SERGIO ZUCATELI ALOQUIO JUNIOR

ESTUDO TAXONÔMICO DOS *NEOMIDA* NEOTROPICAIS (COLEOPTERA: TENEBRIONIDAE: DIAPERINI)

Dissertação apresentada à Universidade Federal de Viçosa, como parte das exigências do Programa de Pós-graduação em Biologia Animal, para a obtenção do título de *Magister Scientiae*.

VIÇOSA

MINAS GERAIS – BRASIL

2016

Ficha catalográfica preparada pela Biblioteca Central da Universidade Federal de Viçosa - Campus Viçosa

T

A454e
2016

Aloquio Junior, Sergio Zucateli, 1993-
Estudo taxonômico dos *Neomida* neotropicais (Coleoptera: Tenebrionidae: Diaperini) / Sergio Zucateli Aloquio Junior. - Viçosa, MG, 2016.
vi, 115f. : il. (algumas color.) ; 29 cm.

Inclui anexo.
Orientador: Cristiano Lopes Andrade.
Dissertação (mestrado) - Universidade Federal de Viçosa.
Inclui bibliografia.

1. *Neomida. 4.* Besouros - Identificação. 5. Taxonomia. 6. Morfologia. I. Universidade Federal de Viçosa. Departamento de Biologia Animal. Programa de Pós-graduação em Biologia Animal. II. Título.

CDD 22. ed. 595.76

SERGIO ZUCATELI ALOQUIO JUNIOR

ESTUDO TAXONÔMICO DOS *NEOMIDA* NEOTROPICAIS (COLEOPTERA: TENEBRIONIDAE: DIAPERINI)

Dissertação apresentada à Universidade Federal de Viçosa, como parte das exigências do Programa de Pós-graduação em Biologia Animal, para a obtenção do título de *Magister Scientiae*.

APROVADA: 17 de fevereiro de 2016.

Lucimar Soares de Araujo

Lucimar Soares de Araujo

Paschoal Coelho Grossi

(Coorientador)

Cristiano Lopes Andrade

(Orientador)

“Try not. Do… or do not. There is no try”

Master Yoda – Star Wars: Episode V - The Empire Strikes Back

“Somewhere, something incredible is waiting to be known”

Carl Sagan

“Beautiful is what we see. More beautiful is what we know. Most beautiful, by far, is that we don’t.”

Nicolas Steno

“I am turned into a sort of machine for observing facts and grinding out conclusions.”

Charles Darwin

AGRADECIMENTOS

Gostaria de agradecer à minha mãe, Iraci, e irmã, Lyvia, que sempre me apoiaram e incentivaram, mesmo que perseguir meus sonhos me levasse para longe delas.

Aos amigos de longa data, que ficaram em Linhares, minha cidade natal, que, mesmo estando longe, não esqueceram desse nerd meio doido.

Aos amigos de Viçosa, tanto os que estão juntos desde 2010, quanto aos que chegaram depois, que fizeram esse tempo de Viçosa um pouco melhor... Ana, Brenda, João, Fabinho e tantos outros, espero sempre nos reencontrarmos para aquela cerveja e conversa fiada.

Ao Cristiano, que aceitou aquele calouro adolescente, de cabeça raspada e imberbe procurando por um estágio nos primeiros meses de curso, e me (des)orienta desde então. Às vezes acho que você acredita em mim mais do eu mesmo acredito...

Aos amigos do LabCol, tanto os antigos (não estou chamando ninguém de velho...) quanto os mais recentes (que daqui a pouco serão velhos...), pelos cafés, pelas piadas sem graça, pelos finais de semanas e noites de trabalho, que viravam diversão, pelas coletas, que renderam uns besouros bacanas e muitas histórias pra contar.

A todos os que citei, e todos que não citei, provavelmente porque minha memória não me permite lembrar de todos (desculpem-me por isso), parafraseio Carl Sagan: Na vastidão do tempo e na imensidão do espaço, é um prazer dividir um planeta e uma época com vocês.

E agradeço também aos homens e mulheres que dedicaram suas vidas à ciência, e fizeram um jovem rapaz escolher esse mesmo caminho, mesmo sendo um caminho difícil, e, muitas vezes, pouco reconhecido. Como diria o grande mestre Sir Isaac Newton: “Se consigo enxergar longe, é porque me apoio em ombros de gigantes”.

A todos, meus mais sinceros agradecimentos.

RESUMO

ALOQUIO JUNIOR, Sergio Zucateli. M.Sc., Universidade Federal de Viçosa, fevereiro de 2016. **Estudo taxonômico dos *Neomida* Neotropicais (Coleoptera: Tenebrionidae: Diaperini).** Orientador: Cristiano Lopes Andrade. Coorientador: Paschoal Coelho Grossi.

Neomida Latreille é um gênero de difícil delimitação, apresentando poucas características diagnósticas, compartilhadas com outros gêneros da tribo ou sujeitos à exceções. Dentre os Diaperini, *Neomida* é um dos gêneros mais diversos, com cerca de 50 espécies descritas, distribuídas em todas as regiões biogeográficas. A região Neotropical apresenta a maior diversidade do gênero, com 31 espécies registradas, entretanto, o estudo desses besouros em grande parte dessa região ainda é incipiente. Caracteres de terminália abdominal de fêmea são negligênciados na taxonomia do gênero, sendo, esse trabalho, a primeira tentativa de utilização desses caracteres na definição das espécies. O meu objetivo nessa dissertação foi realizar um estudo taxonômico das espécies Neotropicais, descrevendo e redescrevendo espécies, e utilizando características das terminalias abdominais de macho e fêmea na delimitação das espécies. Foram descritas nove novas espécies, uma da Colômbia e oito do Brasil; as distribuições de 11 espécies forma ampliadas; uma chave de identificação para as espécies americanas e dados de fungos hospedeiros foram fornecidos.

ABSTRACT

ALOQUIO JUNIOR, Sergio Zucateli. M.Sc., Universidade Federal de Viçosa, February, 2016. **Taxonomic study of the Neotropical *Neomida* (Coleoptera: Tenebrionidae: Diaperini).** Advisor: Cristiano Lopes Andrade. Co-advisor: Paschoal Coelho Grossi.

Neomida Latreille is a genus hard to work with, by its shallow delimitation, with only a few diagnostic characters, mostly shared with other genera within the tribe or subject to exceptions. Within Diaperini, *Neomida* is one of the most diverse genus, comprising about 50 species found in all biogeographic regions. Is highly diverse in the Neotropical region, where are 31 species recorded, however, in the major part of this region, the studies are still incipient. The female abdominal terminalia is neglected within this genus, with this work, being the first attempt to use these characters to species delimitation. My aims in this dissertation, was study taxonomically the Neotropical species of *Neomida*, describing and redescribing species, e use the male and female abdominal terminalias as a character to separate species. Nine new species was described, one from Colombia and eight to Brazil; the geographical distributions of 11 species was extended; an identification key and data of host fungi was provided.

ÍNDICE

INTRODUÇÃO GERAL

Besouros do gênero *Neomida* Latreille, 1802 são estritamente fungívoros e em todas as fases de seu ciclo de vida eles se alimentam de basidiomas de fungos conhecidos popularmente como orelhas-de-pau (Aloquio & Lopes-Andrade 2015). *Neomida* possui cerca de 50 espécies descritas para regiões biogeográficas tropicais e subtropicais (Schawaller 2002), mas a maior diversidade é na região Neotropical, com 31 espécies (Aloquio & Lopes-Andrade 2015). No restante do continente americano, a diversidade do gênero é baixa. Há somente três espécies Neárticas, *N. bicornis* (Fabricius), *N. occidentalis* (Champion) e *N. ferruginea* (LeConte), e nenhuma na região Andina (Aloquio & Lopes-Andrade 2015).

Neomida é um gênero de difícil reconhecimento devido às poucas características diagnósticas. Membros desse gênero podem ser reconhecidos pelas seguintes características (retirado de Triplehorn 1965), nenhuma delas exclusiva do gênero: Clava antenal frouxa e com sete antenômeros; olhos emarginados anteriormente, próximo à inserção antenal, formando um lobo dorsal e um ventral; lobo ventral do olho pelo menos duas vezes o tamanho do lobo dorsal; cabeça do macho com adornos (chifre ou tubérculos) na fronte ou clípeo ou ambos; processo prosternal convexo; pontoação elitral seriada; tarsômero basal do tarso posterior curto. Esses poucas características diagnósticas são compartilhadas com outros gêneros dentro de Diaperini ou sujeitos à exceções. Por exemplo, machos de *Neomida acera* Triplehorn não apresentam adornos cefálicos; a clava antenal longa e frouxa é similiar àquela encontrada em *Diaperis* Geoffroy, *Ulomoides* Blackburn e *Pentaphyllus* Dejean (Triplehorn 1965); e espécies de *Platydema* Laporte & Brullé também possuem pontoação elitral seriada. *Neomida* e *Platydema* são extremamente diversos e utilizam fungos similares como hospedeiros, mas podem ser separados, geralmente, com uma rápida avaliação da morfologia externa: *Neomida* apresenta um corpo distintamente convexo e com lados subparalelos, enquanto *Platydema* é mais achatado e ovoide, com adornos cefálicos do macho, geralmente, assimétricos.

Dentre os Coleoptera, as estruturas genitais externas (edeago e ovipositor) são as estruturas "internas" mais populares para estudos de taxonomia desde o final do século XIX (Tschinkel & Doyen 1980). A significância da terminália de macho para classificações supragenéricas de Coleoptera foi considerada ainda em meados do século XX por Jeannel e Paulian (1944), que também consideraram a morfologia do esqueleto

abdominal (Tschinkel & Doyen 1980). A morfologia da terminália de fêmeas de Tenebrionidae foi pouco ou nunca comparada, com o trabalho pioneiro e mais importante utilizando esses caracteres realizado apenas ao final do século XX (Tschinkel & Doyen 1980). É inegavel a importância taxonômica e filogenética da terminália abdominal de ambos, macho e fêmea (Tschinkel & Doyen 1980), entretanto, as características presentes na terminália de fêmeas ainda são pouco utilizadas ou completamente negligenciadas em diversas famílias de Coleoptera, Tenebrionidae inclusa.

A fauna neotropical de *Neomida*, bem como Diaperinae de modo geral, é fracamente estudada, possuindo alguns poucos trabalhos publicados nas últimas décadas, usualmente com descrição de uma ou poucas espécies (Aloquio & Lopes-Andrade 2015, Triplehorn 1994, 2006). A maioria das descrições carecem de detalhes terminálias abdominais, com apenas representações gráficas do edeago e a terminália da fêmea omitida. A chave de identificação para as espécies neotropicais (Triplehorn 2006) é baseada apenas em características encontradas em machos, e não abrange espécies que ocorrem somente ao sul da Colômbia, que representa uma enorme porção da região Neotropical, região com a maior diversidade desses besouros. Isso dificulta a identificação precisa de espécies coletadas no sul Neotropical, principalmente quando apenas fêmeas são coletadas.

OBJETIVOS

O meu objetivo principal nesta dissertação é revisar a taxonomia das espécies de *Neomida* da região Neotropical, o que inclui as três espécies que estendem sua distribuição até a região Neártica. Os resultados são apresentados em dois capítulos, com seus próprios objetivos específicos:

Capítulo I–Descrever uma nova espécie de *Neomida* da Colômbia e prover uma descrição complementar de *Neomida suilla* (Champion), descrevendo as terminálias abdominais de macho e fêmea. A descrição da terminália de fêmea é a primeira feita para uma espécie de *Neomida*.;

Capítulo II–Revisar a taxonomia das espécies Neotropicais do gênero *Neomida*, redescrevendo e descrevendo espécies, com descrição detalhada de terminália de machos

e fêmeas e uma chave dicotômica para identificação com características de ambos os sexos;

Anexo I–Propor uma nova sinonímia para *N. luteonotata* (Pic).

MATERIAL E MÉTODOS

Os espécimes utilizados no desenvolvimento desse trabalho foram obtidos em coleções entomológicas do Brasil e do mundo e coletas recentes realizadas em biomas brasileiros.

Os indivíduos foram examinados e medidos, e a terminália abdominal dos adultos foram extraídas sob stereomicroscópio Zeiss Stemi 2000-C. A terminália da fêmea foi corada em uma solução de 0,5% de Negro de Clorazol E em uma solução alcoólica 85%, para aumento de contraste. A preparação das lâminas contendo os escleritos dissecados foi realizada utilizando um meio solúvel em água baseado em álcool polivinílico e ácido lático. Lâminas foram fotografadas sob microscópio composto Zeiss AxioLab equipado com uma câmera digital Zeiss AxioCam ERc 5s ou Zeiss AxioCam MRc, adultos foram fotografados sob estrereomicorscópio Zeiss Discovery V8 equipado com uma câmera digital Zeiss AxioCam MRc ou estereomicroscópio Zeiss Discovery V20 equipado com uma câmera digital Zeiss AxioCam 506 color. Imagens finais foram obtidas através da montagem de fotos em diferentes focos com o auxílio do módulo de foco estendido dos *softwares* Zeiss AxioVision 4.8 ou Zeiss ZEN 2012.

