ACTA ENTOMOLOGICA
MUSEI NATIONALIS PRAGAE
ISSN 1804-6487 (online) – 0374-1036 (print)

2025
65(1): 105–147
doi: 10.37520/aemnp.2025.011
www.aemnp.eu

RESEARCH PAPER

Taxonomic revision of the current concept of *Cylindera morio* and allied taxa (Coleoptera: Cicindelidae)

Jiří MORAVEC[1,*] & Ondřej ŠAFRÁNEK[2]

[1] Mendel University in Brno, Faculty of Forestry and Wood Technology, Department of Forest Ecology, Zemědělská 3, CZ-613 00 Brno, Czech Republic. e-mail: jirmor@quick.cz; ORCID: https://orcid.org/0000-0001-5294-6410
[2] Faculty of Tropical AgriSciences, Czech University of Life Sciences Prague, Kamýcká 127, CZ-165 00 Praha 6-Suchdol, Czech Republic. e-mail: ondrejsafranek@seznam.cz; ORCID: https://orcid.org/0000-0003-0270-707X
[*] Corresponding author

Accepted:
30th May 2025

Published online:
9th August 2025

Abstract. A taxonomic revision of the common concept of the hitherto little-known tiger beetle species *Cylindera* (*Cylindera*) *morio* (Klug, 1834) and allied taxa within the nominotypical subgenus of the tiger beetle genus *Cylindera* Westwood, 1831 is presented. Type specimens of *Cicindela morio* Klug, 1834, *Cicindela denticulata* Klug, 1834, *Cicindela acompsa* Chaudoir, 1852, *Cicindela egena* Chaudoir, 1854, *Cicindosa inaequalis* Motschulsky, 1864 and *Cicindosa obliquealba* Motschulsky, 1864 were examined; types of *Cicindela ocskayi* Gistl, 1837 are unknown. These aligned taxa were inconsistently treated in literature either as infrasubspecific or infraspecific taxa of *Cicindela morio*, or recently as junior synonyms of *Cylindera* (*Cylindera*) *morio*. As a result of the present revision of the species-complex, *Cicindela acompsa* and *C. denticulata* proved to be separate species. The former is treated here as *Cylindera* (*Cylindera*) *acompsa* (Chaudoir, 1852), comb. nov. Because *Cicindela denticulata* Klug, 1834 proved to be a primary junior homonym of *Cicindela denticulata* T. W. Harris, 1828, it must be replaced by its next oldest synonym, *Cicindela ocskayi* Gistl, 1837. Lectotypes of the relevant taxa are designated, with the lectotype of *Cicindela denticulata* Klug, 1834 simultaneously designated as the neotype of *Cicindela ocskayi* Gistl, 1837, which makes these names objective synonyms; consequently, the taxon is treated here as *Cylindera* (*Cylindera*) *ocskayi* (Gistl, 1837) comb. nov. *Cicindela egena* is confirmed here as a junior synonym of *Cylindera* (*Cylindera*) *morio*, while *Cicindosa inaequalis* is a junior synonym of *Cylindera* (*Cylindera*) *acompsa*. *Cylindera* (*Cylindera*) *amayai* sp. nov. is described as new for science from Bolivia. *Cicindosa obliquealba* is provisionally treated here as *Cylindera* (*Cylindera*) *obliquealba* (Motschulsky, 1864) comb. nov., as its synonymy with *Cylindera* (*Cylindera*) *acompsa* could not be proved. Due to the absence of specimens with preserved DNA, the revision could not be supported by molecular research within these generally very rare taxa. Habitus and diagnostic characters of all the type and other examined specimens are illustrated here in colour photographs for the first time. Maps of distribution and photos of habitats are also presented and discussed.

Key words. Coleoptera, Cicindelidae, *Cylindera*, lectotypes, new combination, new species, neotype, nomenclature, revised concept, substitute name, taxonomy, Neotropical Region

Zoobank: http://zoobank.org/urn:lsid:zoobank.org:pub:21BED86C-039E-4D48-B16A-9C17A99BA27D

Introduction

This paper deals with the taxonomic revision of the tiger beetle species *Cylindera* (*Cylindera*) *morio* (Klug, 1834) and allied, hitherto little-known taxa within the nominotypical subgenus of the genus *Cylindera* Westwood, 1831: *Cicindela denticulata* Klug, 1834, *Cicindela ocskayi* Gistl, 1837, *Cicindela acompsa* Chaudoir, 1852, *Cicindela egena* Chaudoir, 1854, *Cicindosa inaequalis* Motschulsky, 1864 and *Cicindosa obliquealba* Motschulsky, 1864 were examined. These taxa were inconsistently treated in literature either as subspecies, infrasubspecific taxa, or junior synonyms of *Cicindela* (*Cylindera*) *morio* in the last revision of Brazilian species by Freitag & Barnes (1989), and most recently as synonyms of

Cylindera (s. str.) *morio* by Wiesner (2020). Nevertheless, Freitag & Barnes (1989) did not examine the type specimens of *Cylindera morio* or the allied taxa and overlooked highly important distinguishing characters of the taxa. Consequently, based on newly discovered important diagnostic characters, the present revision came to the conclusion that the taxa represent a species-complex, consisting of five distinct species, one of which is described here as new to science. Because *Cicindela denticulata* Klug, 1834 proved to be a primary junior homonym of *Cicindela denticulata* T. W. Harris, 1828, it is replaced here by its next oldest synonym, *Cicindela ocskayi* Gistl, 1837. Habitus and diagnostic characters of all type and other examined specimens are illustrated here in colour photographs for the first time, also showing their variability. Maps of distribution and photos of habitats are also presented and discussed.

Material and methods

Body length is measured without labrum and is the distance from the anterior margin of the clypeus to the elytral apex, the width is measured across the elytral margins at their widest point. The width of the pronotum may include the lateral margins of the proepisterna. The width of the head is measured across the eyes (the distance between their outer margins) and the labrum is measured without the clypeus. The length of the elytron is measured from the elytral apex to humerus. The term "aedeagus" here refers to the median lobe of the organ (without parameres). Aedeagi are primarily figured in their left lateral position where the basal portion (with basal orifice) points to the right and the left lateral outline (with dorsoapical orifice) faces dorsally, provided that the median portion is settled in its vertical position, and the apex of the aedeagus is perfectly settled in its horizontal position.

The morphological terminology is mostly adopted from Torre-Bueno Dictionary (Nichols 1989); those describing the surface macrosculpture partly from Harris (1979), but many terms were proposed by Moravec (2002, 2007, 2010, 2018, 2020).

Labels are cited in the following manner: lines on the same label are separated by a slash /, separate labels are indicated by a double-slash //; each specimen or a series of specimens is separated by a full stop. The colour of the labels and mode of writing appear in square brackets (in type specimens only, while in other specimens the citation is mostly restricted to locality labels). Words printed on labels in full capital letters are transcribed as lower-case letters (capitals are used only in abbreviations and acronyms). Unless otherwise specified, the listed specimens examined from relevant museum collections were identified in their present sense by the first author of this paper.

The list (catalogue) under the species name in the descriptive part is selective. This means that it gives the original name combination, as well as the first publication of all subsequent taxonomic or nomenclatorial acts concerning the taxon. The list thus does not repeat instantly the same name combinations subsequently published by authors who adopted them (yet the same combinations may be repeated when following different ones).

Unless otherwise specified, the colour photographs of the habitus and diagnostic characters were taken by the first author of the present paper with a Nikon Coolpix 990 digital camera through an MBS-10 stereo microscope. Photos of type specimens of three species were taken by the curators or technicians of the relevant museum collections, i.e., by Olivier Montreuil (MNHN, taken with a Canon EOS 6D digital camera) and by Andrey Matalin jointly with Vladimir Savitsky (ZMUM, using a Canon EOS 40D camera and a Canon EOS 6D camera attached to a Carl Zeiss AXIO Scope). Five photos of some other specimens were taken by Gabriel Biffi (MZSP, taken with a Zeiss Stemi 508 equipped with a Zeiss Axiocam 208 camera) – see "image credit" for each of such photos in captions under the illustrations and relevant notes in "Acknowledgements".

Acronyms for the collections:

BMNH The Natural History Museum, London, United Kingdom;
CCJM Cicindelidae Collection of Jiří Moravec, Adamov, Czech Republic;
COSJ Collection of Ondřej Šafránek, Jiřetín pod Jedlovou, Czech Republic;
FCCR-MCZR Fabio Cassola's Cicindelidae Collection, Museo Civico di Zoologia, Roma, Italy;
HNHM Hungarian Natural History Museum, Department of Zoology, Budapest, Hungary;
IRSNB Institut Royal des Sciences Naturelles de Belgique, Brussels, Belgium;
JWCM Jürgen Wiesner's Collection, Meine, Germany (part of ZSM);
MFNB Museum für Naturkunde der Humboldt-Universität, Berlin, Germany;
MNHN Muséum national d'Histoire naturelle, Paris, France;
MZSP Museu de Zoologia da Universidade de São Paulo, Brazil;
NHMW Naturhistorisches Museum in Wien, Vienna, Austria;
NMPC Museum of the Czech Republic, Prague, Czech Republic;
SDEI Senckenberg Deutsches Entomologisches Institut, Müncheberg, Germany;
UASC Museo de Historia Natural Noel Kempff Mercado, Universidad Autonoma Gabriel René Moreno, Santa Cruz de la Sierra, Bolivia;
ZMUM Zoological Museum of Lomonosov State University, Moscow, Russia;
ZSM Zoologische Staatssammlung, München, Germany.

Taxonomy

Genus *Cylindera* Westwood, 1831

Cylindera Westwood, 1831: 300. Type species: *Cicindela germanica* Linné, 1758, by monotypy.

Eumecus Motschulsky, 1850: 4. Synonymy by Chaudoir (1865: 22). Type species: *Cicindela germanica* Linné, 1758, designated by Motschulsky (1862: 22).

Cicindosa Motschulsky, 1864: 172, synonymy by Freitag & Barnes (1989: 317). Type species: *Cicindosa obliquealba* Motschulsky, 1864, designated by Horn (1915: 236).

Cilindrodera Bedel, 1879: 3. Unjustified emendation of *Cylindera* Westwood, 1831.

Cylindella Jaconson, 1924: 238. Unnecessary replacement name for *Cylindera* Westwood, 1831.

Subgenus *Cylindera* sensu stricto

Cylindera (*Cylindera*): Rivalier (1954: 265).

According to Wiesner (2020), the nominotypical subgenus hitherto included 39 species, 10 of which occur

in the Neotropical Region. In addition, one new species and the three species separated from *Cylindera* (s. str.) *morio* are treated in the present paper.

It must be noted here that the large nominotypical subgenus appears to include species of rather inconsistent characters and deserves a thorough revision (see also Duran & Gough (2019) who treated *Cylindera* as a polyphyletic genus, and re-evaluated its Nearctic taxa with a number of nomenclatorial changes).

Cylindera (*Cylindera*) *morio* species-complex

(Figs 1–10)

Definition. Body small to medium-sized, generally 6.20–10.20 mm long, 2.50–3.40 mm wide, dorsally black, black-brown, rarely cupreous; setal vesture whitish.

Head normally shaped together with large, bulged eyes notably wider than thorax but distinctly narrower than elytra.

Frons fluently passing into vertex, its surface rather distinctly convex in middle, black-brown or dark coppery extremely finely longitudinally striate, striae irregularly crumbled in middle when passing on vertex; supraantennal plates rather large, flat, basally iridescent reddish-cupreous, apical half mostly violet.

Vertex mostly concolorous with frons, almost flat, or with small, limited median convexity and usually with iridescent ornament of dense circular rugae in middle, surface extremely finely granulate-asperate to finely irregularly rugulose (when passing from frons); juxtaorbital areas densely yet mostly irregularly parallel-striate, striae more regular and distinct on sublateral areas when divergent posteriad as passing onto temples and genae; postero-median and occipital area irregularly rugulose.

Genae entirely glabrous, dark iridescent cupreous or green with faint cupreous lustre or darkened, juxtaorbital and postgenal areas densely parallel-striate.

Clypeus mostly multicoloured, variably deep or iridescent metallic green, green-blue or cupreous, surface finely asperate, median area irregularly rugulose, glabrous.

Labrum with variable number of marginal setae, shorter than wide, but in fact never transverse due to mostly semicircular anterior margin with variably 5–9 anterior teeth which are blunt or subacute, median tooth subacute or acute (usually more protruding in females); dorsal surface yellow to ochraceous, sometimes with darkened basolateral areas, with median convexity and more or less distinct basal impression on either side of the convexity.

Mandibles (Figs 1–10) with arcuate lateral margins, subsymmetrical, in *Cylindera* (s. str.) *morio* with four teeth (apart from basal molar), while in other four species with only three teeth (exceptionally with little tooth or its rudiment placed between the second and third one); terminal tooth of right male mandible in its lateral view either smooth and regularly attenuated towards apex (Figs 8, 10), or (in males of two species) with distinct subapical outer lobe (Figs 2, 4, 6).

Palpi normally shaped with elongate terminal palpomeres. Maxillary palpi in both sexes with longest and penultimate palpomere ochre-testaceous (penultimate palpomere in females sometimes darkened or almost metallic); terminal palpomeres metallic black, usually with strong green-blue lustre; labial palpi in both sexes with longest palpomere yellow-testaceous, terminal palpomere metallic black with faint blue-green lustre.

Antennae rather short, slightly surpassing humeri; antennomeres 1–4 metallic-black, usually with faint or strong greenish-blue or reddish-cupreous or violet lustre, scape with long apical seta, antennomeres 3–4 with several stiff setae; antennomere 5, or also 6 brownish-testaceous or ochre-testaceous, antennomeres 7–11 gradually greyish-blackened and with usual micropubescence.

Thorax. Pronotum mostly shorter than wide, either subglobose with lateral margins convex, or with margins more or less attenuated posteriad (notopleural sutures almost parallel-running with proepisternal margins); surface of pronotal disc either extremely finely asperate-granulate lacking striae, or with more or less developed fine parallel striae on areas along median line (alternatively, striae fragmented into fine, irregularly vermicular sculpture); juxtanotopleural and rather wide lateral areas punctate-setose (usually in two irregular rows), setae white, rather short and stiff, appressed or semi-erect and prevailingly mesad-directed, sometimes sparsely passing onto anteromedian area; alternatively (in one species) juxtaepipleural-lateral areas markedly rough due to large iridescent foveae, which are in other species much smaller; proepisterna distinctly and densely or sparsely punctate-setose to foveolate; mesepisterna smooth and glabrous except for few setae at base and adjacent to metepisterna, female coupling sulci in form of longitudinal furrow, yet barely distinguished from surface of male mesepisterna; metepisterna finely punctate-setose; prosternum and mesosternum smooth and almost glabrous; metasternum smooth and glabrous in middle, lateral areas densely setose.

Elytra oblong, subparallel-sided in males, usually moderately dilated below middle in females, humeri rounded, outer anteapical angle elongate-arcuate and more or less distinctly attenuated towards small sutural spine, forming subacute or distinctly acute apex; elytral surface moderately and almost evenly convex with only shallow impressions, shallowly punctate throughout (punctures isodiametric or irregular, greenish, rarely reddish, variably iridescent or dull) and with 5–7 more or less distinct rows of greenish foveae running on elytral disc along sutures from elytral base towards elytral apex; foveae may be distinct, iridescent, or obscure and barely visible (even in syntopic adults of the same species); whole elytral surface with irregularly running characteristic velvety-black streaks which are variably shaped, isolated or partly continuous, simple or branched; whitish elytral maculation either conspicuous, consisting of lateromedian macula (in the new species may be almost connected with subsutural-discal macula), anteapical, or also subsutural-discal and very rarely also little basodiscal spot, but lacking humeral macula, except for *Cylindera* (s. str.) *obliquealba* which primarily possesses conspicuously wide white lateral elytral area, consisting

of oblique subhumeral band, large lateromedian band obliquely running postero-mesad and almost connected with anteapical-apical band, or white area covering also humerus; exceptionally (in one male, see under that species below) the white maculation is very reduced, isolated, but still possessing apical macula and very thin juxtasutural elongate-interrupted band (Fig. 212). The whitish humeral and apical areas in *C. obliquealba* are exceptional within the species-complex.

Legs. Coxae metallic black with diffusing green-blue lustre, almost glabrous with only apical seta; metacoxae with sensory seta in middle, while lateral areas fringed with cluster of whitish (easily abraded) setae; trochanters in both sexes black or black-brown with reddish-brown apical area, metatrochanters almost black; pro- and mesotrochanters with indistinct, easily abraded subapical seta; femora dorsally metallic black, often with faint green-blue lustre, in ventral view usually with stronger green-blue or cupreous lustre; profemora densely covered with rows of mostly whitish, semierect setae, which are somewhat sparser but stiffer on metafemora; tibiae with two (easily broken) thorn-like apical setae, brownish-testaceous or ochre-testaceous, their apices often metallic blackened, sometimes with greenish lustre (mostly on apices of profemora), pro- and mesotibiae covered with rows of scattered, rather stiff, semierect or erect setae which are denser and feebler on apical area of mesotibiae; metatibiae with sparser but almost regularly distant, stiff to almost thorn-like rusty setae; tarsi mostly metallic black, usually with strong green-blue lustre; as usual, first three protarsi in males distinctly dilated; claws black-brown.

Abdomen. Ventrites metallic black usually with strong green-blue lustre (depending upon illumination angle), mostly rather sparsely covered with whitish appressed setae, which are densest on first three or four visible ventrites, becoming much sparser posteriad, last ventrite and male pleurite sometimes brownish-lightened.

Male genitalia. Aedeagus in its lateral view normally shaped with normally bent basal portion, then elongated and straight, widest in middle, apical portion either distinctly conically attenuated (in *Cylindera* (s. str.) *morio***)**, or more abruptly constricted towards rather short and elongate apex that is slightly or more distinctly dorsally emarginated or excised; internal sac widely armed, containing convoluted flagellum with characteristically shaped base; flagelliform portion long, yet never protruding from dorsoapical orifice; other sclerites consisting of stick-like arciform piece (which may have its base somewhat convoluted), downward or upward directed spike, usually with one elongate-voluminous and one semiglobose piece, both with micro-echinate surface; other sclerites of barely defined shapes.

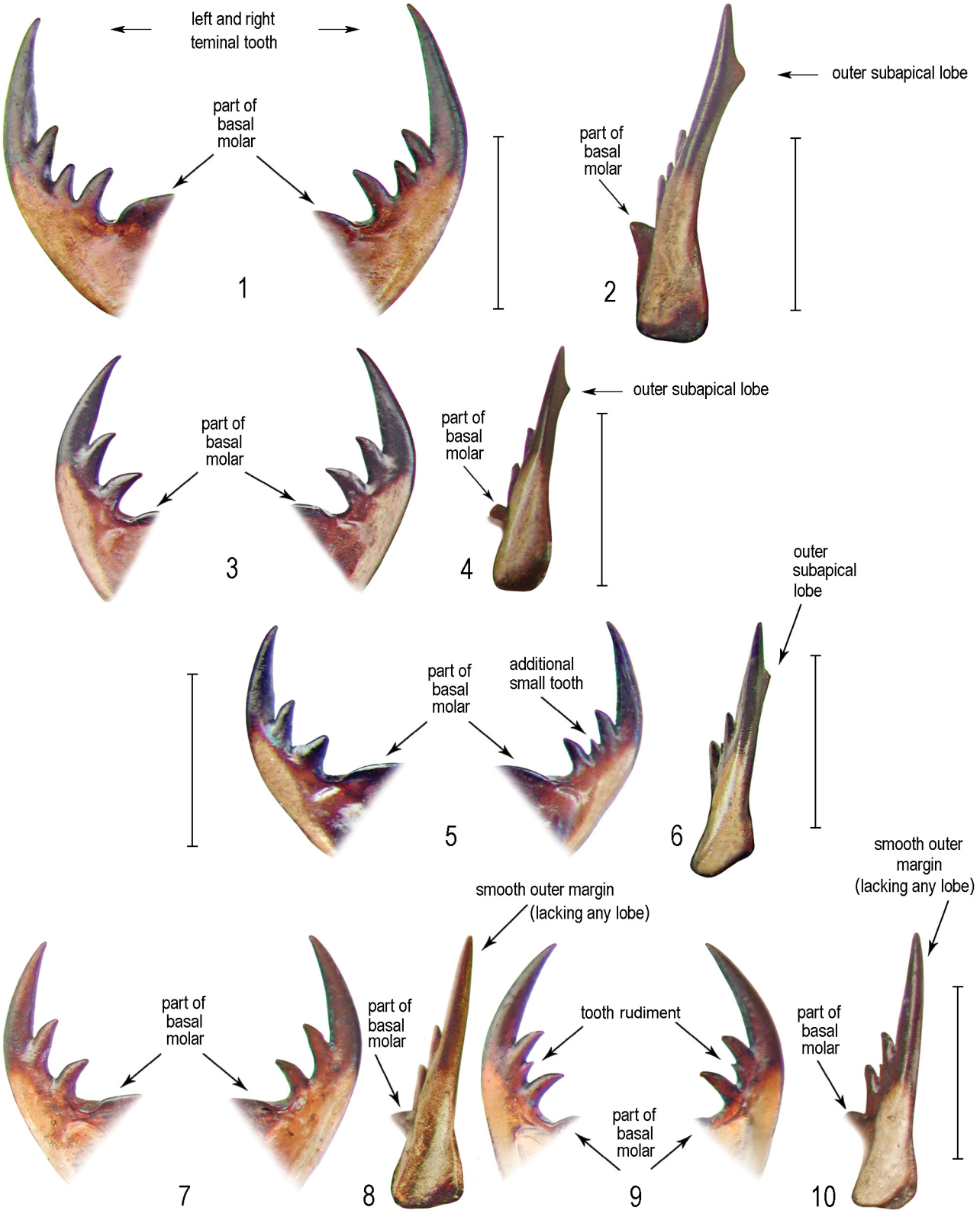
Distribution and biology. The adults of the *Cylindera* (s. str.) *morio* species-complex are diurnal and good flyers. The species of the complex are widely dispersed yet obviously with local occurrence. In literature they were recorded from the Brazilian state of Amazon (particularly Manaus area), Mato Grosso, Mato Grosso do Sul, Goiás, Tocantins and São Paulo (yet the name on the labels may partly mean São Paulo de Olivença). Records from Brazil were published by Freitag & Barnes (1989: fig. 156) when the authors treated all the taxa as synonyms of "*Cicindela* (*Cylindera*) *morio*" (see below).

The occurrence in Argentina is uncertain. While Horn (1915) mentioned the occurrence in northern Argentina with a question mark, the occurrence was repeated by Blackwelder (1944), both authors probably referring to the catalogue by Bruch (1911), as also Sumlin (1979) did in his review of Argentinean Cicindelidae, although he had not examined any specimen from Argentina. Wiesner & Bandinelli (2014) also mentioned the occurrence in N. Argentina referring to Bruch (1911), but instead of any Argentinean record, the authors illustrated only one specimen from Manaus in Brazilian Amazonia. Therefore, it is possible that the record by Bruch (1911) was based on misidentification, which is supported by the fact that one female specimen (BMNH) labelled: "Argentina / O. W. Thomas / 1904–148" examined within this revision proved to be in fact a species of *Brasiella* Rivalier, 1954.

It is noteworthy that some other specimens deposited in some collections under the name "*Cylindera morio*" were misidentified with species of other, very different genera, such as three specimens of *Mesacanthina punctum* (Klug, 1834) and two specimens of a species of *Brasiella* Rivalier, 1954 in BMNH, four specimens of *Poecilochila* (*Eupoecilochila*) *ventralis* (Dejean, 1825) in IRSNB, and eight specimens of *Poecilochila* (*Eupoecilochila*) *rugipennis* (Kollar, 1836) in FCCR-MCZR (thus, the number of specimens listed by Cassola (2013) as deposited in the collection FCCR-MZCR, is reduced to three).

