R. Mus. Hist. Nat. Belg. I. G. 11.082 / Canthydrus angularis Shp. [two dentification labels: the first of R. Mouchamps, the second of F. Guignot 1949] (6 exs. IRSNB); Mysore Dist., Ablathi, 800 m, 12°17'N 76°06'E, X.1984, leg. Lorenz (2 exs. LHM; Figs. 41c, 43c); MAHARASHTRA: Pune district [with no other information, collecting date between 2013–2017], leg. S. Sheth (2 exs. MTP; Figs. 12b, 43); TAMIL NADU: Vilupparam, Auroville, Discipline Village, 12°0.7'N1, 79°47.97'E, 1.I.–26.II.2020, leg. local collector / Canthydrus morsbachi (Wehn.), det. Wewalka 2022 (11 exs, ASG, NMW, MTP; Figs. 41d, 43d); Krishnagiri Distr., lake nr. Hosur, 25.XII.1994, leg. Mazzoldi (5 exs. PMB; Figs. 41e, 43e); Krishnagiri Distr., road Hosur–Krishnagiri, nr. Parianda Palli, 25.XII.1994, leg. Mazzoldi (3 exs. MTP; Figs. 41e, 43e); W BENGAL: Birbhum Dist., Santiniketan, 8.II.1999, leg. D. Boukal (92) (1 ex. NMW; Figs. 12a, 41a, 43a).

SRI LANKA: Colombo, 12.XI.1980, leg. Jäch / Canthydrus morsbachi (Whn.), det. Wewalka 2017 (1 ex. NMW; Figs. 41g, 43g); Polonnaruwa, 8.III.1976, leg. Ziegler & Zöllig / Canthydrus morsbachi Wehncke, det. Brancucci

1982 (1 ex. NMW; Figs. 41f; 43f); Tabbow, Wewa, ca. 14 km E Puttalam, rest pools, 30 m, 20.I.2017, leg. Wewalka / Canthydrus morsbachi (Wehn.), det. Wewalka 2017 (1 ex. NMW).

HABITUS (Fig. 12): Very similar to *C. luctuosus* in body shape and colouration; weakly larger. As in *C. luctuosus*, rather variable in size and extension of pale markings. Body convex; in lateral view pronoto-elytral sinuation rather or well-marked.

COLOURATION: Always dark. Head black or blackish-brown with labrum and clypeus yellowish; in some specimen frons with V-shaped yellow median area between eyes. Pronotum black or blackish-brown with at least anterior angles yellowish, but more often lateral margins broadly pale gradually narrowed toward posterior angles. Elytra black or blackish-brown. In typical specimens each elytron with yellowish basal and submedial transverse band, extending toward disc, both ending at same level; basal band rarely divided into two markings, always in contact or at least very close with hind border of pronotum, laterally not extended caudally toward submedial band; this latter never divided into two parts. Darker specimens with less developed elytral markings, steadily in number of three spots (subbasal-discal, basal-lateral and submedian). Underside colouration dark. Head black or dark brown; abdomen, meso- and metaventrite and prosternal process blackish or blackish brown; prosternum dark brown; proepisterna, hypomera and basal part of epipleura paler. Antennae and mouthparts yellow. Legs reddish-brown; metatibiae and metatarsi darker.

STRUCTURES AND SCULPTURE: No significant differences compared to *C. luctuosus*. Maximum width at base of elytra; lateral sides of pronotum rather rounded, elytra in lateral view rather concave to visibly concave at shoulders; pronoto-elytral sinuation rather marked. Stiff setae on prosternum often visibly longer and thicker than on prosternal process and noterid platform.

MEASUREMENTS: TL: 2.6–3.5 mm; MW 1.3–1.8 mm (lectotype of *H. morsbachi* TL: 3.1 mm, MW: 1.7 mm). Ratio TL/MW: 2.31–1.64; average 1.91–1.89.

MALE: Aedeagus (Fig. 34a–b) similar to *C. luctuosus*, with small but constant differences. Median lobe tendentially shorter and broader, ventral side slightly but visibly sinuate toward apex, ending in narrowed tip weakly bent down. Right paramere (Fig. 34c) with apex broader than in *C. luctuosus*, normally visibly truncate, not rounded, with shorter setae. Left paramere as in *C. luctuosus*.

FEMALE: Not differing externally from males.

TAXONOMIC REMARKS AND VARIABILITY: As for *Canthydrus luctuosus*, *C. morsbachi*, was misinterpreted several times, in the past as more recently, judging by the literature and the material studied in the course of this study, identified, correctly or not, as such by different colleagues. The main misinterpretation of this species is surely the confusion with *C. angularis*, since the synonymy established by RÉGIMBART (1889, 1899) adopted until recently (NILSSON 2005). *Canthydrus morsbachi*, as here defined, may also have been confused with dark, large and more convex specimens of *C. luctuosus*. Obviously the two species are very close, and the possibility that *C. morsbachi* is only part of the vast polymorphism of *C. luctuosus* is not yet a completely discarded idea, but the constant, though small, differences in aedeagal features and the distinctive elytral markings in typical specimens, not seen in any morphotype of *C. luctuosus*, seem to support its specific distinctness.

The lectotype of *Hydrocanthus morsbachi* (see TOLEDO 2008: figs. 4, 7) is a single female, but size, body outline, convexity and colour patterns, match indeed the external features of the specimens seen from West Bengal, Goa and Tamil Nadu (Vilupparam) (Figs. 12a, 41a–b, d), here indicated as typical form. These are all characterized by the fact that the elytral markings form two transverse bands on each elytron as described above. Specimens studied from

Karnataka, Maharashtra (Pune District), Tamil Nadu (Krishnagiri District) and from Sri Lanka, have the pale markings on the elytra reduced into more or less developed spots, but always three of them (Figs. 12b, 41c, e–g). These two forms apparently do not co-exist, although they both can live together with *C. luctuosus* and *C. laetabilis*.

DISTRIBUTION (Fig. 49): The type locality of *Hydrocanthus morsbachi* is "Cochin China" (Vietnam). A consequence of its past synonymy with *Canthydrus angularis* was the wide geographical distribution that later authors attributed to *C. morsbachi*, which in fact included for a long time good part of the distribution currently known for *C. angularis* (Cambodia, China, India, Indonesia, Malaysia, Myanmar, Singapore, Sri Lanka, Thailand, Vietnam and DR Congo) (VAZIRANI 1969a, BRANCUCCI 1979, TOLEDO 2003, WEWALKA 1982, NILSSON 2005). After it was found that *C. angularis* and *C. morsbachi* are two separate species (TOLEDO 2008), the latter has become a taxon with obscure identity and its distribution has been reduced to the type locality (TOLEDO 2008, NILSSON 2011). *Canthydrus morsbachi* was recorded for the first time in India by VAZIRANI (1969a: Kerala, Madras [Chennai], Maharashtra, Odisha; 1970: Goa), who based his diagnosis on the current concept of *C. morsbachi* as a large, rather convex and dark *Canthydrus.* He also provided an illustration of the median lobe (1969a: fig. 2e) which, in spite of its poor accuracy, approximately matches the concept of *C. morsbachi* given here. Based on the same morphological criteria, BRANCUCCI (1979) provided the first record of this species from Sri Lanka. Almost surely Vazirani's and, later, Brancucci's records of *C. morsbachi* from India and Sri Lanka are correct, but likely they include also specimens of large and dark *C. luctuosus* (see above). Despite of several expeditions in tropical Asia, *Canthydrus morsbachi*, as defined here, seems to be never found again in Vietnam (type locality) as like as in other parts of the Oriental Region, except India and Sri Lanka, where the whole material here studied comes from. As for the type of *Hydrocanthus weisei*, apparently collected by the same collector, we think that also the type specimen of *Hydrocanthus morsbachi* might have been mislabeled and that the distribution of this species includes the Indian Subcontinent only. At present known with certainty only from India (Goa, Karnataka, Maharashtra, Tamil Nadu, West Bengal) and Sri Lanka. Due the possible confusion with *C. luctuosus*, the records for Kerala and Odisha (VAZIRANI 1969a) need confirmation.

Canthydrus nitidulus SHARP, 1882

Canthydrus nitidulus SHARP, 1882a: 278 (orig. descr.): NILSSON 2011: 15 (bibliography); FENG 1932: 18; 1933: 86; HÁJEK 2017: 844; NILSSON & HÁJEK 2024: 3.
Canthydrus (s. str.) *nitidulus* SHARP, 1882a: NILSSON 2005: 104 (cat.).
Canthydrus bifasciatus RÉGIMBART, 1889a: 148 (orig. descr.); ZIMMERMANN 1919: 117 (syn.).
Canthydrus nitidules SHARP, 1882a (partim misspell.): FENG 1934: 86.

TYPE LOCALITIES: *C. nitidulus*: Formosa [Taiwan]. *C. bifasciatus*: Cambodia, Pnomh Penh.

TYPE MATERIAL: *C. nitidulus*: Lectotype (NHML) designated by TOLEDO (2008: 65); *C. bifasciatus*: Syntypes (?MNHNP) not found.

OTE: The type material of *Canthydrus bifasciatus* RÉGIMBART, 1889 was not found in the MNHNP and at present we cannot confirm the synonymy established by ZIMMERMANN (1919).

ADDITIONAL MATERIAL EXAMINED:

CHINA (CWBS localities see TOLEDO 2003: 81): GUANGDONG: CWBS loc. 479; CWBS loc. 480; "Canton, … [handwritten, partly illegible], IV.1911, Mell S.V." (1 ex. GWW); GUANGXI: 10 km S Yangshuo, muddy pools, fields pasture, 350 m, 3.XI.1999, leg. Šťastný (1 ex. JSL); HONG KONG: Tai Po Kau, 12.–13.IV.1984, leg. Dudgeon (1 ex. NMW).
JAPAN: Okinawa Isl., Nago City, Tema Hamlet, 7.I.1989, leg. Y. & T. Abe (1 ex. LHM).
TAIWAN: TOLEDO (2003: 81).
VIETNAM: Bac Kan Province, Ba Bè NP (entry), 22°25'07"N 105°38'09"E, 180–200 m, 16.–20.V.2014, leg. Skale (4 exs. ASG); Tuyen Quang Province, 160 km NNW Hanoi, NE env. of Na Hang, 150–200 m, 3.–13.VI.1996,

leg. Napolov & Roma (3 exs. ASG); idem, Pac Ban, 11.VI.1996, leg. Napolov (1 ex. MTP); 180 km SSW Hanoi, 40 km SW Than Hoa, Ben En NP, 50 m, 27.VIII.1997, leg. Napolov (4 exs. LHM); Lao Cai Province, Sa Pa, 22°20'N 103°50'E, 25.V.–10.VI.1991, leg. Jendek (1 ex. MTP).

HABITUS (Fig. 7): Large, shining, convex, elongate-oval, maximum width close to base of elytra; elytra gradually narrowed toward the apex; in lateral view, pronoto-elytral sinuation rather marked.

COLOURATION: Head reddish without darker markings; pronotum reddish with thick, oval black marking on hind margin and large bilobed black marking on fore margin. Elytra black to pitch-brown, apex not faded. Reddish markings on each elytron similarly as in *C. laetabilis* (see above), but submedian band normally more indented, hardly reaching elytro-epipleural margin, and subbasal band always fragmented into two spots almost of same size and shape, less extended than in *C. laetabilis*. Underside in most part reddish-brown, abdomen and prosternal process blackish. Antennae and mouthparts reddish. Legs uniformly reddish.

STRUCTURES AND SCULPTURE: Head smooth and shining; microreticulation of very fine, shallow meshes, hardly visible; fine dots scattered on surface. Sides of pronotum, in lateral view, rounded, with lateral bead rather strong. Surface very smooth, without dots; microreticulation weak, arranged in thin and shallow vermiculations. Elytra rather elongate, convex; in dorsal view sides rounded, gradually narrowed apically; in lateral view, sides rather concave at the shoulders. Microreticulation arranged in vermiculations, slightly more visible, at least on black teguments, where feeble metallic iridescence is normally visible. Transverse series of stiff setae on prosternum not much thicker than on prosternal process. Setal punctation on prosternal process rather coarse and spatiated but uniform, without glabrous parts. Punctation on noterid platform less coarse, with rather spatiated setal punctation and fine but visible microreticulation. Microreticulation on metaventrite and metacoxae rather impressed, abdominal sternites smoother.

MEASUREMENTS TL: 3.4–3.6 mm; MW: 1.7–1.9 mm. Ratio TL/MW: 2.12–1.89; average 1.95.

MALE: Median lobe (Fig. 35a–b) with distal portion long but robust and broad, shortly narrowed at about apical third. Right paramere (Fig. 35c) short and broad, with apex narrow but regularly rounded, bearing tuft of short hairs.

FEMALE: not differing externally from males.

COMPARATIVE DIAGNOSIS: Easy to distinguish from the other bicoloured species because of its large size and the thick dark pronotal markings.

DISTRIBUTION (Fig. 50): China (Beijing, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hong Kong, Hebei, Hubei, Jiangsu, Jiangxi, Liaoning, Shanghai, Sichuan, Zhejiang), Japan (Ryukyu Islands), Taiwan, Vietnam. The record from Cambodia (type locality of *C. bifasciatus*) must be confirmed. First record for Guangxi (China).

Canthydrus politus (SHARP, 1873)

Hydrocanthus politus SHARP, 1873: 51(orig. descr.).
Canthydrus politus (SHARP, 1873): NILSSON 2011: 16 (bibliography); FENG 1932: 18; 1933: 86; HÁJEK 2017: 844; NILSSON & HÁJEK 2024: 3.
Canthydrus (s.str.) *politus* (SHARP, 1873): NILSSON 2005: 105 (cat.).

TYPE LOCALITY: Japan, Hiogo.

TYPE MATERIAL: Lectotype (NHML) designated by TOLEDO (2008: 65).

ADDITIONAL MATERIAL EXAMINED:

CHINA (CWBS localities see TOLEDO 2003: 80): GUIZHOU: CWBS loc. 275; CWBS loc. 276; CWBS loc. 277; HUNAN: CWBS loc. 28; CWBS loc. 33; CWBS loc. 35; JIANGXI?: China \ Sharp coll. 1905–313. \ Kin Kiang [likely Kiu Kiang, refers to Jujiang in Jiangxi] (2 exs. NHML); MACAO: Peninsula, Gateway Friendship Monument, 17.IX.1994, attracted to light, leg. Easton (1 ex. NMW); idem, 1998–1999 [no further data] (1 ex. NMW); Peninsula, Friendship Monument, 12.VII.1998, leg. Easton (2 exs. NMW).

JAPAN: HONSHU: Shizuoka, Iwata City, Okegayanuma Marsh, 11.VII.1988, leg. Y. & T. Abe (15 exs. LHM); SHIKOKU: "Shikoku. Matsuyama \ *Canthydrus politus* Shp., R. Mouchamps det." (2 exs. IRSNB).