Termos de morfologia externa, incluindo escleritos da terminália abdominal, seguem a nomenclatura proposta por Lawrence et al. (2011). O termo basale se refere à falobase, e apicale aos parâmeros fundidos (Lawrence et al. 2011). Os símbolos que se seguem foram utilizados para medições (em mm) e razões: EL, comprimento elitral (medido na região medial, da base do escutelo até o ápice dos élitros); EW, maior largura elitral; GD, maior profundidade do corpo (élitro ao metaventrito); PL, comprimento do pronoto (ao longo da linha média); PW, maior largura do pronoto; TL, comprimento total (=EL+PL, cabeça não inclusa). A razão GD/EW indica o grau de convexidade, e TL/EW o grau de elongação corporal.

Para comparação das terminálias de fêmeas e delimitação dos tipos morfológicos de terminálias, foi utilizado o trabalho de Tschinkel e Doyen (1980), onde eles comparam

estruturas genitais e glandulares de Tenebrionidae. Dados de fungo hospedeiro foram obtidos da literatura e de coletas recentes.

Maior detalhamento dos materiais e métodos utilizados podem ser encontrados na seção "*Material and methods*" dentro de cada capítulo.

RESULTADOS GERAIS

Foram descritas nove novas espécies de *Neomida* para a região Neotropical, e estudadas novas características que podem ajudar na separação e reconhecimento das espécies. Esses resultados, são apresentados nos próximos dois capítulos.

CAPÍTULO 1: A new species of *Neomida* Latreille from Colombia, with additional records and a complementary description for *Neomida suilla* (Champion) (Coleoptera: Tenebrionidae: Diaperini)

(Publicado na revista ZooKeys)

ZooKeys 495: 133–142 (2015)
doi: 10.3897/zookeys.495.8737
http://zookeys.pensoft.net

RESEARCH ARTICLE

A peer-reviewed open-access journal
ZooKeys
Launched to accelerate biodiversity research

A new species of *Neomida* Latreille from Colombia, with additional records and a complementary description for *Neomida suilla* (Champion) (Coleoptera, Tenebrionidae, Diaperini)

Sergio Aloquio[1], Cristiano Lopes-Andrade[2]

1 *Programa de Pós-Graduação em Biologia Animal, Departamento de Biologia Animal, Universidade Federal de Viçosa, 36570-900, Viçosa, MG, Brasil* **2** *Departamento de Biologia Animal, Universidade Federal de Viçosa, 36570-900, Viçosa, MG, Brasil*

Corresponding author: *Sergio Aloquio* (sergio.aloquio@gmail.com)

Academic editor: *P. Bouchard* | Received 12 October 2014 | Accepted 18 March 2015 | Published 8 April 2015

http://zoobank.org/F3854E21-4038-4FF4-BEDE-454302483B3A

Citation: Aloquio S, Lopes-Andrade C (2015) A new species of *Neomida* Latreille from Colombia, with additional records and a complementary description for *Neomida suilla* (Champion) (Coleoptera, Tenebrionidae, Diaperini). ZooKeys 495: 133–142. doi: 10.3897/zookeys.495.8737

Abstract

Neomida diminuta **sp. n.** is described, based on a single male specimen from Colombia, and a redescription of *N. suilla* (Champion) is given. Data on the morphology of the aedeagus for both species, and on the female abdominal terminalia for *N. suilla* are provided. New records of *N. suilla* from Atlantic Forest remnants in the states of Espírito Santo and Minas Gerais, Brazil are given.

Keywords

Tenebrionidae, Diaperini, *Neomida*, new species, redescription, new records, Brazil, Colombia

Introduction

Species of the genus *Neomida* Latreille, 1829 (Coleoptera: Tenebrionidae: Diaperini) are strict fungivorous beetles that dwell in hard conks of Polyporales and Hymenochaetales hosts. *Neomida* has approximately 50 described species, most from tropical and subtropical regions (Schawaller 2002). In America, the genus is most diversified in the neotropics; it does not occur in the Andean region, and has only three Nearctic species, *N. bicornis*

(Fabricius), *N. occidentalis* (Champion) and *N. ferruginea* (LeConte). Members of *Neomida* are diagnosed by the following features (taken from Triplehorn 1965): antennal club loose and with seven antennomeres; eyes emarginate anteriorly close to antennal insertions, forming a lower portion at least twice as long as the upper portion; head of males usually bearing horns or tubercles on frons or clypeus, or both; prosternal process convex; elytral punctation seriate; basal tarsomere of hind tarsi short. However, these features are usually subject to exceptions or shared with species of other Diaperini genera. For instance, *Neomida acera* Triplehorn is devoid of secondary sexual features on male head; the long and loose antennal club of *Neomida* is similar to those of *Diaperis* Geoffroy, *Ulomoides* Blackburn and *Pentaphyllus* Dejean (Triplehorn 1965); and species of *Platydema* Laporte and Brullé also have seriate elytral punctation. *Neomida* and *Platydema* are highly diversified and use similar fungi as hosts, but can be easily distinguished at a glance: the body of *Neomida* is distinctly convex and subparallel-sided, while *Platydema* are comparatively more flattened and ovoid, with male horns on the head often asymmetric. The Neotropical fauna of *Neomida* comprises 30 described species, 16 restricted to the northern and three to the southern neotropics, and 11 species are found in both (Triplehorn 2006).

In recent field collections in southeast Brazil we found *N. suilla*, a species known from a few named specimens in museum collections and amongst the least studied Neotropical *Neomida*. Additionally a small undescribed *Neomida* erroneously identified as *Cis* Latreille (Ciidae) was recognized among the material borrowed from the Muséum national d'Histoire naturelle in Paris. The aims of the present work are to provide new records and a complete description for *N. suilla*, and describe a new species belonging to the same genus.

Material and methods

Specimens of *N. suilla* were found in basidiomes of *Ganoderma* sp. (Ganodermataceae) collected in Rio Doce, in the state of Minas Gerais, and Linhares, in the state of Espírito Santo. Both localities are in the Brazilian Atlantic Forest. The beetles were reared in the laboratory, in the same fungi in which they were found, so as to obtain a high number of specimens for dissecting and depositing in scientific collections. Five adults were preserved in absolute alcohol, which are preserved below -22 °C for future molecular analyses. Forty specimens are dry mounted and several others are preserved in 70% alcohol.

Species identification was possible due to morphological data and images provided in the work of Triplehorn (2006). Specimens were examined and measured, and adult male and female abdominal terminalia extracted under a Zeiss Stemi 2000-C stereomicroscope. Female terminalia, including spermatheca, were stained with a solution of 0.5% Chlorazol Black E in 85% alcohol to enhance contrast. Whole mount preparations of dissected sclerites were made using a water-soluble mounting media based on polyvinyl alcohol and lactic acid. We photographed slides under a Zeiss AxioLab compound microscope equipped with a Zeiss AxioCam ERc 5s digital camera (Figs 3–4) and a Zeiss AxioCam MRc (Figs 7–9, 11–12), and adult specimens under a Zeiss

Discovery V8 stereomicroscope with a Zeiss AxioCam MRc digital camera (Figs 1–2) and a Zeiss Discovery V20 stereomicroscope with a Zeiss AxioCam 506 (Figs 5–6, 10). Final images were the result of montaging 25 to 125 image slices at different focal lengths using the extended focus module of Zeiss Axiovision 4.8 software (Figs 1–2) and Zeiss ZEN 2012 (Figs 5–6, 10).

We based the redescription of *N. suilla* on a male plesiotype (a specimen used for a redescription, supplementary description, or illustration published subsequent to the original description; sensu Evenhuis 2008), and the description of *N. diminuta* sp. n. on a single male from Colombia. Terms for external morphology, including sclerites of abdominal terminalia, follow Lawrence et al. (2011). The term basale refers to the phallobase, and apicale to the fused parameres (Lawrence et al. 2011). The following symbols are used for measurements (in mm) and ratios: EL, elytral length (at midline, from base of scutellum to elytral apex); EW, greatest elytral width; GD, greatest depth of the body (from elytra to metaventrite); PL, pronotal length along midline; PW, greatest pronotal width; TL, total length (=EL+PL; head not included). The ratio GD/EW was recorded as an indication of degree of convexity; TL/EW indicates degree of body elongation.

The distribution map (Fig. 13) was created using latitude and longitude coordinates estimated by tracking localities in the online database GeoNames (Wick 2010) and plotting them in a map using DIVA-Gis 7.5.

Labels were printed in white paper, unless otherwise specified. Label data are cited verbatim in quotation marks; a backslash separates different labels. Square brackets are used to denote our comments on label data. The number and gender of specimens bearing these labels are stated immediately before the label data.

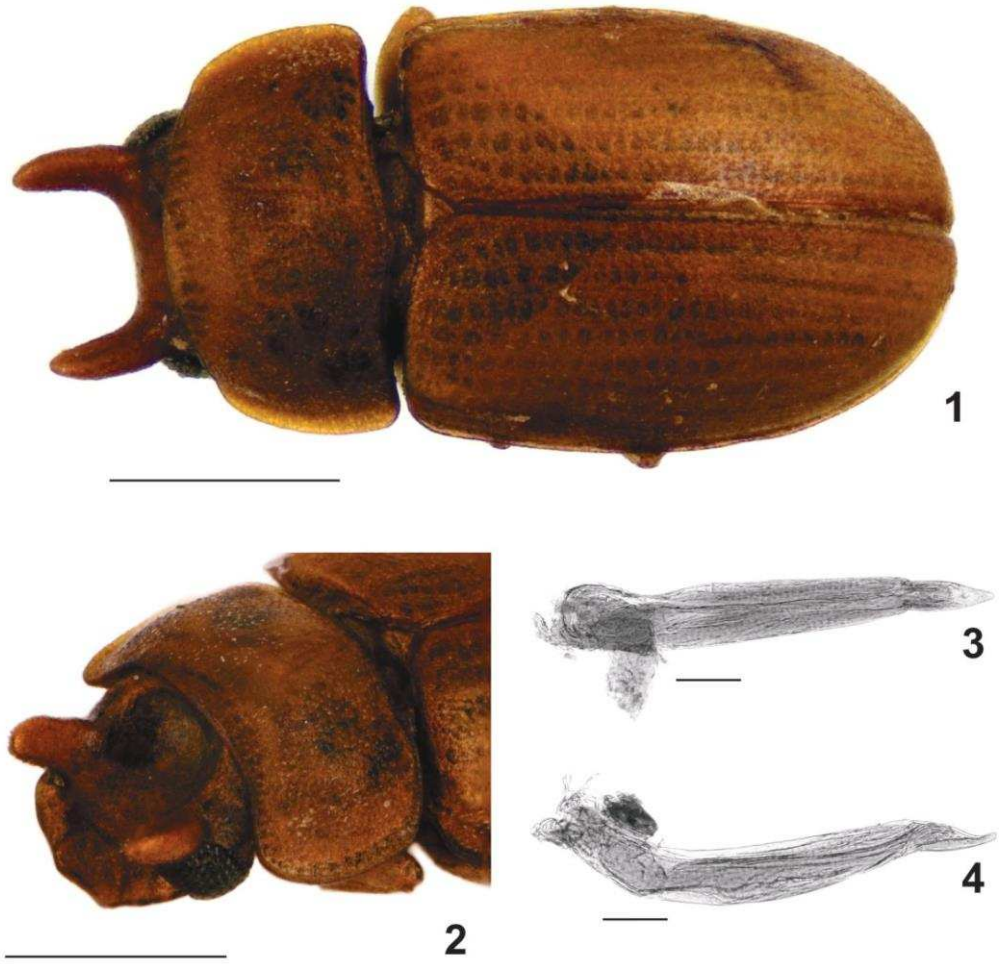
Acronyms of depositories

ANIC	Australian National Insect Collection, CSIRO Ecosystem Sciences (Canberra, Australia)
CELC	Coleção Entomológica do Laboratório de Sistemática e Biologia de Coleoptera, Universidade Federal de Viçosa (Viçosa, Minas Gerais, Brasil)
MNHN	Muséum national d'Histoire naturelle (Paris, France)
OSUC	The Ohio State University Insect Collection (Columbus, Ohio, USA)

Taxonomy

***Neomida diminuta* sp. n.**
http://zoobank.org/74A4E927-BEA1-4763-857E-20A3899F26B1
Figs 1–4

Diagnosis. *Neomida diminuta* sp. n. differs from all other *Neomida* by its minute size (TL 1.74 mm), while other species in the genus are at least 1.85 mm long. It differs



Figures 1–4. *Neomida diminuta* sp. n. male holotype. **1** Dorsal view **2** Diagonal view of head **3** Ventral view of aedeagus **4** Lateral view of aedeagus. Scales bar: 0.5 mm (Figs 1–2), 0.1 mm (Figs 3–4).

from *N. suilla* and *N. picea* in the possession of two clypeal tubercles instead of one, from *N. cioides* in the subcylindrical and straight frontal horns, and from *N. inermis* by its subtle clypeal sinuosity instead of conspicuous and cylindrical tubercles. *Neomida diminuta* sp. n. males have eyes, body shape and cephalic horns similar to those of *N. occidentalis*, but the latter are twice as long. In *N. diminuta* sp. n., the epipleura extends from base to apex of elytra, a feature observed only in other six species of *Neomida*: *N. cioides* (Champion), *N. deltocera* Triplehorn, *N. occidentalis*, *N. pentaphyllodes* (Champion), *N. picea* (Laporte and Brullé) and *N. suilla*.