Note on phylogeny. Freitag & Barnes (1989) classified 61 Brazilian and related Neotropical species of *Cylindera*, its subgenera and the genus *Brasiella* (all of these and other genus group taxa treated by the authors at the time as subgenera of *Cicindela*). Within their well-elaborated piece of work the authors established a reconstructed phylogeny in tables "Phylogenetic – distributional relationships of *Cicindela* sister lineages" including their table 12 for their "group *morio*". Unfortunately, the authors did not include the shape of mandibles and due to their failure, they inappropriately treated all the taxa of the *Cylindera morio* species-complex as junior synonyms of *Cylindera morio.*

Some of the six (mostly very rare) Neotropical species (now in *Cylindera* s. str.) placed by the authors in their species-group "*morio*" really exhibit similar external characters. *Cylindera* (s. str.) *confluentesignata* (W. Horn, 1915) possesses whitish elytral pattern (Fig. 213) resembling *Cylindera* (s. str.) *obliquealba*, but is clearly distinguished from it (see under that species here). The other species placed by the authors into their *morio* species-group were *Cylindera* (s. str.) *kollari* (Gistl, 1837), *Cylindera* (s. str.) *malaris* (W. Horn, 1896) and *Cylindera* (s. str.) *granulipennis* (Bates, 1874). In addition, *Cylindera* (s. str.) *julietae* Šafránek & Amaya, 2021 described quite recently also possesses similar elytral maculation (see Šafránek & Amaya 2021).



Figs 1–10. *Cylindera* (*Cylindera*) *morio* species-complex, diagnostic characters on male mandibles. 1–2 – *C.* (*C.*) *morio* (Klug, 1834): 1 – with four teeth; 2 – terminal tooth of right mandible in lateral view. 3–6 – *C.* (*C.*) *amayai* sp. nov.: 3 – with three teeth; 4 – terminal tooth of right mandible in lateral view; 5 – with small additional tooth in right mandible; 6 – terminal tooth of right mandible in lateral view. 7–10 – *C.* (*C.*) *acompsa* (Chaudoir, 1852) (and other two species of the complex): 7 – with tree teeth; 8 – terminal tooth of right mandible in lateral view; 9 – with three teeth and additional rudiment of tooth; 10 – terminal tooth of right mandible in lateral view (its outer margin in the three later species is smooth also in mandibles possessing additional small tooth). Scale bars = 1 mm.

Key to species of the *Cylindera* (s. str.) *morio* species-complex

General note. The presence or absence of the outer subapical lobe on the terminal tooth of the right male mandible (in its lateral view) is recognizable even in the old male specimens with firmly closed mandibles.

1 Mandibles with four teeth (apart from basal molar), terminal tooth of male right mandible in its lateral view with distinct outer subapical lobe. Elytra with black background, lacking white maculation or with anteapical macula, rarely with lateromedian spot, apex in males more notably elongate-attenuated towards sutural spine. Pronotal surface minutely asperate. Body generally (7.5–)8.2–10.2 mm. Aedeagus conically attenuated towards more elongated, more or less distinctly ventrally excised apex. .... ***Cylindera morio*** (Klug, 1834)

– Mandibles with three teeth (apart from basal molar), exceptionally with little tooth or rudiment of tooth between second and third ones. Elytral background black or cupreous. Body generally smaller, 6.8–8.6 mm. Aedeagus with apical portion wider as more abruptly constricted towards narrow tip. 2

2 Male mandibles with terminal tooth of right mandible in its lateral view regularly elongated towards apex, externally smooth, lacking outer subapical lobe. ... 3

– Male mandibles with terminal tooth of right mandible with distinct outer subapical lobe. Elytra mostly black, white maculation distinct, consisting of sublateral-median macula, either isolate or partially obliquely connected with subsutural-discal macula; exceptionally also indistinct basodiscal macula present. Pronotal disc in males with outer margins more or less narrowed posteriad, surface extremely finely asperate-granulate, almost lacking any striae. Aedeagus apex narrow with indistinct small dorsal emargination. ..... ***Cylindera amayai*** **sp. nov.**

3 Elytral whitish maculation isolated. 4

– Elytra with conspicuously wide whitish lateral area which may cover also humerus and almost or entirely connected with whitish anteapical-apical area; its lateromedian portion divided into postero-mesad-running band; exceptionally with reduced maculation yet with apical macula and juxtasutural thin band present. .... ***Cylindera obliquealba*** (Motschulsky, 1864) **comb. nov.**

4 Elytral background coloration almost black or black-brown (except for usual, more or less notable green or coppery punctures and rows of foveae), whitish elytral maculation isolate, consisting of lateromedian, more distinct anteapical, or also small subsutural-discal macula, very rarely elytra almost immaculate with only indicated anteapical spot. Pronotal surface finely asperate with only occasional striae along median line. .... ***Cylindera acompsa*** (Chaudoir, 1852) **comb. nov.**

– Elytra (and whole body) notably cupreous (except for usual velvety black streaks and rows of mostly iridescent green punctures and foveae), whitish elytral maculation isolate, consisting of lateromedian, anteapical, or also subsutural-discal macula. Pronotal disc almost subglobose, discal surface densely parallel-wrinkled in middle, lateral areas with deep iridescent foveae. Apex of aedeagus narrow, usually slightly bent dorsad. .... ***Cylindera ocskayi*** (Gistl, 1837) **comb. nov.**

Cylindera (*Cylindera*) *morio* (Klug, 1834)

(Figs 1–2, 11–72)

Cicindela morio Klug, 1834: 16.
Cicindela egena Chaudoir, 1854: 12 (synonymy by Fleutiaux 1892: 68).
Cicindela morio var. *egena*: Chaudoir (1865: 40).
Cicindosa morio: Schilder (1953: 561).
Cylindera (*Cylindera*) *morio*: Rivalier (1954: 265).
Cicindela (*Cylindera*) *morio morio*: Sumlin (1979: 108).
Cicindela (*Cylindera*) *morio*: Freitag & Barnes (1989: 320).
Cylindera (s. str.) *morio*: Wiesner (1992: 185), Wiesner (2020: 274).

Type localities. *Cicindela morio*: Brazil; *Cicindela egena*: Brésil: "les contrées riveraines du fleuve des Amazones [= the regions bordering the Amazon River]".

Type material. *Cicindela morio*: Holotype: ♂ (MFNB), labelled: "3719" [printed] // "morio / Klg. / 307 / Brasil. Freir." [large green collection label with thin black frame, handwritten] // "Hist. - Coll. (Coleoptera) / Nr 3719 / Cicindela morio Kl. / Brasil Freireiss / Zool Mus. Berlin" [green label with black frame, printed] // "Holotype / Cicindela / morio / Klug, 1834 / labelled by MFNB 2024" [red label, printed] // "Cylindera (s. str.) / morio (Klug, 1834) / det. Jiří Moravec 2024" [printed].

Cicindela egena: Lectotype (designated here): ♀ (MNHN), lacking labels but standing as first along the large, ochre-tarnished collecting label with black frame: "egena / Chaud. / Amér. équin. / Amazones, / 52 Deyrolle" [handwritten] and labelled: "Lectotype / Cicindela egena / Chaudoir, 1854 / design. Jiří Moravec 2024" [red label, printed] // "Cylindera (s. str.) / morio (Klug, 1834) / det. Jiří Moravec 2024" [printed].

Other material examined. Historical specimens: 1 ♂ (MNHN) [standing as *C. egena* along with the above-addressed lectotype of the synonymous taxon] with small, brownish, square green label. **BRASIL:** 2 ♂♂ 1 ♀ (MFNB): "Ecuador" [Equator] / Manaos". 4 ♂♂ 2 ♀♀ (IRSNB), 1 ♂ (CCJM, ex IRSNB): "Brazil / Aurora" // "Coll. R. I. Sc. N. B. / Brazil". 1 ♂ (IRSNB): "802" / S. Paulo / Brasil" // "Coll. J. Muller / Cicindela / morio / Kl. / R.M.H.N.B. 16.364". 1 ♀ (IRSNB): "Brésil / Sao Paulo / Coll. Schramm" // "R. Mus. Hist. Nat. / Belg. I. G. 11. 230". 1 ♂ (BMNH): "Brazil" // "obscurela Kl.". 2 ♂♂ 1 ♀ (BMNH): "St. Paul" // "296 s.t." // "F. Bates Coll. / 1911–248". 1 ♀ (BMNH): "Santarem / Lower Amazon / 28.I.96 / E. E. Austen / 96–80". 1 ♀ (BMNH): "Brazil / Santarem" // "52/96" [on opposite side of the label] // "C. morio / Klug" // "named by Dr. W. Horn / G.J.A." // "F. Bates Coll. / 1911–248". 1 ♂ 1 ♀ (BMNH): "Jatahy / Prov. Goyaz Brésil". 1 ♂ 1 ♀ (BMNH): same labels and: "F. Bates Coll. / 1911–248" // "morio / D. Klug" // "t. Horn" // "Cicindela / morio Klug / det. R. Freitag 1984". 1 ♀ (SDEI): "Jatahy / Goyaz". 1 ♂ (SDEI): "Manaos / IX. 27". 2 ♂♂ (SDEI): "Staudinger / Sao Paulo". 1 ♀ (HNHM): "Brasilia / S. Paulo" // "C. morio Klug / det W. Horn". 1 ♂ (SDEI): "Brésil, Goyaz / Rio Verde". Recent specimens: 1 ♂ (MZSP): "Utiariti / Rio Papagaio, Mt. / XI.1996 / Lenko & Pereira" // "MZSP6228". 1 ♀ (MZSP): "Faz Cachoeirinha / Jataí, Goiás – Brasil / X.1962 / Exp. Dep. Zool." // "MZSP62729". 1 ♀ (MZSP): "Faz. Acerio / Jataí Goiás / Brasil / X.1962 / Exp. Dep. Zool." // "MZSP62731". 1 ♂ 1 ♀ (JWCM): "Brazil: Amazonas / 20 km n.e. Manaus / 18.IX.1992 / D. Pearson" // "clay-sand / savanna clearing". **BOLIVIA:** 1 ♂ (COSJ): "Bolivia – Santa Cruz department / Concepcion env. / 16°07′24′′S, 62°00′09′′W / 7-9.I.2020, 494 m / O. Šafránek & M. Amaya lgt.". 2 ♀♀ (COSJ): "Bolivia – Santa Cruz department / Concepcion env., 494 m / 16°07′24′′S, 62°00′09′′W / 10.I.2016 / O. Šafránek & J. L. Aramayo lgt.". 1 ♂ (FCCR-MCZR): "Bolivia – Santa Cruz / 25.8 km S / Rafael 305m / D. Brzoska 3-XII-1995".

Examined specimens were labelled: "*Cylindera* (s. str.) / *morio* (Klug, 1834) / det. Jiří Moravec 2024" ("2025" respectively).

Differential diagnosis and brief redescription. *Cylindera morio* is principally distinguished from all other species of this group by its mandibles with four teeth (apart from basal molar) (Figs 1, 12, 27–30, 32–33, 35, 38, 44, 46, 48), combined with distinct outer subapical lobe on terminal tooth of right male mandible in its lateral view (Figs 2, 13, 31, 34, 45, 47), very different shape of its aedeagus (Figs 17–18, 54–62) and generally much larger body size. Such distinct outer lobe on right male mandible (also visible when the mandibles are closed) is shared only with *Cylindera amayai* sp. nov., which, however, clearly differs in having tridentate mandibles (Figs 3, 5, 81, 83, 85, 87) and complex of other diagnostic characters, including its sparsely punctate-setose proepisterna (Fig. 16) and shorter aedeagus apex (Figs 54–62).

Body (Figs 11, 21, 25–26) largest within the species-complex, (7.50–)7.90–10.2 (holotype 8.00) mm long, 2.70–3.40 (holotype 2.90) mm wide (lectotype of *C. egena* 9.20 mm long, 3.25 mm wide). Labrum (Figs 14, 27–29, 32–33, 36–38, 40–43, 49–51) yellow-testaceous, anterior margin semicircular in both sexes yet usually more distinctly in females, variably with 4–9 teeth which are blunt except for subacute median tooth (usually more protruding in females). Antennae as in others of the species complex, but antennomeres 5–6 mostly darker.

Thorax. Pronotum (Figs 15–16, 52–53) 1.70–2.15 mm long, 1.90–2.30 mm wide; surface of pronotal disc extremely finely asperate, finely irregularly wrinkled only at base and on pronotal posterior lobe, but lacking parallel striae; the fine pronotal sculpture is shared with *Cylindera acompsa*, which, however, has its mandibles with only three teeth (apart from basal molar) as also does *Cylindera amayai* sp. nov. which, moreover, has its pronotal surface mostly extremely finely micro-granulate. Proepisterna (Fig. 16) distinctly foveolate-punctate-setose.

Elytra (Figs 20, 23–24, 63–72) oblong, 5.20–6.50 mm long, outer margins subparallel in males, moderately dilated below middle in females, from their arcuate anteapical angles attenuated towards small sutural spine, thus forming elongate-acute apex (more conspicuously in males); surface almost black with darker velvety-black streaks and 5–7 foveae which may be greenish and variably conspicuous or barely recognizable; whitish elytral maculation either absent or with small or only indicated anteapical macula, exceptionally also lateromedian spot present (Fig. 67).

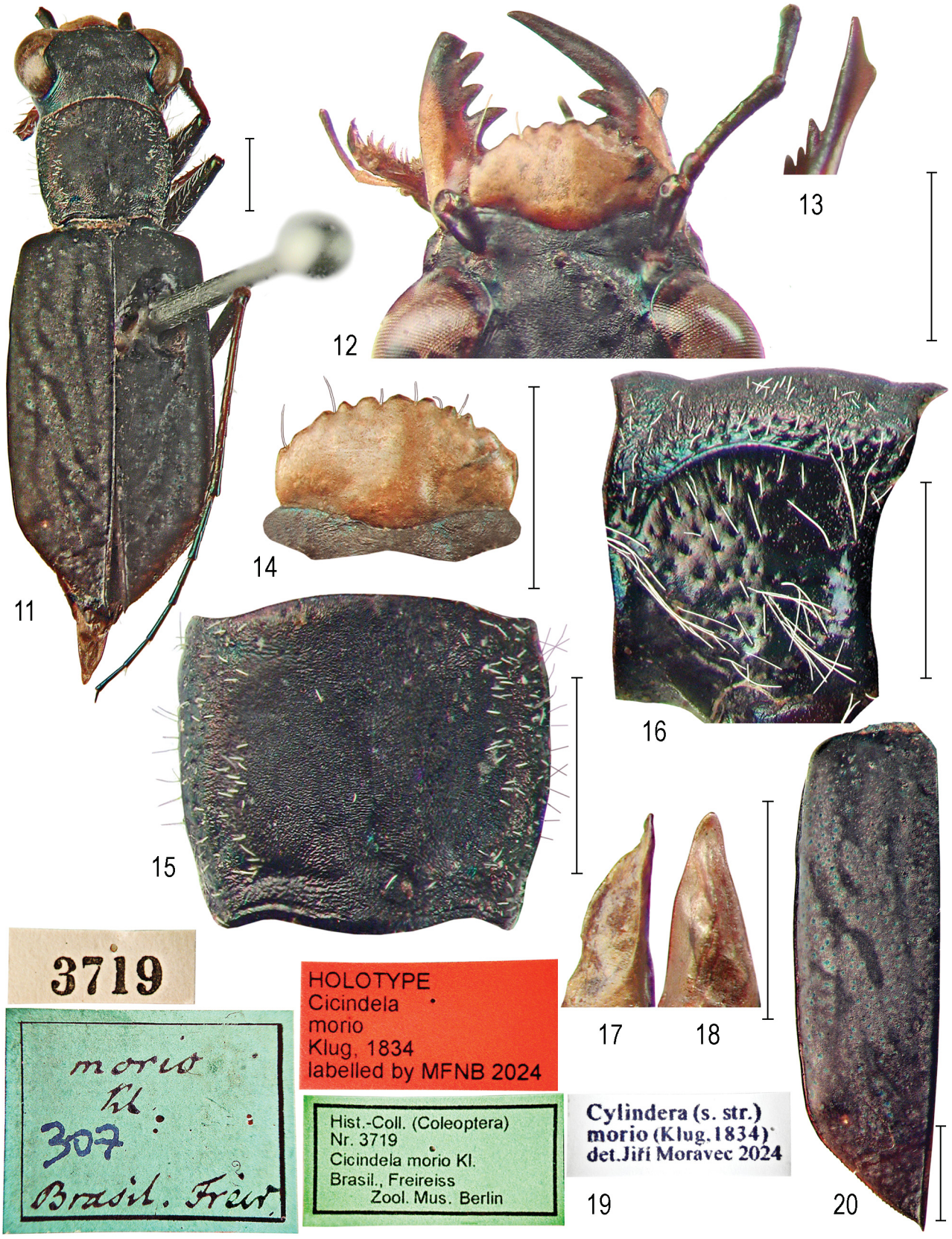
Aedeagus (Figs 17–18, 54–62) elongate, 2.30–2.60 mm long, 0.50–0.55 mm wide, in its lateral view conically attenuated towards more or less elongate and variably (yet always noticeably) dorsally emarginate apex; the aedeagus apex in holotype is slightly damaged, unnoticeably crashed ventrally, yet somewhat changing its shape (Fig. 17).

Distribution and biology. As mentioned under the redescription of the species-complex above, the distribution of *Cylindera morio* in literature includes also the other taxa of the species-complex. Horn (1915) mentioned "Para bis Manaos, Matto Grosso, Goiás, Sao Paulo, ?Nord-Argentina", while later, apart from Lower and Upper Amazonia, Horn (1926) mentioned also the state of Minas Gerais. Although no specimen from Minas Gerais was recorded by Freitag & Barnes (1989) and none was examined within the present revision, the occurrence in the state might be possible in the areas neighbouring with the state of Goiás, covered with savanna biotopes classified as Cerrado biome (Fig. 214). Naviaux (2002) mentioned "Sao Paulo, Mato Grosso (obviously including Mato Grosso do Sul), Goiás, Para and Amazon". This species was recently recorded from the Bolivian department of Santa Cruz by Guerra et al (1997), as well as by Pearson et al. (1999) with a map of distribution.

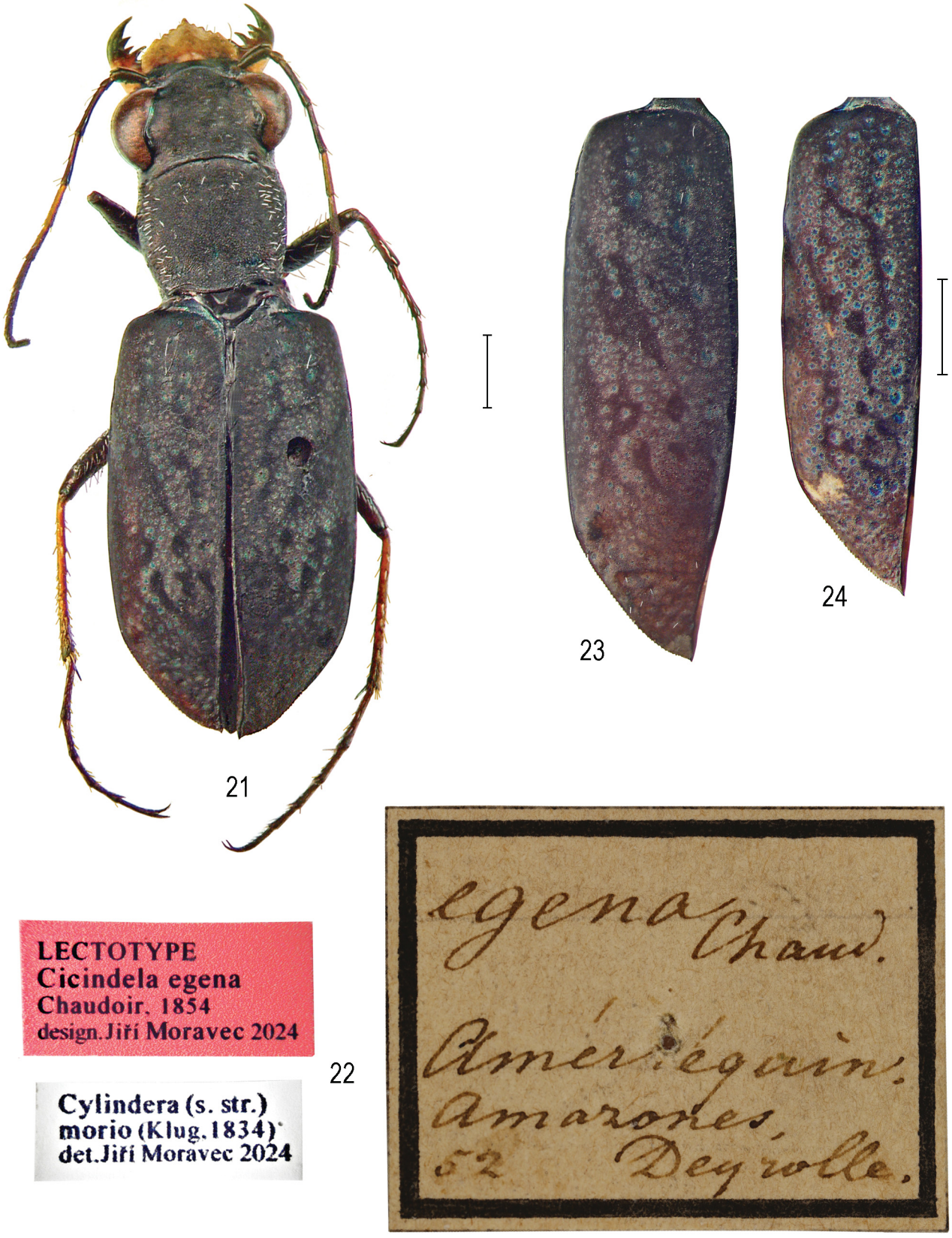
The occurrence of *Cylindera morio* (and of any taxon of this species-complex) in Argentina is uncertain (see "Distribution" under "General redescription of the species-complex" above).

Consequently, only verified localities based on examination (either personally or from photos gained from colleagues mentioned in each of the data or illustrations) are listed here. As the labels of types and historical specimens mostly bear only the names of the Brazilian states without specified areas, the distribution on the map (Fig. 215) is marked partly approximately. The "Sao Paulo" (in one case "S. Paul") on the labels of several specimens in collections might at least partly mean São Paulo de Olivença situated on the western border of the Brazilian state of Amazonas, rather than the remote state of São Paulo lying in the southeastern coast with the Atlantic Rainforest (Mata Atlantica). However, the occurrence is possible in areas covered with savanna biotopes (Cerrado biome) as confirmed by one female in MZSP (not exactly examined here) recorded by Freitag & Barnes (1989) from "Avanhand" which means Avanhandava in the western part of the state of São Paulo (see the map in Fig. 215); the area is now surrounded by plantations, thus missing its original biotopes (Gabriel Biffi (MZSP), pers. comm.).