VIETNAM: North Vietnam, Tuyen Quang Province, 160 km NNW Hanoi, Pac Ban, 11.VI.1996, leg. Napolov; (4 exs. LHM); 180 km SSW Hanoi, 40 km SW Thanh Hoa, Ben En N.P., 40 m, 27.VIII.1997, leg. Napolov (2 exs. LHM).

HABITUS (Fig. 9): Moderate, shining, rather convex, oval to broadly-oval, maximum width close to base of elytra; elytra rounded, gently narrowed toward the apex; in lateral view pronoto-elytral sinuation rather marked.

COLOURATION: Head reddish without dark markings; pronotum reddish, normally with thin dark band along fore margin and slightly thicker V-shaped band on scutellar area of fore side. Elytra black to dark-brown, apex always broadly faded. Reddish or yellow markings on each elytron composed of a transverse submedian band and two subbasal spots, one discal, more or less rhomboid, and one lateral, but elytral patterns very variable in extension of pale markings. Underside mostly reddish-brown; at least part of abdomen, prosternal process and metasternal component of noterid platform darker. Antennae and mouthparts testaceous or reddish. Legs uniformly reddish.

STRUCTURES AND SCULPTURE: Head smooth, without dots, microreticulation very fine, hardly visible. Sides of pronotum, in lateral view, rounded, with lateral bead strong; surface glossy, without dots, microreticulation fine but visible, more or less arranged in small vermiculatons. Elytra short, convex; in dorsal view sides rounded, gradually narrowed apically; in lateral view, sides rather concave at the shoulders. Microreticulation visible, arranged in vermiculations; feeble metallic iridescence normally visible on black teguments. Transverse series of stiff setae on prosternum, above prosternal process well developed, composed of rather few elements, thicker than setae on prosternal process. Setal punctation on prosternal process rather dense, more scattered proximally, without glabrous area. Punctation on noterid platform gradually less dense through metacoxal process. Microreticulation on noterid platform, metaventrite and metacoxae shallow, even less impressed on abdominal sternites.

MEASUREMENTS: TL: 2.6–2.9; MW: 1.4–1.55 mm, ratio TL/MW: 1.85–1.80.

MALE: Median lobe (Fig. 36a–b) rather squat and short, weakly expanded toward apex which is broadly rounded. Right paramere (Fig. 36c) widely triangular, apex rounded bearing tuft of short setae.

FEMALE: not differing externally from males.

VARIABILITY: Extension of pale elytral markings very variable (Fig. 9a–c). In some specimen elytra are almost completely yellow or reddish, with black background reduced in thin lines (Fig. 9c). In MORI & KITAYAMA (1993: fig. 7) good pictures are given on the variability of colour patterns of this species.

COMPARATIVE DIAGNOSIS: Among the bicoloured species, *C. laetabilis* is perhaps the species with which *C. politus* can be easily confused, although these two species do not co-exist (see above "Taxonomic Remarks" of *C. laetabilis*). *Canthydrus politus* lives in sympatry with *C. nitidulus*, which has similar colouration, but is larger and always with two thick dark markings on both fore and hind sides of pronotum. In southern China (Macao) and in northern Vietnam it co-exists with *C. flammulatus*, but it can be distinguished by having no strongly waved sub-

median band and ∩-shaped subbasal-discal marking, typical of this latter species. All specimens seen from Macao have the elytra almost completely yellow (Fig. 9a) and are therefore impossible to confuse with *C. flammulatus*. In any case, the comparison of male genitalia dispels any doubts.

DISTRIBUTION (Fig. 50): A mainly eastern Palearctic species: China (Beijing, Fujian, Guizhou, Hebei, Hubei, Hunan, Jiangsu, Jiangxi, Liaoning, Macao, Sichuan, Shanghai, Shandong), Japan (Honshu, Kyushu, Shikoku, Ryukyu Islands), South Korea (Jeju Island), northern Vietnam. First record for Macao and Vietnam.

Canthydrus proximus SHARP, 1882

Canthydrus proximus SHARP, 1882a: 278 (orig. descr.); BRANDEN 1885: 17 (Siam); RÉGIMBART 1899: 250 (partim misident., Annam, Siam); ZIMMERMANN 1920: 13 (partim misident., Annam, Siam); FENG 1932: 18 (partim misident, Annam, Siam); 1933: 87 (misident., Annam); VAZIRANI 1977a: 7 (partim misident., China, Thailand, Vietnam); NILSSON 1995: 40 (partim misident., ?China, Thailand, Vietnam); HUA 2002: 34 (partim misident., ?China, Thailand, Vietnam); NILSSON 2003: 34 (misident., China); HENDRICH et al. 2004: 108 (misident., ?Singapore.); TOLEDO 2008: 66 (lectotype des.); NILSSON 2011: 16 (cat., ?China, ?Singapore, Thailand, Vietnam); HÁJEK 2017: 844 (misident., China); NILSSON & HÁJEK 2024: 3 (idem).

Canthydrus (s. str.) *proximus* SHARP, 1882a: NILSSON 2005: 105 (cat. ?China, ?Singapore, Thailand, Vietnam).

TYPE LOCALITY: Thailand, Bangkok.

TYPE MATERIAL: Lectotype (NHML) designated by TOLEDO (2008).

ADDITIONAL MATERIAL EXAMINED:

INDONESIA: WEST PAPUA: Arfak Mts., Manokwari, 1300 m, 19.–30.X.2010, leg. Milko / Canthydrus occultus Toledo, det. Wewalka 2020 (1 ex. GWW).

THAILAND: EAST THAILAND: Chon Buri Province, Bang Bueng District, Khlong Kiu, Nong Nam Khieo, Station 76, 80 m, 22.IX.2019, leg. Okada (1 ex. THNHM); idem, Station 108, 14.III.2020, (1 ex. THNHM); idem, Station 353, 7.X.2023 (13 exs. THNHM); NORTHEAST THAILAND: Khon Kaen Province, Kaen Municipality, 15.V.1954, leg. Eibel (1 ex. GWW); Khon Kaen Province, Sunanta, at light, 27.V.1979, leg. Aumphansiri / Canthydrus proximus Sharp, det. G. Wewalka 1985 (1 ex. GWW); SOUTH THAILAND: Songkhla Province, Ranot District, Ban Khao, Station 216, 10 m, 7.II.2021, leg. Okada (1 ex. THNHM).

HABITUS (Fig. 6): Rather large, very convex, shining. Maximum width at shoulders; dorsal outline drop-like, with lateral sides of elytra almost straight behind the shoulders, strongly tapering toward apex; in lateral view pronoto-elytral sinuation very marked.

COLOURATION: Head reddish, vaguely darkened around eyes. Pronotum dark-reddish, with medial, poorly defined, darker area, triangular in shape with base on fore side and vertex toward disc. Elytra black; each elytron with two linear, transverse, reddish bands, not sharply marked: one subbasal on about basal fifth of elytron, divided into two parts, and one submedian, not fragmented. Underside black, slightly paler on sternites 1–3; head, prosternum (but not prosternal process), proepisterna and hypomera reddish-yellow. Antennae and mouthparts testaceous. Legs uniformly dark reddish.

STRUCTURES AND SCULPTURE: Reticulation on head fine, composed of circular meshes, no dots visible. Sides of pronotum, in lateral view, visibly convex, with lateral bead rather strong. Surface of pronotum glossy, microreticulation composed of fine circular meshes arranged in longitudinal vermiculations. Elytra, in dorsal view, strongly tapering toward apex, with maximum width at shoulders and proximal half of lateral sides almost straight; in lateral view, sides visibly concave at shoulders. Elytral surface shining, microreticulation as on pronotum; single longitudinal series of very fine dots visible on each elytron. Prosternum medially covered by rather dense stiff setae, continuing on whole prosternal process; noterid platform covered with close and uniform setation, except for smooth area on distal part of metacoxal lobes; microreticulation rather impressed on metaventrite and abdominal ventrites, with, respectively,

rounded and more elongated elements; microreticulation weak on setae-free areas of noterid platform.

MEASUREMENTS (lectotype): TL: 3.35 mm; MW 1.75 mm.

MALE: Aedeagus very distinctive (Fig. 37a–b): median lobe large, robust, widened apically, with short, beak-like rounded tip; left face with sort of thick bridge extending from ventral side to inner surface of right face; left lamina carinate medially. Right paramere short, apically rounded without visible hairs (Fig. 37c). Left paramere elongate, almost rectangular (Fig. 37d).

FEMALE: Not differing externally from male.

VARIABILITY: On the basis of the few material available, the species seems to be rather uniform in size, body shape and colour patterns, but in few specimens the dark area on the pronotum is missing and its surface is completely reddish. No significant differences have been observed in the shape of the median lobe, but the only two right parameres we were able to examine (both from Thailand), in contrast to the lectotype, bear an apical row of very thin setae (Fig. 37e) which likely got lost in the lectotype. The single specimen from West Papua is not much different from the lectotype externally, but it has not the dark area on pronotum. The median lobe shows no appreciable differences but, unfortunately, the right paramere is damaged and it is impossible to see its features.

TAXONOMIC REMARKS: Including the lectotype, this species is actually known only from less than twenty individuals. Not much can be said on the relationships of this beetle but likely it belongs to a group of its own. It looks similar to *C. angularis*, from which can be readily distinguished by the reddish pronotum, by the rearmost position of the subbasal elytral bands and by the different shape of the male genitalia.

DISTRIBUTION (Fig. 48): So far this species is known with certainty only from the type locality (Bangkok) and few recent findings from the provinces of Chon Buri, Khon Kaen and Songkhla in Thailand. *Canthydrus proximus* was misinterpreted in the past; its distribution was extended also to other countries: RÉGIMBART (1899) recorded *C. proximus* also from Annam (Vietnam), VAZIRANI (1977a) included also China and, more recently, HENDRICH et al. (2004) recorded *C. proximus* from Singapore, which is based with certainty on a misidentification with *C. flammulatus*. Misidentification is probably also the source of the record from Vietnam, where *C. flammulatus* is known to occur. In our opinion, all the records of *C. proximus* outside Thailand should be rejected. It seems to be a very rare species and its distribution is still unclarified. The single specimen from "West Papua" (GWW, identified as *C. occultus* TOLEDO, 2010 by Wewalka 2020) is almost surely mislabeled.

Canthydrus ritsemae (RÉGIMBART, 1880)

Hydrocanthus ritsemae RÉGIMBART 1880: 213 (orig. descr.).
Canthydrus ritsemae (RÉGIMBART, 1880): HENDRICH et al. 2004: 108; NILSSON 2011: 17 (cat. bibliography); JÄCH et al. 2012: 66 (China, Tibet); HÁJEK 2017: 844; NILSSON & HÁJEK 2024: 3.
Canthydrus ritsemai (RÉGIMBART, 1880) (misspell.): GUIGNOT 1954b: 563; VAZIRANI 1969a: 228; 1974: 16; 1975: 41, 43; 1977a: 8; ROCCHI 1976: 179.
Canthydrus ritsmai (RÉGIMBART, 1880) (misspell.): ROCCHI 1986: 33.
Canthydrus javanus WEHNCKE, 1883: 149 (orig. descr.).
Canthydrus pseudoflavus ROCCHI, 1986: 31 (orig. descr.).

TYPE LOCALITIES: *H. ritsemae*: Sumatra, Loeboekh [Lubuk] Gadang; *C. javanus*: Java; *C. pseudoflavus*: Burma [Myanmar], Yangon [Rangoon].

TYPE MATERIAL: *H. ritsemae*: Acc. to WEWALKA (1992: 806) holotype ♂ "in coll. Oberthur. Mus.N.H.N.Paris" [MNHNP]), but acc. to NILSSON (2011: 17) "LT [lectotype]: Wewalka 1992:806 RMNH [Nationaal Natuurhistorisch Museum ('Naturalis'), Leiden, Netherlands)]". As long as there is no indication that the original description

was based on more than one specimen, the specimen examined by WEWALKA (1992) is to be regarded as the holotype (ICZN 1999: Art. 74.6).

C. javanus: Syntypes (MNHNP) not studied.

C. pseudoflavus: Holotype (NMNHS) not studied.

ADDITIONAL MATERIAL EXAMINED:

BRUNEI: Damuan River, 4°51'N 114°48'E, 14.VI.2007, leg. Zettel (4) (1 ex. NMW).

CHINA (CWBS localities see TOLEDO 2003: 77): GUANGDONG: CWBS loc. 460; HAINAN: CWBS loc. 178; CWBS loc. 179; CWBS locs. 180, 181, 183, 214, 216.

INDIA: MEGHALAYA: W Garo Hills, Bagmara, 25°11.5'N 90°38.5'E, ca. 100 m, 19.–21V.1996, leg. Jendek & Šauša (1 ex. NMW); ODISHA: Bhadrak Chanbali, at light, 28.X.2008, leg. Rougemont (19 exs. NMW, MTP); West BENGAL: Santiniketan, 8.II.1999, leg. Boukal (92) (5 exs. NMW).

INDONESIA: KALIMANTAN: W Kalimantan, Nanga Sarawai, Tontang, 24.VII.–2.VIII.1993, leg. Schneider (10 exs. NMW); W Kalimantan, Nanga Ela, Nanga Nyuruh, 700 m, 4.–10.VIII.1993, leg. Schneider (3 exs. NMW); E Kalimantan, Tabang Distr., Ritan Baru, Lalang [stream], 27.VII.1995, leg. Mazzoldi (3 exs. PMB); NIAS: Telukdalam, 8.II.1990, leg. Schödl (5) (3 exs. NMW); idem, 12.II.1990, leg. Jäch (7) (5 exs. NMW); idem, 40 km N Telukdalam, 13.II.1990, leg. Jäch (10) (2 exs. NMW); Lahusa – Gomo, 9.–11.II.1990, leg. Schödl (6) (2 exs. NMW); SIBERUT: Muarasiberut, 15.II.1991, leg. Jäch & Schödl (19) (8 exs. NMW); SULAWESI (see also TOLEDO 2010: 217): N Sulawesi, Doloduo, 150 m, 0°3'3"N 123°57'24"E, 31.I.–2.II.2006, leg. Skale (1 ex. ASG); C Sulawesi, Poso Lake, 1°47.955'S 120°31.622'E, 6.–7.II.1997, leg. Haft (PO 02) (2 exs. NMW); Sulawesi, Lake Morowali, 700 m, 26.II.1998, leg. Krämer (1 ex. NMW); SUMATRA: N Sumatra, Huta Padang, 2.III.1991, leg. Malicky (1 ex. NMW); N Sumatra, Sungei Kopas II, ca. 60 km E Pematangsiantar, ca. 300 m, secondary forest, 25.II.1997, leg. Zorn (1 ex. ASG); W Sumatra, 15 km E Payakumbuh, 12.II.1991, leg. Jäch (14) (2 exs. NMW); W Sumatra, Maninjau, 550 m, 8.II.1991, leg. Schödl (8) (3 exs. NMW).