Etymology. The name "diminuta" means small, referring to its minute size.

Description. Male. Body moderately convex, opaque, glabrous; length 1.74 mm; elytra, pronotum and head reddish-brown; antennae and legs golden-yellow. **Head** with vertex deeply concave; frons armed with a pair of long, subcylindrical, subparallel narrow horns, each rising close to an eye; clypeus with two small sinuosities contiguous

to antennal insertions. **Eyes** with anterior portion emarginated by antennal insertion, forming a lower lobe approx. four times as large as upper lobe. **Antennae** with antennomeres 5–11 expanded forming a club. **Pronotum** strongly transverse, approx. twice as wide as long, widest and longest at middle, sides subparallel and narrowed anteriorly; lateral edges explanate, visible for their entire lengths from above; anterior edge truncate. **Elytra** approx. twice as long as pronotum, widest at middle and narrowing to apex, epipleura extending to apex. **Hind wings** developed, apparently functional. **Ventral surface** slightly darker than dorsum, punctation sparser; prosternal process subparallel. **Protibiae** with outer edge serrate; apex bearing a row of spines; inner apical angle with two long spines. **Hind tarsi** with basal tarsomere approx. as long as the following three together. **Aedeagus** with basale approx. three and a half times as long as apicale, curved at base, sides subparallel, a bit wider in the second third; apicale with sides subparallel, narrowing near middle to apex; penis about as long as basale, cylindrical, expanded at apex, with struts converging and fusing at basal one-fifth; internal sac not observed (possibly lost during dissection). **Female** unknown.

Measurements. Male holotype (in mm): TL 1.74, PL 0.49, PW 0.89, EL 1.17, EW 0.98, GD 0.69; ratios: PL/PW 0.55, EL/EW 1.19, EL/PL 2.39, GD/EW 1.70, TL/EW 2.46.

Type specimen. Male holotype (MNHN) labeled: "Dup Colomb 41 [sic] {circular green label}\ ♂ {small green label}\ *Neomida diminuta*, HOLOTYPUS, Aloquio & Lopes-Andrade {handwritten in red label}".

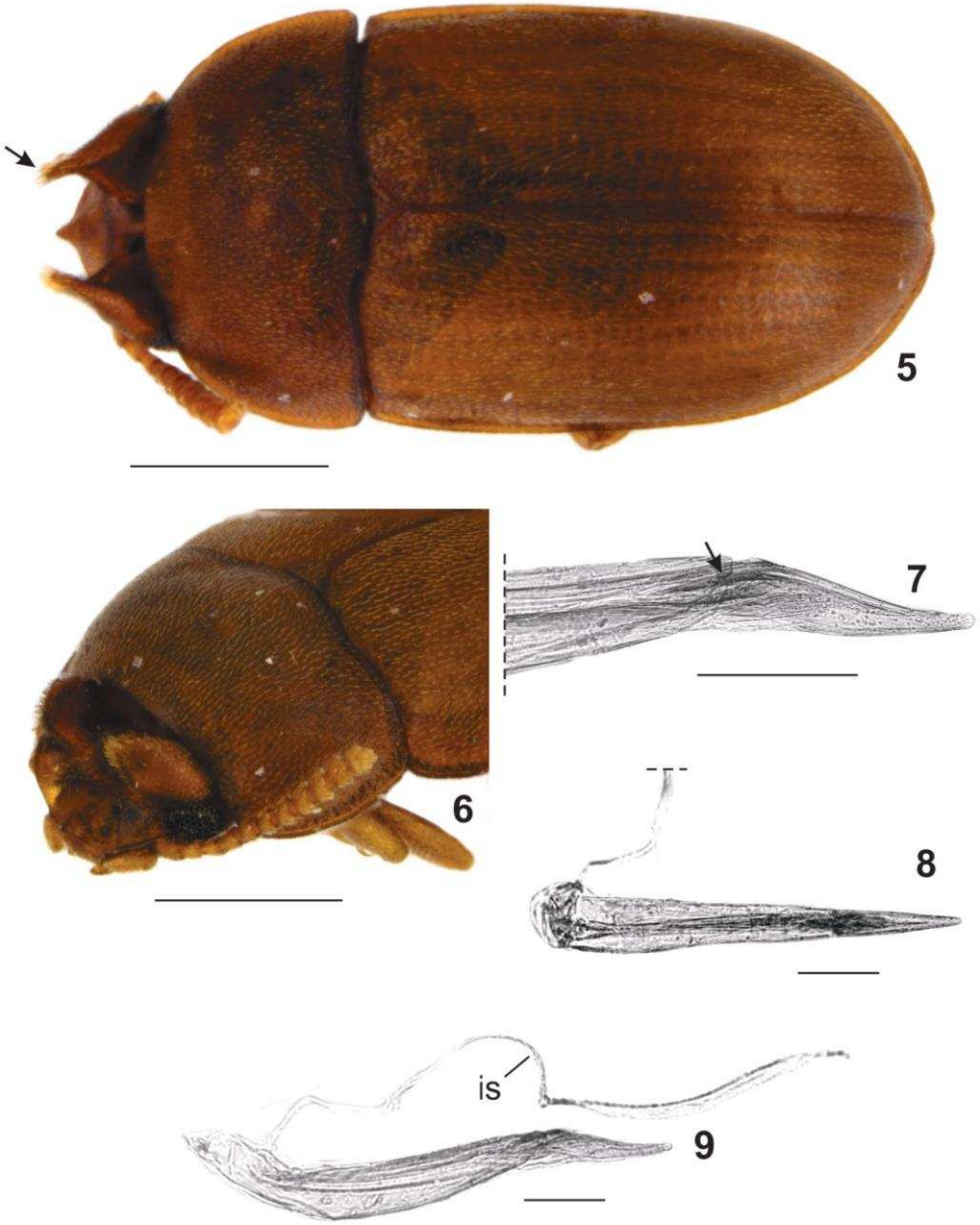
Comments. *Neomida diminuta* sp. n. was collected in 1841 and remained unrecognized as a tenebrionid beetle in the Muséum national d'Histoire naturelle of Paris, France, until recently. It was found among specimens identified as *Cis* Latreille (Ciidae), possibly confounded due to its small size and head bearing horns. The great age certainly affected important morphological features, such as body vestiture, pronotal and elytral punctation and integrity of membranous structures as the internal sac of aedeagus. Information on host fungus was not available. The extension of exposed epipleura and other conspicuous characters need to be more carefully observed, because they can be important for proposing species-groups or even subgenera for *Neomida*, in order to facilitate the work with such a speciose genus.

Neomida suilla (Champion, 1896)

Figs 5–12

Arrhenoplita suilla Champion 1896: 11
Hoplocephala suilla (Champion): Blackwelder 1945: 527
Neomida suilla (Champion): Triplehorn 1965: 375; Marcuzzi 1984: 87; Triplehorn 2006: 313

Diagnosis. Males of *N. suilla* differ from males of all other described New World *Neomida*, except *N. picea* (Laporte and Brullé), in having a single prominent median clypeal tubercle



Figures 5–9. *Neomida suilla* male. **5** Dorsal view, tuft of bristles on horn tip (arrow) **6** diagonal view of head **7** Detail of aedeagus apicale showing the ala (arrow) **8** Ventral view of aedeagus **9** Lateral view of aedeagus. **is** – internal sac. Scale bars: 0.5 mm (Figs 5–6), 0.1 mm (Figs 7–9).

(Triplehorn 2006). *Neomida suilla* differs from *N. picea* by its shorter length, and males in having triangular-shaped cephalic horns with a tuft of bristles at their tips (Fig. 5, arrow).

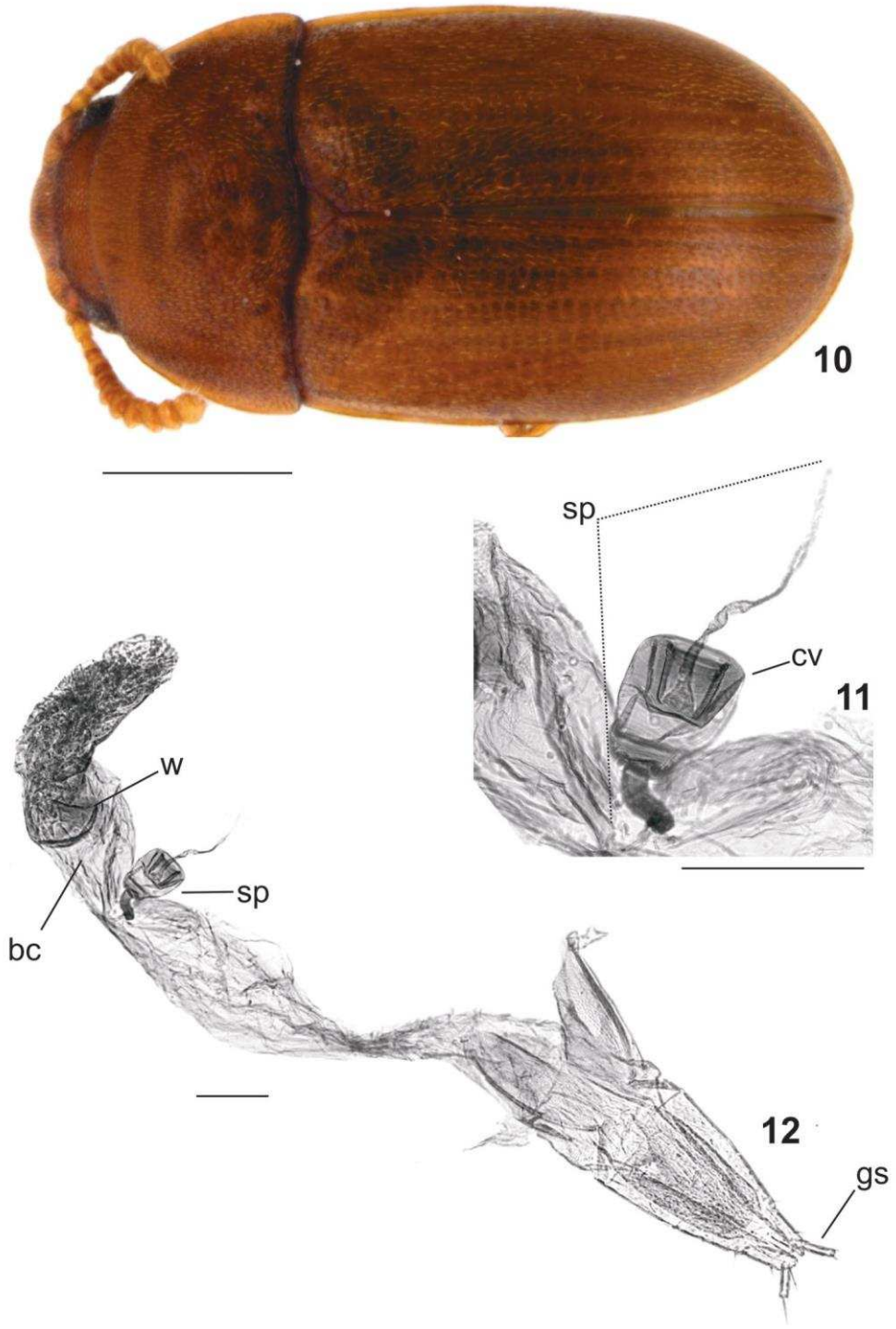
Supplementary description. Male. Body moderately convex, opaque, with vestiture of small seta; length 1.85–2.25 mm; elytra, pronotum and head reddish-brown;