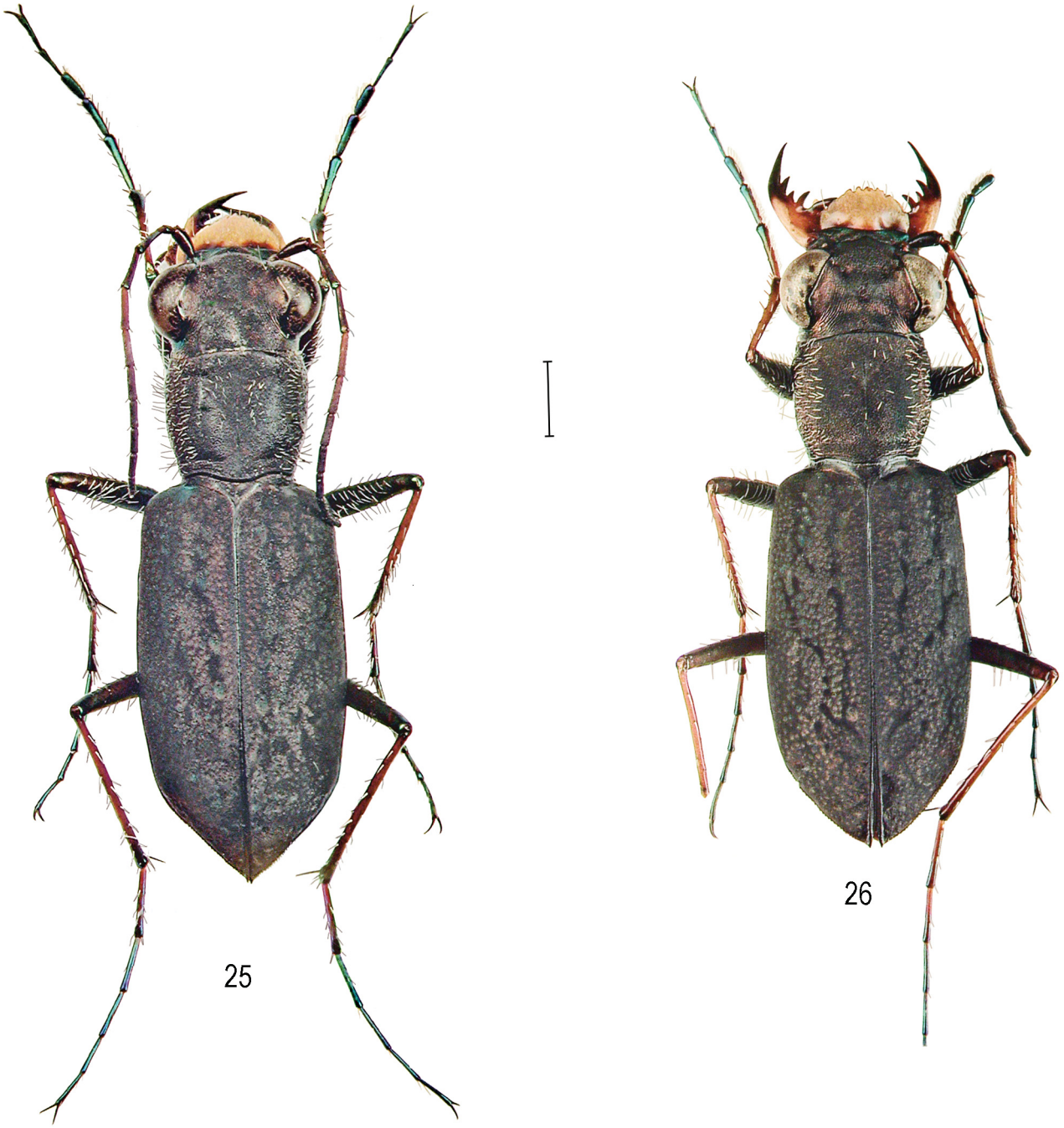
In spite of the possible confusions of the taxa and their rare depository in collections (for instance only one in ZSM and HNHM, three in MCZR and three in NMPC), or absence (such as in NHMW), *Cylindera morio* is obviously rather widely distributed. It is obviously partly sympatric with others of this species-complex in Brazil. Records of this species from Manaos within the Amazon rainforest biome probably come from sandy-grassy areas near the riversides, yet probably not directly from sandy beaches. Guerra et al. (1997) and Pearson et al. (1999) mentioned that in Bolivia the species was found on light sand in open grassy areas in cerrado-savanna. This is also in accordance with the herein examined and illustrated specimens recently collected by the second author in the area of the city of Concepción in the Bolivian department of Santa Cruz, where *Cylindera morio* inhabits more open areas within the low forest vegetation (Fig. 219). According to the ecoregion delineation by Ibisch et al. (2004), the locality near Concepcion meets two ecoregions: Chiquitano dry forest and Cerrado forest of the



Figs 11–20. *Cylindera* (*Cylindera*) *morio* (Klug, 1834), holotype, ♂ (MFNB). 11 – habitus, 8 mm; 12 – head part; 13 – terminal tooth of right mandible in lateral view (its apical half); 14 – labrum; 15 – pronotum, dorsal view; 16 – pronotum, lateral view, showing proepisternum; 17–18 – aedeagus (apical portion) in its left lateral and dorsal aspects; 19 – labels; 20 – elytron. Scale bars = 1 mm.



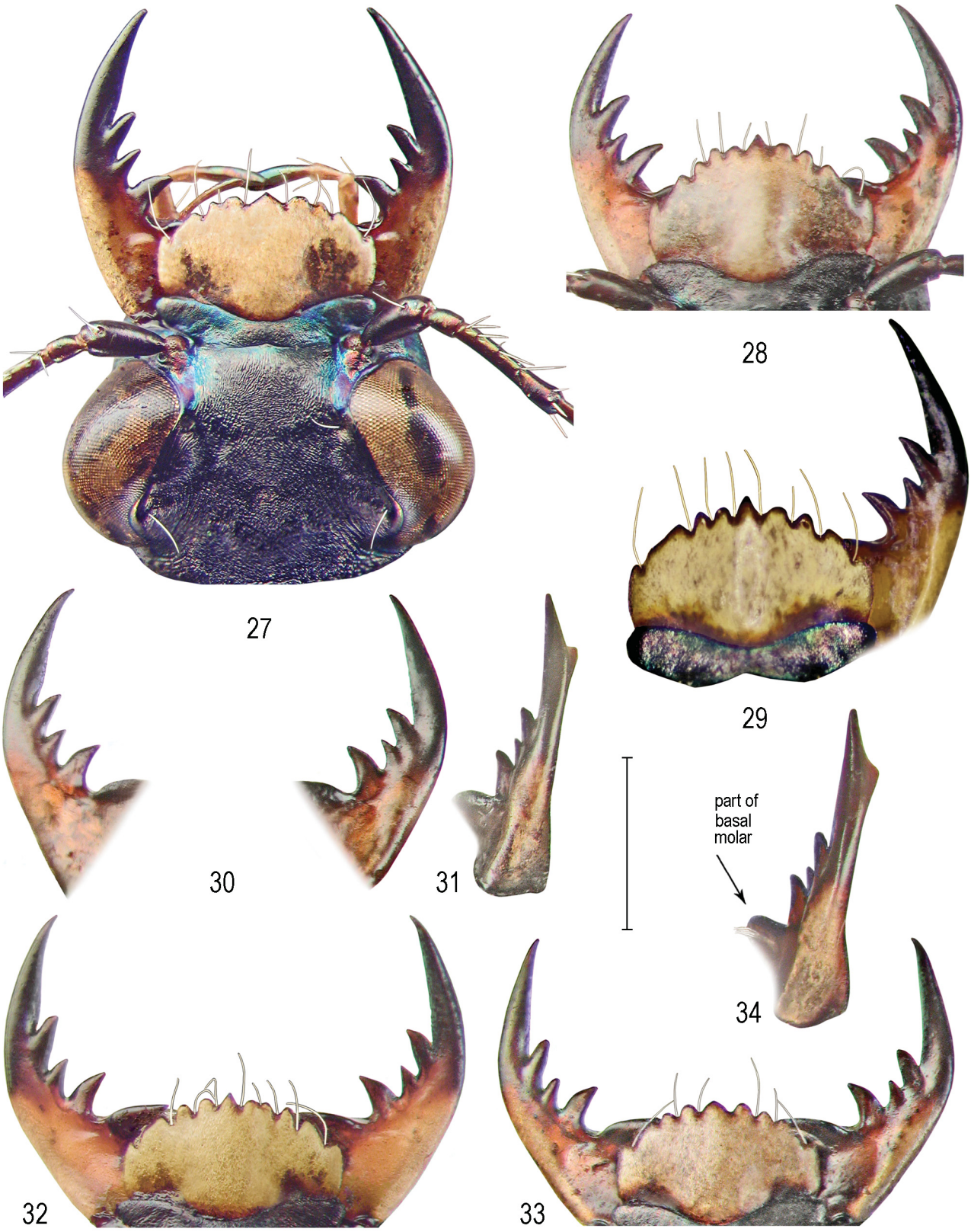
Figs 21–24. *Cylindera* (*Cylindera*) *morio* (Klug, 1834). 21–23 – ♀, lectotype (MNHN) of the synonym *Cicindela egena* Chaudoir, 1854: 21 – habitus, 9.2 mm; 22 – labels; 23 – elytron. 24 – male from collection Chaudoir (MNHN), elytron. Scale bars = 1 mm.



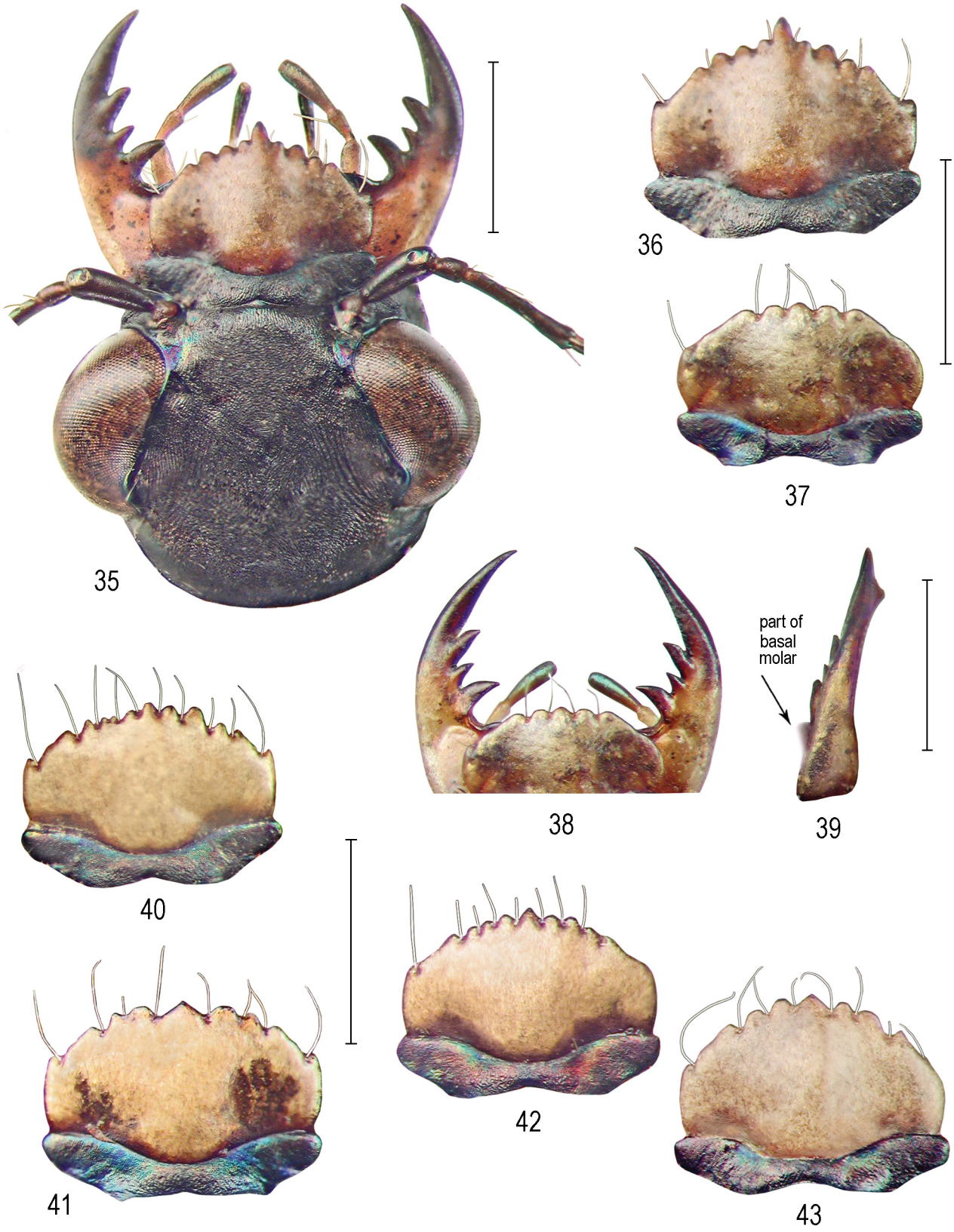
Figs 25–26. *Cylindera* (*Cylindera*) *morio* (Klug, 1834), habitus. 25 – ♂, 8.8 mm, Brazil, Aurora (IRSNB); 26 – ♂, 8.4 mm, Bolivia, Concepción (COSJ). Scale bar = 1 mm.

Chiquitano region. Observed adults of this species run and fly quickly along the paths during the day and fly quickly when disturbed, as also addressed by Pearson et al. (1999).

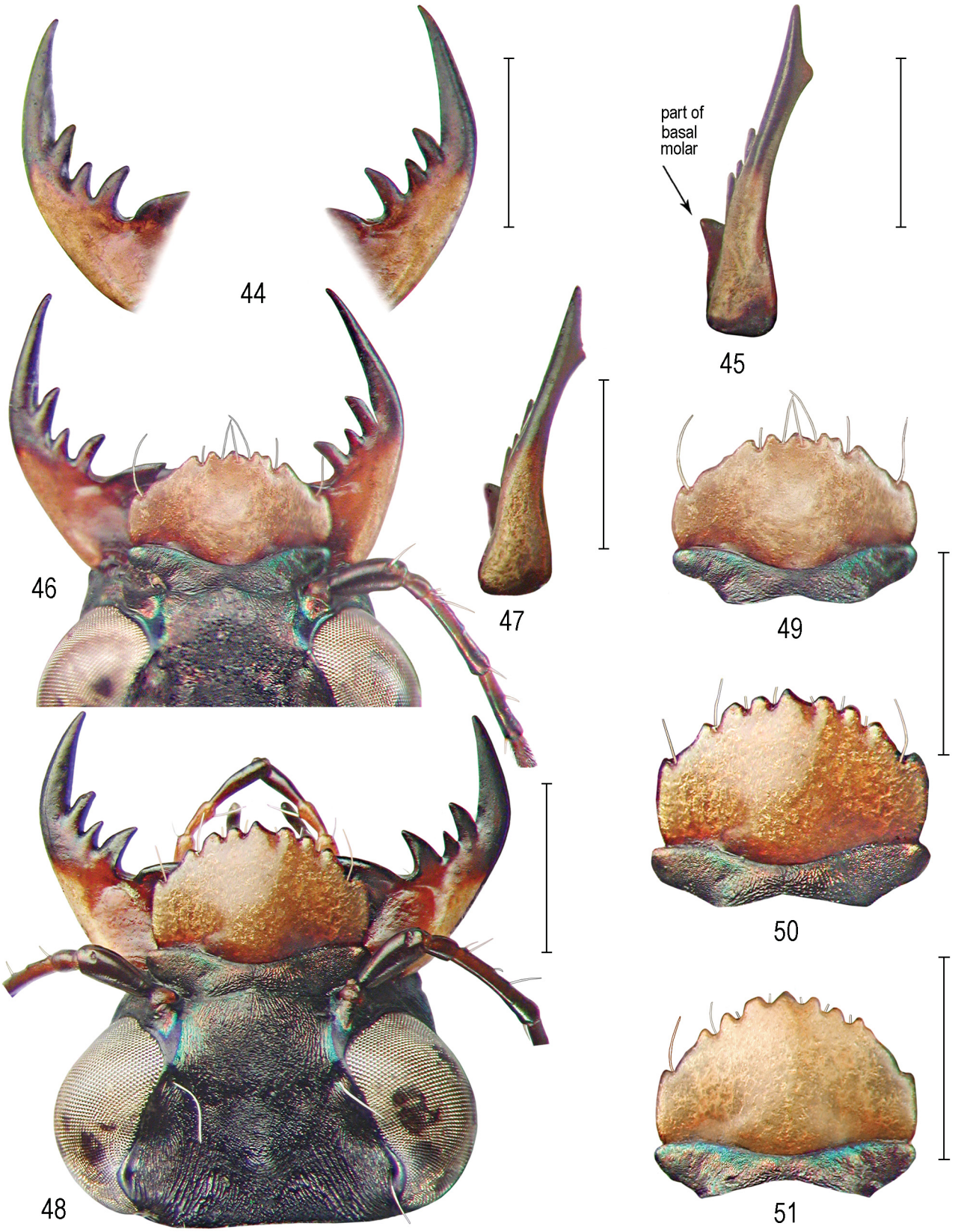
Remarks. Freitag & Barnes (1989) did not examine the type specimens of any taxon of the *Cylindera morio* species-complex, and failed to examine mandibles which are firmly closed in old specimens. Therefore, they overlooked the above-emphasized important diagnostic characters, despite the fact that one of the characters, the outer subapical lobe on the right male mandible in *Cicindela* (*Cylindera*) *morio*, is visible even when the mandibles are closed, and that the lobe is absent in other Brazilian taxa of the species-complex. Consequently, the redescription under *Cicindela* (*Cylindera*) *morio* and the map of distribution by Freitag & Barnes (1989) includes also other Brazilian species of the complex (see also "Remarks" under *Cicindela* (*Cylindera*) *acompsa* below).



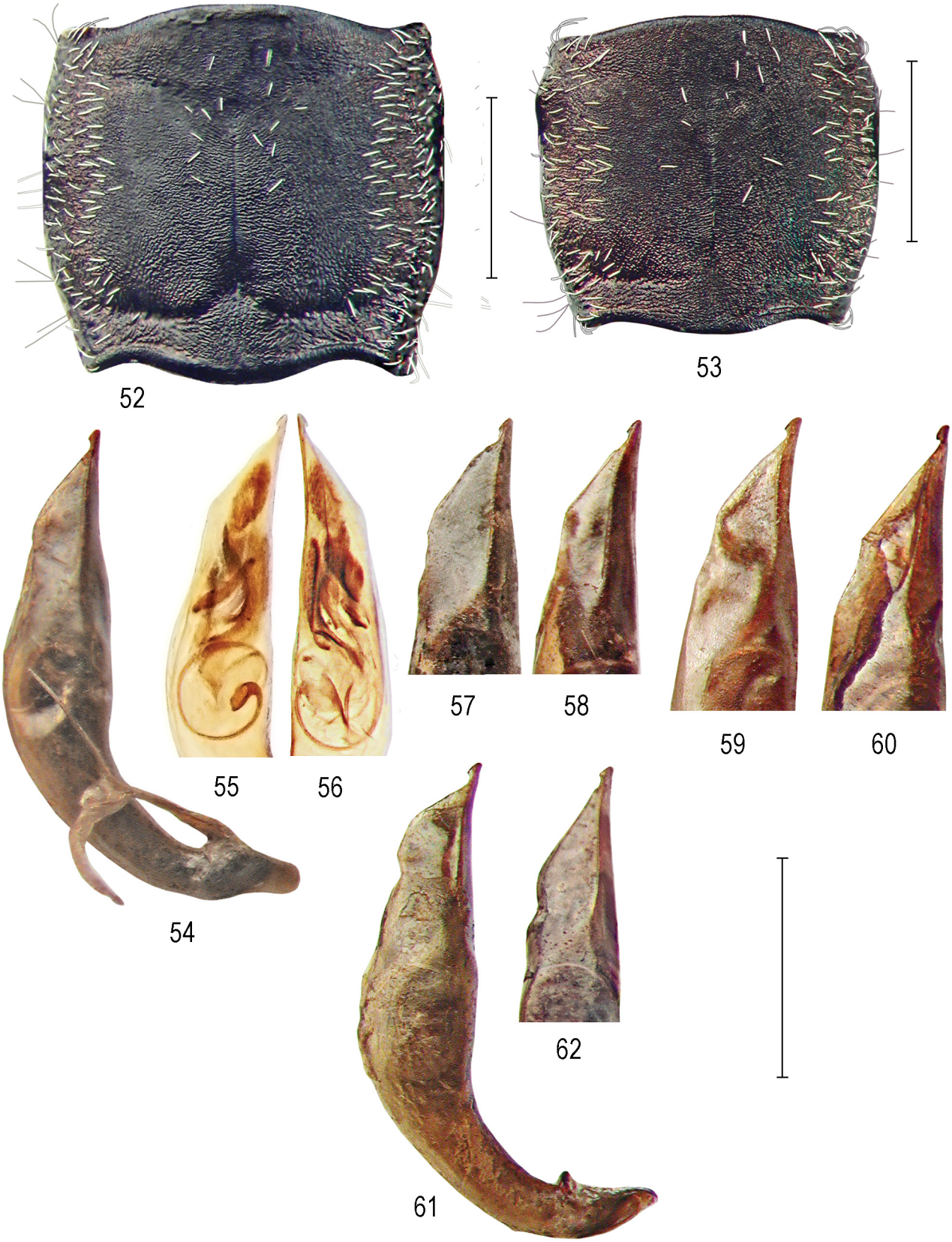
Figs 27–34. *Cylindera* (*Cylindera*) *morio* (Klug, 1834). 27 – head, ♂, Brazil, Aurora (IRSNB); 28 – mandibles with labrum, ♀, Brazil, Santarem (BMNH); 29 – right mandible with labrum, ♀, Brazil, Jataí (MZSP 62731); 30 – mandibles, ♂, Brazil, "Goyaz" [= Goiás] (SDEI); 31 – ♂, Brazil, "Goyaz", right mandible in lateral view; 32–33 – mandibles with labrum, Brazil, São Paulo: 32 – ♀ (BMNH); 33 – ♂ (SDEI); 34 – ♂, Brazil, São Paulo, terminal tooth of right mandible in lateral view. Scale bars = 1 mm. (For Fig. 29 image credit Gabriel Biffi).



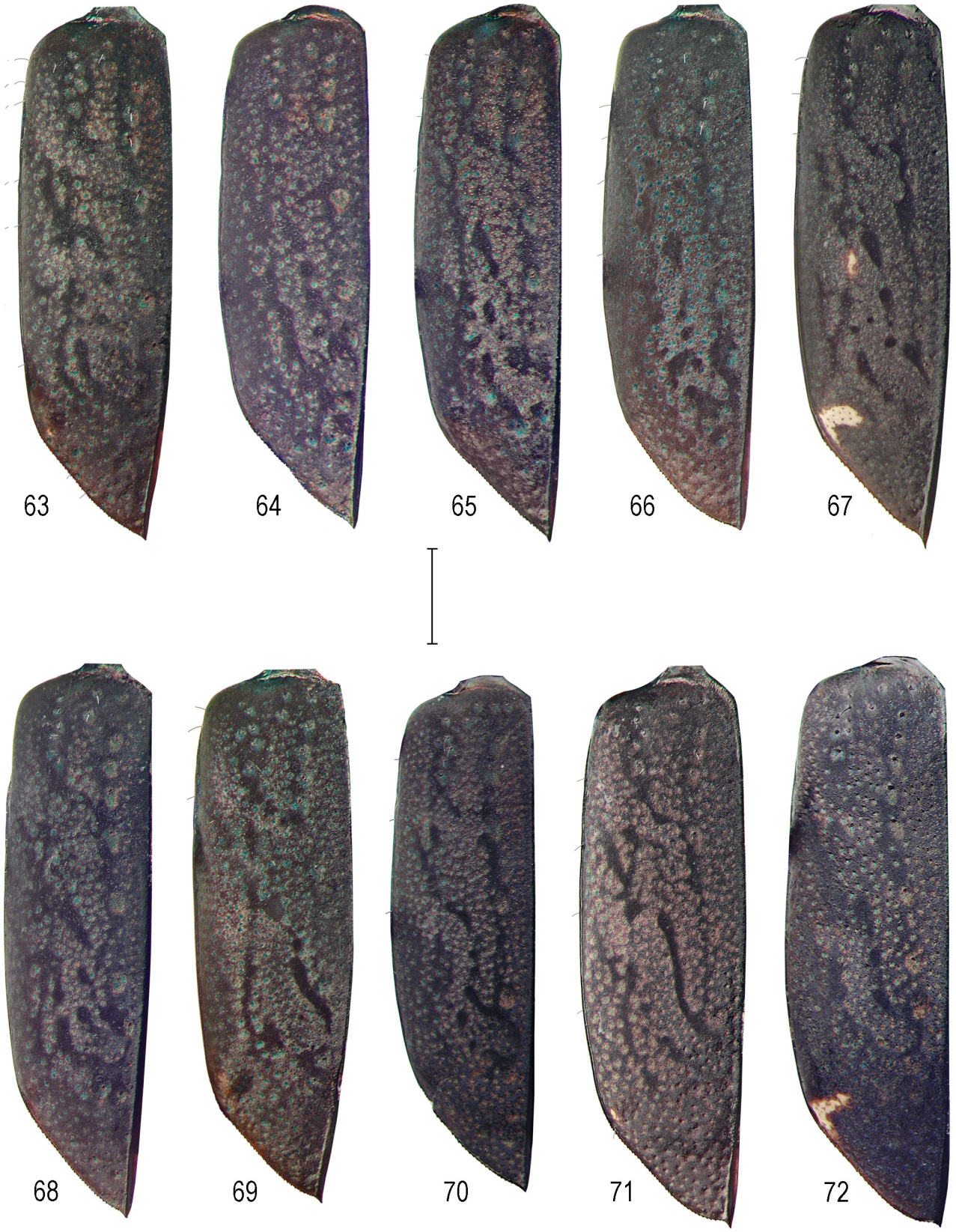
Figs 35–43. *Cylindera* (*Cylindera*) *morio* (Klug, 1834). 35–36 – ♀, lectotype (MNHN) of the synonym *Cicindela egena* Chaudoir, 1854: 35 – head; 36 – labrum; 37–39 – ♂ of the synonym *C. egena* (MNHN): 37 – labrum; 38 – mandibles; 39 – ♂, terminal tooth of right mandible in lateral view; 40–43 – labrum: 40–42 – Brazil, Aurora: 40–41 – ♂ (IRSNB); 42 – ♂ (CCJM ex IRSNB); 43 – ♂, "Manaos" [= Manaus] (MFNB). Scale bars = 1 mm.