LAOS: N Laos, Luang Prabang Province, 10 km N Luang Prabang, 240 km N Vientiane, 250 m, light trap, XI.1992, leg. Somsy (2 exs. LHM); C Laos, Viangchan Province, Phou Khao Khouay NP, Nam Leuk, Tad Leuk Waterfall, at light, 200 m, 1.–8.VI.2006, leg. Schillhammer (15a) (1 ex. NMW); Bolikhamxai Province, Ban Nape Kaew Nua Pass, ca. 600 m, small stream, 18.IV.–1.V.1998 (1 ex. NMW); Khammouan Province, Ban Khoun Ngeun, 18°7'N 104°29'E, 250 m, 4.–16., 25.–30.XI.2000, leg. Jendek & Pacholátko (29 exs. NMW, MTP); S Laos, Attapeu Province, Bolaven Plateau, 15 km SE of Ban Houaikong, Nong Lom (lake) env., 15°2'N 106°35'E, 800 m, 18 –30.IV.1999, leg. Jendek & Šauša (1 ex. NMW); Champasak Province, ca 50 km S Pakse, of Ban Phatoumphone, 50–100 m, 23.–24.V.1996, leg. Schillhammer (1a) (3 exs. NMW).

MALAYSIA: EAST MALAYSIA: Sarawak, Kelabit Highlands, Bareo, 1000–1200 m, 26.II.–1.III.1993, leg. Zettel (11) (2 exs. NMW); idem, Bareo, ca. 1000 m, 26.II.1993, leg. Jäch (14) (1 ex. NMW); Sarawak, ca. 25 km E Kapit, III.1994, leg. Kodada (1 ex. NMW); Sabah, ca. 7 km S Sapulut, Sapui River, 17.V.2001 (7 exs. NMW); Perlis State, Langkawi Isl., P. Lalang – U. Melaka, 13.II.1988, leg. Madl (3 exs. NMW); WEST MALAYSIA: Perlis State, Langkawi Isl., Pantai Kok, 30.I.1992, leg. Jäch (14) (2 exs. NMW); Penang State, George Town, 22.VIII.1988, leg. Schödl (9) (1 ex. NMW); Perak State, 30 km SW Ipoh, Batu Gajah, Teronoh lakes, 100 m, 19.–21.III.2002, leg. Čechovsky (5 exs. MTP); Kelantan State, 60 km NE Tanah Rata, Tanah Kerajaan, 1000 m, 12.–30.IV.2007, leg. Čechovský (1 ex. NMW); Pahang State, 50 km NE Kuala Rompin, Endau Rompin N.P., G. Keriung, Tebu Hitam, 9.–30.IV.2008, leg. Čechovský (10 exs. NMW); Pahang/Johor states, Endau Rompin N.P., Selendang, 100 m, 28.II.–12.III.1995, leg. Štrba & Hergovits (15 exs. NMW).

MYANMAR: Shan State, Highland, Mong Hkok, 2006 (1 ex. ASG); Yangon State, Highland Lodge, Pyay Road, 7.5 miles, at light, 21.–23.XI.2004, leg. Shaverdo & Schillhammer (44 exs. NMW, MTP).

NEPAL: CENTRAL NEPAL: Narayani/Chitwan, 2 km W Sauraha, 27°34'48"N 84°28'10"E, 180 m, 5.VII.2017, leg. Kopetz (1 ex. ASG); EAST NEPAL, Jhapa District, Nagardubba Khola at Dhulabari, 25.I.2000, leg. Khanal & Nesemann (1 ex. NMW).

THAILAND: CENTRAL THAILAND: Saraburi Province, Muak Lek District, Mittraphap, Station 121, 230 m, 30.V.2020, leg. Okada (1 ex. THNHM); Uthai Thani Province, 240 km NW Bangkok, 25 km NW Lan Sak, 110 m, at light, II.1989, leg. Thielen (1 ex. NMW); EAST THAILAND: Chachoengsao Province, Sanam Chai Khet District, Tha Kradan, Station 331, 60 m, 6.V.2023, leg. Okada (1 ex. THNHM); Prachinburi Province, Kabin Buri District, Khao Mai Kaeo, Station 330, 70 m, 6.V.2023, leg. Okada (2 exs. THNHM); NORTH THAILAND: Chiang Mai Province, 18°49'N 98°57'E, Zoo, 1.–8.V.1989, leg. Malicky & Chantaramongkol (5 exs. NMW); Chiang Mai and Lamphun provinces, Mae Ping Nat. Park, at light, 5.IX.1991, leg. Malicky (1 ex. NMW); Chiang Rai Province, Mae Chan District, Tha Khao Plueak, Station 19, 380 m, 24.XI.2018, leg. Okada (2 exs. THNHM); Chiang Rai Province, Wiang Chai District, Wiang Chai, Station 64, 390 m, 10.VIII.2019, leg. Okada (1 ex. THNHM); NORTHEAST THAILAND: Bueng Kan Province, Bueng Khong Long District, Bueng Khong Long, Station 204, 90 m, 27.XII.2020, leg. Okada (1 ex. THNHM); Buri Ram Province, Mueang Buri Ram District, Sawak Chik Station 323, 160 m, 11.II.2023, leg. Okada (2 exs. THNHM); Loei Province, Tha Li, Nam

Kham, 8.III.1994, leg. Shepard (1 ex. NMW); Khon Kaen Province, Ban Phai District, on rd. Khon Kaen to Bangkok, large fishing pond, 16°06'18"N 102°44'21"E, 22.III.2017, leg. Shaverdo (3 exs. NMW); Nakhon Ratchasima Province, Lam Takhong, nr. Khao Yai NP, stream, 380 m, 8.I.2009, leg. Zettel (50) (1 ex. NMW); Nakhon Ratchasima Prov., Sida District, on rd. Khon Kaen to Bangkok, ca. 150 km to Khoen Kaen, 15°19'53"N 102°26'19"E, 19.III.2017, leg. Shaverdo (13 exs. NMW); Nakhon Ratchasima Province, Sida District, Khon Kaen – Bangkok, nr. road bridge across Khlong Sathaet, 15°16'22"N 102°25'7"E, 21.III.2017, leg. Shaverdo (7 exs. NMW); Nakhon Ratchasima Province, Sung Noen District, Makluea Mai, Station 252, 360 m, 19.VI.2021, leg. Okada (1 ex. THNHM); Sakon Nakhon Province, Mueang Sakon Nakhon District, Huai Yang, Station 209, 360 m, 29.XII.2020, leg. Okada (1 ex. THNHM); Surin Province, 150 m, 5.–10.XII.1995, leg. Schwendinger (1 ex. NMW); Ubon Ratchathani Province, Si Mueang Mai District, Nam Thaeng, Station 221, 26.II.2021, leg. Okada (3 exs. THNHM); idem, Station 273, 8.I.2022, leg. Okada (2 exs. THNHM); SOUTH THAILAND: Krabi Province, Ao Nang (2), 22.II.1991, leg. Madl (2 exs. NMW); Krabi Province, Noppharat Thara, 28.III.1993, leg. Madl (1 ex. NMW); Phatthalung Province, Thale Noi, 7°47'N 100°13'E, 1.–2.V.1993, leg. Malicky (1 ex. NMW); Pattani Province, Sai Buri, 23.–28.IV.1993, leg. Strnad (1 ex. NMW); WEST THAILAND: Kanchanaburi Province, Sai Yok Yai N.P., NW Kanchanaburi (8), 3.XII.1990, leg. Jäch (1 ex. NMW).

VIETNAM: Cuc Phuong N.P., 100 km S Hanoi, 2.–12.V.1991, leg. Jendek (8 exs. NMW); Gia Lai Province, ca. 60 km S Pleiku, pools of Song Ea H'leo River, ca. 700 m, 12.II.2012, leg. Wewalka (1 ex. NMW); Hanoi, 25.V.1986, leg. Olexa (3 exs. NMW); Quang Ninh Province, ca. 10 km W Ha Long City, pools, ca. 5 m, 4.II.2012, leg. Wewalka (1 ex. GWW); Nam Cat Tien N.P., 1.–15.V.1994, leg. Pacholátko & Dembický (81 exs. NMW); idem, 18.VII.1995 [leg. ?] (2 exs. HSV); 14 km NW Bao Loc, 16.–29.V.1994, leg. Pacholátko & Dembický (2 exs. NMW); Than Hoa Province, 180 km SSW Hanoi, 40 km SW Than Hoa, Ben En N.P., 50 m, 27.VIII.1997, leg. Napolov (37 exs. LHM, MTP); Thua Thien Hué Province, ca. 30 KM SE Hué, pools, ca. 5 m, 7.II.2012, leg. Wewalka (10 exs. NMW).

This species has been recently redescribed and illustrated in WEWALKA (1992) and TOLEDO (2003, 2010); here only the most relevant diagnostic characters are given.

HABITUS (Fig. 16): Small, body slightly broad to elongate with maximum width normally at shoulders or just behind, weakly convex; in lateral view, sides of pronotum weakly rounded and sides of elytra weakly concave to rather straight; pronoto-elytral sinuation normally weak. Colouration uniformly yellow or brownish-yellow, without appreciable markings, head and pronotum normally paler than elytra. Prosternum with stiff setae longer and thicker than on posternal process.

MEASUREMENTS: TL: 2.3–2.8 mm (average: 2.5 mm); MW: 1.15–1.4 mm (average: 1.27 mm). Ratio TL/MW: 1.84–2.12 (average: 1.96).

MALE: Median lobe (Fig. 38a–b) robust, broad and rounded apically. Right paramere (Fig. 38c) short, rounded apically, with fringe of setae.

FEMALE: Average size larger than in males.

COMPARATIVE DIAGNOSIS: Small and uniformly reddish or testaceous, *C. ritsemae* externally looks very similar to *C. flavus*, together with which it is often collected. The male genitalia of the two species are very different and the submedian-lateral pale marking on each elytron in *C. flavus* (always absent in *C. ritsemae*) gives further help in their separation. Nevertheless, in some specimens of *C. flavus* such markings can be hardly discernible or totally missing, enhancing the separation of the two species, though their loss seems to occur in males only. On average, *C. flavus* is larger than *C. ritsemae*. In general, females of *C. ritsemae* have more or less the size of *C. flavus* males (average size of females in *C. ritsemae* TL: 2.55 mm; MW: 1.29 mm; in *C. flavus* TL: 2.75 mm; MW: 1.43 mm), though exceptions occur. Besides, *C. flavus* has a broader and more convex body compared with *C. ritsemae*; in lateral view, the lateral side of each elytron is normally more concave at shoulders than in *C. ritsemae*, therefore in *C. flavus* the lateral pronoto-elytral sinuation is more marked; this character can be better appreciated with the comparison of the two species together. The median lobe figured in VAZIRANI (1969a: fig. 2f) for *C. ritsemai* (sic!) differs distinctly from this species and it almost resembles the median lobe

of *C. mazzoldii*. We don't have an opinion for this, but maybe the author based his drawing on a damaged specimen.

DISTRIBUTION (Fig. 47): One of the most widespread Noteridae in southeast Asia. Its distribution range is even wider of the widespread *C. flavus*, crossing the Wallace line in the southeast (TOLEDO 2010) and reaching the Himalaya in the northwest of its range. Bangladesh, Brunei, southern China (Guangdong, Hainan, Hong Kong), northeastern India (Assam, Meghalaya, Odisha, West Bengal), Indonesia (Java, Kalimantan, Nias, Siberut, Sulawesi, Sumatra), Laos, Malaysia (E Malaysia, W Malaysia), Myanmar, eastern Nepal, Singapore, Thailand, Vietnam. First record for Brunei and Laos. Specimens from Bhutan deposited in the NMW most probably belong to a stock of water beetles which seem to have been mislabeled and most likely collected in Laos (see SHAVERDO et al. 2021). The same probably applies to specimens recorded by JÄCH et al. (2012: 66) from Tibet. Therefore, the presence of this species in Bhutan and Tibet must be regarded as unconfirmed.

Canthydrus rocchii WEWALKA, 1992

Canthydrus rocchii WEWALKA, 1992: 807 (orig. descr.); NILSSON 2005: 98; ROCCHI 2007: 60; NILSSON 2011: 107 (cat., Myanmar).

Canthydrus antonellae TOLEDO 2003: 78 (orig. descr.) **syn.n.**; NILSSON 2011: 9 (cat.; China: Yunnan); HÁJEK 2017: 844 (China: Yunnan); NILSSON & HÁJEK 2024: 3 (idem).

Canthydrus flavus (MOTSCHULSKY, 1855): VAZIRANI 1969a: 227 (partim); ROCCHI 1986: 32.

Canthydrus morsbachi (WEHNCKE, 1876): VAZIRANI 1969a: 232 (misident.: Burma).

Hydrocanthus guignoti YOUNG, 1985: 95: DEVI et al. 2013: 242 (misident., India: Manipur); DEVI et al. 2016 (Manipur): 290; DEVI et al. 2017: 6 (Manipur).

Hydrocanthus sp.; DEVI et al. 2014: 7 (misident., India: Manipur).

TYPE LOCALITIES: *C. rocchii*: Burma [Myanmar], Mandalay; *C. antonellae*: China, Yunnan, Xishuangbanna, Menglun City.

TYPE MATERIAL: *C. rocchii*: Holotype ♂ (NMW), paratypes in GWW and SRF; *C. antonellae*: Holotype ♂ (IAECAS), paratypes in NMW and MTP.

ADDITIONAL MATERIAL EXAMINED:

CHINA: YUNNAN: type material of *Canthydrus antonellae* (TOLEDO 2003: 78).

LAOS: Northern Laos, 15 km NW Luang Namtha, 12.–24.V.1997, leg. Jendek & Šauša (2 exs. MTP, NMP); 10 km N Luang Prabang, 250 m, XI.1992, light trap, leg. Somsy (3 exs. LHM); Hua Phan [Houaphanh] Province, 25 km SE Vieng Xai, Ban Kangpabong, 20°19'N 104°25'E, 14.–18.V.2001, leg. Bezděk (1 ex. NMP).