antennae, legs and mouthparts golden-yellow. **Head** with clypeus bearing a single prominent tubercle near the middle of anterior edge; frons armed with a pair of long, flattened, subtriangular, broad horns, each rising close to an eye and directed upward; horns with a row of bristles extending from about the middle of anterior edge to apex (Fig. 5, arrow); vertex deeply concave; **Eyes** with anterior portion emarginate by antennal insertion, forming a lower lobe about three times larger than upper lobe. **Antennae** with antennomeres 5–11 expanded forming a club; antennomeres 6–11 bearing multi-pronged sensilla (sensillifers) at the upper portion. **Pronotum** strongly transverse, twice as wide as long, widest posteriorly and longest at middle; lateral edges explanate, visible for their entire lengths from above; anterior edge slightly curved outward. **Elytra** approx. two and a half times as long as pronotum; sides subparallel at basal half, then narrowing to apex, epipleura extending to apex. **Hind wings** developed, apparently functional. **Ventral surface** slightly darker than dorsum, punctation sparser; prosternal process subparallel, narrowest at apex. **Protibiae** with outer edge serrate; apex bearing a row of spines; inner apical angle with two long spines. **Aedeagus** with basale about three times as long as apicale; basale most expanded near its base; apicale strongly narrowed at apex and with two lateral projections (ala) directed anteriorly and fitting the basale (Fig. 7, arrow); penis about as long as basale, cylindrical, expanded at apex, with struts converging and fusing at basal one-seventh of the length; internal sac narrow, elongated, about twice as long as penis. **Females** similar to males except for the following features: head without clypeal tubercle and frontal horns, and vertex devoid of concavity; eyes with lower lobe twice as long as upper one. **Female abdominal terminalia** with bursa copulatrix approx. one and a half time as long as gonocoxites together; common oviduct approx. as long as window of bursa; window of bursa about four times as long as spermatheca; spermatheca (Fig. 11) with check valve small, oval, bearing an invagination from upper portion to about middle; paraprocts about as long as gonocoxites together; baculi of basal gonocoxites perpendicular in relation to baculi of paraprocts; gonocoxites transversely divided into three parts; gonostyli inserted at top of apical gonocoxites.

Variation. Males (n = 30), measurements (in mm): TL 1.90–2.20 (2.10 ± 0.09), PL 0.45–0.60 (0.56 + 0.04), PW 0.90–1.05 (1.00 + 0.04), EL 1.00–1.40 (1.28 + 0.08), EW 0.95–1.10 (1.05 + 0.04), GD 0.70–0.80 (0.74 + 0.03); ratios: PL/PW 0.50–0.60, EL/EW 1.00–1.35, EL/PL 2.00–2.67, GD/EW 0.64–0.75, TL/EW 1.82–2.15. Females (n = 10), measurements (in mm): TL 1.85–2.20 (2.08 + 0.10), PL 0.45–0.60 (0.56 + 0.05), PW 0.90–1.05 (1.00 + 0.04), EL 1.25–1.40 (1.32 + 0.05), EW 0.95–1.10 (1.06 + 0.05), GD 0.70–0.75 (0.74 + 0.02); ratios: PL/PW 0.50–0.60, EL/EW 1.18–1.35, EL/PL 2.17–2.78, GD/EW 0.68–0.74, TL/EW 1.91–2.10.

Material examined. 15 males and five females (1♂ and 1♀ ANIC, 13♂ and 3♀ CELC, 1♂ and 1♀ OSUC) labeled: "BRASIL: MG, Rio Doce, Lago da Candonga; área de mata, 16.ix.2009, leg. E.F. Barbosa". 15 males and five females (1♂ and 1♀ ANIC, 13♂ and 3♀ CELC, 1♂ and 1♀ OSUC) labeled: "BRASIL: ES, Linhares, Mata do Lago, 16.vii.2010, leg. S.Z. Aloquio Jr.".

Comments. All specimens of *N. suilla* were found in basidiomes of *Ganoderma* sp., which is the primary host fungus record for the species. *Neomida suilla* was col-



Figures 10–12. *Neomida suilla* female. **10** Dorsal view **11** Spermatheca **12** Abdominal terminalia. **bc** – bursa copulatrix, **cv** – check valve, **gs** – gonostylus, **sp** – spermatheca, **w** – window of bursa. Scale bars: 0.5 mm (Fig. 10), 0.1 mm (Figs 11–12).

Figure 13. Distribution map for *Neomida diminuta* sp. n., represented by an interrogation symbol (**?**), without specific locality, and *Neomida suilla*, represented by a triangle (▲).

lected in two localities of the Brazilian Atlantic Forest (Fig. 13) separated by approx. 500 linear km, each at an extreme of the Doce River. These two localities are the most southern records for the species, which was known from only two localities in the Lesser Antilles (St. Vincent and Guadeloupe) and one in Recife (in the state of Pernambuco, Brazil). Its occurrence in the Lesser Antilles and in distant localities of the Brazilian Atlantic Forest suggests a wide distribution throughout the east coast of tropical South America.

Acknowledgments

We wish to express our thanks to Vivian E. Sandoval Gómez for showing us the undetermined *Neomida* among ciid beetles sorted by her in the MNHN, and to Tatiana Gilbertoni (UFPE) for identifying the host fungus of *Neomida suilla*. Financial support

was provided by Fundação de Amparo à Pesquisa do Estado de Minas Gerais (FAPEMIG: Universal APQ-00653-12; PPM-00026-14), Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq: PROTAX 52/2010 nº 562229/2010-8; Universal nº 479737/2012-6, research grant to CLA nº 302480/2012-9), Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES: master degree grant to the senior author; PVE nº 88881.030447/2013-01), Secretaria de Estado de Ciência, Tecnologia e Ensino Superior de Minas Gerais (SECTES-MG), Projeto Floresta-Escola, and the Graduate Program in Animal Biology of Universidade Federal de Viçosa (UFV). We thank Dr. Charles A. Triplehorn, Dr. Roland Grimm and Dr. Patrice Bouchard for the revision of the manuscript and for improving it with their comments.

References

Blackwelder RE (1945) Checklist of the coleopterous insects of Mexico, Central America, the West Indies, and South America, part 3. United States National Museum Bulletin 185: 343–550.

Champion GC (1896) On the heteromerous Coleoptera of St. Vincent, Grenada, and Grenadines. Transactions of the Entomological Society of London, 1–54, illus.

Evenhuis NL (2008) A compendium of zoological type nomenclature: A reference source. Bishop Museum Technical Report 41, 23 pp.

Lawrence JF, Ślipiński A, Seago AE, Thayer MK, Newton AF, Marvaldi AE (2011) Phylogeny of the Coleoptera based on morphological characters of adults and larvae. Annales Zoologici 61(1): 1–217. doi: 10.3161/000345411X576725

Marcuzzi G (1984) A catalogue of tenebrionid beetles (Coleoptera: Heteromera) of the West Indies. Folia Entomologica Hungarica Rosartani Kozlemenyak XLV 1: 69–108.

Schawaller W (2002) Taxonomic notes on Paleartic and Oriental species of *Neomida* Latreille, 1829 (Coleoptera, Tenebrionidae), with description of a new species from southern India. Entomoligica Basiliensia 24: 281–287.

Triplehorn CA (1965) Revision of Diaperini of America north of Mexico, with notes on extralimital species (Coleoptera: Tenebrionidae). Proceedings of the Unites States National Museum 3515: 349–458. doi: 10.5479/si.00963801.117-3515.349

Triplehorn CA (2006) Studies in Neotropical *Neomida*: A synopses of the genus *Neomida* (Coleoptera: Tenebrionidae: Diaperini) from America north of Colombia with notes on other western hemisphere species. Proceedings of the Entomological Society of Washington 108(2): 312–334.

Wick M (2010) GeoNames Home [online]. The GeoNames Geographical Database, Switzerland. http://www.geonames.org [accessed 01.X.2014]

CAPÍTULO 2: Synopsis of the American *Neomida* (Coleoptera: Tenebrionidae: Diaperini), with an identification key and description of eight new Brazilian species

(Não publicado. Esta publicação não é considerada válida de acordo com o Código de Internacional de Nomenclatura Zoológica–ICZN)

Synopsis of the American *Neomida* (Coleoptera: Tenebrionidae: Diaperini), with an identification key and description of eight new Brazilian species

Sergio ALOQUIO[1], Cristiano LOPES-ANDRADE[2]

[1]*Programa de Pós-Graduação em Biologia Animal, Departamento de Biologia Animal, Universidade Federal de Viçosa, 36570-900, Viçosa, MG, Brazil*

[2]*Departamento de Biologia Animal, Universidade Federal de Viçosa, 36570-900, Viçosa, MG, Brazil*

Corresponding author: Sergio Aloquio (sergio.aloquio@gmail.com)

Abstract

The American *Neomida* species are revised. We provide redescriptions, when necessary, and complementary descriptions, with a detailed description of male and female abdominal terminalia whenever possible. Eight new species are described from Brazil: *N. bimaculata* **sp.n.**, *N. capixaba* **sp.n.**, *N. grossii* **sp.n.**, *N. luciae* **sp.n.**, *N. samurai* **sp.n.**, *N. triplehorni* **sp.n.**, *N. vespertilionis* **sp.n.** and *N. vivianae* **sp.n.**. We discuss the morphology of species, specially of their female abdominal terminalia, provide insights on host fungi and geographic distribution of species, and an identification key to the American *Neomida*.

Keywords

Darkling beetle, Diaperinae, morphology, new records, taxonomy

Introduction

Species of the genus *Neomida* Latreille, 1829 (Coleoptera: Tenebrionidae: Diaperini) are strict fungivorous beetles that dwell in hard conks of Polyporales and Hymenochaetales hosts. *Neomida* has approximately 50 described species, most from tropical and subtropical regions (Schawaller 2002). In America, the genus is most diversified in the neotropics. It does not occur in the Andean region, and has only three species extending to the Nearctic region: *N. bicornis* (Fabricius), *N. occidentalis* (Champion) and *N. ferruginea* (LeConte). Members of *Neomida* are diagnosed by the following features antennal club loose and with seven antennomeres; eyes emarginate anteriorly close to antennal insertions, forming a lower portion at least twice as long as the upper portion; head of males usually bearing horns or tubercles on frons or clypeus, or both; prosternal process convex; elytral punctation seriate; basal tarsomere of hind tarsi short (Triplehorn 1965). However, these features are usually subject to exceptions or shared with species of other Diaperini genera. For instance, *Neomida acera* Triplehorn is devoid of secondary sexual features on male head; the long and loose antennal club of *Neomida* is similar to those of *Diaperis* Geoffroy, *Ulomoides* Blackburn and *Pentaphyllus* Dejean (Triplehorn 1965); and species of *Platydema* Laporte and Brullé also have seriate elytral punctation. *Neomida* and *Platydema* are highly diversified and use similar fungi as hosts, but can be easily distinguished at a glance: the body of *Neomida* is distinctly convex and subparallel-sided, while *Platydema* are comparatively more flattened and ovoid, with male horns on the head often asymmetric. The American fauna of *Neomida* comprises 31 described species, 16 restricted to the northern and four to the southern neotropics, and 11 species are found in both (Aloquio and Lopes-Andrade 2015, Triplehorn 2006).

The use of characters of female abdominal terminalia is neglected within *Neomida*, with only one description of its parts (Aloquio and Lopes-Andrade 2015). Tschinkel and Doyen (1980) pointed that the female abdominal terminalia was never used in Tenebrionidae until that date and, after that, few works used those characters (Matthews and Bouchard 2008, Matthews et al. 2010). The use of the female abdominal terminalia for taxonomy is almost restricted to differentiate higher taxa such as subfamilies (Matthews and Bouchard 2008, Matthews et al. 2010). The use of those characters may provide new insights toward the classification within subfamilies, genera and even species.

Our objective in the present work is to provide a synopsis on the American *Neomida*, with the description of eight new species, additional data on geographic distribution and host fungi of species, and a provisional identification key for males and females. We also provide data on the morphology of male and female abdominal terminalia whenever possible and briefly discuss their importance in the taxonomy of the genus.

Material and methods

Specimens were examined and measured, and adult male and female abdominal terminalia extracted under a Zeiss Stemi 2000-C stereomicroscope. In order to extract the abdominal terminalia, the specimens were softened in a solution of hot water and detergent for about half an hour. Then the abdomen was extracted, using pins to brake the intestine at the height of the metaventrite. The whole abdomen were put in a solution of 50 mL water, 2 mL detergent and 5mL concentrate KOH, and left overnight to soften the membranes and make easier to extract the whole terminalia without major damage. Female terminalia, including spermatheca when possible, were stained with a solution of 0.5% Chlorazol Black E in 85% alcohol to enhance contrast. Whole mount preparations of dissected sclerites were made using a water-soluble mounting media based on polyvinyl alcohol and lactic acid. We photographed slides under a Zeiss AxioLab compound microscope equipped with a Zeiss AxioCam ERc 5s digital camera or a Zeiss AxioCam MRc, and adult specimens under a Zeiss Discovery V8 stereomicroscope with a Zeiss AxioCam MRc digital camera or a Zeiss Discovery V20 stereomicroscope with a Zeiss AxioCam 506. Final images were the result of montaging image slices at different focal lengths using the extended focus module of Zeiss Axiovision 4.8 software and Zeiss ZEN 2012.