Figs 44–51. *Cylindera* (*Cylindera*) *morio* (Klug, 1834). 44 – mandibles, ♂, "Manaos" [= Manaus] (MFNB); 45 – ♂, terminal tooth of right mandible in lateral view; 46–48 – head, Bolivia, Concepción (COSJ): 46 – ♂; 47 – ♂, terminal tooth of right mandible in lateral view; 48 – ♀; 49–51 – labrum, Bolivia, Concepción (COSJ): 49 – ♂; 50–51 – ♀. Scale bars = 1 mm.



Figs 52–62. *Cylindera* (*Cylindera*) *morio* (Klug, 1834). 52–53 – pronotum: 52 – ♂, Brazil, Aurora (IRSNB); 53 – ♂, Bolivia, Concepción (COSJ); 54–62 – male aedeagus or its apex: 54 – Brazil, Aurora (IRSNB); 55–56 – Brazil, Aurora, internal sac in its left and right lateral aspect; 57–58 – Brazil, Aurora (IRSNB); 59 – Brazil, São Paulo (BMNH); 60 – Brazil, São Paulo (IRSNB); 61 – Bolivia, Concepción (COSJ); 62 – Brazil, Manaus (MFNB). Scale bars = 1 mm.



Figs 63–72. *Cylindera* (*Cylindera*) *morio* (Klug, 1834), elytron. 63–66 – Brazil, Aurora (IRSNB): 63–65 – ♂; 66 – ♀; 67 – ♂, São Paulo (SDEI); 68 – ♂, Manaus (MFNB); 69 – ♂, Goiás (SDEI); 70–72 – Bolivia, Concepción (COSJ): 70 – ♂; 71–72 – ♀. Scale bar = 1 mm.

Cylindera (*Cylindera*) *amayai* sp. nov.

(Figs 73–101)

Type locality. Bolivia: department of Santa Cruz, 20 km south of San Jose de Campamento, environs of Palmarito (15°23′36″S, 60°58′05″W, altitude 200 m).

Type material. Holotype: ♂ (UASC, temporarily in COSJ), labelled: "Bolivia – Santa Cruz depart. / 20 km S San Jose de Campamento / Palmarito env., 9.I.2020 / 15°23´36´´S, 60°58´05´´W, 200m / O. Šafránek & M. Amaya lgt." // "Holotype / *Cylindera* (s. str.) *amayai* sp. nov. / det. Jiří Moravec & Ondřej Šafránek 2025" [red label, printed]. Allotype: ♀ (COSJ), with the same label data and: "Allotype / *Cylindera* (s. str.) *amayai* sp. nov. / det. Jiří Moravec & Ondřej Šafránek 2025" [red label, printed]. Paratypes: 4 ♂♂ 2 ♀♀ (2 ♂♂ 1 ♀ in COSJ, 1 ♀ in NMPC, 2 ♂♂ in CCJM), with the same label data as holotype and: "Paratype / *Cylindera* (s. str.) *amayai* sp. nov. / det. Jiří Moravec & Ondřej Šafránek 2025" [red label, printed].

Differential diagnosis. *Cylindera amayai* sp. nov. can be immediately distinguished from other taxa of the species-complex by its almost or entirely black elytra with distinct white maculation (Figs 73–79) consisting of mostly large sublateral-median macula which is either isolated or obliquely connected with posteriad placed subsutural-discal macula (Fig. 77) or indistinctly connected as in the holotype (Figs 73–74); exceptionally also a barely visible basodiscal macula is present (as in holotype, Figs 73–74). Mandibles (Figs 3, 5, 81, 83, 85, 87) tridentate (exceptionally a rudiment of tooth present between the second and third tooth – Figs 5, 83); right terminal tooth in male mandibles possessing (in its lateral view) a distinct lobe on its outer margin (Figs 4, 6, 82, 84, 86). Such important diagnostic character is shared with *Cylindera morio*, which is, however, clearly distinguished by its mandibles with four teeth (Figs 1, 12, 27–30, 32–33, 35, 38, 44, 46, 48), and by the differently shaped apical portion of its aedeagus, which is elongate-attenuated towards longer and dorsally more or less distinctly excised apex (Figs 17–18, 54–62). Antennomeres 5–6 darker than in the following three species. The surface of the pronotal disc in *Cylindera amayai* sp. nov. is extremely finely asperate-granulate, almost lacking any striae (Fig. 99), thus distinguished from the finely asperate (not granulate) pronotal surface in *Cylindera morio* and *C. acompsa*, and even more distinctly differing from the partly striate pronotal surface in *C. ocskayi*.

The tridentate mandibles in *Cylindera amayai* sp. nov. are shared with *C. acompsa*, *C. ocskayi* and *C. obliquealba*, but these three species clearly differ from the new species in having the outer margin of the terminal tooth in right mandible (in its lateral view) regularly continuous towards apex, smooth and lacking any dilatation (Figs 8, 10). Moreover, *C. ocskayi* can be immediately distinguished by its notably cupreous dorsal body surface and other characters emphasized under that species below. In addition, the aedeagus apex of *C. amayai* sp. nov. differs from all other species in having small emargination just below the narrow tip, and also its internal sac (Figs 95–96) appears distinct, particularly due to the dorsal spike directed downwards and rather different appearance of other sclerites.

Description. *Body* (Fig. 73) small, 7.30–8.30 (holotype, allotype) mm long, 2.50–2.80 (holotype, allotype) mm wide, dorsally black, black-brown, rarely cupreous; setal vesture whitish.

Head (Figs 81, 87) with large bulged eyes notably wider than thorax but narrower than elytra, 2.05–2.30 mm wide.

Frons fluently passing into vertex, its surface rather distinctly convex in middle, metallic black with strong green-blue lustre, or black-brown or cupreous with green-blue lustre on lateral areas only; anterior and lateral areas extremely finely longitudinally striate, striae irregularly crumbled in middle forming fine, asperate-granulate sculpture when passing on vertex; supraantennal plates rather large and flat, elongate-triangular, their base variably iridescent reddish-cupreous, bronze, or green, apical half deep violet.

Vertex almost flat, mostly concolorous with frons, anterior area (when passing from frons) extremely finely granulate-asperate to irregularly rugulose, usually with limited iridescent-reddish or green central ornament of dense circular rugae, surrounded by fine, arcuate-longitudinal striae on sublateral areas; juxtaorbital areas very finely and densely yet rather irregularly parallel-striate, striae usually fragmented or partly effaced, appearing more distinct and regular on sublateral-basal areas when divergent posteriad as passing onto temples and post-genae; postero-median and occipital area finely irregularly rugulose.

Genae entirely glabrous, dark iridescent cupreous or bronze dorsally and in middle; juxtaorbital area finely parallel striate, striae coarser on postgenal area; large ventral area mostly metallic green-blue, smooth and shiny.

Clypeus (Figs 88–91, illustrated with labrum) glabrous, entirely or partly iridescent green-blue or cupreous sometimes darkened, with various green-blue lustre; surface almost smooth, finely coriaceous; median area irregularly finely rugulose.

Labrum (Figs 88–91) with variable number of marginal setae, in both sexes almost uniformly coloured, yellow to ochraceous with darkened basolateral areas; shorter than wide, but never appearing transverse due to its semicircular-raised anterior margin, 0.55–0.70 mm long, 1.05–1.20 mm wide; lateral indentation (on either side) distinct, right-angled or subacute; anterior margin with variable number of 5–7 anterior teeth which are blunt or subacute except for usually subacute or acute median tooth (mostly more protruding in females); dorsal surface with rather distinct yet wide median convexity and more or less distinct basal impression on either side of the convexity.

Mandibles (Figs 3, 5, 81, 83, 85, 87) normally shaped with arcuate lateral margins, subsymmetrical, with only three teeth (apart from basal molar), exceptionally with little tooth placed between second and third ones (Figs 5, 83); the inner teeth mostly wide; terminal tooth of right male mandible in its lateral view with distinct outer subapical lobe (Figs 4, 6, 82, 84, 86).

Palpi (Figs 81, 87) normally shaped with elongate terminal palpomeres. Maxillary palpi in males with longest and penultimate palpomere ochre-testaceous, penultimate palpomere in female allotype metallic green-blue; terminal palpomeres metallic black, usually with strong green-blue lustre; labial palpi in both sexes with longest palpomere yellow-testaceous, terminal palpomere metallic black with faint blue-green lustre.

Antennae (Figs 73, 81, 87) rather short, slightly surpassing elytral humeri; scape metallic-black, usually with

faint or strong greenish-blue or reddish-cupreous or violet lustre, scape rather elongate, dilated towards apex, with long apical seta, together with pedicel metallic black with cupreous or green lustre; antennomeres 3–4 concolorous with scape and pedicel, or with stronger reddish-cupreous or green-blue lustre, with several semierect, stiff setae; antennomere 5 with brownish testaceous basal half (paler in female allotype), or also base of antennomere 6 brownish-testaceous (generally coloured as in *C. morio*, thus mostly darker than in following three species); antennomeres 7–11 gradually greyish-blackened and with usual micropubescence.

Thorax. Pronotum (Figs 98–101) mostly shorter than wide, 1.50–1.70 mm long, 1.60–1.90 mm wide, more distinctly wider in females, lateral margins of disc convex, more distinctly in females while more or less attenuated posteriad in males (notopleural sutures in dorsal view almost parallel-running with proepisternal margins); surface of pronotal disc extremely finely asperate or micro-granulate, lacking any striae, dorsal juxtanotopleural and rather wide lateral areas punctate-setose (usually in two irregular rows), setae white, rather short and stiff, appressed or semi-erect, mostly mesad-directed, sparsely passing onto anteromedian area; lateral thoracic sterna densely whitish setose: proepisterna rather sparsely punctate-setose only in their ventral third, while rather wide dorsal-juxtanotopleural area is smooth and glabrous, with only few parallel wrinkles; mesepisterna smooth and glabrous except for a few setae at base and adjacent to metepisterna, female coupling sulci in form of deeper longitudinal furrow, yet barely distinguished from simpler and shallower longitudinal furrow as usual for male mesepisterna; metepisterna finely punctate-setose; prosternum and mesosternum smooth and almost glabrous; metasternum smooth and glabrous in middle, lateral areas densely setose.

Elytra (Figs 74–79) elongate 4.60–5.10 mm long, lateral margins in both sexes moderately convex below middle (more distinctly in females), from arcuate anteapical angles obliquely running (more steeply in males) towards small sutural spine; surface moderately and almost evenly convex; humeral impressions short but distinct, basal convexity moderate, basodiscal impression shallow, oblique mesad towards sutures, anteapical and apical impressions indistinct; surface very shallowly punctate throughout: punctures flat, isodiametric or irregular, more or less distinct as mostly matt, diffusing-greenish, rarely diffusing-cupreous or feebly iridescent, as also are the faintly iridescent or sometimes barely visible 4–7 foveae running on elytral disc along sutures from elytral base towards elytral apex; background elytral coloration almost black (as in holotype), or with diffusing coppery tinge, and always with characteristic, irregular and irregularly running, simple or branched velvety-black streaks; whitish elytral maculation conspicuous, consisting of rather large sublateral-median, anteapical or also subsutural-discal macula; the sublateral-median macula may be distinctly connected with the subsutural-discal macula (Fig. 77) or only indistinctly as in holotype (Figs 73–74); very rarely also indistinct anterior basodiscal spot (Figs 73–74) is present (as in holotype); humeral and apical macula entirely absent.

Legs as in the description of the species-complex above, yet tibiae mostly darker, coppery-testaceous.

Abdomen. Ventrites metallic black usually with more or less distinct green-blue lustre (depending upon light-angle), smooth and glabrous in middle, while wide lateral areas rather densely covered with whitish appressed setae mostly on all visible ventrites, male pleurite sometimes brownish-lightened.

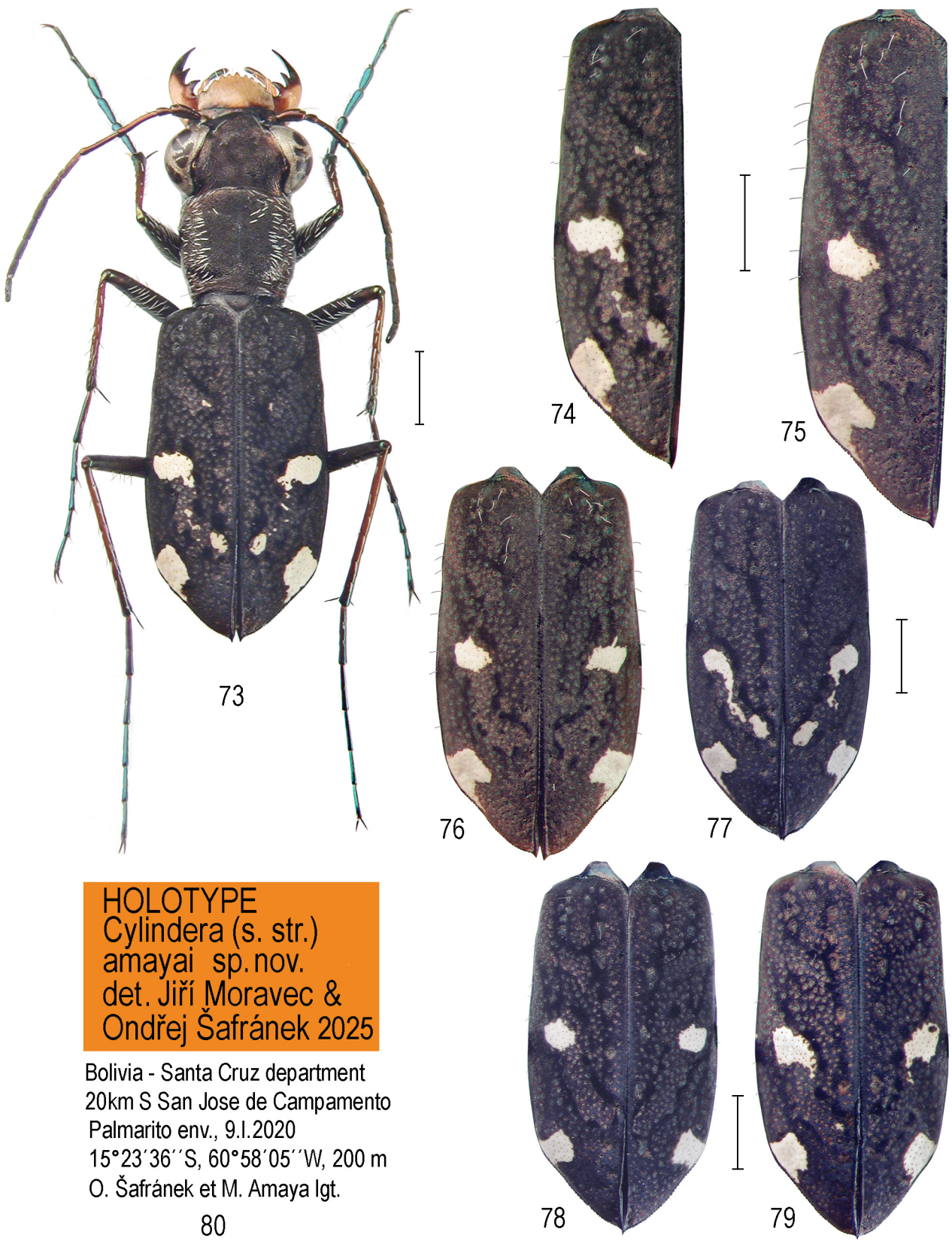
Aedeagus (Figs 92–97) in its lateral view normally shaped with normally bent basal portion, median portion elongated and straight, widest in middle or again below apical portion before it is conically attenuated, or constricted (less abruptly than in *Cylindera acompsa* but more abruptly than in *C. morio*) towards rather short and narrow apex that is dorsally slightly emarginated below the tip; internal sac (Figs 95–96) widely armed, containing convoluted flagellum with characteristically shaped base, its flagelliform portion long, yet never protruding from dorsoapical orifice; in left lateral view (Fig. 95) showing long, stick-like arciform piece somewhat convoluted at its base, downward directed dorsal spike surrounded by elongate-voluminous piece with its micro-echinate surface and sclerotized dorsal margin, and another, subapical voluminous piece with micro-echinate surface; in right lateral view (Fig. 96) the arciform piece is unrecognizable but the two voluminous pieces appear much larger; other sclerites are of barely defined shapes.

Distribution and biology. *Cylindera amayai* sp. nov. is known only from the type locality near Palmarito, 20 km south of San Jose de Campamento in the department of Santa Cruz (Figs 216, 218). The new species inhabits the westernmost margin of the Pantanal ecoregion, where periodical flooded savanna depressions blend with the mosaic of tropical Chiquitano dry forest on its northwestern part (Figs 217–218). It represents quite a unique ecosystem covered by grass-shrub vegetation in the depressions on alluvial soils and low forest vegetation at the higher levels of the landscape. The difference between these two types of vegetation is just 10–20 meters of altitude, often with sharp transition zone (Ibisch et al. 2004). Observed adults run during the day on the small path through grassy areas (Fig. 217) within the above-mentioned transitional zone vegetation; they run or fly quickly to the surrounding vegetation when disturbed. No larva was found.

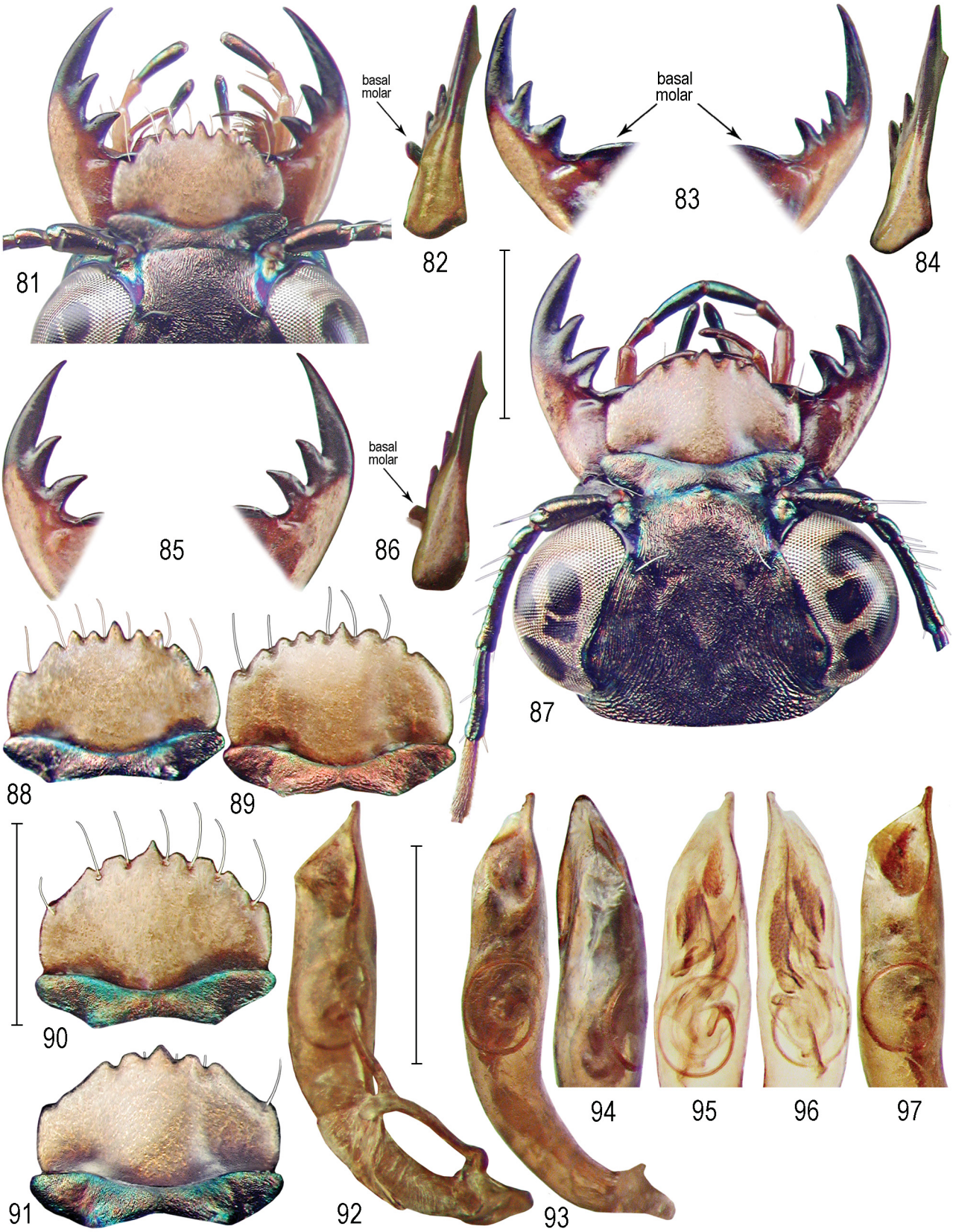
Pearson et al. (1999), when recording *Cylindera morio* from Bolivia, obviously had not collected *Cylindera amayai* sp. nov. (see "Remarks" below). Nevertheless, both species may have sympatric (but obviously not syntopic) occurrence as the collecting area of the new species is rather large, and indeed, one female of *Cylindera morio* was collected near Palmarito yet without exact evidences as to the distance from the adults of the new species.

Etymology. The new species is dedicated to one of the collectors and our dear colleague Marcelo Amaya (Santa Cruz de la Sierra, Bolivia).

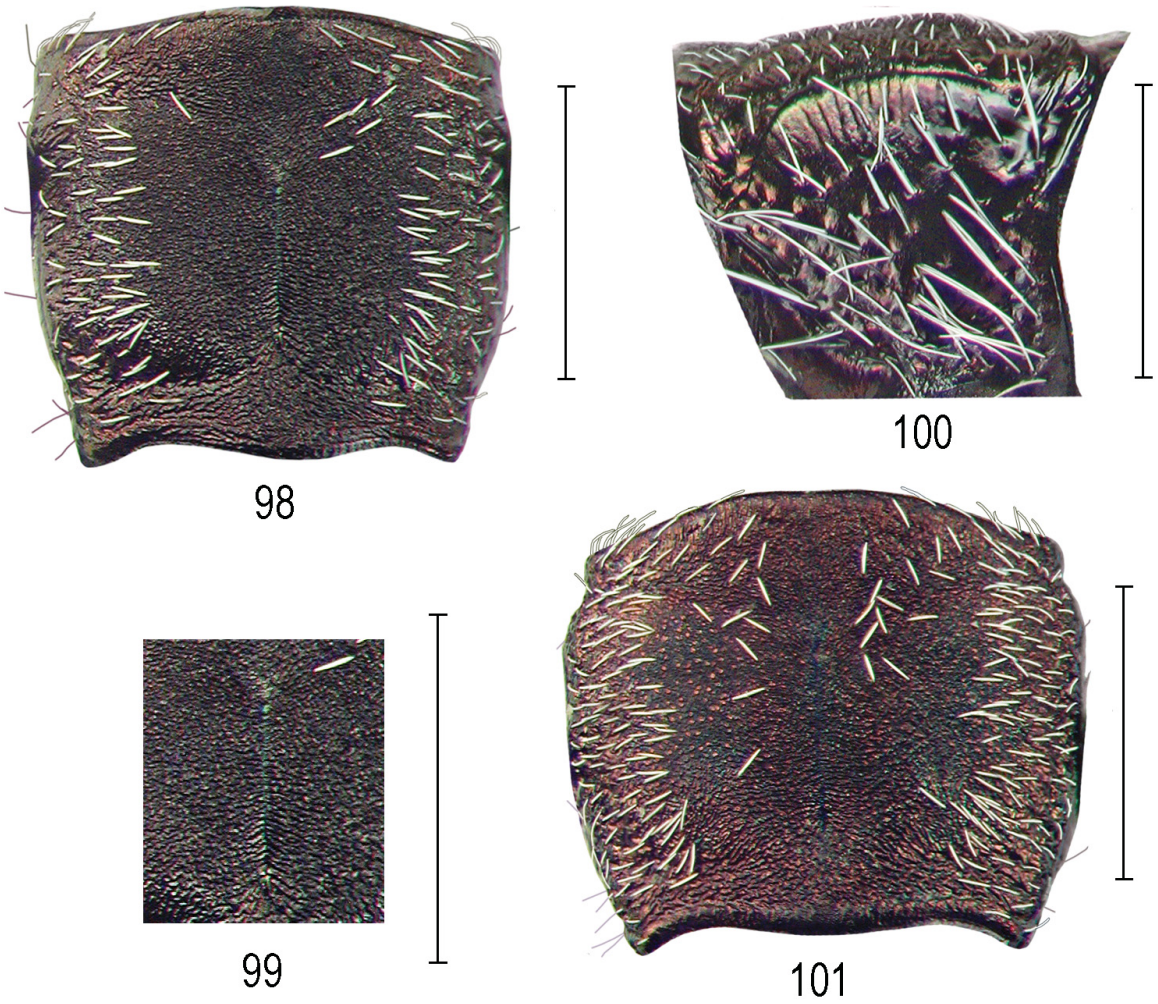
Remarks. As Pearson et al. (1999) mentioned that all the Bolivian specimens possessed black, immaculate elytra, the authors obviously recorded only *Cylindera morio*, apparently without any specimen of *C. amayai* sp. nov. This supposition is supported by the fact that neither the name of the type locality, nor its coordinates are listed among the records (with coordinates) by the authors.