MYANMAR: Bago Region, Bago Yoma, 33 km W Oktwin, Sein Yay Forest Camp, ca. 170 m, 29.X.1998, leg. Schillhammer (36) (1 ex. NMW); Mandalay Region, ca. 50 km NW Kalaw, 450 m, 20°48.457'N 96°21.610'E, Mytisone River, 25.X.1998, leg. Schillhammer (32) (1 ex. NMW); Sagaing Region, Chatthin Wildlife Sanctuary, 23°32'05"N 95°38'53"E, ca. 200 m, 5.–17.X.1998, leg. Schillhammer (1) (1 ex. NMW); Chatthin Wildlife Sanctuary, 23°33.017'N 95°34.851'E, Kinsan Camp, 210 m, 13.X.1998, leg. Schillhammer (14) (1 ex. NMW); Chatthin Wildlife Sanctuary, 23°32.446'N 95°36.794'E, Chaung Mido, ca. 210 m, 16.X.1998, leg. Schillhammer (17) (1 ex. NMW); Chatthin Wildlife Sanctuary, 23°32'05"N 95°38'53"E, San Myaung Camp, ca. 200 m, 15.–20.VI.2002, leg. Schillhammer, Myint Laing & Aung Moe (MBS 88) (2 exs. NMW); Sagaing Region, Alaungdaw Katthapa NP, 22°19.113'N 95°28.518'E, ca. 350 m, light, 3.–13.X.2003, leg. Boukal & Schillhammer (101) (1 ex. NMW); Shan State, Inle Lake, 20°36.718'N 96°52.918'E, ca. 890 m, wetland, 3.VI.2004, leg. Shaverdo & Schillhammer (135) (13 exs. NMW); Than Taung vill., at market, 20°32.299'N 96°50.408'E, ca. 900 m, pools, 5.VI.2004, leg. Shaverdo & Schillhammer (137a) (2 exs. NMW); Nyaungshwe, Hotel "New Point Inn", 20°39.696'N 96°55.500'E, ca. 920 m, pond, 6.–7.VI.2004, leg. Shaverdo & Schillhammer (139) (14 exs. NMW); idem, nr. Nyaungshwe, on way to Kalaw, 20°41.483'N 96°55.717'E, ca. 900 m, wetland at roadside, 8.VI.2004, leg. Shaverdo & Schillhammer (141) (1 ex. NMW); W Heho, near Ingaung Stream (source), 20°41.448'N 96°45.653'E, ca. 1175 m, puddles, 8.VI.2004, leg. Shaverdo & Schillhammer (142) (4 exs. NMW); ca. 2.5 km N Mintaingbin Forest Camp, 20°55.722'N 96°33.913'E, ca. 1250 m, puddles, 12.–16.VI.2004, leg. Shaverdo & Myint Hlaing (149) (1 ex. NMW); Yangon Region, Highland Lodge, Pyay Road, 7.5 miles, pond, 6.XII.2004, leg. Shaverdo (163) (5 exs. NMW).

THAILAND: CENTRAL THAILAND: Phitsanulok Province, Thung Salaeng Luang NP, pond, 4.I.1997, leg. Mazzoldi (1 ex. MTP); NORTH THAILAND: Mae Hong Son, 1000 m, 16.–23.VI.1993, leg. Schneider (1 ex. NMW); Mae Hong Son, 29.IV.1992, leg. Strnad (1 ex. NMW); Mae Hong Son, 29.–30.IV.1992, leg. J. Horák (4 exs. NMW); Mae Hong Son, 19°19'N 97°59'E, 29.IV.1992, leg. Dembický (7 exs. NMW); Mae Hong Son Province, 17 km N Mae Hong Son, Mok Cham Pae, 11.XI.1995, leg. Zettel (12b) (25 exs. NMW); Mae Hong Son Province, Khun Yuan [Khun Yuam], 800 m, 2.VII.1993, leg. Schneider (2 exs. NMW); Mae Hong Son Province, Mueang Mae Hong Son District, Pang Mu, Station 247, 300 m, 12.VI.2021, leg. Okada (3 exs. THNHM); Nan Province, Pha Khab, 11.–16.V.1993, leg. Pacholátko (1 ex. NMW); Nan Province, Bo Kluea District, 700 m, 19°8'N 101°10'E, 22.–26.IV.1999, leg. Hauck (12 exs. NMP, MTP); Nan Province, Tha Wang Pha District, Tan Chum, Station 309, 260 m, 17.XII.2022, leg. Okada (2 exs. THNHM); NORTHEAST THAILAND: Loei Province, Na Haeo District, Saeng Pha, Station 185, 610 m, 19.IX.2020, leg. Okada (1 ex. THNHM); WEST THAILAND: Kanchanaburi Province, pond near Sangkhla Buri, 26.XII.1996, leg. Mazzoldi (4 exs. PMB); Kanchanaburi Province, Sangkhla Buri, pond on road to Karen village Ban Sane Pang, 26.XII.1996, leg. Mazzoldi (10 exs. PMB).

HABITUS (Fig. 13): Medium sized to rather large, rather convex, shining, oval to broadly oval, maximum width normally just behind shoulders; in lateral view pronoto-elytral sinuation rather marked.

COLOURATION: Dorsal colouration variable. Uniformly reddish-brown (typical form), almost completely black or bicoloured, with elytra darker than pronotum and head. Head yellow or black with clypeus yellow or reddish, and darker area between eyes. Pronotum from black with yellow lateral sides, or wholly reddish, sometimes dark reddish vaguely darkened on disc. Elytra black or pitch-brown or reddish-brown, always with single submedian-lateral pale spot. Rarely pronotum darker (deep black) than elytra (brown-black). Underside black on metaventrite, metacoxal plates, noterid platform, prosternal process and abdominal ventrites; testaceous or reddish on head and mouthparts, prosternum (except prosternal process) and epipleura. In reddish specimens underside uniformly of same colour. Antennae testaceous. Legs uniformly reddish or reddish-brown.

STRUCTURES AND SCULPTURE: Microreticulation on head visible, variably impressed: almost strong to almost inconsistent. Pronotum, in lateral view, with lateral sides convex and lateral bead rather strong; surface glossy, microreticulation fine but visible, arranged in small vermiculations. Elytra, in dorsal view regularly rounded laterally, with maximum width about 2/5 of length; in lateral view sides rather concave at shoulders. Elytral surface shining, microreticulation finer than pronotum, more evidently arranged in vermiculations; weak metallic sheen visible in black specimens. Setal punctation on prosternal process coarse and somewhat irregular; small smooth area between prosternum and prosternal process, flanked on each side by stiff and thick setae arranged into two short, transverse series. Punctation on rest of noterid platform less coarse, especially on metacoxal process. Microreticulation on metaventrite, metacoxal plates and metacoxal process well impressed, less on abdominal ventrites.

MEASUREMENTS: TL: 2.8–3.5 mm (average: 3.08 mm); MW: 1.45–1.8 mm (average: 1.61 mm). Ratio TL/MW: 2–1.8; average 1.91.

MALE: Median lobe (Figs. 22a–b, 44) quite elongate, distal portion slightly expanded through apex, with ventral side barely sinuated and tip weakly but clearly bent down. Right paramere (Figs. 23a, 44) rather wide, with broad apex, weakly rounded to almost truncate; tuft of setae well developed on whole apical side.

FEMALE: Not differing externally from males.

VARIABILITY: Very variable, mostly in colouration. Although no strict geographical correlations with its variability can be supported at present, it has been noticed that totally black specimens (= *C. antonellae*; Fig. 13a) occur mainly in the northeast of the distribution range (Yunnan, northern Laos). In Thailand and Laos, the bicoloured variety (Fig. 13b) is the most common one, though sometimes mixed up with black or pale specimens and sometimes with

intermediate specimens (Fig. 13c). The typical form, uniformly reddish or reddish-brown and relatively smaller in size (Fig. 13d), has been observed mainly from the central regions of Myanmar [Sagaing, Mandalay (type locality), Bago, Yangon]. The pale specimen from Alaungdaw Katthapa NP (Sagaing Region) has also hardly distinct paler subbasal areas on its elytra (Fig. 13e) and the median lobe is stockier (Fig. 44a) in comparison to the other specimens of *C. rocchii* studied from Myanmar (Fig. 44b). The specimen illustrated in DEVI et al. (2013) from Manipur, India (identified as the Neotropical (!) *Hydrocanthus guignoti* YOUNG, 1985) shares the same habitus of the typical form (Manipur is on the border between India and Myanmar); this population from Manipur was already misidentified in VAZIRANI (1969a) as *Canthydrus flavus*, a species whose presence in India is yet to be confirmed (see above).

COMPARATIVE DIAGNOSIS: The original description of this species was based on totally reddish specimens from central Myanmar and for this reason *C. rocchii* was inserted in the *C. flavus* species group (WEWALKA 1992), together with *C. flavus*, *C. ritsemae* and *C. birmanicus*. At the light of the material here examined, *C. rocchii* seems to be not particularly related with these species, and the *C. flavus* group cannot be supported by any character except body colouration. Black specimens of *C. rocchii* might be confused with dark specimens of *C. luctuosus* or *C. morsbachi*, but the first species do not co-exist with the latter two except, perhaps, in northeastern India, where *C. rocchii* seems to be represented by uniformly reddish specimens, therefore not to be confused with them. All these three species have also rather similar male genitalia, but with small but constant differences: in *C. luctuosus* the ventral side of median lobe is straight or at most weakly curved and the apex is not bent down, and the left paramere is less broad, with regularly rounded apex. In *C. morsbachi* the apical tip of the median lobe is weakly bent down, but the whole last apical third is narrowed and not rounded as in *C. rocchii*, besides, the left paramere is apically visibly truncate or almost so (compare Figs. 22–23, 34, 43–44). Finally, both *C. luctuosus* and *C. morsbachi* have normally three pale markings on each elytron (rarely the subbasal ones can be reduced or missing in *C. luctuosus*); *C. rocchii* has always one single spot in the submedian-lateral position and no other elytral markings.

DISTRIBUTION (Fig. 49): Southern China (Yunnan), northeastern India (Manipur), northern Laos, Myanmar, Thailand. The presence of this species in India was expected by WEWALKA (1992), which is here confirmed after the (misidentified) data provided by DEVI et al. (2013). First records for India, Laos and Thailand.

Canthydrus semperi (WEHNCKE, 1876)

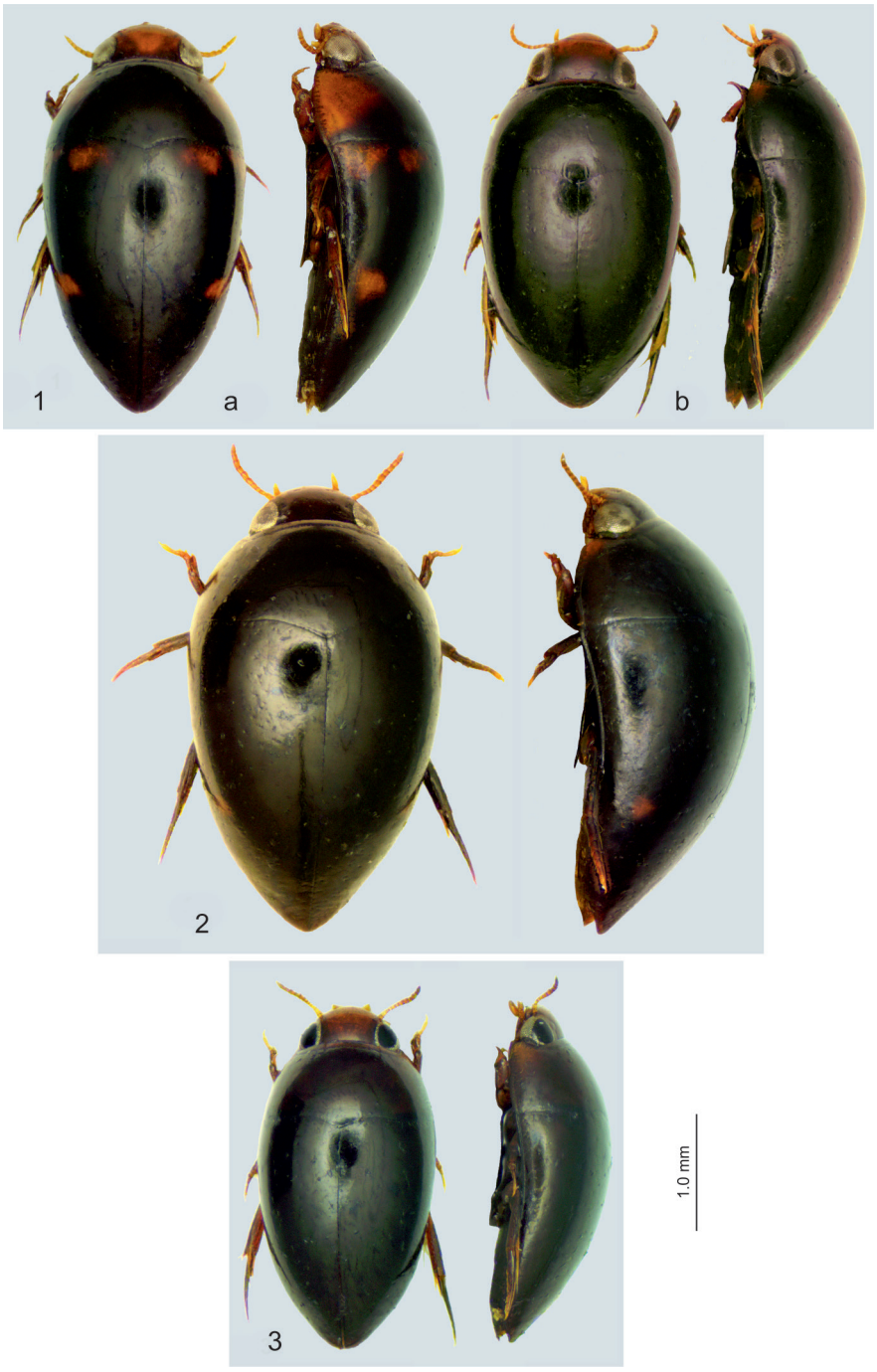
Hydrocanthus semperi WEHNCKE, 1876: 223 (orig. descr.).
Canthydrus semperi (WEHNCKE, 1876): YANO et al. 1983 (Philippines, Mindanao); NILSSON 2011: 18 (cat., bibliography); FREITAG et al. 2016: 186.
Canthydrus (s. str.) *semperi* (WEHNCKE, 1876): NILSSON 2005: 108 (cat.).
Hydrocanthus auritus RÉGIMBART, 1877: LXXIX (orig. descr.); 1878b: 359 (second descr.).

TYPE LOCALITIES: *H. semperi*: Philippines, Luzon; *H. auritus*: Philippines, Luzon, Manila.

TYPE MATERIAL: *H. semperi*: Lectotype (MNHNP) designated by TOLEDO (2010: 217). *H. auritus*: Syntypes (MNHNP).

ADDITIONAL MATERIAL EXAMINED:
INDONESIA: Sumatra, Sulawesi (TOLEDO 2010: 217).
PHILIPPINES: see TOLEDO (2010: 218).

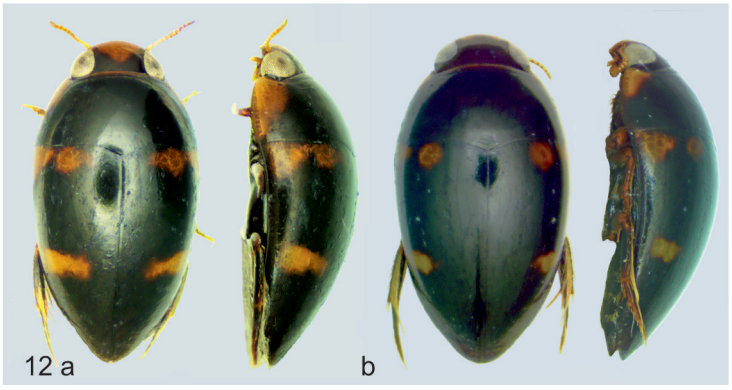
DIAGNOSIS: This species has been redescribed in TOLEDO (2010); here only the most relevant diagnostic characters are given.