When we judge necessary, we redescribed species, otherwise we only provide a diagnosis and a complementary description with information about the abdominal terminalia of male and female, when possible. For those species that we had no access to specimens, the diagnoses were obtained consulting their original descriptions. The redescriptions and complementary descriptions are based on a plesiotype (a specimen used for a redescription, supplementary description, or illustration published subsequent to the original description; sensu Evenhuis 2008). Terms for external morphology,

including sclerites of abdominal terminalia, follow Lawrence et al. (2011). The term basale refers to the phallobase, and apicale to the fused parameres (Lawrence et al. 2011). The following symbols are used for measurements (in mm) and ratios: EL, elytral length (at midline, from base of scutellum to elytral apex); EW, greatest elytral width; GD, greatest depth of the body (from elytra to metaventrite); PL, pronotal length along midline; PW, greatest pronotal width; TL, total length (head included). The ratio GD/EW was recorded as an indication of degree of convexity; TL/EW indicates degree of body elongation. The identification key includes all described American *Neomida* species. In cases of species we did not have in hand, we included them based on characteristics cited in their original descriptions and any subsequent work. We included characteristics that allow identification of males and females, whenever possible.

For identificating the characters of the female abdominal terminalia, and separate them into different morphological types, we used the comparative work of Tschinkel and Doyen (1980). The data for host fungi was obtained from literature (Triplehorn 1965, 1994, 2006), labels of the specimens from museuns and recent collections.

Labels were printed on white paper, unless otherwise specified. Label data are cited verbatim in quotation marks; a backslash separates different labels. Square brackets are used to denote our comments on label data. The number and gender of specimens bearing these labels are stated immediately before the label data.

Acronyms of depositories

ANIC Australian National Insect Collection, CSIRO Ecosystem Sciences (Canberra, Australia)

CEIOC Coleção Entomológica do Instituto Oswaldo Cruz (Rio de Janeiro, Brazil)

CELC Coleção Entomológica do Laboratório de Sistemática e Biologia de Coleoptera, Universidade Federal de Viçosa (Viçosa, Minas Gerais, Brazil)

DZUP Coleção Entomológica Padre Jesus Santiago Moure, Universidade Federal do Paraná (Curitiba, Paraná, Brazil)

FMNH Field Museum of Natural History (Chicago, Illinois, USA)

FZRGS Fundação Zoobotânica do Rio Grande do Sul (Porto Alegre, Rio Grande do Sul, Brazil)

MNRJ Museu Nacional do Rio de Janeiro (Rio de Janeiro, Brazil)

OSUC The Ohio State University Insect Collection (Columbus, Ohio, USA)

Results

Female abdominal terminalia

The female abdominal terminalia have proved to be an important addition to the diagnosis of species. We recognized four distinct morphological types of female terminalia in *Neomida*, listed below.

Type 1 (Fig. 1)–Ovipositor slender; gonostyli inserted almost laterally; gonostyli less than 1/5 of the apical gonocoxite length; internal protuberance in the last gonocoxite absent; baculi of paraproct oblique; paraproct twice as long as gonocoxites together; check valve bearing ring-like, hardened invaginations. Species: *N. distans*, *N. nigricornis*, *N. pogonocera*.

Type 2 (Fig. 2)–Ovipisitor subtriangular; last gonocoxite slender, cilyndrical, 0.5 to 1 time the length of the first two gonocoxites together, width one and a half to twice as wide as gonostyli; check valve bearing cylindrical, hardened invaginations, invagination closer to bursa about 1/3 to 1/4 the length of check valve, invagination far from bursa, at least, reaching the middle of check valve; window of bursa, when present, about twice as long as the ovipositor. Species: *N. aeneipennis*, *N. bicornis*, *N. bimaculata* **sp.n.**, *N.* capixaba **sp.n.**, *N. divergicornis*, *N. ferruginea*, *N. luteonotata*, *N. obsoleta*, *N. samurai* **sp.n.**, *N. vespertilionis* **sp.n.**, *N. vitula*.

Type 3 (Fig. 3)–Ovipositor triangular; gonocoxites subequal in length; gonostyli inserted almost apically; internal protuberance in the last gonocoxite, when present, about 1/4 to 1/2 the length of gonostyli; baculi of paraprocts parallel; paraprocts the same length to twice as long as gonocoxites together; check valve quite membranous, invaginations variable in size; window of bursa always present, and never longer than ovipositor. Species: *N. atricollis*, *N. cioides*, *N. clavicornis*, *N. deltocera*, *N. picea*, *N. suilla*, *N. triplehorni* **sp.n.**.

Type 4 (Fig. 4)–Ovipositor subtriangular; basal gonocoxites subequal in length; apical gonocoxite reduced in length, bearing an internal hardened, curved ventrally protuberance; gonostyli as long as last gonocoxite, inserted obliquely; baculi of paraproct wide, oblique; paraproct about one and a half as long as the gonocoxites together; check valve bearing cylindrical, hardened invaginations, invagination closer to bursa about 1/4 the length of check valve, invagination far from bursa, exceeding the middle of check valve; window of bursa absent. Species: *N. castanea*, *N, hoffmanseggi*, *N. lecontei*.

Taxonomy

Neomida Latreille, 1829

Hoplocephala Laporte and Brullé, 1831

Arrhenoplita Kirby, 1837

Evoplus LeConte, 1866

Type species: *Ips haemorrhoidales* Fabricius, 1787

Neomida acera Triplehorn, 1994

Figs. 5–7

Diagnosis. Similar to *N. paurocera* and *N. obsoleta* but easily recognizable by its lack of sexual dimorfism. Males of *N. acera* have no sign of clypeal nor frontal protuberances (Triplehorn 1994, 2006)

Complementary description. Aedeagus (Fig. 7) with basale about six times as long as apicale; apicale triangular, about as long as wide, convex, apex slightly rounded; basale widest at middle, slightly curved ventrally; penis about half as long as basale, sides subparellel, apex truncate; internal sac about five times as long as penis.

Measurements. Male (in mm): TL 4.06, PL 1.25, PW 1.63, EL 2.31, EW 1.88, GD 1.50; ratios: PL/PW 0.77, EL/EW 1.23, EL/PL 1.85, GD/EW 0.80, TL/EW 2.17.

Material examined. One male (ANIC) labelled: “CANAL ZONE: Is. Barro Colorado II/19–III/9–79 Lawrence, Erwin\ J.F. Lawrence Lot. 3877 [number handwritten]\ Nigrofomes melanoporus”.

Distribution. Costa Rica; Panama.

***Neomida aeneipennis* Triplehorn, 1965**

Figs. 8–13

Diagnosis. Easily recognized by its metallic reflections. Differs from *N. bicornis* by its laerger size, finely puncture and setose abdominal sterna, and short, obtuse clypeal tubercles (Triplehorn 2006), and from *N. vivianae* **sp.n.** by the characters discussed under the diagnosis of this species.

Complementary description. Aedeagus (Fig. 11) with basale about five and a half times as long as apicale; apicale triangular, about twice as long as wide, convex, apex sharply pointed; basale widest at basal 1/3, slightly curved ventrally; penis about as long as basale, sides subparallel, enlarging from basal 1/3 to truncate apex; internal sac about twice as long as penis. **Female** abdominal terminalia (Fig. 12) with bursa copulatrix about six times as long as gonocoxites together; expanded at apical 1/3; window of bursa absent; paraprocts about twice as long as gonocoxites together; baculi of basal gonocoxites perpendicular to baculi of paraprocts; gonocoxites (Fig. 13) divided into three parts, subequal in length; apical gonocoxite slender; gonostyli about as long as and half as wide as apical gonocoxites, inserted almost apically.

Measurements. Male (in mm): TL 4.38, PL 0.94, PW 1.88, EL 2.69, EW 2.19, GD 1.25; ratios: PL/PW 0.50, EL/EW 1.23, EL/PL 2.87, GD/EW 0.57, TL/EW 2.00. Female (in mm): TL 5.13, PL 1.19, PW 1.94, EL 3.25, EW 2.38, GD 1.63; ratios: PL/PW 0.61, EL/EW 1.37, EL/PL 2.74, GD/EW 0.68, TL/EW 2.16.

Material examined. One male (CELC) labelled: "MÉXICO: Yucatán Tínum: "Chichen Itzá" 6-i-2006 leg. C. Lopes-Andrade & F. Vaz-de-Mello"; one female (ANIC) labelled: "16 mi. W Linares 2200', N.L., MEX. V–30–71 A. Newton\ J.F. Lawrence Lot. 3227 [number handwritten]\ Polyporus maximus"; four male and one female (FMNH) labelled: "Córdoba, Veracruz MEX VII–11–41".

Distribution. Costa Rica; El Salvador; Guatemala; Honduras; Mexico; Nicaragua.

***Neomida atricollis* (Pic, 1926)**

Hoplocephala atricollis Pic, 1926

Neomida atricollis (Pic), Triplehorn, 2006

Figs. 14–20

Diagnosis. *Neomida atricollis* can be easily recognized by its minute size (2.4–3.6 mm), elytra slightly ligther than head and pronotum and, in males, the straight horns and convergent clypeal tubercles. The clavate penis is unique within *Neomida*.

Redescription. Body (Figs. 14–16) moderately convex, opaque, glabrous; length 2.92–3.36 mm; pronotum and head dark brown; elytra reddish brown, lighter at basal 1/3; antennae, legs and mouth parts light reddish brown. **Head** inconspicuously punctate, in male, ans finely punctate, in female; clypeus slightly raised, bearing two long, cylindrical, convergent tubercles, in contact with genal margins, in male; frons armed with two long, cylindrical parallel horns, apex truncate and lighter colored, in male; female with no sign of tubercles on clypeus and bearing two small protuberances where the frontal horns are located on male; vertex with no excavation. **Eyes** emarginated anteriorly by antennal insertions, forming a lower lobe about three times larger than upper lobe. **Antennae** with 11 antennomeres; antennomeres 4–11 expanding into a loose, long club; antennomeres 5–11 bearing multi-pronged sensilla (sensillifers) at the upper portion; antennal insertions concealed by genal margins; genal margin moderately expanded, following a subquadrate shape of head. **Pronotum** coarsely punctate, transverse, about twice as wide as long, widest posteriorly and longest at middle; lateral edges explanate, visible dorsally for their entire lengths; anterior edge almost straight, in male, and slightly curved outward, in female. **Elytra** about two and a half as long as pronotum; sides subparralel at basal 2/3, then narrowing to apex; epipleura not extending to apex, ending beyond last abdominal suture; punctation seriate, with a large puncture separated by two irregular rows of a puncture about half the size of the larger puncture. **Hind wings** developed, apparently functional. **Ventral surface** coarsely punctate. **Protibiae** with outer edge simple; apex bearing a row of spines; inner apical angle with two long spines. **Aedeagus** (Fig. 17) with the basale about four times as long as apicale; apicale about twice as long as wide, sides subparallel at basal 2/3, then narrowing to apex; basale one and a half times as wide as apicale, sides subparallel, almost straight in lateral view; penis as long as basale, expanded at apical 1/3; internal sac about twice as long as penis. **Female** abdominal terminalia (Fig. 18) with bursa copulatrix about seven times as long as gonocoxites together; window of bursa absent; spermatheca with check valve (Fig. 19) about three

times as long as gonostyli, oval, bearing two hardened, cylindrical invaginations; bottom invagination about 1/5 as long as check valve; upper invagination reaching the middle of check valve; paraprocts about as long as gonocoxites together; baculi of basal gonocoxite perpendicular to baculi of paraprocts; gonocoxites (Fig. 20) triangularly shaped, transversely divided into three parts, subequal in length; gonostyli inserted almost apically at the apical gonocoxite.

Measurements. Male (in mm): TL 3.36, PL 0.88, PW 1.44, EL 2.00, EW 1.60, GD 1.20; ratios: PL/PW 0.61, EL/EW 1.25, EL/PL 2.27, GD/EW 0.75, TL/EW 2.10. Female (in mm): TL 2.92, PL 0.76, PW 1.28, EL 1.88, EW 1.48, GD 1.12; ratios: PL/PW 0.59, EL/EW 1.27, EL/PL 2.47, GD/EW 0.76, TL/EW 1.97.