Figs 73–80. *Cylindera* (*Cylindera*) *amayai* sp. nov., all from Bolivia, Palmarito. 73 – habitus, ♂, 7.3 mm, holotype (UASC, temporarily in COSJ); 74–75 – elytron: 74 – ♂, holotype; 75 – ♀, allotype (COSJ); 76–79 – elytra: 76 – ♀, allotype; 77–79 – ♂, paratype; 80 – labels, holotype. Scale bars = 1 mm.



Figs 81–97. *Cylindera* (*Cylindera*) *amayai* sp. nov., all from Bolivia, Palmarito. 81 – head, ♂, holotype (UASC, temporarily in COSJ); 82 – ♂, holotype, terminal tooth of right mandible in lateral view; 83–86 – mandibles, ♂, paratypes (COSJ): 83 and 85 – both mandibles; 84 and 86 – terminal tooth of right mandible in lateral view; 87 – head, ♀, allotype (COSJ); 88–91 – labrum: 88–90 – ♂, paratypes; 91 – ♀, allotype; 92–97 – male aedeagus: 92 – holotype; 93 – paratype; 94 – paratype, dorsal view; 95–96 – internal sac in left and right lateral views; 97 – paratype, apex. Scale bars = 1 mm.



Figs 98–101. *Cylindera* (*Cylindera*) *amayai* sp. nov., all from Bolivia, Palmarito. 98 – pronotum, ♂, holotype (UASC, temporarily in COSJ); 99 – holotype, detail of surface sculpture; 100 – holotype, lateral view, showing proepisternum; 101 – pronotum, ♀, allotype (COSJ). Scale bars = 1 mm.

Cylindera (*Cylindera*) *acompsa* (Chaudoir, 1852) comb. nov.

(Figs 102–147)

Cicindela acompsa Chaudoir, 1852: 27.
Cicindosa inaequalis Motschulsky, 1864: 174, **syn. nov.**
Cicindela morio acompsa: Chaudoir (1865: 39).
Cicindela morio syn. *acompsa*: Fleutiaux (1892: 68).
Cicindela morio var. acompsa: Horn (1892: 213).
Cylindera morio syn. *acompsa*: Horn (1915: 405).
Cicindela morio "phase" *acompsa*: Blackwelder (1944: 18).
Cicindosa acompsa: Schilder (1953: 561).
Cicindela (*Cylindera*) *morio* syn. *acompsa*: Freitag & Barnes (1989: 320).
Cylindera (s. str.) *morio* syn. *acompsa*: Wiesner (1992: 185) – as a junior synonym of *Cylindera morio* (the synonymy followed by all subsequent authors until the present revision).

Type locality. *Cicindela acompsa*: Brazil, "les bords du fleuve des Amazones" [= the banks of the Amazon River]; *Cicindosa inaequalis*: "De l'Amérique equatoriale" [= from Equatorial America].

Type material. *Cicindela acompsa*: Holotype: ♀ (MNHN), lacking any label yet selected in MNHN because of its characters corresponding to the original description, and as standing in the first line along the ochre-tarnished collection label with black frame: "acompsa / Chaud. / Amér. tropic / 49 Melly", labelled: "Holotype by monotypy / Cicindela acompsa / Chaudoir, 1852 / design. Jiří Moravec 2024" [red label, printed] // "Cylindera (s. str.) / acompsa (Chaudoir, 1852) / det. Jiří Moravec 2024" [printed].

Cicindosa inaequalis. Lectotype (here designated): ♂ (ZMUM), labelled: "Amaz." [dark green label, handwritten] // "Cicindosa / inaequalis / m. / Am. aeq." [green label, handwritten] // "= C. r [illegible] morio / Klg. / Dr. W. Horn det. 1426" [handwritten] // "Lectotype / Cicindosa / inaequalis / Motschulsky, 1864 / design. Jiří Moravec 2025" [red label, printed] // "*Cylindera* (s. str.) / *acompsa* (Motschulsky, 1864) / det. Jiří Moravec 2025" [printed]. Paralectotype: 1 ♀ (ZMUM): "Cicindosa / inaequalis / Motsch. / Am. aeq." [dark green label, handwritten] // small square plain green label // "Paralectotype / Cicindosa / inaequalis / Motschulsky, 1864 / design. Jiří Moravec 2025" [red label, printed] // "*Cylindera* (s. str.) / *acompsa* (Motschulsky, 1864) / det. Jiří Moravec 2025".

Other material examined. Historical specimens: 1 ♂ 1 ♀ (MNHN), standing in the same line with the holotype of *C. acompsa*, lacking labels except for one ♀ with small square plain ochre label. 1 ♂ (MFNB): "Hist. - Coll. (Coleoptera) / Nr 3719 / Cicindela morio Kl. / Brasil Freireiss / Zool Mus. Berlin" [green printed] // "*Cylindera* (s. str.) / *acompsa* (Motschulsky, 1864) / det. Jiří Moravec 2025". 1 ♀ (BMNH): "Para" // "Cicindela / morio / var." // "named by Dr. W. Horn / G.J.A." [on opposite side of the label]. 2 ♂♂ (BMNH): "Para" // "Bowring / 63.47*". 1 ♂ (BMNH): "Para" // "49/" [on opposite side]. 1 ♂ (BMNH): "[illegible] / Para" // "denticulata Kl. / t. Horn" // "F. Bates Coll. / 1911–248". 1 ♂ (BMNH): "Amazons" // "morio / Klug" // "denticulata / t. Horn". 1 ♂ (BMNH):

"181" // "Para" // "46/33" [on the opposite side]. 1 ♂ 1 ♀ (BMNH): "Brazil / Santarem" // "52/96" [on the opposite side]. 1 ♀ (SDEI): "Staudinger / Cuyaba". 1 ♂ (SDEI): "Ap. / Amaz.". 1 ♂ (SDEI): "Jatahy / Goyaz". Recent specimens: 1 ♀ (MZSP): "Dianópolis / GO, Brasil / 16-22.I.1962 / J. Bechyné" [Bechyně] // "MZSP62732". 1 ♂ (MZSP), with the same labels except for: "MZSP62745". Other 15 syntopic adult specimens in MZSP examined by Gabriel Biffi (pers. comm.).

The examined specimens are labelled: "*Cylindera* (s. str.) / *acompsa* (Chaudoir, 1852) / det. Jiří Moravec 2024" ("2025" respectively).

Differential diagnosis and brief redescription. *Cylindera acompsa* differs clearly from *C. morio* in having mandibles with only three teeth (apart from basal molar) (Figs 7, 9, 103, 111–113, 117, 119–120, 122–123, 146–147), exceptionally with a little tooth or its rudiment between the second and third tooth (Figs 9, 113). Moreover, the right terminal tooth in male mandibles is always regularly attenuated towards apex, with smooth outer margin, lacking any outer dilatation (Figs 8, 10, 114, 118, 121). Surface of pronotal disc covered with extremely fine sculpture (consisting of striae fragmented into densely vermicular pattern, parallel striae indistinctly present along median line). Body (Figs 102, 106–107, 139, 140) 7.10–8.60 (holotype 7.50) mm long, 2.50–2.90 (holotype 2.90) mm wide, notably smaller that in *C. morio*. White elytral maculation consisting of usually distinct lateromedian, anteapical, or also subsutural-discal macula (Figs 102, 106–107, 124, 127–131, 139); very rarely elytra almost immaculate with only indicated anteapical spot (Figs 125–126, 140). Aedeagus (Figs 132–138, 143) with apical portion abruptly constricted towards small apex.

Cylindera ocskayi shares most of its characters with *C. acompsa*, yet apart from its prevailingly cupreous dorsal body coloration, it differs in several other characters stressed under that species below (see also "Remarks" below).

Cylindera obliquealba (Motschulsky, 1864), in literature considered to be conspecific with *C. acompsa* (more recently with *C. morio*), is immediately distinguished by its primarily conspicuously wide whitish elytral pattern (Figs 181–182, 188, 206–211). It is noteworthy that the elytron illustrated by Horn (1938: tab. 84, fig. 26) as for "*Cicindela morio* ab. *acompsa*" in fact shows the elytron which is characteristic of the examined specimens of *C. obliquealba*. It was contrary to the original description of *C. acompsa* by Chaudoir (1852), as well as to the elytra in the holotype of *C. acompsa* in MNHN (Fig. 102). The above cited illustration by Horn (1938) obviously contributed to the subsequent concept of *C. acompsa* and *C. obliquealba*, hitherto as synonyms of *C. morio*.

Distribution. Specimens confirmed as *C. acompsa* come only from Brazil; the species very probably does not occur in Bolivia, because all specimens recorded from Bolivia by Pearson et al. (1999) clearly belong to *C. morio* (see "Distribution and biology" under that species above). Moreover, according to the records and the map of distribution published by Freitag & Barnes (1989: fig. 156), no specimen of the species-complex was recorded from Bolivia by the authors.

In the original description of his *Cicindela acompsa*, Chaudoir (1852) mentioned "*les bords du fleuve des Amazones*" as the type locality, thus very probably Brazilian Amazonia. He also mentioned that he had received the female holotype from M. Melly, which is in accordance with the large collecting label "acompsa / Chaud. / Amér. tropic / 49 Melly" in the MNHN box with the female holotype placed there in the same line along the above-cited label. Old and historical specimens lack exact locality data on their labels, except for 17 specimens in MZSP, collected by Jan Bechyně (researcher of Czech origin) near Dianópolis in the Brazilian state of Tocantins. As Tocantins was formerly northern part of the state of Goiás (once spelled Goyaz), some historical specimens labelled as "Goyaz" might also come from the state of Tocantins (see the map Fig. 215).

Remarks. As mentioned in "Note on phylogeny" above, Freitag & Barnes (1989) did not examine type specimens of the taxa of the *C. morio* species-complex, and overlooked the important diagnostic characters, particularly on mandibles, as emphasized in the present paper (also in "Differential diagnosis" above). When Freitag & Barnes (1989) inappropriately treated *C. acompsa* as a junior synonym of *C. morio*, they argued in line with their above-mentioned failure: "*adults of the C. acompsa form which have extensive pale maculations on the elytra are not given subspecific status as they are found with conspecific adults which have various elytral patterns*". However, apart from the distinguishing diagnostic characters overlooked by the authors, all taxa of the species-complex occur sympatrically in the same Brazilian states, and as the old specimens lack exact locality, the authors could not be absolutely sure of their syntopic occurrence (see also under *C. obliquealba* below). Accordingly, the redescription by Freitag & Barnes (1989) under *C. morio* evidently comprises other taxa of this species-complex including *C. acompsa*. This is also clear from their illustrations of the elytra, where in figures 131a–b the authors illustrate larger elytra from Jataí (with acute apex in male) of *C. morio*, while in figures 131c–d much smaller elytra from Brazilian Dianópolis (MZSP) also with characteristic elytral maculation of *C. acompsa*, as well as the much smaller aedeagus illustrated by the authors in figs 149 a–b. It is fully in accordance with the same 17 specimens from Dianópolis (originally all with closed mandibles) deposited in MZSP and examined by Freitag & Barnes (1989). Thanks to the photos kindly sent by Gabriel Biffi (MZSP), the specimens were proved herein to be conspecific with *C. acompsa* and clearly differing from *C. morio* in their notably smaller body, their whitish elytral maculation (see Fig. 124) and tridentate mandibles (see Figs 122–123). The aedeagi were illustrated by Freitag & Barnes (1989) rather schematically and according to the aedeagus apex in its lateral view illustrated by the authors from Brazilian Jataí, it also might be taken from *C. acompsa*, which occurs sympatrically with *C. morio* in Jataí and in other Brazilian states.

It must be noted here that despite the above-mentioned several differences, *C. acompsa* shares a number of its characters with *C. ocskayi*. Therefore, if these two taxa are proven conspecific in the future (providing that fresh specimens with preserved DNA are available), *C. acompsa* will become a junior synonym of *C. ocskayi*.

102

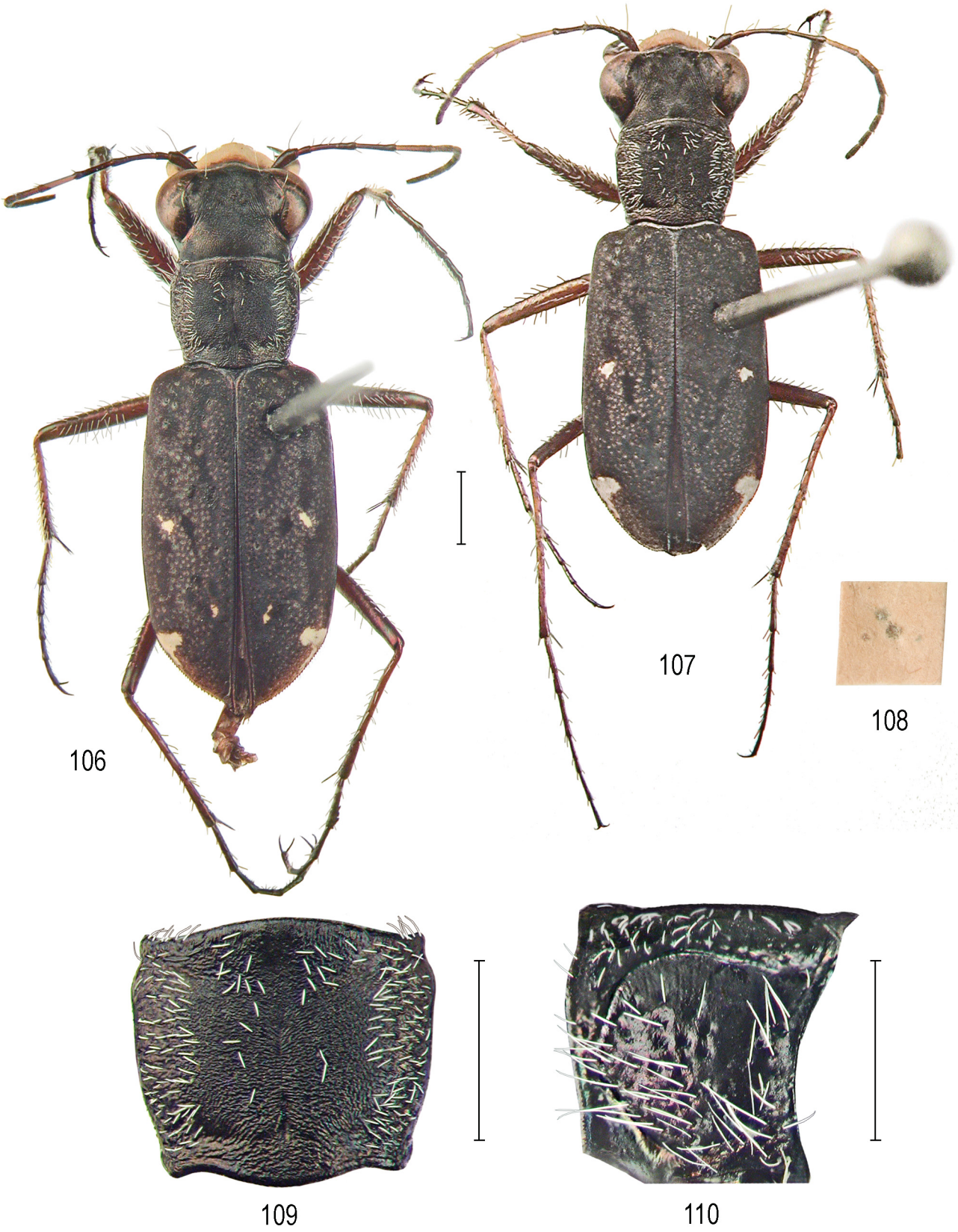
103

104

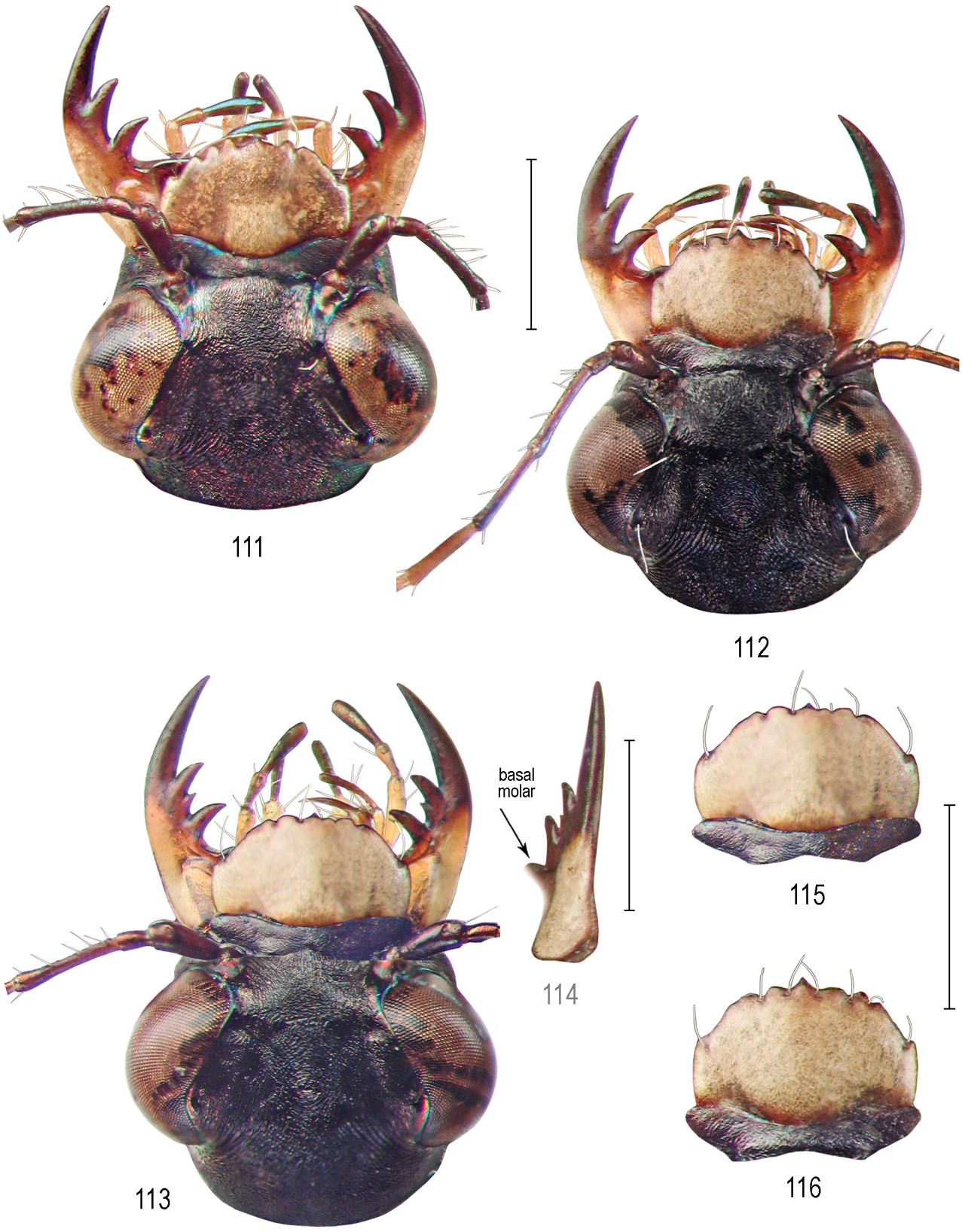
HOLOTYPE (by monotypy)
Cicindela
acompsa Chaudoir, 1852
design. Jiří Moravec 2025

105

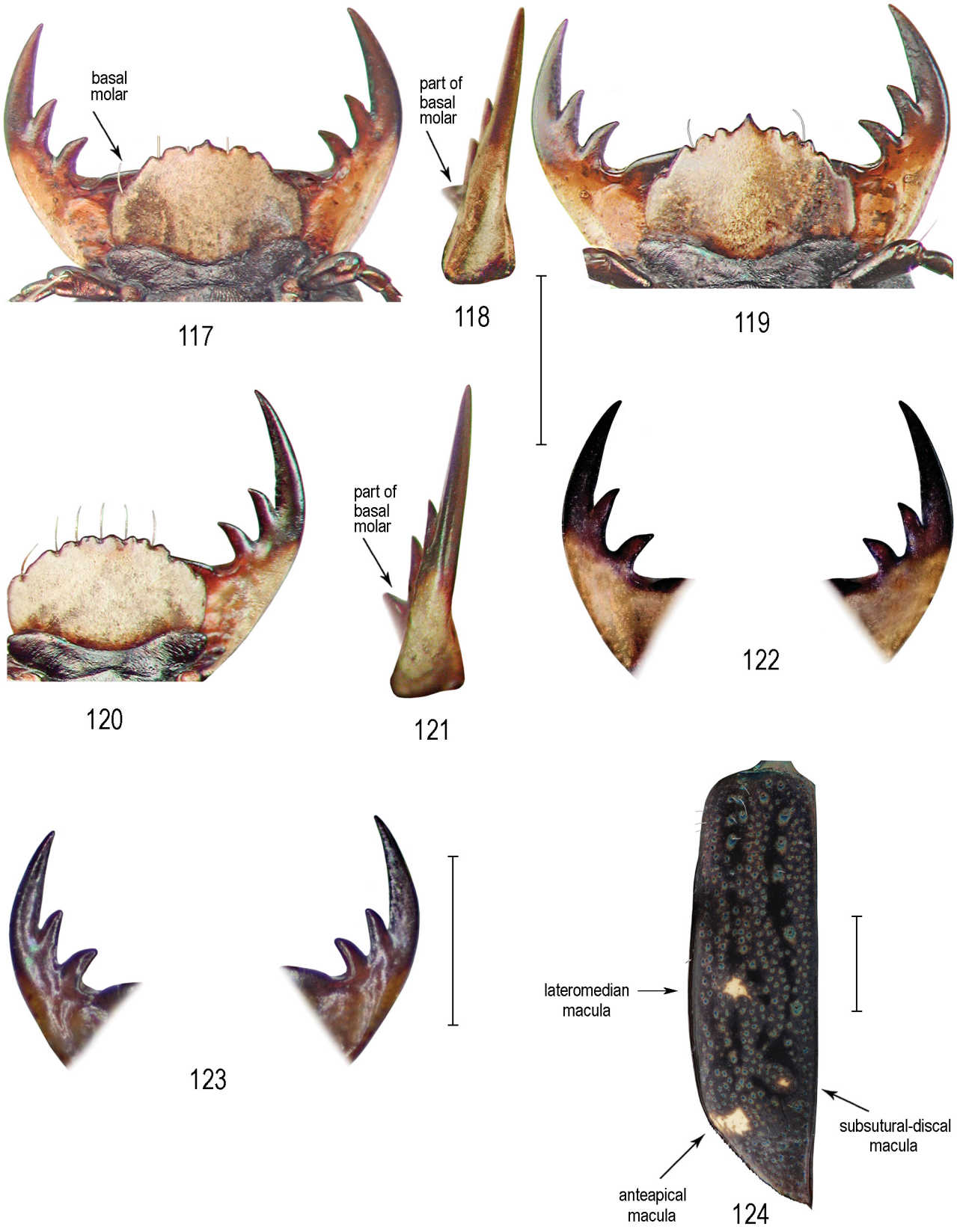
Figs 102–105. *Cylindera* (*Cylindera*) *acompsa* (Chaudoir, 1852), ♀, holotype (MNHN). 102 – habitus, 7.5 mm; 103 – mandibles with labrum; 104 – pronotum; 105 – labels. Scale bars = 1 mm (image credit Olivier Montreuil, MNHN).