Figs. 1–3: Habitus, dorsal and lateral views: 1) *Canthydrus angularis*: a) typical specimen (Vietnam), b) dark form (Sulawesi, Indonesia); 2) *C. mazzoldii* paratype (Thailand); 3) *C. semperi* (Sulawesi, Indonesia).

Figs. 4–6: Habitus, dorsal and lateral views: 4) *Canthydrus flammulatus*: a) typical specimens (Malaysia), b) specimen from Macao (China); 5) *C. haagi* (Laos); 6) *C. proximus* a) lectotype (Bangkok, Thailand), b) Chonburi Prov. (Thailand), c) Songkhla Prov. (Thailand).

Figs. 7–10: Habitus, dorsal and lateral views: 7) *Canthydrus nitidulus* (Guangdong, China); 8) *C. laetabilis* (Nepal); 9) *C. politus*: a) typical specimen (Guizhou, China), b) specimen with more extended pale patterns (Japan), c) specimen with almost completely yellow elytra (Macao, China); 10) *C. luctuosus* "morphotype III" (Nepal).



Figs. 11–12: Habitus, dorsal and lateral views of *Canthydrus luctuosus* (Fig. 11) and *C. morsbachi* (Fig. 12): 11 a) "morphotype I" (typical form; Tamil Nadu, India), 11 b) idem (Sri Lanka), 11 c) idem, pale specimen (Nashik District, Maharashtra, India), 11 d) "morphotype II" (Kerala, India), 11 e) "morphotype IV" (Karnataka, India); 12 a) West Bengal (India), 12 b) Maharashtra (India).

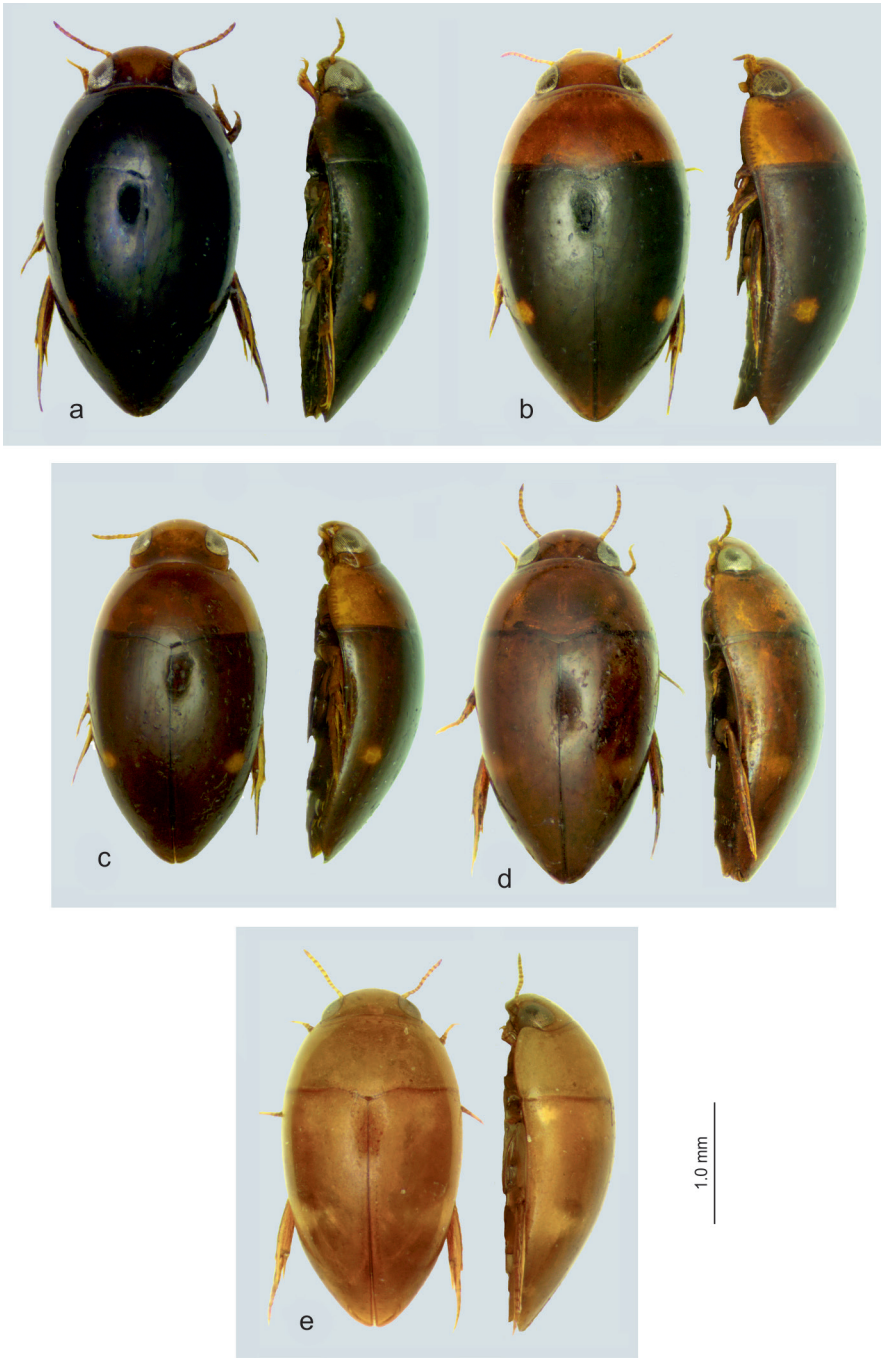
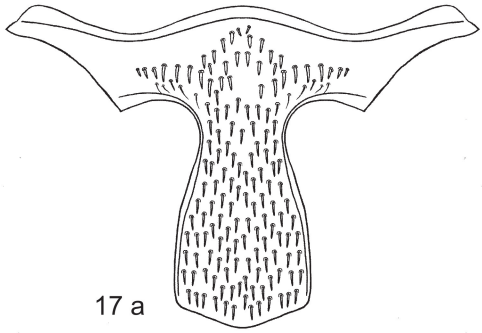
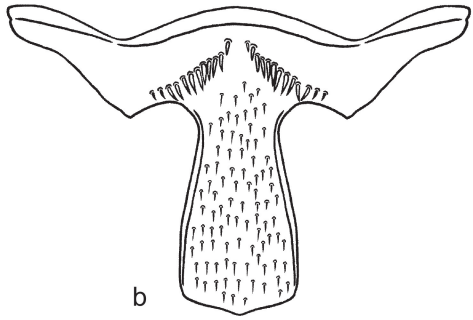
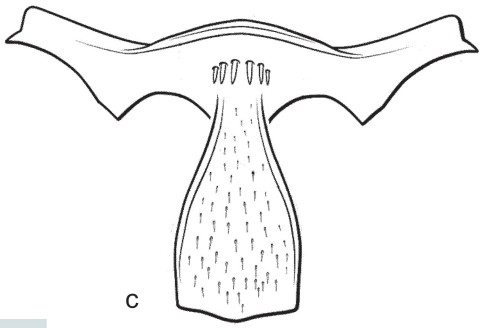


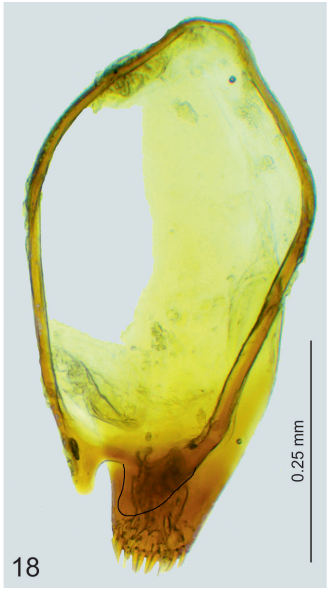
Fig. 13: *Canthydrus rocchii*, habitus, dorsal and lateral views: a) paratype of *C. antonellae* (Yunnan, China), b) specimen from Central Thailand, c) specimen from North Thailand, d) typical specimen (Myanmar), e) pale specimen with more developed elytral pattern (Myanmar).

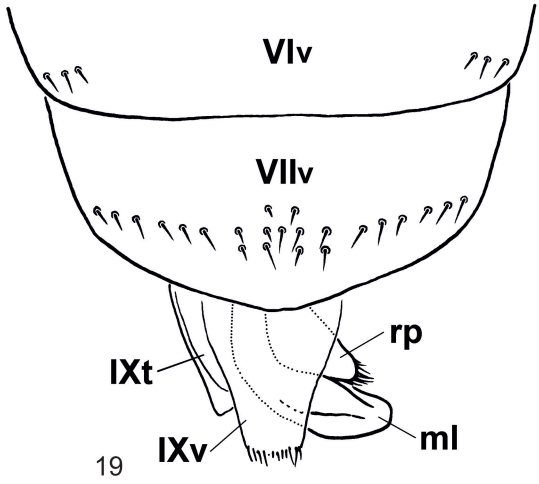
Figs. 14–16: Habitus, dorsal and lateral views: 14) *Canthydrus birmanicus*: a) paratype (Myanmar), b) specimen from North-East Thailand, c) specimen from Laos with poorly developed elytral patterns; 15) *C. flavus* (Malaysia); 16) *C. ritsemae* (Laos).



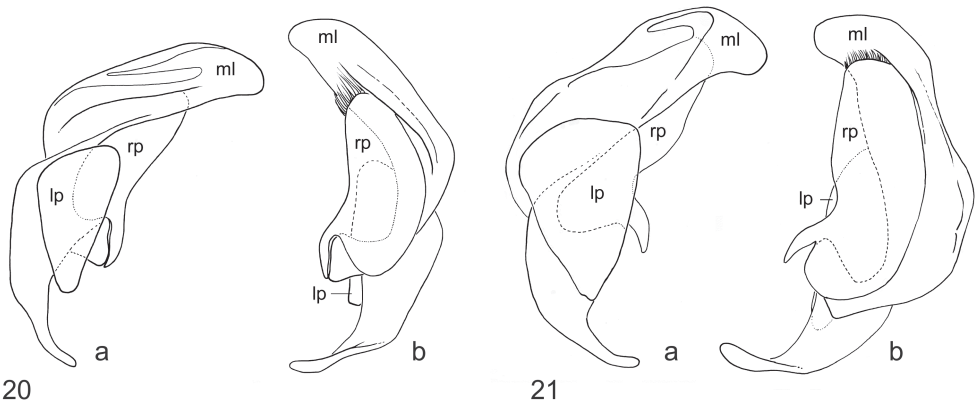


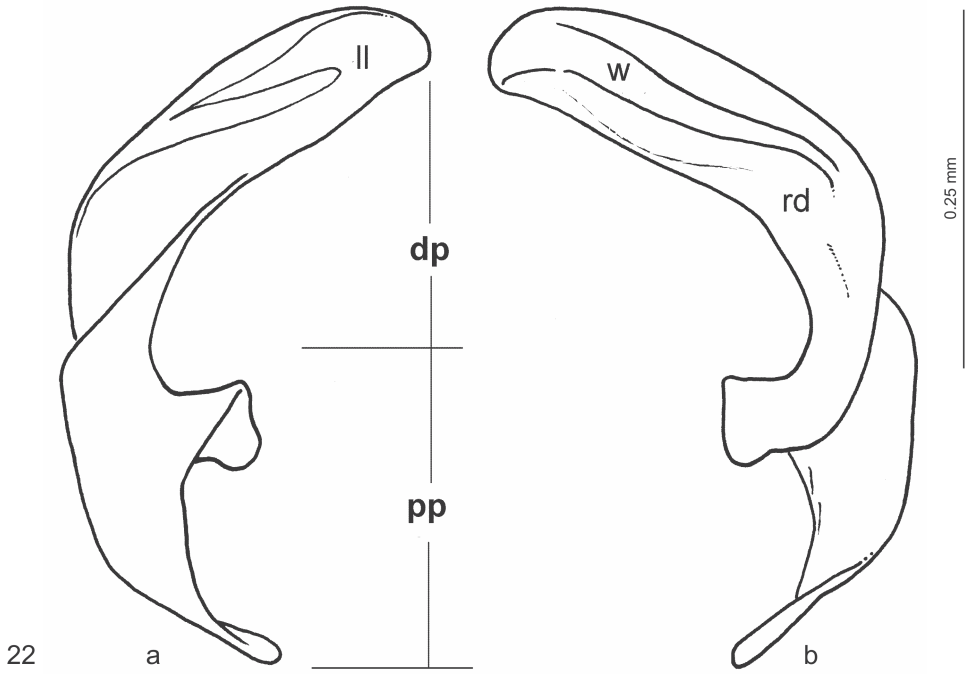






Figs. 17–19: 17) Prosternum and prosternal process: a) *Canthydrus luctuosus*, b) *C. ephemeralis,* c) *Canthysellus buqueti* (after BACA & TOLEDO 2015, modified); figures not to scale; 18) male abdominal segment IX (gonosomite) of *Canthydrus rocchii*, dorsal view; 19) male last abdominal segments (ventral view) of *Canthydrus*, genital structures partially everted (VIII abdominal segment omitted for simplification). VIv–VIIv = abdominal ventrites, IXt = ninth tergite, IXv = ninth ventrite, ml = median lobe (right face), rp = right paramere.





Figs. 20–21: Aedeagus with its pieces in anatomical position: 20) *Canthydrus rocchii*; 21) *C. siculus* (RAGUSA, 1882). Dashed lines delineate covered parts; a) left side; b) right side; lp = left paramere, rp = right paramere, ml = median lobe.

Fig. 22: Main features of median lobe in *Canthydrus* (*C. rocchii*: specimen from North Thailand), lateral view: a) left face; b) right face; dp = distal portion, ll = left lamina, pp = proximal portion, rd = right depression, w = wall.