Material examined. Male and female (CELC) labelled: "BRASIL: MT, Cuiabá "Parque Mãe Bonifácia" 27.xi.2012 Sandoval-Gómez leg.".

Remarks. At first we tought that it was a new species, but with the diagnosis provided by Triplehorn (2006) we found to be specimens of *N. atricollis*. We provide here the description we made for, what we tougth to be a new species.

Distribution. Bolivia; Brazil; French Guiana; Guyana.

***Neomida bicornis* (Fabricius, 1776)**

Hispa bicornis Fabricius, 1776

Hispa cornigera Fabricius, 1781

Diaperis bicornis (Fabricius), Olivier, 1791

Diaperis cornigera (Fabricius), Olivier, 1795

Diaperis viridipennis Fabricius, 1801

Blaps metallica Palisot de Beauvois, 1805

Oplocephala viridipennis (Fabricius), Laporte and Brullé, 1831

Oplocephala virescens Laporte and Brullé, 1831

Arrhenoplita bicornis (Fabricius), Kirby, 1837

Hoplocephala viridipennis (Fabricius), Horn, 1870

Oplocephala gracilis Motschoulsky, 1873

Arrhenoplita viridipennis (Fabricius), Blatchley, 1910

Neomida bicornis (Fabricius), Triplehorn, 1965

Figs. 21–26

Diagnosis. Easily recognized by its metallic green (for the specimens from insular America) and metallic blue elytra (for specimens form continental America).

Complementary description. Aedeagus (Fig 24) with basale about seven times as long as apicale; apicale triangular, about as long as wide; basale with sides subparallel, slightly curved ventrally; penis about as long as basale, enlarging from basal 1/3 to truncate apex. **Female** abdominal terminalia (Fig 25) with paraprocts about twice as long as gonocoxites together; baculi of basal gonocoxites perpendicular to baculi of paraprocts; gonocoxites (Fig. 26) divided into three parts, subequal in length; apical gonocoxites slender; gonostyli about as long as and half as wide as apical gonocoxite, inserted almost apically.

Measurements. Males (in mm): TL 3.38–4.56 (3.97±0.59), PL 0.88–1.13 (1.00±0.13), PW 1.44–1.88 (1.66±0,22), EL 2.06–2.94 (2.50±0.44), EW 1.88–2.38 (2.13±0.25), GD 1.13–1.50 (1.31±0.19); ratios: PL/PW 0.60, EL/EW 1.10–1.24 (1.17±0.07), EL/PL 2.36–2.61 (2.48±0.13), GD/EW 0.60–0.63 (0.62±0.02), TL/EW 1.80–1.92 (1.86±0.06). Females (in mm): TL 4.06–4.38 (4.22±0.16), PL 0.94–1.00 (0.97±0.03), PW 1.44–1.63 (1.53±0.09), EL 2.69–2.81 (2.75±0.06), EW 2.00–2.19 (2.09±0.09), GD 1.31–1.38 (1.34±0.03); ratios: PL/PW 0.62–0.65 (0.63±0.02), EL/EW 1.29–1.34 (1.31±0.03), EL/PL 2.81–2.87 (2.84±0.03), GD/EW 0.60–0.69 (0.04±0.04), TL/EW 2.00–2.03 (2.02±0.02).

Material examined. Ten males and two females (FMNH) labelled: “CUBA: La Palma June 30, 1928 [handwritten]”; one male and six females (FMNH) lebelled: “El Valle, V–1922 [date handwritten] Ven.”.

Remarks. Species very well redescribed by Staig (1940), and Triplehorn (1965) discuss about the intraspecific variation in color.

Distribution. Canada; Cuba; USA; Venezuela.

***Neomida bimaculata* Aloquio and Lopes-Andrade sp.n.**

Figs 27–33

Diagnosis. *Neomida bimaculata* **sp.n.** can be easily recognized by its colored elytra, character only shared with *N. luteonotata*, differing on the shape of the light spot, reaching

the apex of elytra in *N. luteonotata*. Also differs from *N. luteonotata* by the shape of frontal horns on males, small, acute and with a depression behind the horns in *N. bimaculata* **sp.n.**, The female abdominal terminalia is also diagnostic with the upper invagination of check valve longer, absence of window of bursa and the last gonocoxites narrower and converging to each other.

Etimology. The name "bimaculata" means "double spotted", in reference to the two light spots, one on each elytra, that this species have.

Description. Body (Fig. 27–29) convex, shinny, glabrous; length: 4.19–5.13 mm; pronotum and head reddish to dark brown; elytra reddish to dark brown with an irregularly shaped spot golden yellow, on each elytra; legs, antennae and mouth parts light reddish brown. **Head** finely punctate; clypeus slightly raised, denser punctate, with two almost inconspicuous tubercles; frons with a pair of small, conical horns; frontal horns excavate porteriorly; excavation extending to temple, right behind eyes; females without nay sing of clypeal tubercles or frontal horns. **Eyes** emarginated anteriorly by antennal insertions, forming a lower lobe about three times larger than upper lobe. **Antennae** with 11 antennomeres; antennomeres 5-11 expanding into a loose, long club, bearing multi-pronged sensilla (sensillifers) at the upper portion; antennal insertions concealed by genal margin; genal margin slightly expanded, following a subquadrate shape of head. **Pronotum** finely punctate, transverse, about twice as wide as long, widest posteriorly and longest at middle; lateral edges explanate, visible dorsally for their entire lengths; anterior edge slightly curved outward. **Elytra** about twice as long as pronotum; sides subparallel at basal 2/3, the narrowing to apex; epipleura not extending to apex, ending beyond last abdominal suture; punctation seriate, with a large puncture separated by three fine series. **Hind wings** developed, apparently functional. **Ventral surface** fine and densely punctate**. Protibiae** with outer edge serrate; apex bearing a row of spines; inner apical angle with two long spines. **Aedeagus** (Fig. 30) with basale about four times as long as apicale; apicale triangular, about twice as long as wide, apex slightly rounded; basal 1/4 of apicale with and rounded indentation; basale widest at basal 1/3; basal 1/4 of basale curved ventrally; apex of basale with a triangular indentation; penis as long as basale, sides subparallel, narrowing to the apical 1/4; internal sac about three times as long as penis. **Female** abdominal terminalia (Fig. 31) with bursa copulatrix about seven times as long as gonocoxites together, expanded at apical 1/3; window of bursa absent; spermatheca with check valve (Fig. 32) large, about twice as long as gonostyli, oval,

bearing two hardened, cylindrical invaginations; bottom invaginatrion reaching 1/4 of check valve, upper invagination reaching the bottom invagination; paraprocts as long as gonocoxites together; baculi of basal gonocoxite perpendicular to the baculi of paraprocts; gonocoxites (Fig. 33) transversally divided into three parts; basal and apical gonocoxites subequal in length, median gonocoxite slightly short; apical gonocoxite slender, about twice as long and wide as gonostyli, converging at apex.

Measurements. Male holotype (in mm): TL 5.00, PL 1.31, PW 2.19, EL 3.06, EW 2.38, GD 1.88; ratios: PL/PW 0.60, EL/EW 1.29, EL/PL 2.33, GD/EW 0.79, TL/EW 2.11. Male paratypes (in mm): TL 4.75–5.13 (4.94±0.19), PL 1.31–1.56 (1.44±0.13), PW 2.13–2.25 (2.19±0.06), EL 2.88–3.13 (3.00±0.13), EW 2.15–2.50 (2.38±0.13), GD 1.69–1.88 (1.78±0.09); ratios: PL/PW 0.62–0.69 (0.66±0.04), EL/EW 1.25–1,28 (1.26±0.01), EL/PL 2.00–2.19 (2.10±0.10), GD/EW 0.75, TL/EW 2.05–2.11 (2.08±0.03). Female paratype (in mm): TL 4.19, PL 1.19, PW 1.88, EL 2.50, EW 2.13, GD 1.69; ratios: PL/PW 0.63, EL/EW 1.18, EL/PL 2.11, GD/EW 0.79, TL/EW 1.97.

Type series. Male, holotype (CELC) labelled: "BRASIL AM, Manaus Tarumã-Mirin; Rio Negro 10.vii.2011 Pereira, M.C.\ *Neomida bimaculata* Aloquio & Lopes-Andrade, HOLOTYPE [printed on red label]"; four males and two females, paratypes (CELC) labelled: "BRASIL AM, Manaus Tarumã-Mirin; Rio Negro 10.vii.2011 Pereira, M.C.\ *Neomida bimaculata* Aloquio & Lopes-Andrade, PARATYPE [printed on yellow label]".

Distribution: Brazil.

***Neomida capixaba* Aloquio and Lopes-Andrade sp.n.**

Figs 34–40

Diagnosis. Differs from all other small (<4 mm) American *Neomida*, except *N. divergicornis* and *N. luciae* **sp.n.** in having divervent forntal horns. Differs form both by its frontal horns broad at base and the slightly curved apex. Internally, differs from *N. divergicornis* by its longer apicale and the converging apical gonocoxites.

Etimology. "Capixaba" is the gentile given to those who are born in the state of Espírito Santo, Brazil, where this species were collected.

Description. Body (Figs. 34–36) moderately convex, shinny, glabrous; length 3.75–3.90 mm; elytra, pronotum and head reddish brown; legs, antennae and mouth parts light reddish brown. **Head** inconspicuously punctate, in male; coarsely punctate, in female; clypeus slightly raised, bearing two triangular tubercles, in contact with genal margins; frons armed with a pair of long horns; horns broad at base, narrowing to about middle, apex slightly curved posteriorly, in male; female with no sign of clypeal tubercles and with small tubercles instead of frontal horns; vertex not excavate. **Eyes** emarginated anteriorly by antennal insertions, forming a lower lobe about four times as large as upper lobe, in male; in female, lower lobe about three times as large as upper lobe. **Antennae** with 11 antennomeres; antennomeres 4–11 expanding into a loose, long club, bearing multi-pronged sensilla (sensillifers) at the upper portion; antennal insertions concealed by genal margins; genal margins moderately expanded, following the rounded shape of head. **Pronotum** finely punctate, transverse, about twice as wide as long, widest at posterior 1/3 and longest at middle; in female, narrower anteriorly; lateral edges explanate, visible dorsally by their entire lengths; anterior edge slightly curved outward, a bit more curved in female. **Elytra** about three times as long as pronotum; sides subparallel at basal 2/3, then narrowing to apex; epipleura not extending to apex, ending beyond last abdominal suture; punctation seriate, with a large puncture separated by two irregular, fine series. **Hind wings** developed, apparently functional. **Ventral surface** coarsely punctate. **Protibiae** with outer edge simple; apex bearing a row of spines; inner apical angle with two long spines. **Aedeagus** (Fig. 37) with basale about five and a half times as long as apicale; apicale triangular, narrow, about twice as long as wide, apex pointed; basale wider at apical half, narrowing to base; basale almost straight laterally; penis as long as basale, sides subparallel, truncate at apex; internal sac about twice as long as penis. **Female** abdominal terminalia (Fig. 38) with bursa copulatrix about four times as long as gonocoxites together; window of bursa absent; spermatheca with check valve (Fig. 39) oval, as long as gonostyli, bearing two hardened, cylindrical invaginations; bottom invagination about 1/4 as long as check valve, upper invagination reaching the middle of check valve; paraprocts abou as long as gonocoxites together; baculi of basal gonocoxites perpendicular to baculi of paraprocts; gonocoxites (Fig. 40) transversally divided into three parts; basal gonocoxite about as long as the other two combined; apical gonocoxite slender, obliquous, converging apically; gonostyli about as long and half wide as apical gonocoxite.

Measurements. Male holotype (in mm): TL 3.90, PL 1.00, PW 1.70, EL 2.40, EW 1.80, GD 1.10; ratios: PL/PW 0.59, EL/EW 1.33, EL/PL 2.40, GD/EW 0.61, TL/EW 2.17. Female paratype (in mm): TL 3.75, PL 0.90, PW 1.50, EL 2.30, EW 1.75, GD 1.05; ratios: PL/PW 0.60, EL/EW 1.31, EL/PL 2.56, GD/EW 0.60, TL/EW 2.14.

Type series. Male holotype (CELC) labelled: "BRASIL: ES, Venda Nova do Imigrante 08.viii.2003 R. & S.A. Falqueto Ex.: *Phellinus* sp.\ *Neomida capixaba* Aloquio & Lopes-Andrade HOLOTYPE [printed on red paper]"; female paratype (CELC) labelled: "BRASIL: ES, Venda Nova do Imigrante 08.viii.2003 R. & S.A. Falqueto Ex.: *Phellinus* sp.\ *Neomida capixaba* Aloquio & Lopes-Andrade PARATYPE [printed on yellow paper]".

Distribution: Brazil.