Figs 106–110. *Cylindera* (*Cylindera*) *acompsa* (Chaudoir, 1852), historical specimens (MNHN) ex collection Chaudoir (standing along with holotype), lacking locality labels. 106 – ♂, 7.5 mm; 107 – ♀, 7.3 mm; 108 – plain label; 109 – pronotum, ♂; 110 – its lateral view, showing proepisternum. Scale bars = 1 mm.

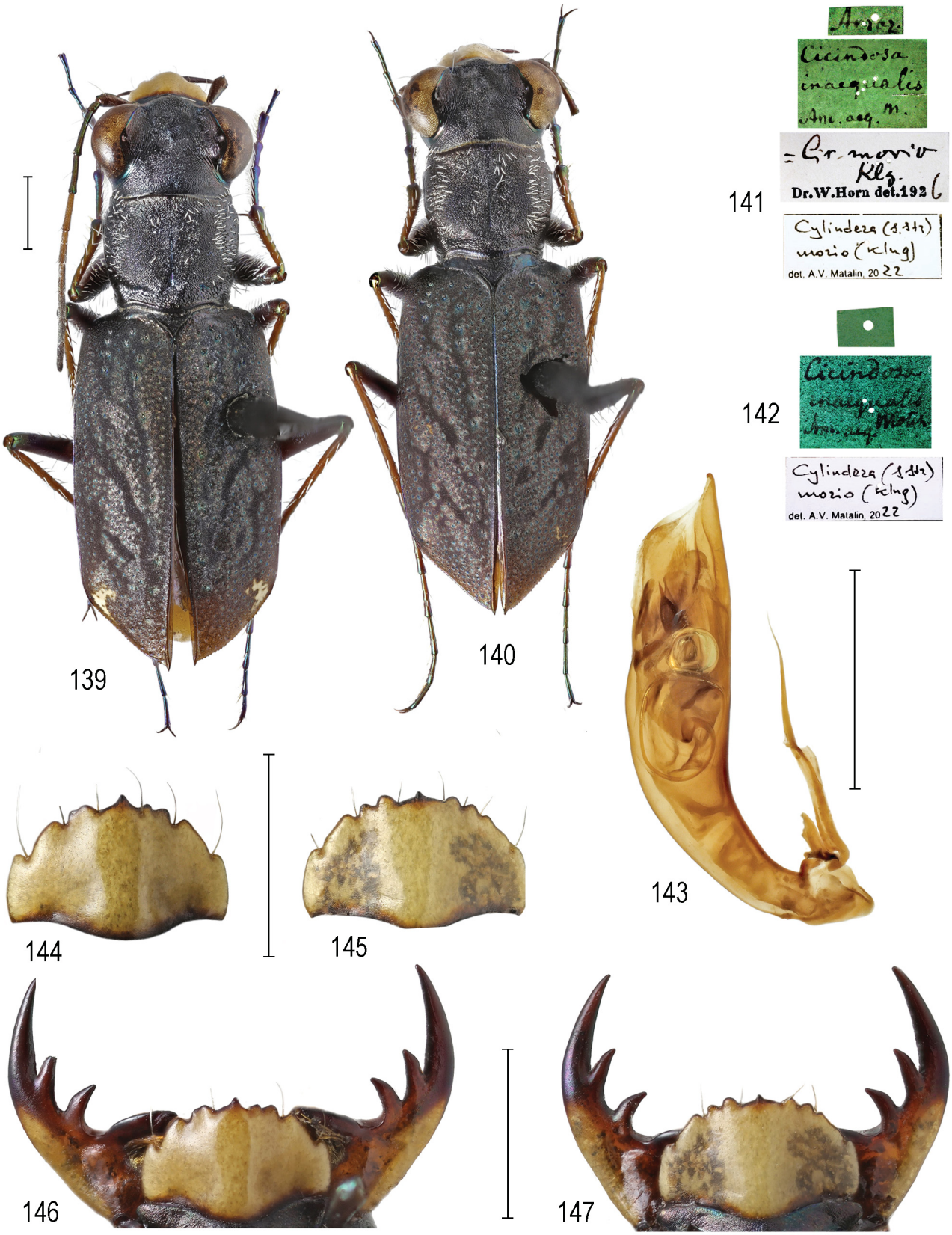


Figs 111–116. *Cylindera* (*Cylindera*) *acompsa* (Chaudoir,1852), historical specimens. 111–113 – head: 111 – ♂, Nr 3719, "Brasil, ex Freireiss" (MFNB); 112–114 – ex collection Chaudoir (MNHN) lacking locality labels: 112 – ♀; 113 – ♂; 114 – terminal tooth of right mandible in lateral view; 115–116 – labrum, historical specimens ex collection Chaudoir (MNHN): 115 – ♂; 116 – ♀. Scale bars = 1 mm.



Figs 117–124. *Cylindera* (*Cylindera*) *acompsa* (Chaudoir, 1852), all from Brazil. 117 – mandibles with labrum, ♂, Santarem (BMNH); 118 – ♂, Santarem, terminal tooth of right mandible in lateral view; 119 – mandibles with labrum, ♀, Santarem (MNHN); 120 – right mandible with labrum, Para (BMNH); 121 – terminal tooth of right male mandible in lateral view, Para (BMNH); 122–123 – mandibles, Dianópolis: 122 – ♂ (MZSP 62745); 123 – ♀ (MZSP 62732); 124 – elytron, Dianópolis (MZSP 62745). For Figs 122–124 image credit Gabriel Biffi (MZSP). Scale bars = 1 mm.

Figs 125–138. *Cylindera* (*Cylindera*) *acompsa* (Chaudoir, 1852), all from Brazil. 125–131 – elytron: 125 – "Brasil, ex Freireiss, Nr 3719" (MFNB); 126 – ♂, Santarem (BMNH); 127 – ♀, Santarem (BMNH); 128 – ♂, ex collection Chaudoir (MNHN); 129 – ♂, Para (BMNH); 130 – ♀, ex collection Chaudoir (MNHN); 131 – ♂, "Jatahy, Goyaz" [= Jataí, Goiás] (SDEI); 132–138 – male aedeagus: 132 – Santarem (BMNH); 133 – "Brasil, ex Freireiss, Nr 3719" (MFNB), 134 – the same aedeagus in dorsal view; 135 – Para (BMNH); 136–138 – internal sac in left and right lateral and dorsal view, Para (BMNH). Scale bars = 1 mm.



Figs 139–147. *Cylindera* (*Cylindera*) *acompsa* (Chaudoir, 1852), syntypes (ZMUM) of the synonym *Cicindosa inaequalis* Motschulsky, 1864. 139–140 – habitus: 139 – ♂, 7.7 mm, lectotype; 140 – ♀, 7.5 mm, paralectotype; 141–142 – original labels of syntypes: 141 – ♂, lectotype; 142 – ♀, paralectotype; 143 – aedeagus, lectotype; 144–145 – labrum: 144 – ♂, lectotype; 145 – ♀, paralectotype; 146–147 – mandibles: 146 – ♂, lectotype; 147 – ♀, paralectotype. Scale bars = 1 mm. (Image credit A. Matalin and V. Savitsky, ZMUM).

Cylindera (*Cylindera*) *ocskayi* Gistl, 1837

(Figs 148–180)

Cicindela denticulata Klug, 1834: 15 – primary junior homonym of *Cicindela denticulata* T. W. Harris, 1828: 19, which is presently a junior synonym of *Cicindela scutellaris rugifrons* (Dejean, 1825).
Cicindela ocskayi Gistl, 1837: 22 – substitute name for *Cicindela denticulata* Klug, 1834.
Cicindela morio var. *denticulata*: Horn (1892: 213).
Cicindela denticulata: Fleutiaux (1892: 45).
Cicindela morio syn. *denticulata*: Horn (1915: 405).
Cicindela morio syn. *ocskayi*: Horn (1915: 405).
Cicindela morio "aberration" *denticulata*: Horn (1938: tab. 38, figs 24–25).
Cicindela morio denticulata: Blackwelder (1944: 18).
Cicindosa denticulata: Schilder (1953: 561).
Cylindera (s. str.) *morio denticulata*: Rivalier (1954: 265).
Cicindela (*Cylindera*) *morio* syn. *denticulata*: Freitag & Barnes (1989: 320).
Cicindela (*Cylindera*) *morio* syn. *ocskayi*: Freitag & Barnes (1989: 320).
Cylindera (s. str.) *morio* syn. *denticulata*: Wiesner (1992: 185) – as a junior synonym of *C. morio* Klug, 1834 (the synonymy followed by all subsequent authors until the present revision).

Type locality. *Cicindela denticulata*: "Brasil"; *Cicindela ocskayi*: "Brasilia".

Type material. Lectotype of *Cicindela denticulata* Klug, 1834, here designated, and simultaneously also designated as a neotype for *Cicindela ocskayi* Gistl, 1837: ♂ (MFNB), labelled: "Hist. – Coll. (Coleoptera) / Nr 3716 / Cicindela denticulata Kl. / Brasil, Freireiss / Zool Mus. Berlin" [green label with black frame, printed] // "Syntype / Cicindela / denticulata / Klug, 1834 / labelled by MFNB 2024" [red label, printed] // "Lectotype / Cicindela / denticulata / Klug, 1834 / design. Jiří Moravec 2024 [red label, printed] // "Neotype / Cicindela / ocskayi Gistl, 1837 / design. Jiří Moravec 2025" [red label, printed] // "Cylindera (s. str.) / ocskayi (Gistl, 1837) / (replacement name for / C. denticulata Klug, 1834 / det. Jiří Moravec 2025" [printed]. Paralectotype of *C. denticulata*: 1 ♀ (MFNB) with same labels as lectotype and: "denticulata / Kl. / 307 / Brasil, Freir." [large green collection label with black frame, handwritten" // "Paralectotype / Cicindela / denticulata / Klug, 1834 / design. Jiří Moravec 2024" [red label, printed] // "Cylindera (s. str.) / ocskayi (Gistl, 1837) / (replacement name for / C. denticulata Klug, 1834 / det. Jiří Moravec 2025" [printed].

Other material examined. 1 ♂ (BMNH), lacking locality label: "Bates" [greyish label, handwritten] // "denticulata / Kl. t. Horn" [handwritten] // "F. Bates Coll. / 1911–248". 4 ♂♂ (BMNH): "Lower Amazon" // "morio / Kl. / var. t. W. Horn" // "F. Bates Coll. / 1911–248". 1 ♂ (BMNH): "Amazon" // "biguttata / Deyr." // "denticulata / Kl. t. Horn". 1 ♀ (BMNH): "Amazon" // acompsa / Chaud. / Para" // "denticulata / Kl. t. Horn". 1 ♀ (BMNH): "Para" // "50/2" [on the opposite side]. 1 ♂ (SDEI): "Amazon" // "Coll V. de Poll". The examined specimens are labelled: "Cylindera (s. str.) / ocskayi (Gistl, 1837) / (new replacement name for / *C. denticulata* Klug, 1834 / det. Jiří Moravec 2025" [printed].

Differential diagnosis and brief redescription. *Cylindera ocskayi*, whose neotype is simultaneously the lectotype of *Cicindela denticulata* Klug (the characters described here particularly from the male lectotype and female paralectotype), is probably closely related to *Cylindera acompsa* with which it shares the shape of tridentate mandibles (Figs 153–154, 164, 167–168) with smooth outer margin of the right terminal tooth in males (Figs 165, 169), similar pattern of whitish elytral maculation (Figs 148–149, 161–163, 174–177) and rather similar shape of the aedeagus (Figs 178–180). Nevertheless, unlike the prevailingly black basic elytral coloration in *C. acompsa*, the entire dorsal body coloration of *C. ocskayi* is notably cupreous (Figs 148–149). Although the dorsal body coloration itself may not be a reliable diagnostic character, *C. ocskayi* is distinguished by the following diagnostic characters: pronotal disc is notably wider (Figs 157–158, 170–172), its surface minutely yet markedly parallel-striate in median area (Figs 159, 171) and with conspicuously deep iridescent punctures and foveae on lateral areas of the disc (Figs 160, 173) unlike the prevailingly micro-vermicular discal surface and smaller lateral punctures in *C. acompsa*. Aedeagus with apical portion dorsally abruptly constricted towards small, rather thin and usually slightly dorsad-bent apex (Figs 150, 178–180).

Cylindera obliquealba, which also possesses the primarily tridentate mandibles and similar apex of its aedeagus, is immediately recognizable by its primarily conspicuously wide white elytral lateral area, yet the whitish pattern may be reduced (see under that species below).

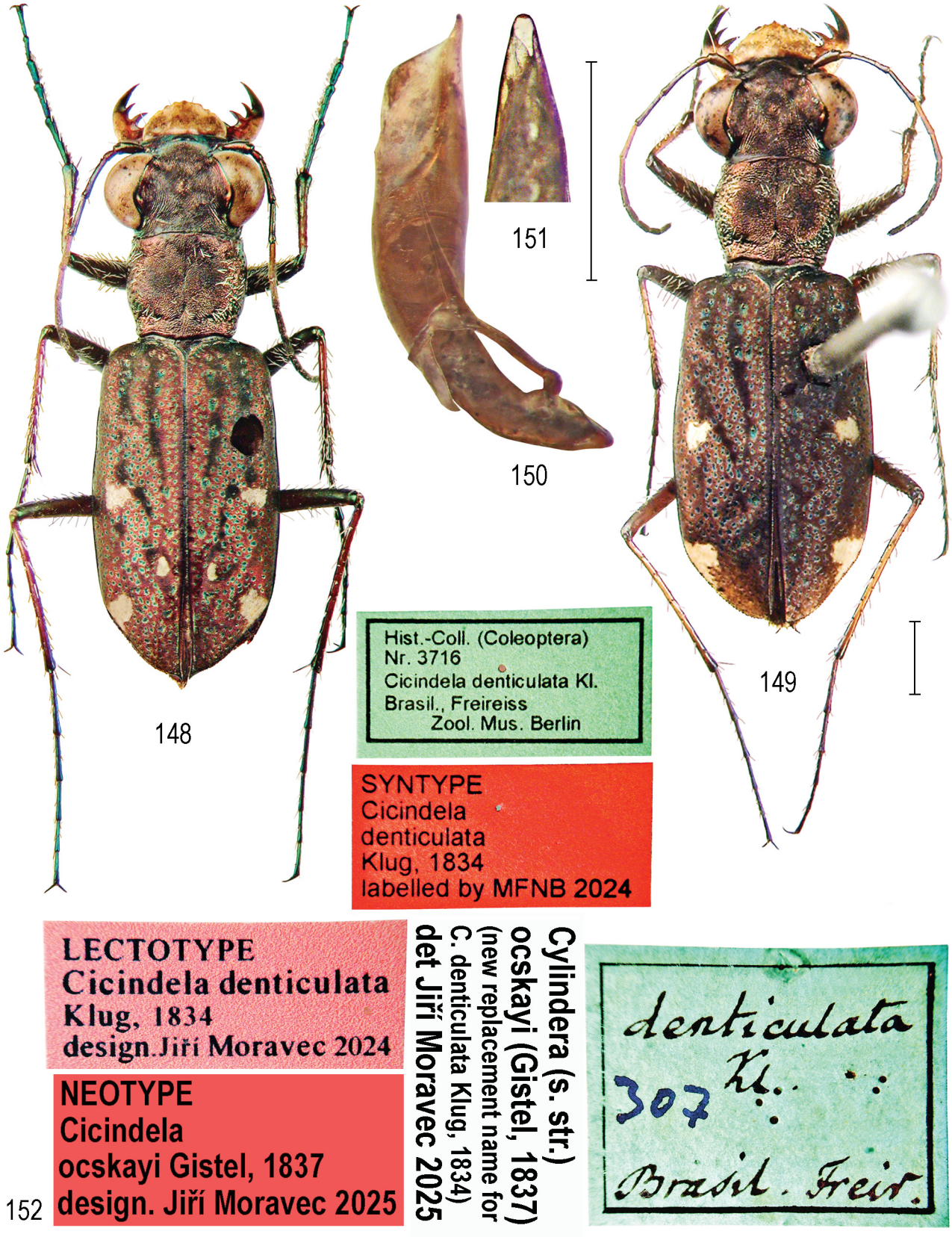
Variability. Left mandible in one non-type male specimen (BMNH) has also a rudiment of tooth between the second and third tooth (Fig. 164).

Distribution. *Cylindera ocskayi* is known only from Brazil, and only old historical specimens were found in collections. Apart from the type locality "Brasilia" or "Brasil", other examined specimens are labelled "Lower Amazon" and "Para".

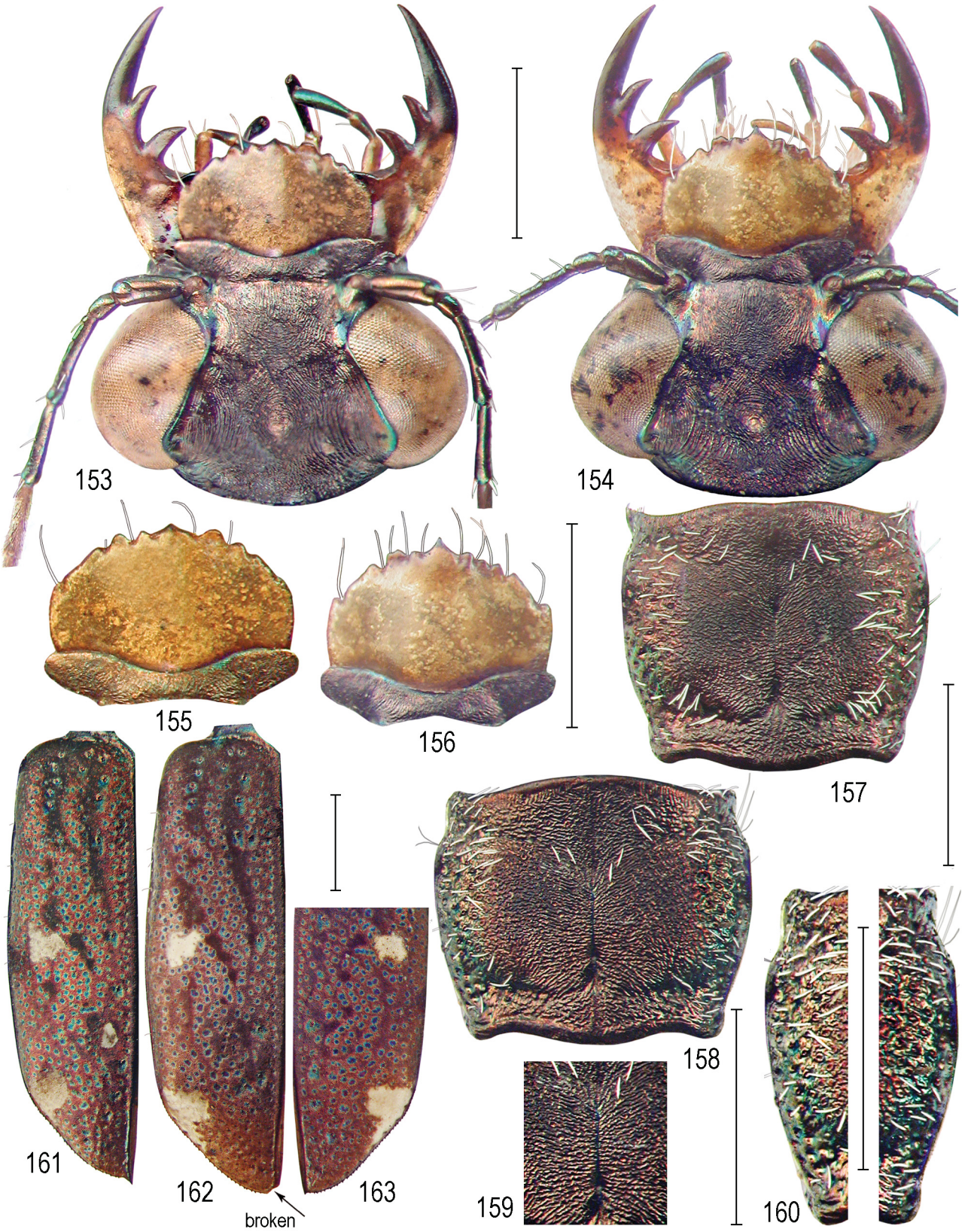
Nomenclatorial remarks. *Cicindela denticulata* Klug, 1834 is the primary junior homonym of *C. denticulata* T. W. Harris, 1828, a fact which was overlooked in the past and also by most recent authors, except for Lorenz (1998a,b, 2005a,b) and Bousquet (2012), who further mentioned that also *C. denticulata* Hentz, 1830 is a primary junior homonym of *C. denticulata* T. W. Harris (the latter is presently a junior synonym of *Cicindela scutellaris rugifrons* Dejean, 1825). *Cicindela denticulata* Klug, 1834 is thus invalid (ICZN 1999: Article 53.3) and must be replaced by the next oldest available name from among its synonyms, which is *Cicindela ocskayi* Gistl, 1837 (see ICZN 1999: Articles 23.3.5 and 60.2), also because the reversal of precedence (ICZN 1999: Articles 23.9.1) cannot be applied as the name *Cicindela denticulata* Klug was used only rarely in the past and therefore the conditions of Article 23.9.1.2 (ICZN 1999) cannot be met.

The original type specimens of *Cicindela ocskayi* Gistl, 1837 are unknown. Although Gistl (1837) gave the type depository as Berlin, no syntypes or other specimens under that name were found by curators in MFNB (Bernd Jaeger, pers. comm.), ZSM (Katja Neven, pers. comm.) or in HNHM (Zsolt Sághy, pers. comm.), nor in other relevant collections. Specimens from Gistl's collection could be variously distributed; moreover, the Regensburg Natural History Museum, which housed part of Gistl's collection, was completely destroyed during the World War II.

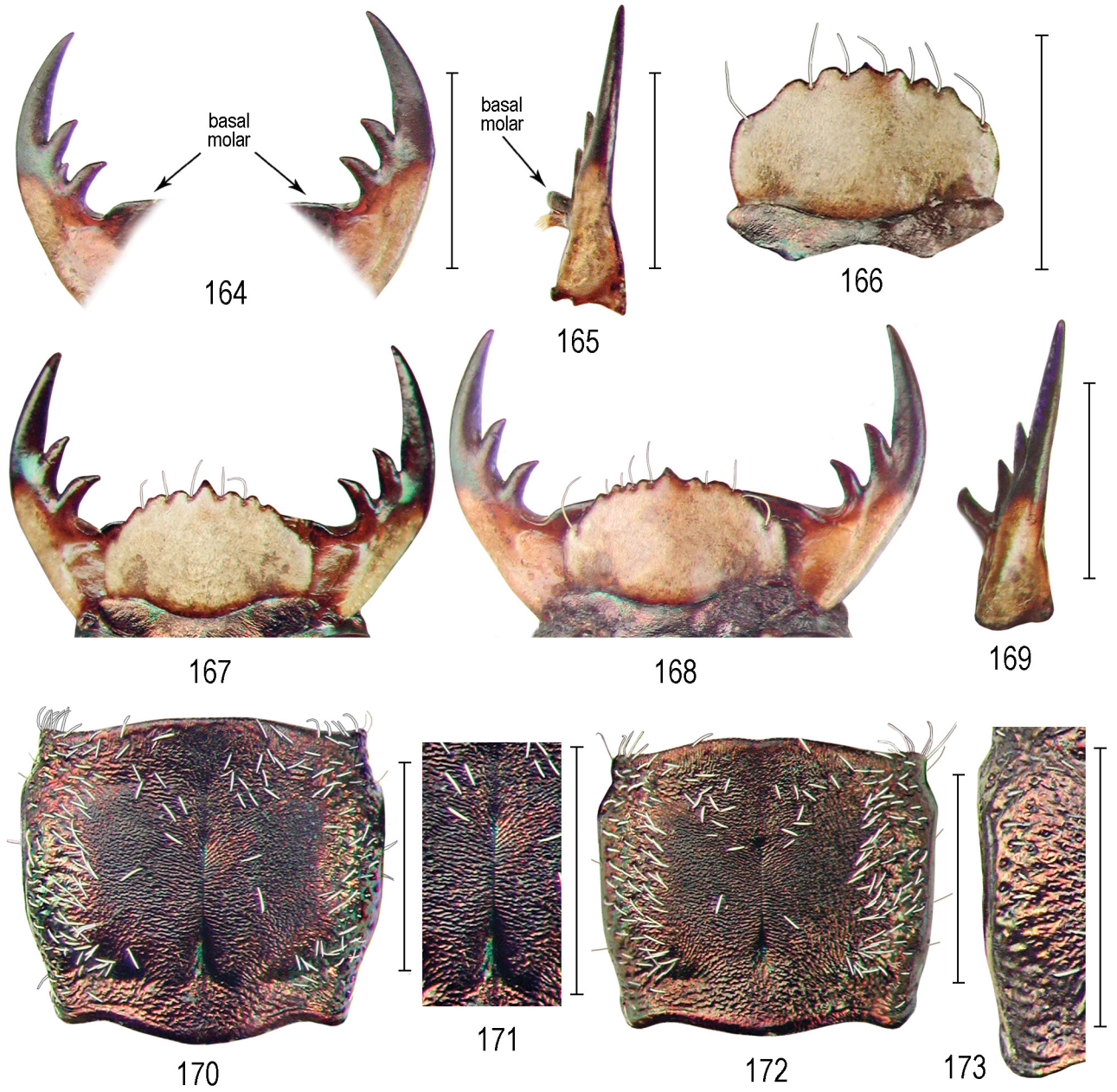
It must be noted here that Gistl (1837), in his original description of *Cicindela ocskayi* compared it directly to *Cicindela denticulata* Klug, 1834, referring to that species as: "*C. denticulata* Klug in Jahrb, d. Ins. I p. 15. n. 31, ♂, ♀" and "*Habitat* in Brasilia. *Mus. berolin.*". Thus, Gistl might has been aware of the existing homonymy with *Cicindela denticulata* T. W. Harris, 1828, which had priority (see above). If so, we may speculate that instead of describing



Figs 148–152. *Cylindera* (*Cylindera*) *ocskayi* (Gistl, 1837): syntypes of *Cicindela denticulata* Klug, 1834 (MFNB). 148–149 – habitus: 148 – ♂, 7.4 mm, lectotype, simultaneously neotype of *Cicindela ocskayi* Gistl; 149 – ♀, paralectotype of *C. denticulata*; 150 – aedeagus; 151 – its apex in dorsal view; 152 – labels. Scale bars = 1 mm.