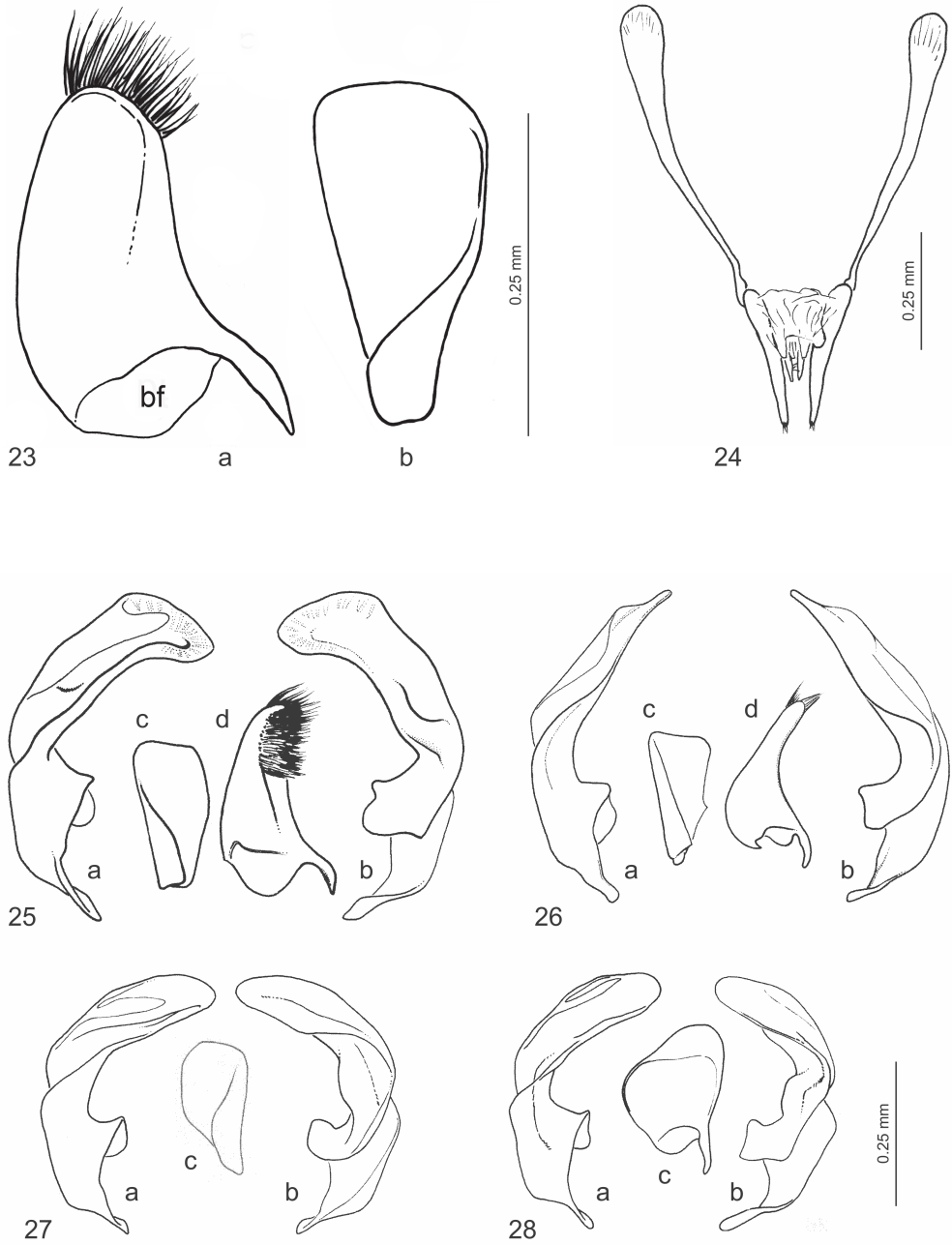
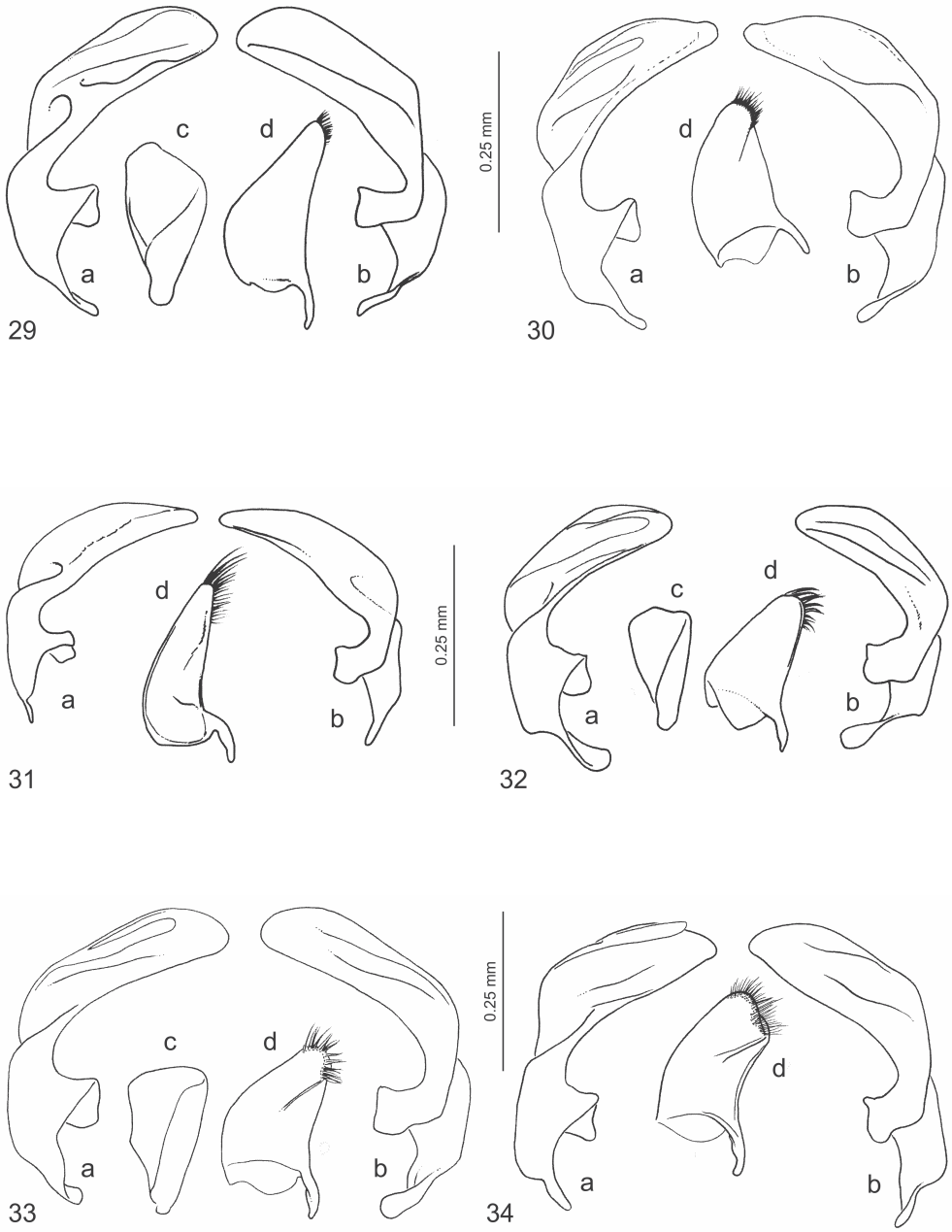


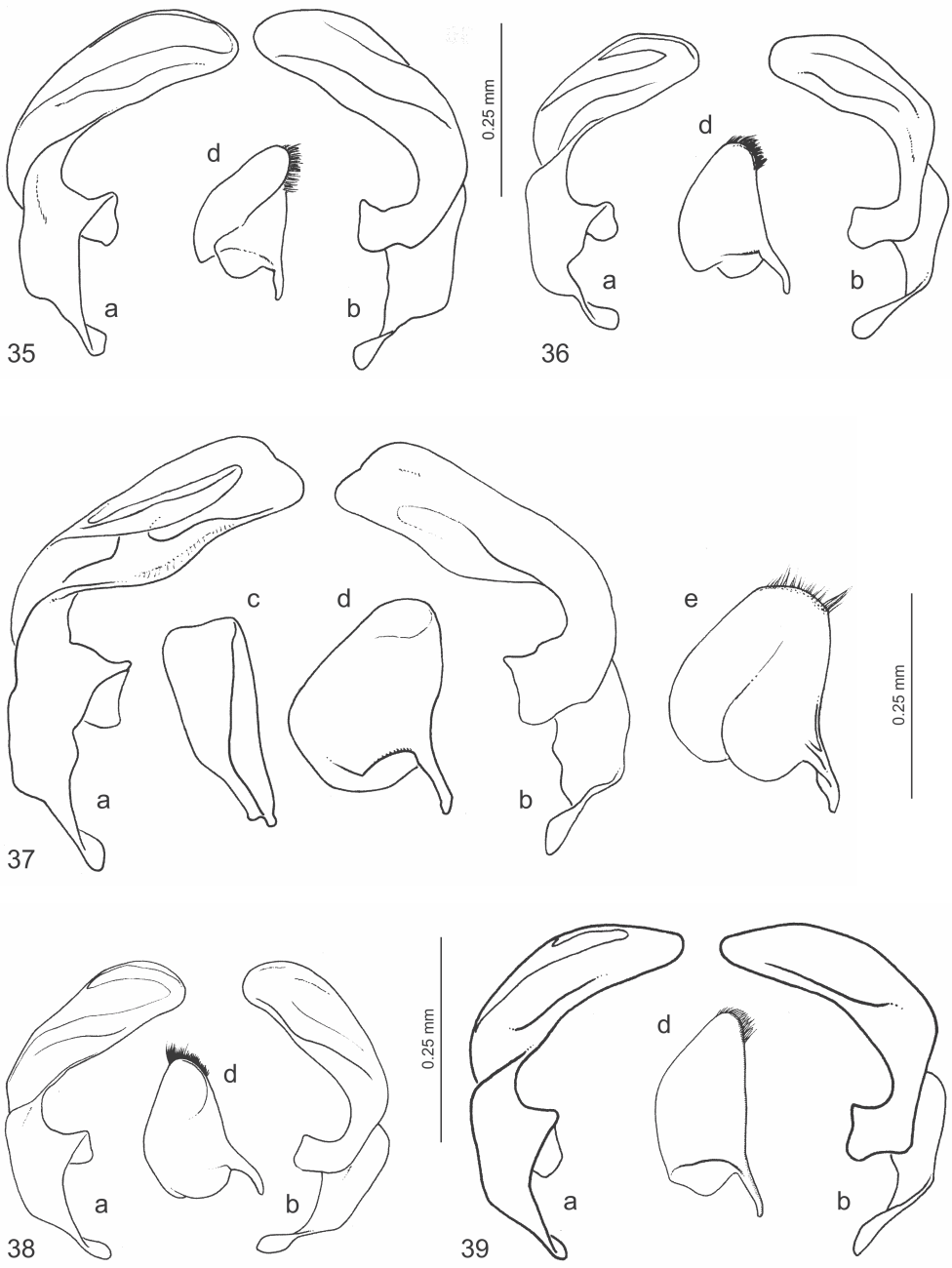
Fig. 23: Parameres of *Canthydrus* (*C. rocchii*: specimen from North Thailand), inner face: a) right paramere; b) left paramere; bf = basal foramen.

Fig. 24: Gonocoxosternites of *Canthydrus serialis* (Papua New Guinea).

Figs. 25–28: Aedeagus: a) median lobe, left face, b) median lobe, right face, c) left paramere, inner face, d) right paramere, inner face. 25) *Canthydrus angularis* (Sulawesi); 26) *C. mazzoldii* (paratype); 27) *C. birmanicus* (paratype), 27c) left paramere, specimen from Bueng Kan (Thailand); 28) *C. birmanicus* (Laos).



Figs. 29–34: Aedeagus: a) median lobe, left face, b) median lobe, right face, c) left paramere, inner face, d) right paramere, inner face. 29) *Canthysdrus flammulatus* (Malaysia); 30) *C. flavus* (Malaysia); 31) *C. haagi* (Laos); 32) *C. laetabilis* (Sri Lanka); 33) *C. luctuosus* (Tamil Nadi, India); 34) *C. morsbachi* (Goa, India).



Figs. 35–39: Aedeagus: a) median lobe, left face, b) median lobe, right face, c) left paramere, inner face, d) right paramere, inner face. 35) *Canthydrus nitidulus* (Guangdong, China); 36) *C. politus* (Guizhou, China); 37) *C. proximus* (lectotype), 37e) left paramere, specimen from Khon Kaen (Thailand); 38) *C. ritsemae* (Laos); 39) *C. semperi* (Indonesia, Sulawesi).

Fig. 40: *Canthydrus luctuosus*, habitus variability. The letters are referring to the distribution in Fig. 49.

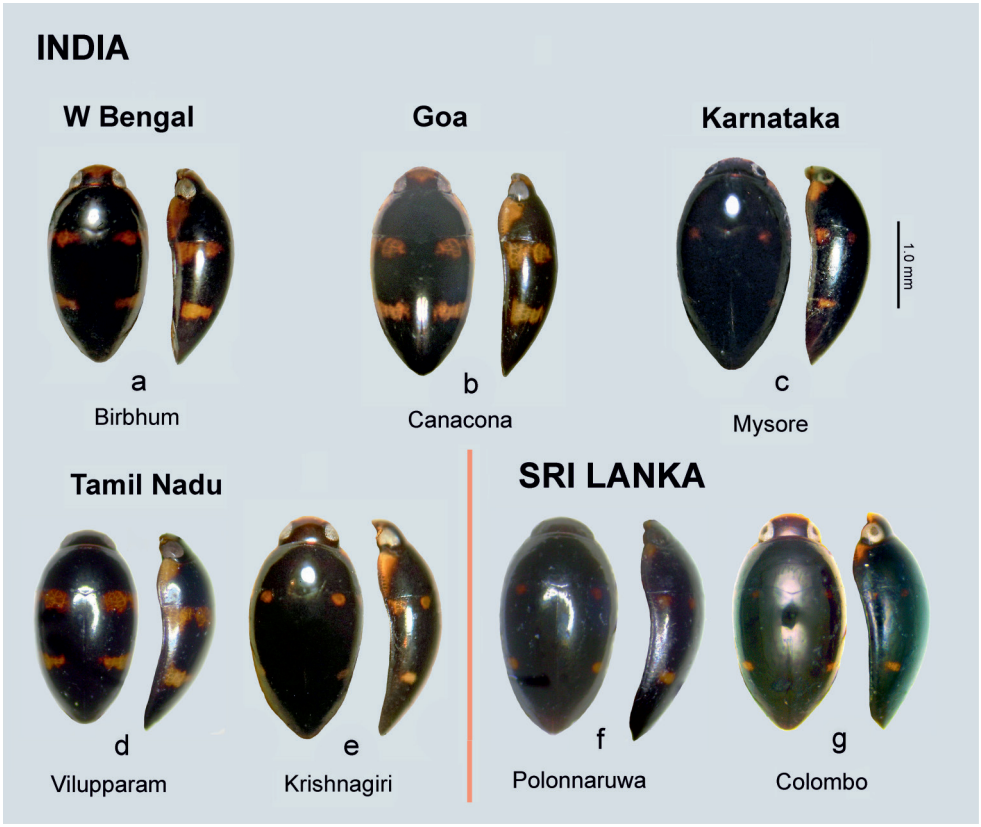


Fig. 41: *Canthydrus morsbachi*, habitus variability. The letters are referring to the distribution in Fig. 49.