***Neomida castanea* (Bates, 1873)**

Hoplocephala castanea Bates, 1873

Hoplocephala oblonga Chevrolat, 1878

Neomida oblonga (Chevrolat), Maes and Merkl, 1991

Neomida castanea (Bates), Triplehorn, 2006

Figs. 41–47

Diagnosis. The most distinctive characteristic of this species is the vertex (Triplehorn 2006), the female abdominal terminalia is quite distinctive as well, differing from *N. lecontei* and *N. hoffmanseggi* by its check valve of spermatheca, from *N. lecontei* by its conical shape, and *N. hoffmaseggi* by its smaller size.

Redescription. Body (Figs. 41–43) moderately convex, shinny, glabrous; length 5.54–6.23 mm; head, pronotum and elytra dark reddish brown; mouth parts, antennae and legs light reddish brown. **Head** inconspicuously punctate, in males, and finely punctate, in females; clypeus bearing two small, wide tubercles; frons armed with two subcylindrical, parallel horns, truncated at apex, in males; females with almost inconspicuously clypeal protuberances, and tubercles where are found the frontal horns on males; vertex deeply excavate in males. **Eyes** emarginated anteriorly by antennal insertions, forming a lower lobe two times larger than upper lobe. **Antennae** with 11 antennomeres; antennomeres 4–11 expanding into a loose, long club, bearing multi-pronged sensilla (sensillifers) at the

upper portion; antennal insertions concealed by genal margins; genal margin moderately expanded, following a subquadrate shape of head. **Pronotum** finely punctate, transverse, twice as wide as long, widest at 1/3 of base and longest at middle; lateral edges explanate, visible dorsally for their entire lengths; anterior edge slightly curved outward. **Elytra** about two and a half times as long as pronotum; sides subparallel at basal 2/3, then narrowing to apex; epipleura not extending to apex, ending beyond last abdominal suture; punctation seriate, with a large puncture separated by three smaller series. **Hind wings** developed, apparently functional. **Ventral surface** coarsely punctate. **Protibiae** with outer edge serrate; apex bearing a row of spines; inner apical angle with two long spines. **Aedeagus** (Fig. 44) with basale about six times as long as apicale; apicale triangular, about as long as wide, convex; basale with sides subparallel, slightly curved ventrally at basal half; penis as long as basale, enlarging to truncate apex; internal sac about twice as long as penis. **Female** abdominal terminalia (Fig. 45) with bursa copulatrix about five times as long as gonocoxites together; expanded at apical half; window of bursa absent; spermatheca with check valve (Fig. 46) about twice as long as gonostyli, conical, bearing two hardened, conical invaginations; bottom invagination about 1/3 as long as check valve; upper invagination reaching half of check valve; paraprocts about as long as gonocoxites together; baculi of basal gonocoxites, wide, oblique to baculi of paraprocts; gonocoxites (Fig. 47) divided into three parts; two basal gonocoxites subequal in length; apical gonocoxite reduced to only about the internal protuberance; internal protuberance as long as gonostyli, curved ventrally; gonostyli inserted laterally.

Measurements. Males (in mm): TL 5.54–6.23 (5.95±0.30), PL 1.62–1.77 (1.72±0.07), PW 2.38–2.69 (2.56±0.13), EL 3.31–3.77 (3.62±0.22), EW 2.54–2.69 (2.62±0.06), GD 2.15–2.46 (2.33±0.13); ratios: PL/PW 0.66–0.68 (0.67±0.01), EL/EW 1.30–1.44 (1.38±0.06), EL/PL 2.05–2.13 (2.10±0.04), GD/EW 0.85–0.91 (0.89±0.03), TL/EW 2.18–2.31 (2.27±0.06). Females (in mm): TL 5.69–5.92 (5.81±0.12), PL 1.69–1.77 (1.73±0.04), PW 2.38–2.62 (2.50±0.12), EL 3.46–3.62 (3.54±0.08), EW 2.69, GD 2.23–2.46 (2.35±0.12); ratios: PL/PW 0.68–0.71 (0.69±0.02), EL/EW 1.29–1.34 (1.31±0.03), EL/PL 2.04, GD/EW 0.83–0.91 (0.87±0.04), TL/EW 2.11–2.20 (2.16±0.04).

Material examined. Three males and one female (CELC) labelled: “BRASIL: AM, Manaus Tarumã-Mirin; Rio Negro 10.vii.2011 Pereira, M.C.”; and one male and one female (CELC) labelled: “BRASIL: PA, Marabá; “Reserva Biológica de Tapirapé; Amazônia Legal” 19.xi.2003 leg. F. Gumier-Costa”; two males and one female (ANIC)

labelled: “FortSherman Canal Zone Panama IV–2–67”; one male and one female (ANIC) labelled: “Cerro Campana Panama, PANAMA Aug. 9, 1969”; two males and three females (ANIC) labelled: “ECUAD: Pichincha Rio Palenque, 47 km. S Sto. Domingo may 18–29, 1975”.

Distribution. Brazil; Colombia; Costa Rica; Ecuador; French Guiana; Guyana; Nicaragua; Panama; Paraguay; Peru; Suriname; Venezuela.

***Neomida cioides* (Champion, 1886)**

Arrhenoplita cioides Champion, 1886

Neomida cioides (Champion), Triplehorn, 1965

Figs. 48–54

Diagnosis. Differs from all other *Neomida* by its minute size (2.0 mm), epipleura extending to apex of elytra, confusedly elytral puncture and the bridge connecting the frontal horns.

Redescription. Body (Figs 48–50) moderately convex, opaque, with a small vestiture covering the entire dorsum; length 2.0 mm; head, pronotum, elytra, legs and antennae reddish brown; mouth parts golden yellow. **Head** finely punctate; clypeus bearing two triangular tubercles, in contact with genal margins; frons armed with a pair of cylindrical horns, curved outward, with a tuft of bristles apically; frontal horns connected by a bridge, in the vertex, with two small tubercles medially, in males; females with no sign of clypeal tubercles, frontal horns or bridge in vertex. **Eyes** emarginated anteriorly by antennal insertions, forming a lower lobe three times larger than upper lobe. **Antennae** with 11 antennomeres; first three and last two antennomeres lighter than the others; antennomeres 5–11 expanding into a loose, long club, bearing multi-pronged sensilla (sensillifers) at the upper portion; antennal insertions concealed by genal margins; genal margins moderately expanded, following a rounded shape of head. **Pronotum** finely punctate, transverse, about twice as wide as long, widest at 1/3 of base and longest at middle; lateral edges explanate, visible dorsally for their entire lengths; anterior edge slightly curved outward. **Elytra** about two and a half times as long as pronotum; sides subparallel to about middle, then narrowing to apex; epipleura extending to apex; confusedly punctate. **Hind wings** developed, apparently functional. **Ventral surface** finely punctate. **Protibiae** with outer

edge simple; apex bearing a row of spines; inner apical angle with two long spines. **Aedeagus** (Fig. 51) with basale about three times as long as apicale; apicale subtriangular, wider at basal 2/3, then abruptly narrowing to apex; basale widest at middle, slightly curved ventrally at basal 1/3; penis about as long as apicale. **Female** abdominal terminalia (Fig. 52) with bursa copulatrix about four times as long as gonocoxites together, gradually expanding to apex; window of bursa about half as long as gonocoxites together; spermatheca with check valve (Fig. 53) oval, twice as long as gonostyli, bearing two hardened, cylindrical invaginations; bottom invagination about 1/6 as long as check valve; upper invagination reaching the middle of check valve; paraprocts as long as gonocoxites; baculi of basal gonocoxites oblique to baculi of paraprocts; gonocoxites (Fig. 54) divided into three parts; two basal gonocoxites subequal in length; apical gonocoxite oblique, about 1/3 as long as the others gonocoxites; gonostyli as long as apical gonocoxites, inserted apically.

Measurements. Male (in mm): TL 2.00, PL 0.50, PW 0.88, EL 1.13, EW 0.93, GD 0.63; ratios: PL/PW 0.57, EL/EW 1.22, EL/PL 2.25, GD/EW 0.68, TL/EW 2.16. Female (in mm): TL 2.00, PL 0.58, PW 1.00, EL 1.33, EW 1.08, GD 0.68; ratios: PL/PW 0.58, EL/EW 1.23, EL/PL 2.30, GD/EW 0.63, TL/EW 1.86.

Material examined. One male and one female (ANIC) labelled: "PANAMA: Canal Zone Barro Colorado Is. February 1976 A. Newton\ J.F. Lawrence Lot. No. 4102 [number handwritten]"; four males and seven females (ANIC) labelled: "Barro Colorado Is. Canal Zone Feb. 6, 1968"; one male (FMNH) labelled: "BRASIL: Aldeia Aracu, Igarape, Gurupu-Uma Maranhão; 50km E of Caninde, Para B. Mlkin 28.v.1963".

Distribution. Bolivia; Brazil; Costa Rica; Dominica; Dominican Republic; Ecuador; Guadeloupe; Mexico; Panama; Peru; Suriname; Trinidad.

Neomida clavicornis (Champion, 1886)

Arrhenoplita clavicornis Champion, 1886

Neomida clavicornis (Champion), Triplehorn, 2006

Figs. 55–61

Diagnosis. This species can be easily recognized by the antennae with only 10 antennomeres, rather than the normal 11 antennomere found in *Neomida*; the antennal

club formed by only 6 antennomeres; and the genal margin expanded, not following the shape of clypeus.

Redescription. Body (Figs. 55–57) moderately convex, shinny, glabrous; length 3.40–3.76 mm; head and pronotum reddish brown; mouth parts, antennae, legs and elytra light reddish brown. **Head** finely punctate; clypeus bearing a pair of small, triangular tubercles, not in contact to genal margins; frons armed with a pair of cylindrical, converging horns, in males; females with almost inconspicuous expansion where the clypeal tubercles are found in males, small protuberances where are the frontal horns in males; vertex excavate in males. **Eyes** emarginated anteriorly by antennal insertions, forming a lower lobe about three times larger than upper lobe. **Antennae** with 10 antennomeres; last antennomere lighter in coloration; antennomeres 5–10 expanding into a loose, long club, bearing multi-pronged sensilla (sensillifers) at the upper portion; antennal insertions concealed by genal margins; genal margin strongly expanded, going beyond rounded shape of head. **Pronotum** finely punctate, transverse, about twice as wide as long, widest at 1/3 of base and longest at middle; lateral edges explanate, visible dorsally for their entire lengths; anterior edge slightly curved outward. **Elytra** about three times as long as pronotum; sides subparallel at basal 2/3, then narrowing to apex; epipleura not extending to apex, ending beyond last abdominal suture; punctation seriate, with large puncture separated three fine series; area between striae, convex. **Hind wings** developed, apparently functional. **Ventral surface** coarsely punctate. **Protibiae** with outer edge simple; apex bearing a row of spines; inner apical angle with two long spines. **Aedeagus** (Fig. 58) with basale about two and a half times as long as apicale; apicale triangular, convex, about twice as long as wide; basale mostly membranous, sides subparallel, slightly curved ventrally at basal 1/3; penis as long as basale, with two ventral ridges following almost to truncate apex; internal sac about three times as long as penis. **Female** abdominal terminalia (Fig. 59) with bursa copulatrix about four times as long as gonocoxites together; window of bursa smaller than check valve of spermatheca; spermatheca with check valve (Fig. 60) about three times as long as gonostyli, oval, bearing two hardened invaginations; both bottom and upper invaginations about as long as 1/6 as long as check valve; paraprocts as long as gonocoxites together; baculi of basal gonocoxites perpendicular to baculi of paraprocts; gonocoxites (Fig. 61) transversally divided into three parts; basal gonocoxites as long as the two apical together; apical gonocoxites oblique, reduced, truncate at apex; gonostyli inserted almost apically, as long as apical gonocoxites.

Measurements. Males (in mm): TL 3.40–3.76 (3.58±0.18), PL 0.88–0.96 (0.92±0.04), PW 1.40–1.60 (1.50±0.10), EL 2.08–2.32 (2.20±0.12), EW 1.64–1.84 (1.74±0.10), GD 1.08; ratios: PL/PW 0,60–0.63 (0.61±0.01), EL/EW 1.26, EL/PL 2.36–2.42 (2.39±0.03), GD/EW 0.59–0.66 (0.62±0.04), TL/EW 2.04–2.07 (2.06±0.01). Female (in mm): TL 3.48, PL 0.88, PW 1.52, EL 2.24, EW 1.80, GD 1,08; ratios: PL/PW 0.58, EL/EW 1.24, EL/PL 2.55, GD/EW 0.60, TL/EW 1.93.