Figs 153–163. *Cylindera* (*Cylindera*) *ocskayi* (Gistl,1837), syntypes of *Cicindela denticulata* Klug, 1834 (MFNB), all from Brazil. 153–154 – head: 153 – ♂, lectotype, simultaneously neotype of *Cicindela ocskayi* Gistl; 154 – ♀, paralectotype of *C. denticulata*; 155–156 – labrum: 155 – ♂, lectotype (and neotype); 156 – ♀, paralectotype of *C. denticulata*; 157–160 – pronotum: 157 – ♂, lectotype (and neotype); 158 – ♀, paralectotype of *C. denticulata*; 159 – ♀, paralectotype, detail of surface; 160 – ♀, paralectotype, pronotal lateral margins; 161–163 – elytron: 161 – ♂, lectotype (and neotype); 162–163 – left and right, ♀, paralectotype of *C. denticulata*. Scale bars = 1 mm.



Figs 164–173. *Cylindera* (*Cylindera*) *ocskayi* (Gistl, 1837), all from Brazil. 164–166 – ♂, ex collection Bates (BMNH): 164 – mandibles; 165 – terminal tooth of right mandible in lateral view; 166 – labrum; 167–168 – mandibles with labrum: 167 – ♂, Lower Amazon (BMNH); 168 – ♂, Amazon (SDEI); 169 – ♂, terminal tooth of right mandible in lateral view, Amazon (SDEI); 170–173 – pronotum: 170 – ♂, ex collection Bates (BMNH); 171 – the same pronotum, detail of surface; 172 – ♂, Lower Amazon (BMNH); 173 – ♂, Amazon (SDEI), detail of lateral margin. Scale bars = 1 mm.

a new species, in fact he created a new replacement name for the junior homonym *C. denticulata* Klug. 1834.

However, as Gistl did not mention such an intention, nor the name *C. denticulata* T. W. Harris, his reference to *C. denticulata* Klug might have also been because he was not sure of the exact differences in characters between his new species and the species described previously by Klug (1834). In this regard, we must consider the act by Gistl (1837) to be a description of a new species. Added to that, we must mention that Chaudoir (1838), in his critical paper on the publication by Gistl (1837), mentioned an arbitrary treatment of some taxa by Gistl (also spelled Gistel), alleging that he described already published taxa (for instance *C. denticulata* Klug, 1837) as new just in order to dedicate the new names to his friends, in this case to the Hungarian Baron Ocskay d'Ocsko. However, it must be emphasized again that Chaudoir overlooked (as did also other subsequent authors – see above) that the taxon by Klug (1834) was a primary junior homonym of *Cicindela denticulata* T. W. Harris.

Consequently, although the original description of *C. ocskayi* Gistl, 1837 was brief, the taxon was validly described, mentioning the basic characters (partly shared with *C. denticulata* Klug, 1834) and with the practically same type locality "Brasilia".

In order to stabilise the nomenclature, one of the two

Figs 174–180. *Cylindera* (*Cylindera*) *ocskayi* (Gistl,1837), all from Brazil. 174–177 – elytron: 174 – ♂, ex collection Bates (BMNH); 175–176 – ♂, Lower Amazon (BMNH); 177 – ♂, Amazon (SDEI); 178–180 – male aedeagus, Amazon (SDEI). Scale bars = 1 mm.

syntypes of *Cicindela denticulata* Klug, 1834 in the MFNB collection is here designated as a lectotype of that species according to ICZN (1999: Article 74). The same specimen is simultaneously designated here as a neotype of *Cicindela ocskayi* Gistl, 1837 according to ICZN (1999: Article 75) to fix the identity of the taxon beyond doubt, which makes *C. denticulata* and *C. ocskayi* objective synonyms (ICZN 1999: Article 61.3.4).

Cylindera (*Cylindera*) *obliquealba* (Motschulsky, 1864) comb. nov.

(Figs 181–212)

Cicindosa obliquealba Motschulsky, 1864: 173.

Cicindela morio syn. *obliquealba*: Fleutiaux (1892: 68); Horn (1915: 405).

Cicindela morio "aberration" *acompsa*: Horn (1938: tab. 84, fig. 26).

Cicindosa morio syn. *obliquealba*: Schilder (1953: 561).

Cicindela (*Cylindera*) *morio* syn. *obliquealba*: Freitag & Barnes (1989: 320).

Cylindera (s. str.) *morio* syn. *obliquealba*: Wiesner (1992: 185) – as a junior synonym of *C. morio* Klug, 1834 (the synonymy followed by all subsequent authors until the present revision).

Type locality. "Des rives du fl. des Amazones" [= From the banks of the Amazon River].

Type material. Lectotype (designated here): ♀ (ZMUM), labelled: "Amaz." [dark green label, handwritten] // "Cicindosa / obliquealba / Motsch. / Amazones" [dark green label, handwritten] // "Cicindosa / obliquealba / Motsch." [red label, handwritten] // "Lectotype / Cicindosa / obliquealba / Motschulsky, 1864 / design. Jiří Moravec 2025" [red label, printed] // "*Cylindera* (s. str.) *obliquealba* (Motschulsky, 1864) / det Jiří Moravec 2025" [printed].

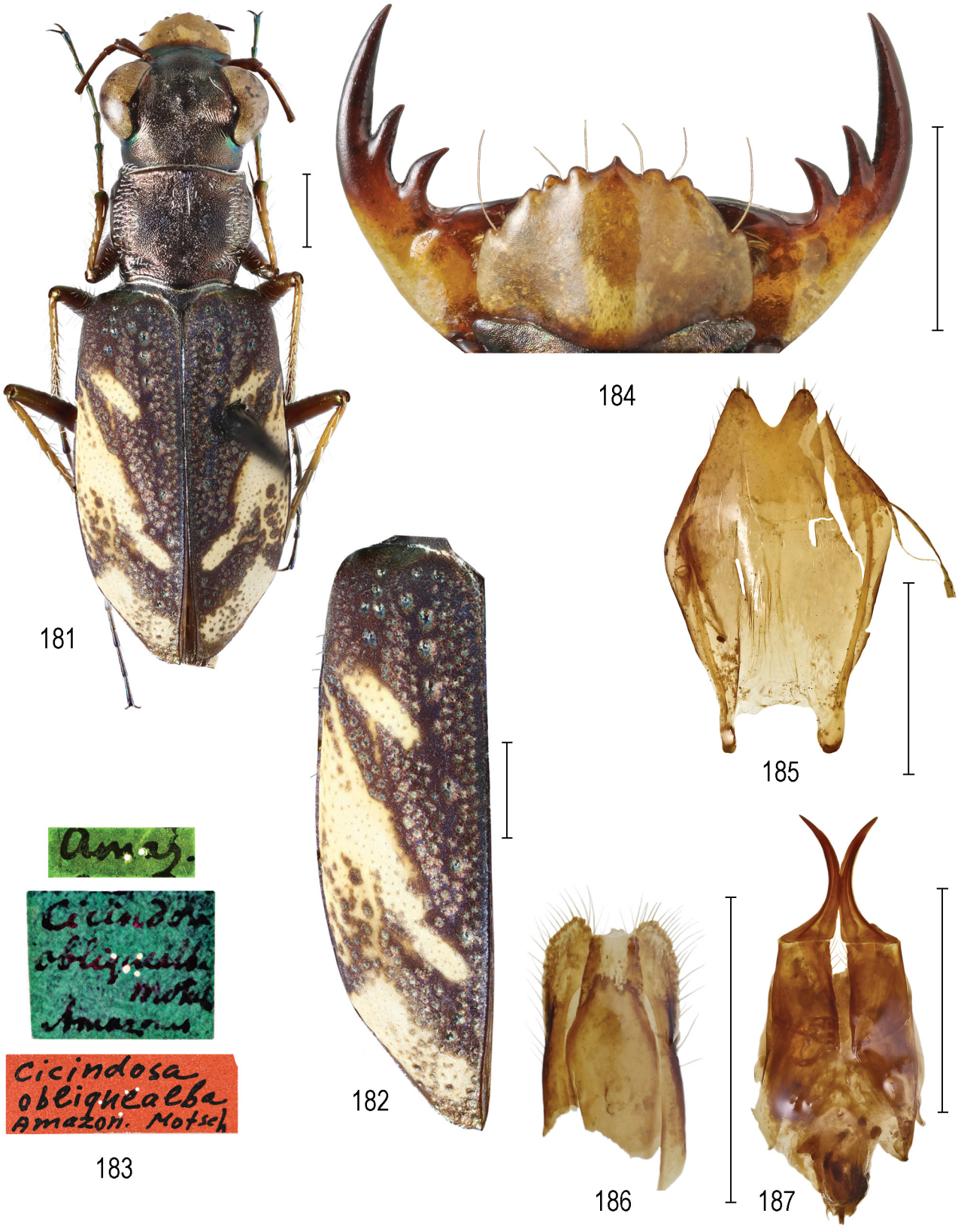
Other material examined. Historical specimens: 2 ♂♂ 1 ♀ (MNHN), lacking labels, standing there as *C. acompsa*. 1 ♂ (MFNB): "42567" // "v. / acompsa / Chd. Amazon" / "307" // "Hist. - Coll. (Coleoptera) / Nr 3719 / Cicindela morio Kl. var. acompsa Chaud. / Amazonia / Coll. Schaum / Zool Mus. Berlin". 1 ♂ (BMNH): "Bowring / 63.47*". 1 ♂ 1 ♀ (BMNH): "Brazil / Santarem" // "52/96" [on the opposite side of the label]. 1 ♂ (BMNH), with the same label data and: "C. morio / v. acompsa / Chaud." // "named by Dr. W. Horn / G.J.A.". 1 ♂ (BMNH): "Santarem" // "53/72" [on opposite side of the label] // "528". 1 ♂ (BMNH), "Amazones" // "Acompsa / t. Horn" // "F. Bates Coll. / 1911–248". 1 ♀ (BMNH): "Amazon" // "F. Bates Coll. / 1911–248". 1 ♀ [with separately stored female genitalia] (BMNH): "Para / acompsa Chd. / t. Horn" // "F. Bates Coll. / 1911–248" // Cicindela morio / acompsa Chd. / det. / R. Freitag, 1984. Recent specimens: 1 ♂ (SDEI): "Est de Para / Santarem / VI. 1922 / H. C. Boy" // "denticulata Kl." // "aberrant specimen / with reduced elytral / whitish maculation / det. Jiří Moravec 2025". 1 ♂ (SDEI), with the same locality label.

The examined specimens also labelled: "Cylindera (s. str.) obliquealba (Motschulsky, 1864) / det Jiří Moravec 2025" // "Provisionally / separated from / Cylindera (C.) acompsa (Chaudoir, 1852) / det. Jiří Moravec 2025".

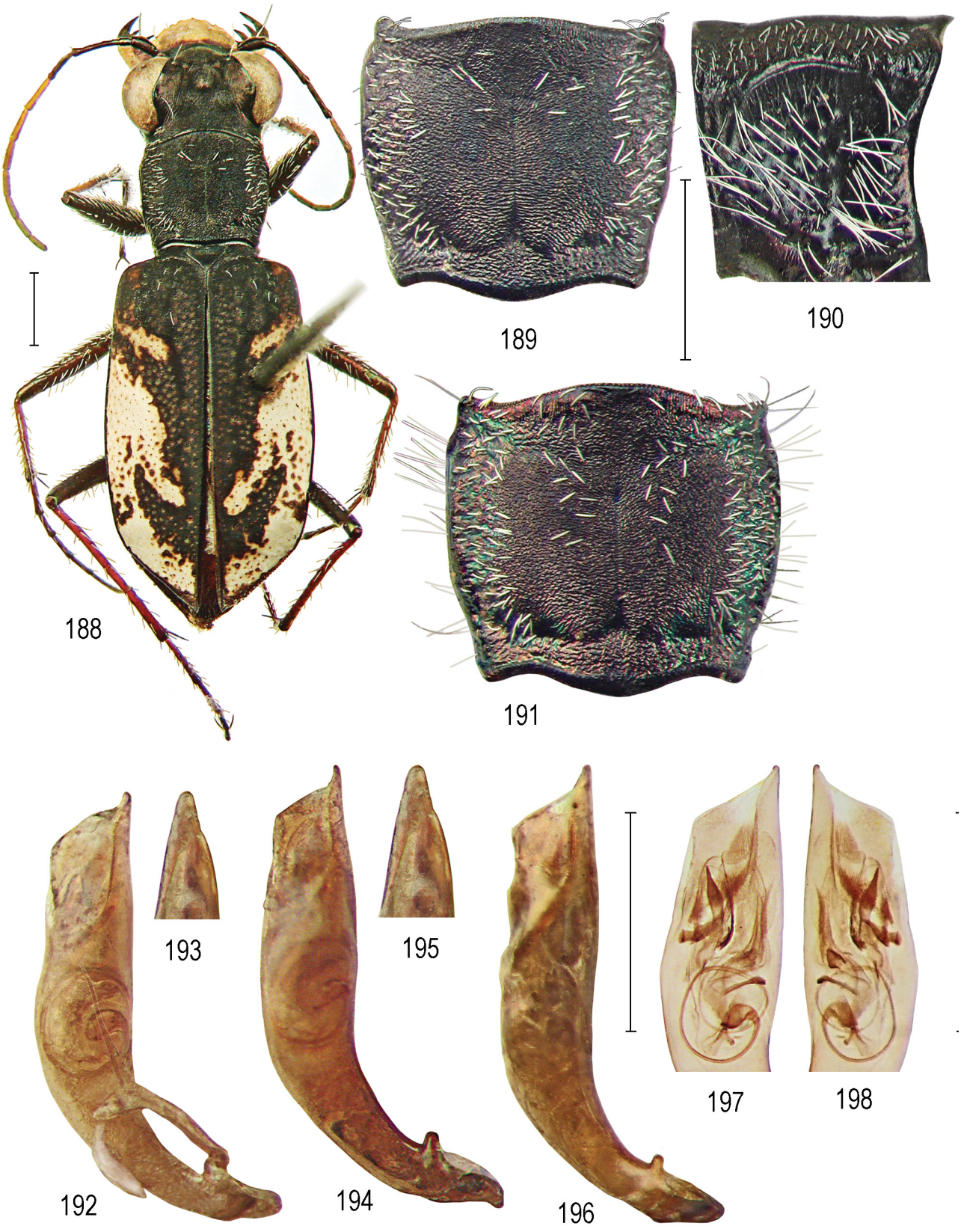
Differential diagnosis and brief redescription. Adults of *Cylindera obliquealba* are immediately recognizable from all other taxa of this species-complex due to their mostly conspicuously wide white elytral lateral area consisting of oblique subhumeral band running transverse-obliquely mesad, laterally sometimes dilated and covering also humerus and apex (exceptional characters within the species-complex as all other species entirely lack both humeral and apical maculae); large lateral area almost or entirely connected with the subhumeral (or humeral) band, as well as with anteapical-apical area, and divided in middle into postero-mesad running band (Figs 181–182, 188, 206–211) – yet see "Variability" below.

Other characters, including the shape of the pronotum (Figs 189–191) and aedeagus (Figs 192–198) are basically as in *Cylindera acompsa*.

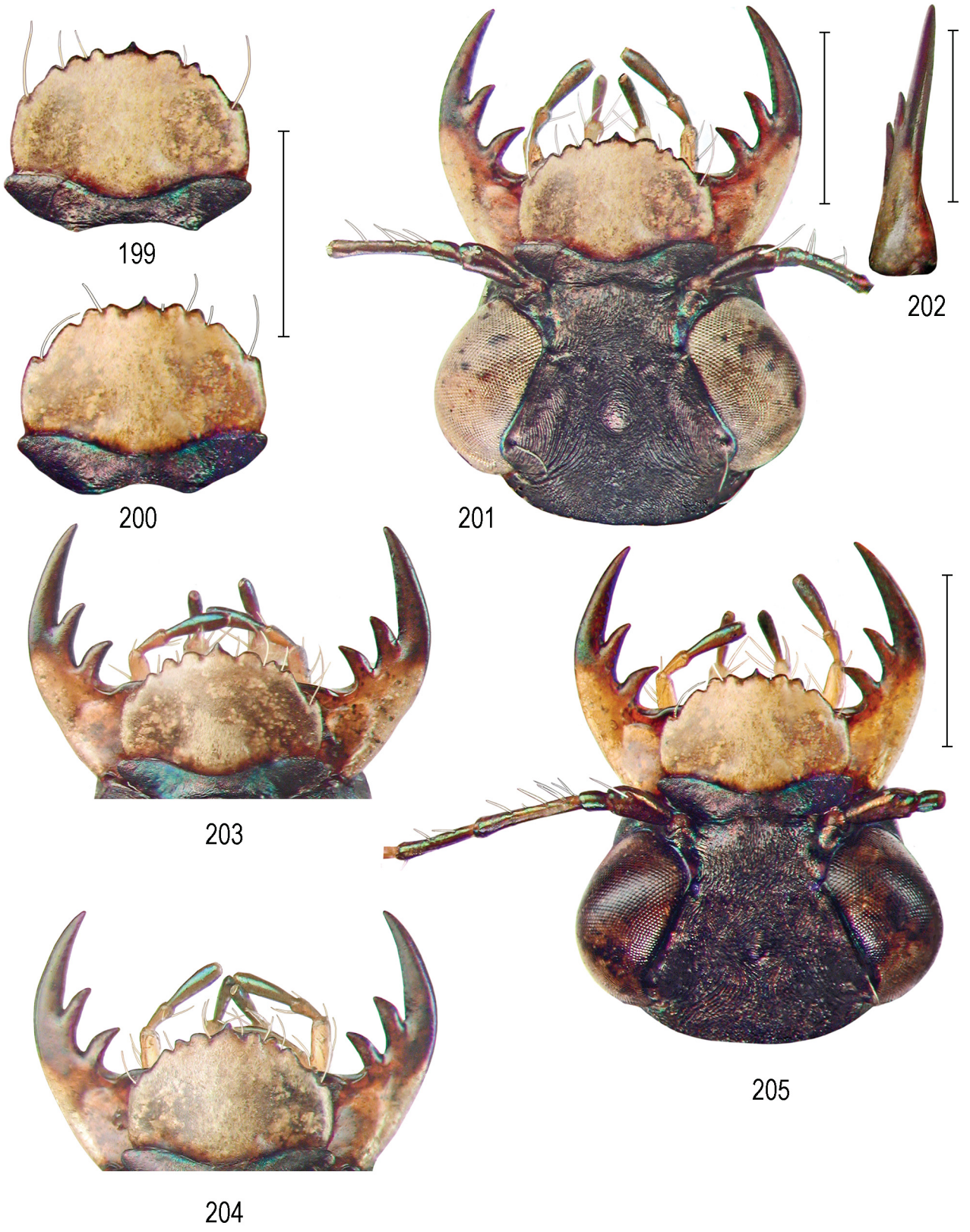
Cylindera confluentesignata (W. Horn, 1915) possesses rather similar whitish elytral pattern (Fig. 213) as in *C. obliquealba*, but is clearly distinguished by a complex of other characters, including its four-dentate mandibles with



Figs 181–187. *Cylindera* (*Cylindera*) *obliquealba* (Motschulsky, 1864), ♀, lectotype of *Cicindosa obliquealba* (ZMUM). 181 – habitus, 8.2 mm; 182 – elytron; 183 – original labels; 184 – mandibles with labrum; 185–187 – female genitalia: 185 – sternum VIII, ventral view; 186 – syntergum IX–X, dorsal view; 187 – second gonapophyses (stylets), dorsal view. Scale bars = 1 mm. (Image credit A. Matalin and V. Savitsky, ZMUM).



Figs 188–198. *Cylindera* (*Cylindera*) *obliquealba* (Motschulsky, 1864) from Brazil. 188–190 – ♂, Amazonia, historical specimen Nr 3719 (MFNB): 188 – habitus, 7.7 mm; 189 – pronotum; 190 – thorax in lateral view, showing proepisternum; 191 – pronotum, ♂, historical specimen ex collection "Bowring / 63.47" (BMNH); 192–198 – male aedeagus or its apex: 192 – Amazonia, historical specimen Nr 3719 (MFNB); 193 – its dorsal view; 194 – ex collection Chaudoir (MNHN, as *C. acompsa*); 195 – its dorsal view; 196 – Santarem (BMNH); 197–198 – its internal sac in left and right lateral aspects. Scale bars = 1 mm.



Figs 199–205. *Cylindera* (*Cylindera*) *obliquealba* (Motschulsky,1864) from Brazil. 199–200 – labrum: 199 – ♂, Amazonia, historical specimen Nr 3719 (MFNB); 200 – ♂, ex collection Chaudoir (MNHN as *C. acompsa*); 201–202 – ♂, ex collection Chaudoir (MNHN): 201 – head; 202 – terminal tooth of right mandible in lateral view; 203–204 – mandibles with labrum, Santarem (BMNH): 203 – ♂; 204 – ♀; 205 – head, ♂, ex collection Chaudoir (MNHN). Scale bars = 1 mm.

Figs 206–213. Two species of *Cylindera*. 206–212 – *Cylindera obliquealba* (Motschulsky, 1864) from Brazil, elytron. 206 – ♂, Amazonia, historical specimen Nr 3719 (MFNB); 207 – ♂, ex collection Chaudoir (MNHN as *C. acompsa*); 208–209 – Santarem (BMNH): 208 – ♂; 209 – ♀; 210 – ex Bowring (BMNH); 211 – ♂, Santarem (SDEI); 212 – ♂, Santarem (SDEI), with reduced whitish maculation yet with indicated thin lateral band and well-developed apical macula; 213 – *Cylindera confluentesignata* (W. Horn, 1915), elytron, ♂, Paraguay, Salazar (CCJM). Scale bar = 1 mm.

outer subapical lobe on the right terminal tooth in males (recognized within the present revision) and denser setae on its pronotal disc.

Body (Figs 181, 188) 7.30–8.20 mm long, 2.80–3.10 mm wide. Labrum (Figs 184, 199–200, 203–204) as in other taxa of the species-complex, similarly variable in shape and number of teeth. Mandibles (Figs 184, 201, 203–205) with only three teeth (apart from basal molar), no additional rudiment of tooth observed in examined specimens, and with smooth outer margin of right terminal tooth in lateral view (Fig. 202).

Variability. One male specimen (SDEI) possesses reduced elytral maculation consisting of sublateral-median and apical large maculae, while the lateral whitish area is reduced into very thin interrupted lateral band (Fig. 212). Such reduced maculation occurs in other genera of tiger beetles and in this case does not represent an intermediate character towards *Cylindera acompsa* the adults of which

(and of all others of the species-complex) never possess juxtasutural and apical white areas and never have whitish humeri like in some specimens of *C. obliquealba* (Figs 209–210).