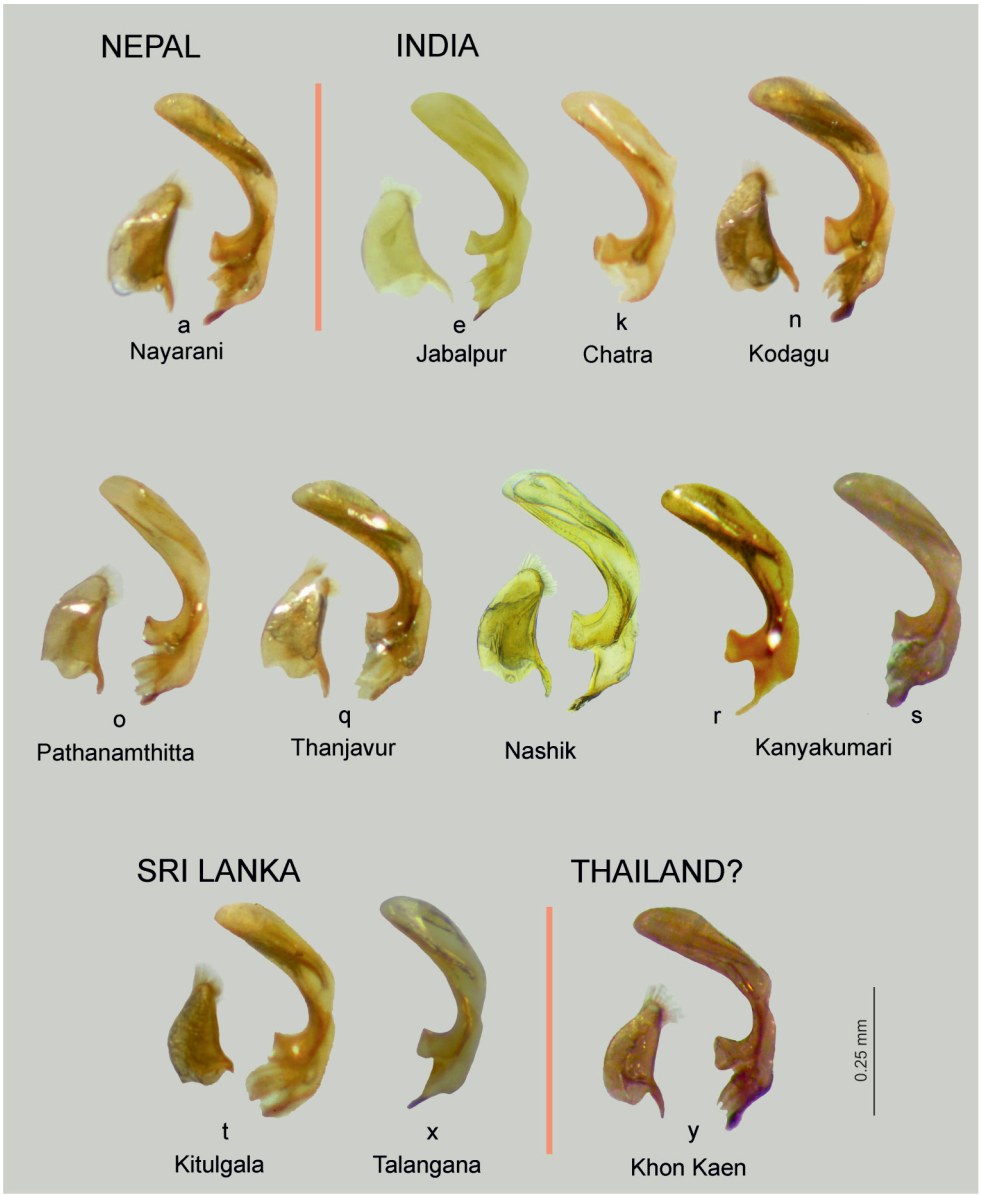


Fig. 42: Median lobes (right face) and right parameres (inner face) of *Canthydrus luctuosus*. The letters correspond to the specimens depicted in Fig. 40.

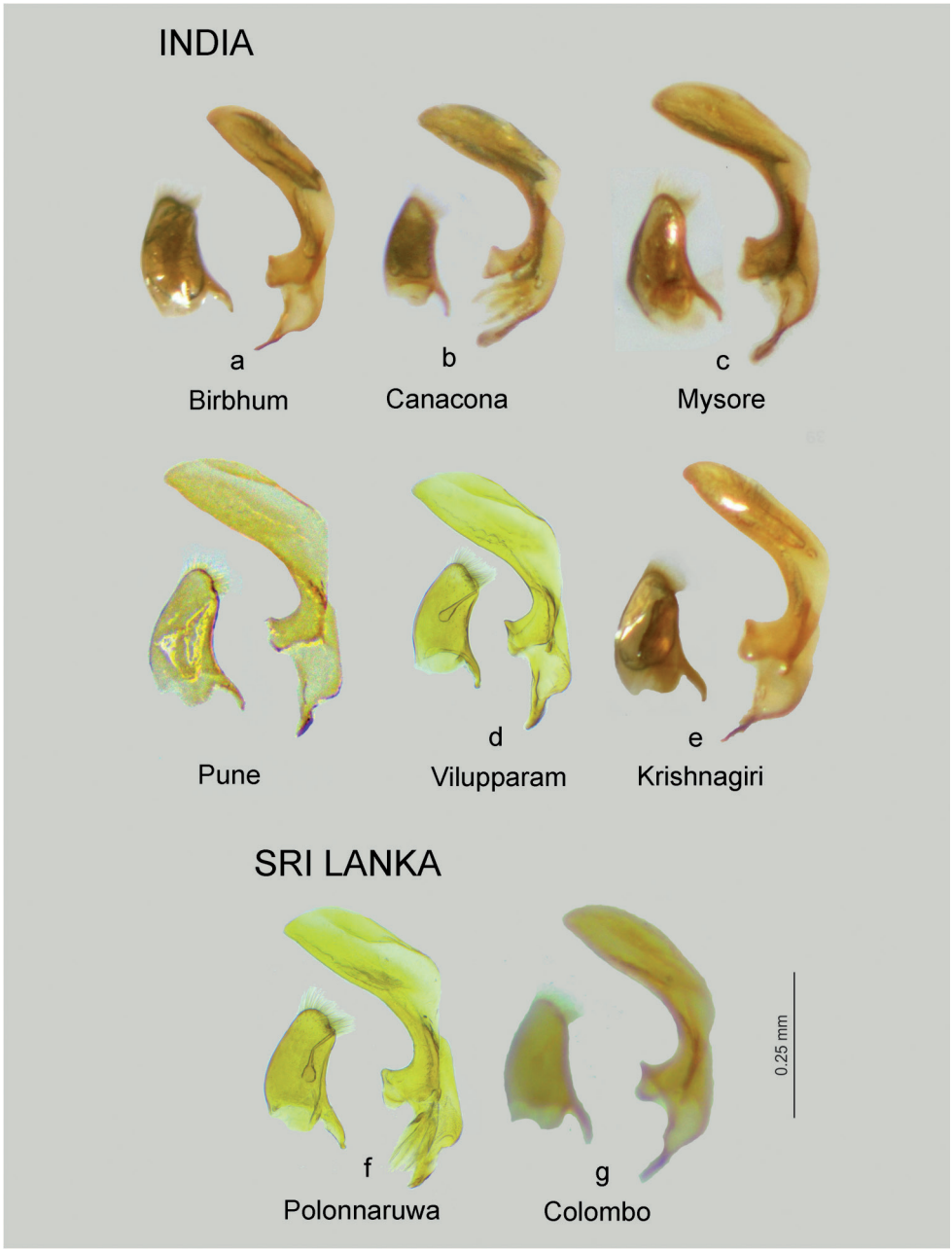


Fig. 43: Median lobes (right face) and right parameres (inner face) of *Canthydrus morsbachi*. The letters correspond to the specimens depicted in Fig. 41.

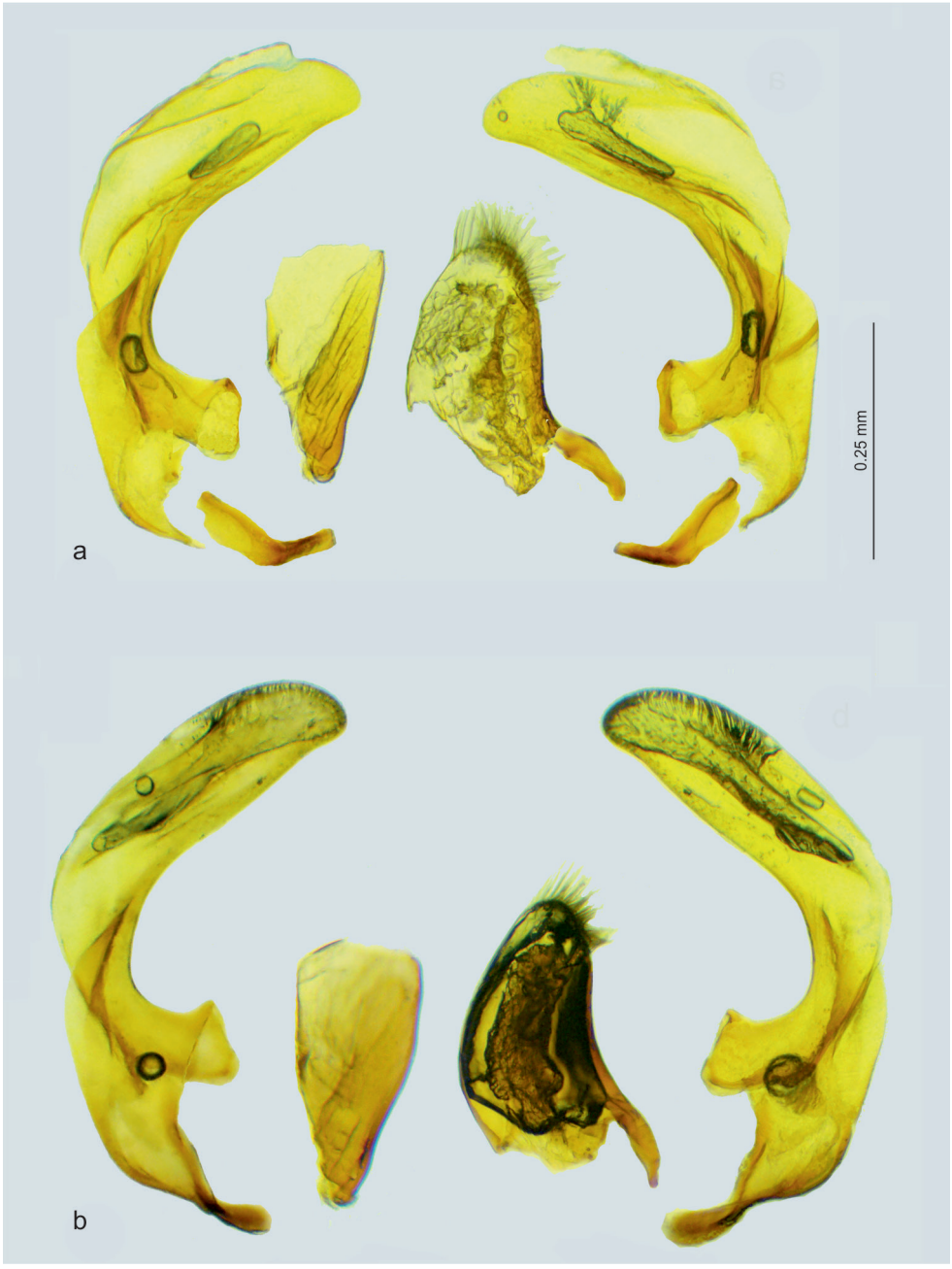
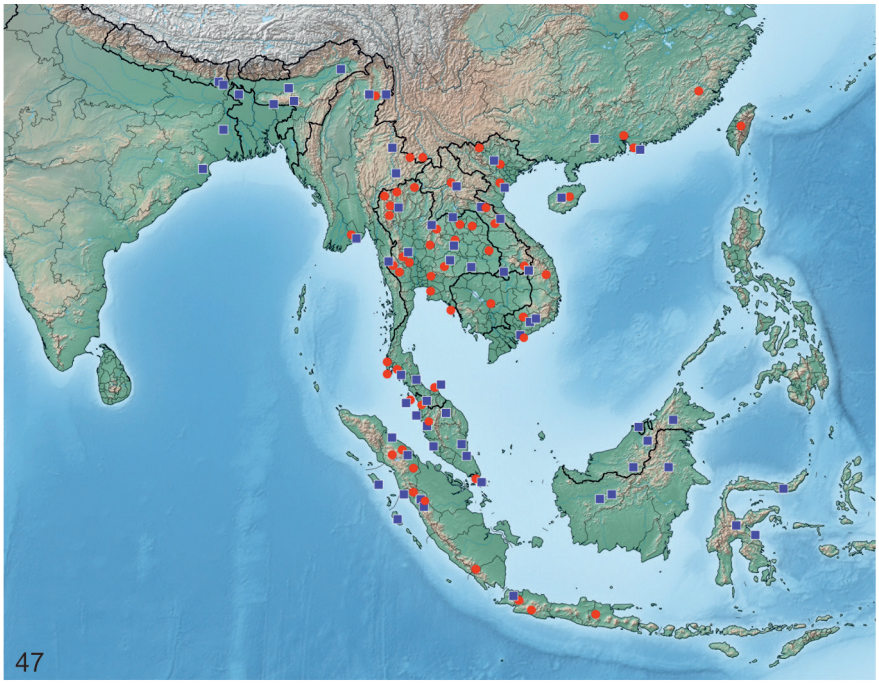


Fig. 44: Differences in aedeagal features of *Canthydrus rocchii* from central Myanmar: median lobe (left and right faces), left paramere (inner face) and right paramere (inner face): a) specimen from Sagaing Region (habitus, see Fig. 13e); b) specimen from Bago Region.

Fig. 45: Lectotype labels: a) *Canthydrus festivus*; b) *C. luctuosus*.

Fig. 46: Distribution of *Canthydrus angularis* (yellow triangles) and *C. mazzoldii* (red circles). The white triangle with a question mark in Taiwan indicates the record of *C. guttula* from KANO (1930), which almost surely should be attributed to *C. angularis*.



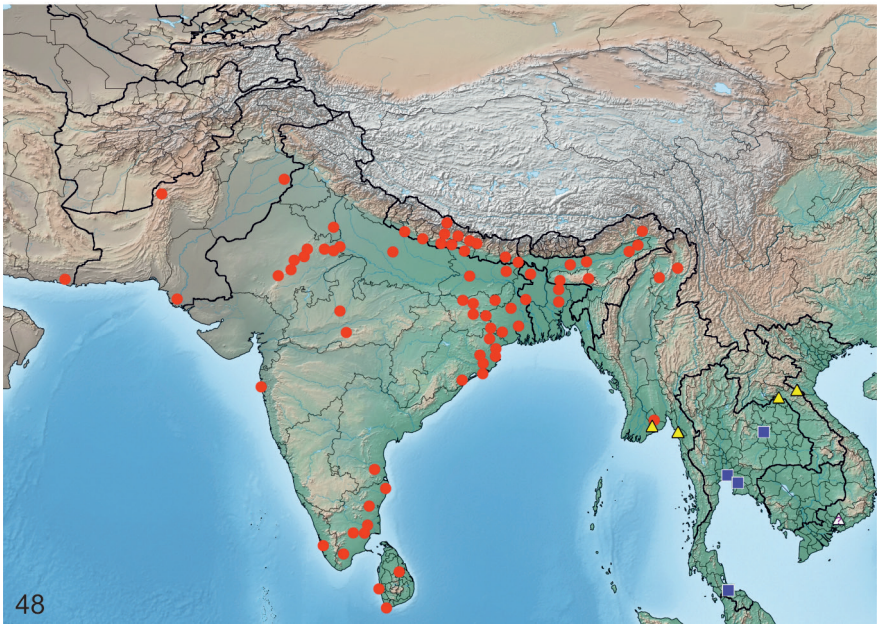


Fig. 47: Distribution of *Canthydrus flavus* (red circles) and *C. ristemae* (blue squares). The doubtful record of *C. flavus* from West Papua is not shown on this map.

Fig. 48: Distribution of *Canthydrus laetabilis* (red circles), *C. birmanicus* (yellow triangles) and *C. proximus* (blue squares). The white triangle with a question mark refers to the single female specimen collected in Vietnam (NMW). The doubtful record of *C. proximus* from West Papua is not shown on this map.

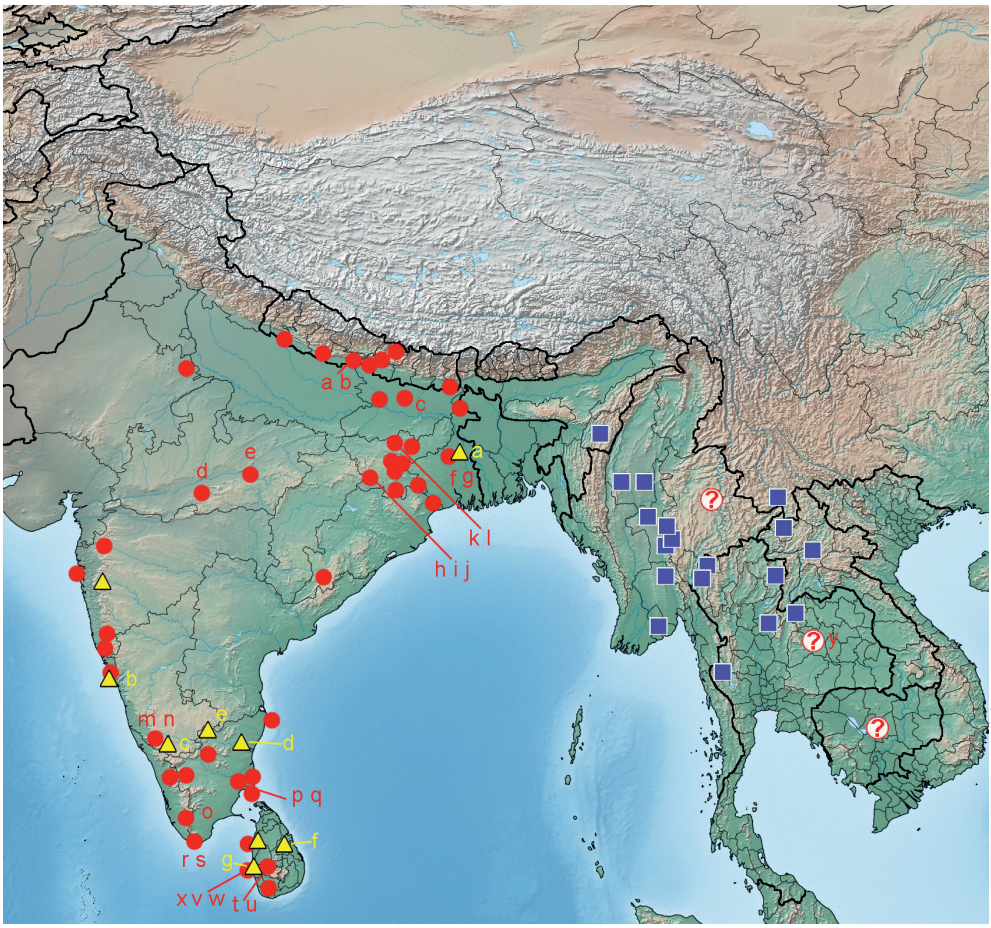


Fig. 49: Distribution of *Canthydrus luctuosus* (red circles), *C. morsbachi* (yellow triangles) and *C. rocchii* (blue squares). Red letters refer to specimens of *C. luctuosus* illustrated in Fig. 40, and yellow letters to *C. morsbachi* (Fig. 41); the question mark in Myanmar refers to the record of *C. morsbachi* in VAZIRANI (1969a); the question marks in Thailand and Cambodia refer to doubtful literature records of *C. luctuosus* and *C. morsbachi*. Type localities of the synonyms of *C. luctuosus* are not shown on the map.

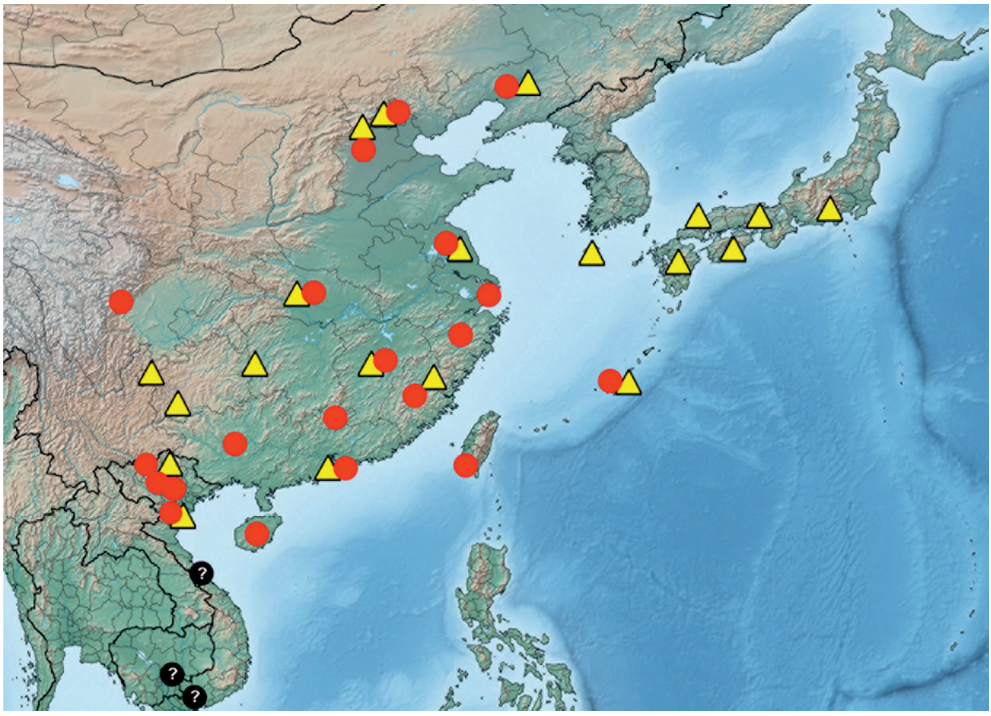


Fig. 50: Distribution of *Canthydrus nitidulus* (red circles) and *C. politus* (yellow triangles). The question marks in Vietnam refer to historical records from "Annam" and "Cochinchine", and the question mark in Cambodia refers to the type locality of *C. bifasciatus*.

HABITUS (Fig. 3): Moderate to rather large, dorsal outline regularly oval, with maximum width behind shoulders (ca. 1/5 of elytral length); in lateral view poorly convex, sides of pronotum weakly convex, sides of elytra slightly concave at shoulders; pronoto-elytral sinuation rather weak. Head black, yellow on clypeus, labrum and part of frons; pronotum black with yellow or reddish hind angles; elytra totally black, always without pale markings. Stiff setae on prosternum larger and thicker than on prosternal process. Prosternal process and noterid platform with setal punctation rather uniform and close. Microreticulation visible on metacoxae, less on noterid platform and abdominal ventrites.

MEASUREMENTS: TL: 2.9–3.5 mm; MW: 1.5–1.7 mm.

MALE: Median lobe (Fig. 39a–b) rather regularly curved, in distal third gradually narrowed toward apex, which is rounded; right paramere (Fig. 39c) rather broad with apex narrowed, bearing tuft of short setae.

COMPARATIVE DIAGNOSIS: Completely black elytra and shape of median lobe easily distinguish this species from *C. luctuosus* or *C. morsbachi* or black specimens of *C. rocchii* with which it does not co-exist. Dark specimens of *C. semperi* resemble those of *C. angularis* (see above and Fig. 1), but the latter is larger, more convex with a stronger pronoto-elytral sinuation and often with at least a submedian pale elytral marking. The male genitalia of the two species are completely different.

DISTRIBUTION (Fig. 50): Indonesia (Sumatra, Sulawesi), Philippines (Luzon, Mindanao). The record for Taiwan (HUA 2002) needs confirmation.

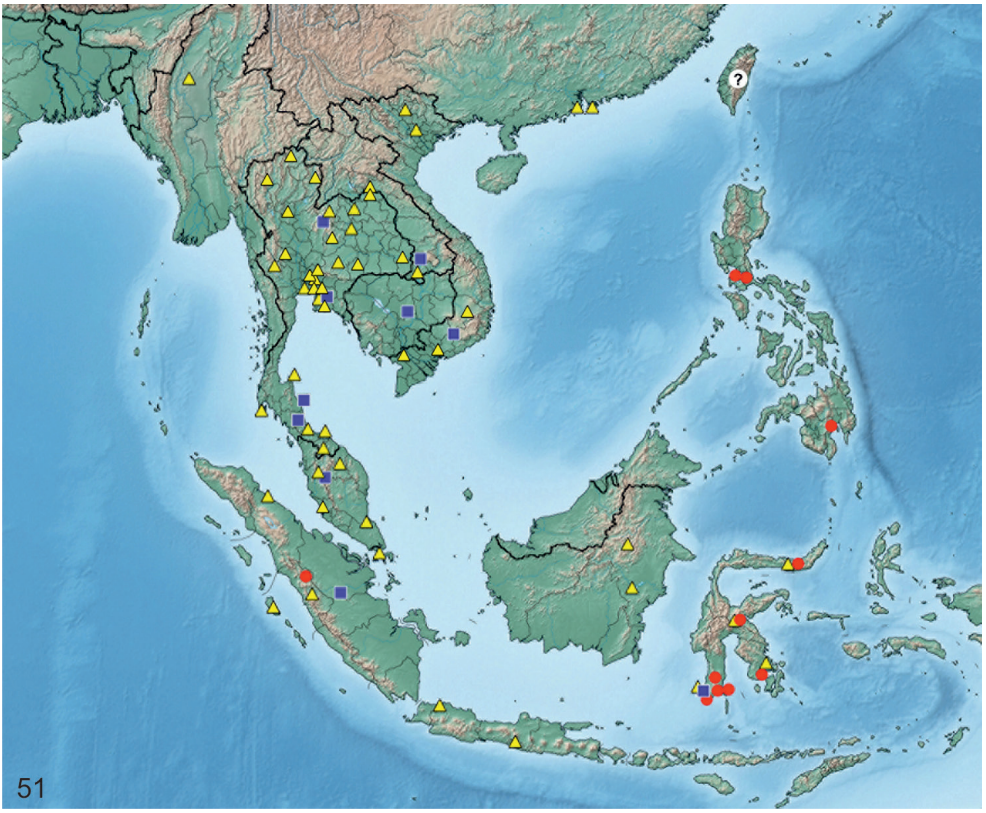


Fig. 51: Distribution of *Canthydrus flammulatus* (yellow triangles), *C. haagi* (blue squares) and *C. semperi* (red circles). The question mark in Taiwan refers to the unconfirmed record of *C. semperi* by HUA (2002). The doubtful record of *C. flammulatus* from West Papua is not shown on the map.

Corrections to TOLEDO (2008)

TOLEDO (2008: 55) states that a lectotype is designated for *Canthydrus semperi*, which is incorrect as this designation published two years later by TOLEDO (2010). Furthermore, the values of the scale bars in TOLEDO (2008: figs. 9–13) must be replaced: 0.5 mm instead of 1.0 mm for figs. 9–11; 0.25 mm instead of 0.5 mm for figs. 12–13.

Corrections to TOLEDO (2010)

Page 213: Key, first line: replace “one subbasally and the other medially” with “with one medially and the other subapically”.

Discussion

Canthydrus is the most speciose genus of Noteridae in the Eastern Hemisphere. However, the taxonomy of its species was, particularly in southern Asia and in the Australian Region, poorly known until some studies were published that shed at least some light on this topic (TOLEDO 2003, 2008, 2010). The present review is the latest contribution to the knowledge of the

systematics of the genus in the East Palearctic and the Oriental Region, covering an area from eastern Iran to the Indonesian island of Sulawesi. Currently, 15 species of *Canthydrus* are known to occur in East Asia, three in the West Palearctic (TOLEDO 2022), and five in the Australian Region (TOLEDO 2010). However, the majority of *Canthydrus* species is Afrotropical, with 40 described species (NILSSON 2011, BILARDO & ROCCHI 2018). Although a significant portion of these species were addressed by GUIGNOT (1959), a modern revision of the African species of *Canthydrus* is still needed.

Canthydrus seems to be composed largely of species with a wide or even a very wide distribution. In the Oriental and Australian regions there is no species with a restricted area, with the possible exception of *C. ater* TOLEDO, 2010, known from two islands of the Moluccas, and possibly also from the islands of Sangihe and Sulawesi, though this is yet uncertain (TOLEDO 2010), and *C. mazzoldii*, which is currently known to occur only in restricted mountain areas of northern Thailand and northern Laos. Other species, such as *C. birmanicus* and *C. proximus*, appear to be very rare, and at present their distribution seems scattered and not yet well understood.

Canthydrus is a rather uniform genus, with few characters enabling identification. Body shape, colouration, and size are often highly variable and, while useful in most cases, have frequently led to confusion in polymorphic species. Examination of the male genitalia is generally reliable, though in some groups (e.g., the Afrotropical *C. minutus* RÉGIMBART, 1895 and its allies) it may provide limited utility. As mentioned above, several species of *Canthydrus* are remarkably polymorphic. *Canthydrus luctuosus* is certainly one of the most variable species in the whole genus, showing wide variation in many morphological traits (colour patterns, size, body proportions), with the exception of the male genitalia, which remain relatively uniform throughout the range of the species. This variability has led to the undesired description of some synonyms species in the past, contributing to the taxonomic confusion. Though less pronounced, the significant variability of *C. rocchii* has also caused difficulties for those attempting to identify non-typical specimens. The erection of a new species, *C. antonellae*, by TOLEDO (2003), which has been synonymized herein, is a consequence of the confusion caused by the morphological variability of *C. rocchii*.

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