Remarks. Because of the very different, markedly wide white elytral maculation, and lack of exactly intermediate maculation, *C. obliquealba* (Motschulsky, 1864) comb. nov. is maintained here as a separate species. Its synonymy with *C. acompsa* could not be proved not only due to scarcity of specimens with exact locality labels, but also due to the sympatric occurrence of most taxa of this species-complex. The only exception is represented by two males deposited in SDEI, bearing identical locality labels: "Est de Para / Santarem / VI. 1922", the male with the same wide whitish elytral pattern (Fig. 211) as in other examined specimens of *C. obliquealba*, while the elytral maculation in the second male is exceptionally reduced. However, the male with the reduced, isolate maculae possesses large apical macula and faintly indicated juxtasutural, elongate-interrupted band (Fig. 212), thus possessing maculae which have never been observed in numerous examined adults of *C. acompsa* (nor in others of the species-complex). Consequently, this reduced maculation pattern is classified here within the variability of *C. obliquealba* (see also "Variability" above). It is fully in accordance with occurrence of aberrant adults with similarly reduced maculation in some other tiger beetle genera, for instance in the genus *Calomera* Motschulsky, 1862 as demonstrated by Moravec et al. (2025).

At this point it should be remembered that Horn (1938: tab. 84, fig. 26) misleadingly illustrated the same elytral pattern characteristic for the type of *C. obliquealba* under "*Cicindela morio* ab. *acompsa*", thus entirely contrary to the original description of *C. acompsa* by Chaudoir (1852) describing small, isolate whitish maculae as in the holotype (Fig. 102).

It must be mentioned here that (as commonly known) the elytral coloration in some species of some tiger beetle genera may depend on the substrate colour of their habitats, e.g. the adults occurring on light sands are prevailingly whitish (with reduced background black area), while those from dark sand have their background coloration prevailingly or almost entirely black (and white maculation reduced). Nonetheless, this can hardly be the case of adults of the *C. morio* species-complex, because the recently collected adults with black elytral background, such as those of *C. morio* from Bolivian Concepción and those of *C. amayai* sp. nov. from Bolivian Palmarito were never found on black sand, but on paths through the cerrado areas, also with usually reddish or yellowish laterite soil (Figs 217, 219). The adults of *C. obliquealba* are explicitly known only from the areas near Santarem where the sandy substrates might be both whitish and dark as it is in some other Amazon riverbank areas, yet no record comes directly from the same sandy beaches where adults of the nocturnal species of the genus *Phaeoxantha* Chaudoir, 1850 were found (see Moravec & Dheurle 2023). Consequently, it is clear that the adults of this species complex with whitish elytral pattern are not confined to light-sand substrates.

Fig. 214. Biomes in Brazil. (Approximately compiled according to a map by Toda Matéria https://www.todamateria.com.br/biomas-brasileiros/).

Such whitish elytral areas as in *C. obliquealba* were never found in prevailingly black *C. morio* despite their sympatric occurrence in Santarem. It is in accordance with Pearson et al. (1999), who mentioned that all adults of *C. morio* collected in Bolivia were black and immaculate although found on light sand.

Notwithstanding, the concept of *C. obliquealba* as a separate species is presented here provisionally (yet with stronger arguments for considering it to be a separate species). Naturally, if some exactly syntopic adults of *C. obliquealba* bearing evidently intermediate elytral maculation are found in the future, the synonymy with *C. acompsa* could be confirmed; alternatively, it can be also done by molecular analysis if fresh specimens of these taxa are acquired.

Although unimportant, it is noteworthy that Erwin & Pearson (2008) wrongly addressed the original name combinations as *Cicindela acompsa* and *Cicindela obliquealba* despite the fact that the two taxa by Motschulsky (1864) were originally described under the genus-group name *Cicindosa*.

Acknowledgements

The first author would like to thank the directors and curators of the collections listed in "Material and methods", particularly for loans of specimens, namely Maxwell Barclay (BMNH), Alain Drumont (IRSNB), Bernd Jaeger (MFNB), and Mandy Schröter (SDEI). We are also greatly obliged to the curators of the collections or the technicians, who kindly took and sent photos of the type specimens of several taxa (see "Material and methods" above and their image credits in captions for the relevant figures under the plates), namely Andrey Matalin and Vladimir Savitsky

Fig. 215. Distribution of the *Cylindera morio* species-complex in Brazil and Bolivia, verified records (modified from the map by QGIS Development Team, 2016).

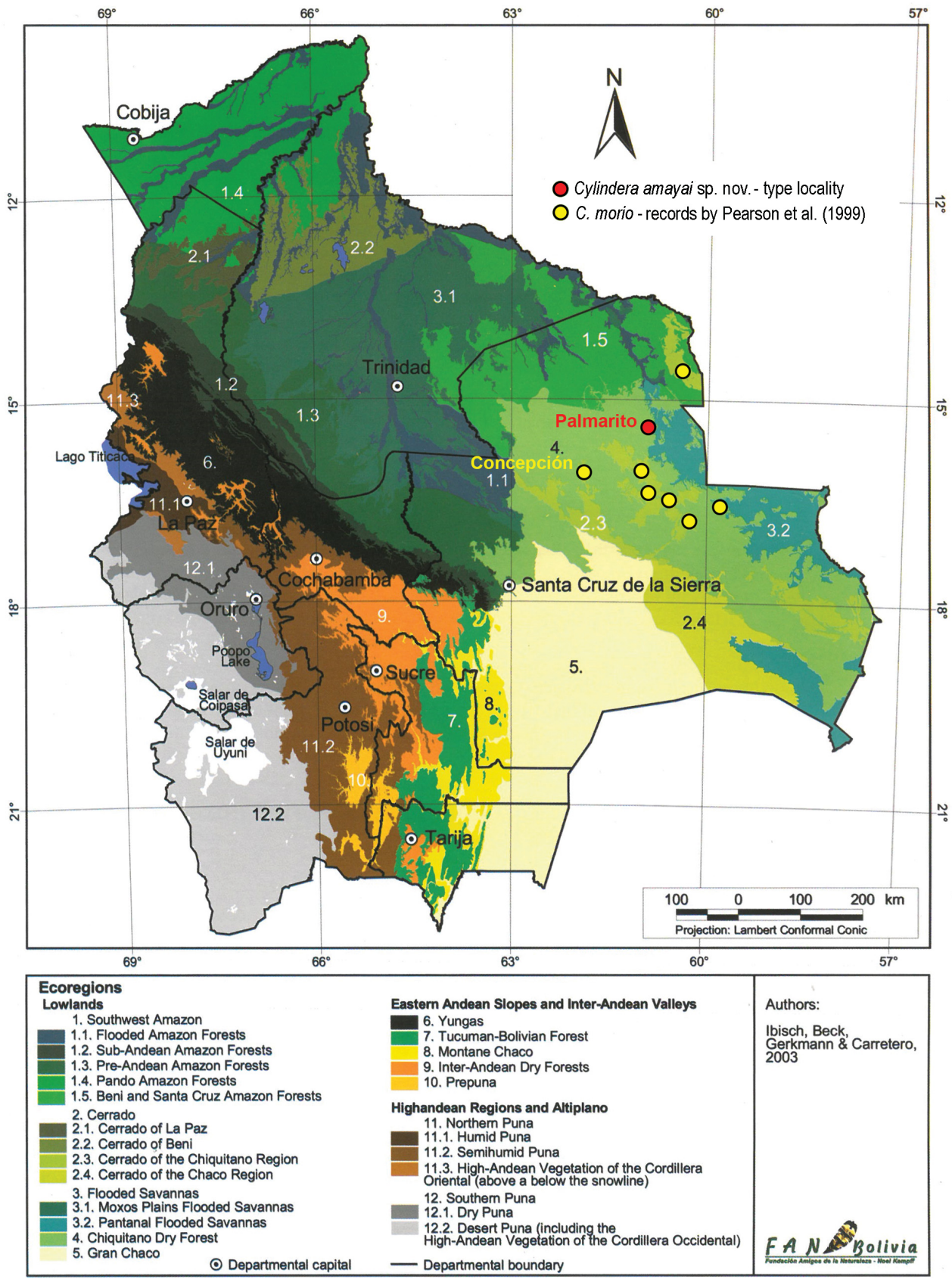
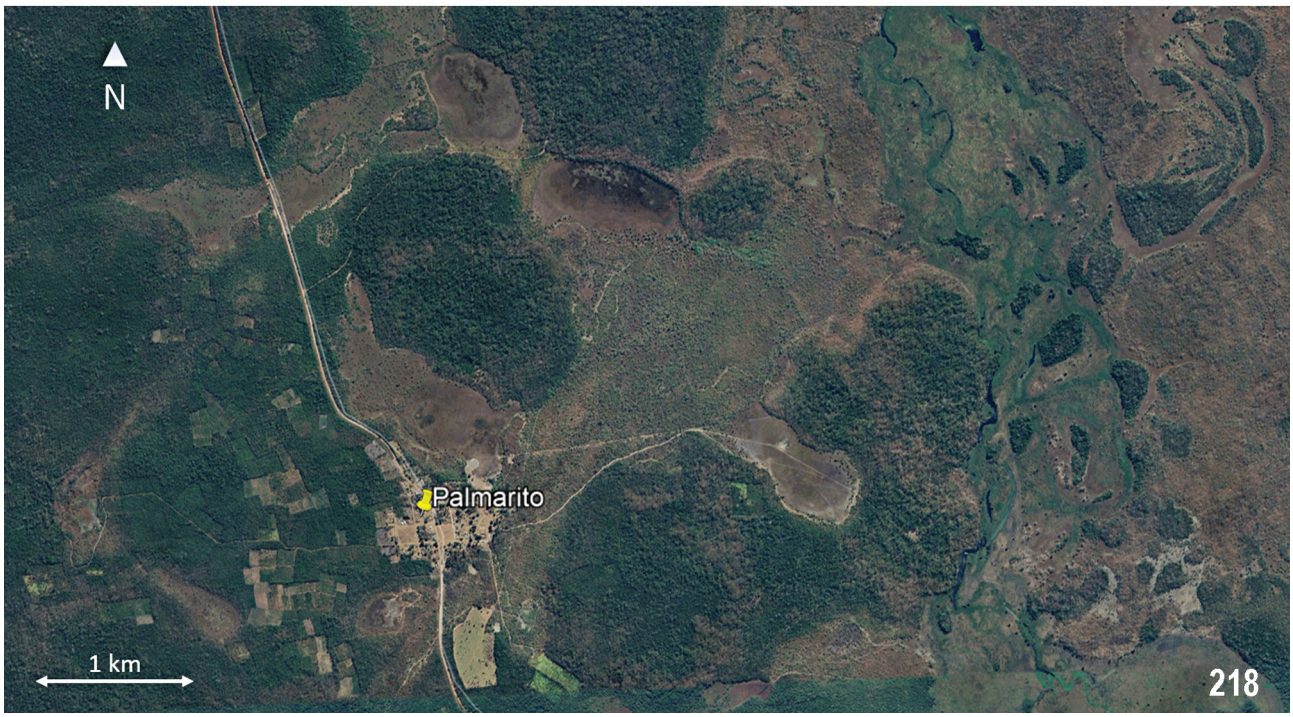


Fig. 216. Ecoregions of Bolivia with distribution of the *Cylindera morio* species-complex in Bolivia, including records published by Pearson et al. (1999). Adopted and modified from Ibisch et al. (2004).



Figs 217–218. *Cylindera amayai* sp. nov., biotope and map of Palmarito environs, Bolivia (Fig. 218 acquired from Google Earth 2025).

Fig. 219. Biotope of *Cylindera morio* Klug, 1834, near Concepción, Bolivia.

(both ZMUM) and Olivier Montreuil (MNHN). The first author is also greatly thankful to Gabriel Biffi (MZSP) for photos and useful data from the MZSP collection. Katja Neven (ZSM), Roberto Casalini (FCCR-MCZR), Jiří Hájek (NMPC), Harald Schillhammer (NHMW), and Zsolt Sághy (HNHM) also sent useful data from the relevant collections. Petr Kment (NMPC) and Igor Malenovský (Department of Botany and Zoology, Faculty of Science, Masaryk University, Brno, Czech Republic) are greatly acknowledged for their highly important help concerning the nomenclature according to the relevant ICZN articles. Our special thanks belong to Marcelo Amaya (Santa Cruz de la Sierra, Bolivia) who accompanied the second author during his collecting trips to Bolivia organized together with the Museum of Santa Cruz. Táňa Vybíralová (Brno, Czech Republic) and Jitka Ansari (London, United Kingdom) are greatly acknowledged for their kind revision of English.

References

BATES H. W. 1874: New species of Cicindelidae. *Entomologist's Monthly Magazine* **10**: 261–269.

BLACKWELDER R. E. 1944: Checklist of the Coleopterous insects of Mexico, Central America, the West Indies, and South America. Part I. *United States National Museum Bulletin* **185**: i–xii + 1–188.

BOUSQUET Y. 2012: Catalogue of Geadephaga (Coleoptera, Adephaga) of America, north of Mexico. *ZooKeys* **245**: 1–1722.

BRUCH C. 1911: Catalogo sistematico de los coleopteros de la Republica Argentina, pars 1. Familia Carabidae (Cicindelinae, Carabinae). *Revista del Museo de La Plata*: **17 (4)**: 143–180.

CASSOLA F. 2013: *La Collezione "F. Cassola" di coleotteri Cicindelidi (Coleoptera Cicindelidae). (Studi sui Cicindelidi CXCI). Scrigni di Biodiversità i Tesori nascosti del Museo Civico di Zoologia I*. Palombi Editori, 119 pp.

CHAUDOIR M. 1838: Revue critique de quelques ouvrages entomologiques. *Bulletin de la Société Impériale des Naturalistes de Moscou* **2**: 205–209.

CHAUDOIR M. 1852: Mémoire sur la famille des Carabiques, 3e Partie. *Bulletin de la Société Impériale des Naturalistes de Moscou* **25**: 3–104.

CHAUDOIR M. 1854: Mémoire sur la famille des Carabiques, 4e Partie. *Bulletin de la Société Impériale des Naturalistes de Moscou* **27**: 112–144.

CHAUDOIR M. 1865: *Catalogue de la collection des cicindélètes de M. le Baron Chaudoir*. Nys, Bruxelles, 64 pp.

DEJEAN P. M. F. A. 1825: *Species général des Coléoptères, de la collection de M. le Comte Dejean. Tome premier*. Crevot, Paris, xxx + 463 pp.

DURAN D. & GOUGH H. M. 2019: Unifying systematics and taxonomy: Nomenclatural changes to Nearctic tiger beetles (Coleoptera: Carabidae: Cicindelinae) based on phylogenetics, morphology and life history. *Insecta Mundi* **727**: 1–12.

ERWIN T. L. & PEARSON D. L. 2008: *A treatise on the Western Hemisphere Caraboidea (Coleoptera). Their classification, distributions, and ways of the life. Volume II. Carabidae – Nebriformes 2 – Cicindelitae*. Pensoft Series Faunistica 84, Pensoft Publishers, Sofia-Moscow, 365 + [1] pp. + 33 pls.

FLEUTIAUX E. 1892: *Catalogue systématique des Cicindelidae*. Imp. H. Vaillant-Carmanne, Liège, 186 pp.

FREITAG R. & BARNES B. L. 1989: Classification of Brazilian species of *Cicindela* and phylogeny and biogeography of subgenera *Brasiella*, *Gaymara* new subgenus, *Plectographa* and South American species of *Cylindera* (Coleoptera: Cicindelidae). *Quaestiones Entomologicae* **25**: 241–386.

GISTL J. 1837: *Systema insectorum, secundum classes, ordines, genera, species, cum characteribus, synonymis, annotationibus, locis et iconibus. Tomus Imus. Coleoptera. Fasciculus 1mus. Mantichora–Dromica. Cum tabula aeneo incisa.* Fleischmann, Monachii. xvi + 64 pp. + 1 pl.

GUERRA J. F., BRZOSKA D. W. & PEARSON D. L. 1997: Preliminary list of the tiger beetle species of Bolivia (Coleoptera: Cicindelidae). *Cicindela* **29 (1–2)**: 25–32.

HARRIS R. A. 1979: A glossary of surface sculpturing. In: ANDREWS G. (ed.): Department of Food and Agriculture Division of Plant Industry, Sacramento. *Occasional Papers of Laboratory Services / Entomology* **28**: 1–31.

HARRIS T. W. 1828: Contributions to entomology. No. I. *The New England Farmer, and Horticultural Journal* **7**: 90–91.

HENTZ N. M. 1830: Description of eleven new species of North American insects. *Transactions of the American Philosophical Society, New Series* **3**: 253–258.

HORN W. 1892: III. Beitrag zur Kenntnis der Cicindeleten. *Deutsche Entomologische Zeitschrift* **2**: 209–219.

HORN W. 1896: Quatre especes nouvelles de Coleopteres (famille des Cicindelides) du museum d'histoire naturelle de Paris. *Bulletin du Museum d'Histoire Naturelle* **2 (7)**: 328–329.

HORN W. 1915: *Coleoptera Adephaga, Fam. Carabidae, Subfam. Cicindelinae*. *In*: WYTSMAN P.: *Genera Insectorum*, *Fascicule 82*, Bruxelles, pp. 209–487 + pls 16–23.

HORN W. 1926: Carabidae, Cicindelinae. In: JUNK W. & SCHENKLING S. (eds.): *Coleopterorum Catalogus, Pars 86.* W. Junk, Berlin, 345 pp.

HORN W. 1938: 2000 Zeichnungen von Cicindelinae. *Entomologische Beihefte aus Berlin-Dahlem* **5**: 1–71, 90 Tafeln.

IBISCH P. L., BECK S. G., GERKMANN B. & CARRETERO B. 2004: Ecoregions and ecosystems. Pp. 47–87. In: IBISCH P. L. & MÉRIDA G. (eds.): *Biodiversity: the richness of Bolivia. Vol. 1. State of knowledge and conservation*. Ministry of Sustainable Development, Editorial FAN, Santa Cruz de la Sierra, 644 pp.

ICZN 1999: *International Code of Zoological Nomenclature, fourth edition.* International Trust for Zoological Nomenclature, London, xxix + 306 pp.

KLUG J. C. F. 1834: *Jahrbücher der Insectenkunde, mit besonderer Rücksicht auf die Sammlung im Königl. Museum zu Berlin. Erster Band*. Theod. Chr. Friedr. Enslin, Berlin, viii + 396 pp. + 2 pls.

LORENZ W. 1998a: *Systematic list of extant ground beetles of the world (Insecta, Coleoptera, "Geadephaga": Trachypachidae and Carabidae incl. Paussinae, Cicindelinae, Rhysodinae)*. Wolfgang Lorenz, Tutzing, Germany, 502 pp.

LORENZ W. 1998b: *Nomina Carabidarum: a directory of the scientific names of ground beetles (Insecta, Coleoptera, "Geadephaga": Trachypachidae and Carabidae incl. Paussinae, Cicindelinae, Rhysodinae)*. Wolfgang Lorenz, Tutzing, Germany, 937 pp.

LORENZ W. 2005a: *Systematic list of extant ground beetles of the world (Insecta, Coleoptera, "Geadephaga": Trachypachidae and Carabidae incl. Paussinae, Cicindelinae, Rhysodinae)*. *Second edition*. Wolfgang Lorenz, Tutzing, Germany, iv + 530 pp.

LORENZ W. 2005b: *Nomina Carabidarum: a directory of the scientific names of ground beetles (Insecta, Coleoptera, "Geadephaga": Trachypachidae and Carabidae incl. Paussinae, Cicindelinae, Rhysodinae)*. *Second edition*. Wolfgang Lorenz, Tutzing, Germany, 937 pp.

MORAVEC J. 2002: *A monograph of the genus Physodeutera (Coleoptera: Cicindelidae). Tiger Beetles of Madagascar Vol. 2*. Nakladatelstvi Kabourek, Zlín, 290 pp.

MORAVEC J. 2007: *Tiger beetles of Madagascar 1. A monograph of the genus Pogonostoma (Coleoptera: Cicindelidae).* Nakladatelství Kabourek, Zlín, 499 pp.

MORAVEC J. 2010: *Tiger beetles of the Madagascan Region (Madagascar, Seychelles, Comoros, Mascarenes, and other islands. Taxonomic revision of the 17 genera occurring in the region (Coleoptera: Cicindelidae)*. Biosférická rezervace Dolní Morava, o.p.s., Lednice na Moravě, 429 pp.

MORAVEC J. 2018: *Taxonomic revision of the Neotropical tiger beetle genera of the subtribe Odontocheilina – Volume 1. Odontocheila Laporte de Castelnau, Cenothyla Rivalier and Phyllodroma Lacordaire. (Coleoptera: Cicindelidae)*. Biosférická rezervace Dolní Morava, o.p.s., Lednice na Moravě, 623 +2 pp.

MORAVEC J. 2020: *Taxonomic revision of the Neotropical tiger beetle genera of the subtribe Odontocheilina – Volume 2. A complete revision of other twelve genera of the subtribe (Coleoptera: Cicindelidae)*. Biosférická rezervace Dolní Morava, o.p.s., Lednice na Moravě, 589 + 1 pp.

MORAVEC J. & DHEURLE C. 2023: Taxonomic and nomenclatorial revision of the Neotropical genus *Phaeoxantha* Chaudoir (Coleoptera: Cicindelidae). *Zootaxa* **5386 (1)**: 1–83.

MORAVEC J., DHEURLE C., SCHUELE P. & WIESNER J. 2025: Reassessment of the concept of *Calomera decemguttata* (Fabricius) with a description of *Calomera paradecemguttata* sp. nov. (Coleoptera: Cicindelidae). *Zootaxa* **5570 (1)**: 1–56.

MOTSCHULSKY V. 1862: Entomologie spéciale. Remarques sur la collection d'insectes de V. de Motschulsky. Coléopteres. *Etudes Entomologiques* **11**: 15–55.

MOTSCHULSKY V. 1864: Énumération des nouvelles espèces de Coléoptères rapportés de ses voyages 4-ème article. Carabicines. *Bulletin de la Société Impériale des Naturalistes de Moscow* **37 (3)**: 171–240.

NAVIAUX R. 2002: Faune du Brésil. Description de deux nouveaux *Ctenostoma*, catalogue des Cicindèles (Coleoptera Cicindelidae). *Bulletin de la Société Entomologique de France* **107 (3)**: 205–273.

NICHOLS S. W. 1989: *The Torre-Bueno glossary of entomology, revised edition of Torre Bueno (Rollin J.) 1937: A glossary of entomology including Tulloch G. S. 1962: Supplement A*. The New York Entomological Society, American Museum of Natural History, New York, 840 pp.

PEARSON D. L., GUERRA J. F. & BRZOSKA D. W. 1999: The tiger beetles of Bolivia: their identification, distribution and natural history (Coleoptera: Cicindelidae). *Contributions on Entomology, International* **3 (4)**: 379–524.

RIVALIER E. 1954: Démembrement du genre *Cicindela* Linné, II. Faune américaine. *Revue Française d'Entomologie* **21**: 249–268.

SCHILDER F. A. 1953: Studien zur Evolution von *Cicindela*. *Wissenschaftliche Zeitschrift der Martin-Luther-Universität Halle-Wittenberg* **3 (2)**: 539–576.

SUMLIN W. D. III. 1979: A brief review of the genus *Cicindela* of Argentina (Coleoptera: Cicindelidae). *Journal of the New York Entomological Society* **87 (2)**: 117.

ŠAFRÁNEK O. & AMAYA M. 2021: A new species of the genus *Cylindera* (Coleoptera: Cicindelidae) from southern Bolivia with the behaviour imitating co-occurring ants. *Zootaxa* **4980 (3)**: 575–582.

WESTWOOD J. O. 1831: Mémoire pour servir a l'histoire naturelle de la famille des cicindeletes. *Annales des Sciences Naturelles* **22**: 299–317.

WIESNER J. 1992: *Verzeichnis der Sandlaufkäfer der Welt, Checklist of the Tiger Beetles of the World.* Verlag Erna Bauer, Keltern, 364 pp.

WIESNER J. 2020: *Checklist of the Tiger Beetles of the World, 2nd Edition*. Winterwork, Borsdorf, 540 pp.

WIESNER J. & BANDINELLI A. 2014: Notes on the tiger beetles (Coleoptera: Cicindelidae) of Argentina. 117. Contribution towards the knowledge of Cicindelidae. *Insecta Mundi* **377**: 1–66.