Material examined. Two males and five female (CELC) labelled: "BRASIL: MG, Viçosa "Mata da Biologia" 07.ii.2012 S. Aloquio & A. Puker leg."; one male (CELC) labelled: "BRASIL: MG, Viçosa "Mata da Biologia" 03.ii.2012 C. Lopes-Andrade et al."; one male (CELC) labelled: "BRASIL: MG, Viçosa "Mata da Biologia" 04.ii.2012 S. Aloquio leg.".

Remarks. At first we thought that this was a new species, a very unusual one. After reading the original descriptions of Champion, we identified these specimens to be *N. clavicornis*, which raised a question that is discussed under the "Unplaced specimens" on this paper. The two localities that this species occurs, almost opposite from each other inside the Neotropical region, may not indicate a disjunct distribution, but a gap of collects between those two points. There are several species that widely distributed through the entire Neotropical region, such as *N. obsoleta*, *N. cioides* and *N. distans*, and probably an increase of collects in the Biomes between those two countries, such as Amazon Forest, Brazilian Atlantic Forest and Cerrado, will reveal more specimens.

Distribution. Brazil (new record); Mexico.

Neomida deltocera Triplehorn, 1994

Figs. 62–68

Diagnosis. This small species is similar to *N. pentaphylloides*, which also have the epipleura extending to apex of elytra, but does not have an excavation behind the frontal horns and it does have clypeal tubercles in the male (Triplehorn 1994, 2006)

Complementary description. Aedeagus (Fig. 65) with basale about five times as long as apicale; apicale narrow, about three times as long as wide, triabgular, sharply pointed; basale widest at basal 1/3, then narrowing to apex; narrower portion of basale wider than apicale; penis about 4/5 as long as basale, sides subparallel, apex pointed; internal sac

about three times as long as penis. **Female** abdominal terminalia (Fig. 66) with bursa copulatrix about five times as long as gonocoxites together; window of bursa apparently absent; spermatheca with check valve (Fig. 67) about three times as long as gonostyli, oval, bearing two hardened, cylindrical invaginations; bottom invagination about 1/4 as long as check valve; upper invagination reaching the middle of check valve; paraprocts about as long as gonocoxites together; baculi of basal gonocoxites perpendicular to baculi of paraprocts; gonocoxites (Fig. 68) divided into three parts; basal gonocoxites as long as other two gonocoxites together; middle and apical gonocoxites subequal in length; apical gonocoxites bearing an inner protuberance about half as long as gonostyli, slightly curved towards gonostyli; gonostyli about half as long as apical gonocoxites.

Measurements. Males (in mm): TL 2.59–2.66 (2.63±0.03), PL 0.72–0.75 (0.73±0.02), PW 1.16–1.25 (1.20±0.05), EL 1.66–1.72 (1.69±0.03), EW 1.25–1.28 (1.27±0.02), GD 0.94; ratios: PL/PW 0.60–0.62 (0.61±0.01), EL/EW 1.29–1.38 (1.33±0.04), EL/PL 2.29–2.30 (2.30±0.01), GD/EW 0.73–0.75 (0.74±0.01), TL/EW 2.02–2.13 (2.07±0.05). Female (in mm): TL 2.69, PL 0.75, PW 1.16, EL 1.72, EW 1.25, GD 0.94; ratios: PL/PW 0.65, EL/EW 1.38, EL/PL 2.29, GD/EW 0.75, TL/EW 2.15.

Material examined. Two males and two females (CELC) labelled: "BRASIL: PA, Marabá "Reserva Biológica de Tapirapé; Amazônia Legal" 20.xi.2003 leg. F. Gumier-Costa"; two males (CELC) labelled: "BRASIL: AM, Manaus Tarumã-Mirin; Rio Negro 10.vii.2011 Pereira, M.C."; one male and one female (FMNH) labelled: "BRASIL: Aldeia Aracu, Igarape, Gurupu-Uma Maranhão; 50km E of Caninde, Para B. Mlkin 28.v.1963".

Distribution. Brazil; Costa Rica; Dominica; French Guiana; Panama; Suriname.

Neomida diminuta Aloquio and Lopes-Andrade, 2015

Figs. 69–71

Diagnosis. *Neomida diminuta* differs from all other *Neomida* by its minute size (1.74 mm), while other species in the genus are at least 1.85 mm long. It differs from *N. suilla* and *N. picea* in the possession of two clypeal tubercles instead of one, from *N. cioides* in the subcylindrical and straight frontal horns, and from *N. inermis* by its subtle clypeal sinuosity instead of conspicuous and cylindrical tubercles. *Neomida diminuta* males have eyes, body shape and cephalic horns similar to those of *N. occidentalis*, but the latter are

twice as long. In *N. diminuta*, the epipleura extends from base to apex of elytra, a feature observed only in other six species of *Neomida*: *N. cioides* (Champion), *N. deltocera* Triplehorn, *N. occidentalis*, *N. pentaphyllodes* (Champion), *N. picea* (Laporte and Brullé) and *N. suilla* (Champion) (Aloquio and Lopes-Andrade 2015).

Remarks. Species described, including description of abdominal terminalia of male, by Aloquio and Lopes-Andrade (2015).

Distribution. Colombia.

***Neomida distans* (Champion, 1886)**

Arrhenoplita distans Champion, 1886

Neomida distans (Champion), Triplehorn, 2006

Figs. 72–78

Diagnosis. The most distinctive character of this species is de frontal horns of males that are broad at basal half, then narrows abruptly, forming a medial indentation. The female abdominal terminalia is also distinctive, differing from all *Neomida* except *N. nigricornis* and *N. pogonocera*, by its long, slender ovipositor, differing from those two species by its larger size.

Redescription. Body (Figs. 72–74) moderately convex, shinny, glabrous; length 5.31–5.81 mm; head, pronotum and elytra reddish brown; mouth parts, antennae and legs light reddish brown. **Head** finely punctate; clypeus slightly raised, bearing a pair of small, triangular tubercles, in contact with genal margins, in both sexes; frons armed with a long, slender, basal half larger, then abruptly narrowing, forming an medial indentation, in males; females bearing small tubercles instead of frontal horns; vertex not excavate. **Eyes** emarginated anteriorly by antennal insertions, forming a lower lobe about three times larger than upper lober. **Antennae** with 11 antennomeres; antennomeres 5–11 expanding into a loose, long club, bearing multi-pronged sensilla (sensillifers) at the upper portion; antennal insertions concealed by genal margins; genal margin moderately expanded, following a subquadrate shape of head. **Pronotum** finely punctate, transverse, about twice as wide as long, widest posteriorly and longest at middle; lateral edges explanate, visible dorsally for their entire lengths. **Elytra** about three times as long as pronotum; sides subparellel at basal 2/3, then narrowing to apex; epipleura not extending to apex,

ending beyond last abdominal suture; punctation seriate, with large puncture separate by three fine series. **Hind wings** developed, apparently functional. **Ventral surface** finely punctate. **Protibiae** with outer edge simple; apex bearing a row of spines; inner apical angle with two long spines. **Aedeagus** (Fig. 75) with basale about six times as long as apicale; apicale triangular, about twice as long as wide; basale widest at middle, with a constriction at apical 1/4, basal half with two lateral ridges; penis about as long as basale, sides subparallel, apex truncate; internal sac about three times as long as penis. **Female** abdominal terminalia (Fig. 76) with bursa copulatrix about eigth times as long as gonocoxites together; window of bursa about as long as gonocoxites together; spermatheca with check valve (Fig. 77) about half as long as gonocoxites together, cylindrical, bearing two circular, hardened invaginations; both bottom and upper invaginations about 1/5 as long as check valve; paraprocts twice as long as gonocoxites together; baculi of basal gonocoxites oblique to baculi of paraprocts; gonocoxites (Fig. 78) divided into three parts subequal in length; gonostyli inserted laterally, about as long as the narrower portion of last gonocoxite.

Measurements. Males (in mm): TL 5.31–5.81 (5.63±0.22), PL 1.25–1.44 (1.35±0.08), PW 2.44–2.50 (2.48±0.03), EL 3.44–3.75 (3.54±0.15), EW 2.69–2.81 (2.77±0.06), GD 1.88–2.00 (1.96±0.06); ratios: PL/PW 0.50–0.56 (0.55±0.03), EL/EW 1.22–1.33 (1.28±0.05), EL/PL 2.50–2.75 (2.62±0.10), GD/EW 0.70–0.71 (0.71±0.01), TL/EW 1.98–2.04 (2.03±0.04). Female (in mm): TL 5.44, PL 1.38, PW 2.44, EL 3.25, EW 2.81, GD 1.88; ratios: PL/PW 0.56, EL/EW 1.16, EL/PL 2.36, GD/EW 0.67, TL/EW 1.93.

Material examined. Three males and one female (CELC) labelled: "BRASIL: MG, Ubá 17.viii.2001 C. Lopes-Andrade & F. Gumier-Costa"; three males and eight females (MNRJ) labelled: "Amazonas Manaus IV-55 [city and date hand written] Elias e Roppa col.\ DZ 9/59"; three males and two females (ANIC) labelled: "Barro Colorado Is. Canal Zone Feb. 6, 1968"; one male (ANIC) labelled: "Barro Colorado Is. Canal Zone Feb. 10, 1968"; four males and one female (CELC) labelled: "BRASIL: MT, Canarana Faz. Santa Marta 22.xii.2008 C.M. Mews leg."; two males and one female (MNRJ) labelled: "Parque Sooretama LINHARES E. Santo BRASIL ix.1955 R. Aguire".

Remarks. We studied a male from "Amazonas", that, at first, we tought to be a new species, close related to *N. distans*. After dissection, we realized that was a strange *N. distans*, without the characteristic broad base of frontal horns. This specimen have just a slightly broad basal frontal horn, not forming the middle indentation.

Distribution. Bolivia; Brazil; Costa Rica; Mexico; Panama; Peru; Suriname.

Neomida divergicornis Triplehorn, 1994

Figs. 79–85

Diagnosis. This species closely resembles *N. clavicornis* but lacks the deep concavity on vertex, also being separated by its antennae with 11 antennomeres.

Complementary description. Aedeagus (Fig. 82) with basale about six times as long as apicale; apicale triangular, about as long as wide, convex, abruptly narrowing to apex at apical 1/3; basale with sides subparallel, silightly curved ventrally at base; penis as long as basale, sides subparallel, apex truncate; internal sac about one and a half times as long as penis. **Female** abdominal terminalia (Fig. 83) with bursa copulatrix about four times as long as gonocoxites together; spermatheca with check valve (Fig. 84) about as long as gonostyli, oval, bearing two hardened, cylindrical invaginations; bottom invagination about 1/4 as long as check valve; upper invagination reaching the middle of check valve; paraprocts about as long as gonocoxites together; baculi of basal gonocoxites perpendicular to baculi of paraprocts; gonocoxites (Fig. 85) divided into three parts, subequal in length; apical gonocoxite narrower, parallel; gonostyli about as long as and half as wide as apical gonocoxite, inserted almost apically.

Measurements. Male (in mm): TL 3.68, PL 0.88, PW 1.48, EL 2.20, EW 1.72, GD 1.16; ratios: PL/PW 0.59, EL/EW 1.28, EL/PL 2.50, GD/EW 0.67, TL/EW 2.14. Female (in mm): TL 3.40, PL 0.80, PW 1.40, EL 2.28, EW 1.64, GD 1.20; ratios: PL/PW 0.57, EL/EW 1.39, EL/PL 2.85, GD/EW 0.73, TL/EW 2.07.

Material examined. Two males and two females (CELC) labelled: "BRASIL: MG, Lavras "Parque Ecológico Quedas do Rio Bonito" 06.vi.2003 Leg. F.Z. Vaz-de Mello".

Distribution. Brazil (new record); Mexico.

Neomida dolichocera Triplehorn, 1994

Diagnosis. *Neomida dolichocera* differs from all other *Neomida* by its large size (7.5 to 8 mm in length), the long slender horns, and the flat, smooth head (Triplehorn 2006).

Remarks. We did not had access to any specimens of this species to dissection and description of abdominal terminalia of male and female.

Distribution. Costa Rica.

***Neomida ferruginea* (LeConte, 1866)**

Evoplus ferruginea LeConte, 1866

Oplocephala castanea Motschoulsky, 1873

Arrhenoplita ferruginea (LeConte), Champion, 1886

Hoplocephala ferruginea Gebien, 1911

Neomida ferruginea (LeConte), Triplehorn, 1965

Figs. 86–92

Diagnosis. This species can be recognized by having deep pits behind the eye and horn on either side of the head and the elytral intervals distinctly convex (Triplehorn 1965, 2006).

Complementary description. Aedeagus (Fig. 89) with basale about ten times as long as apicale; apicale triangular, about twice as long as wide; basale with sides subparallel, slightly curved ventrally; penis about as long as basale, sides subparallel, apex truncate; entire aedeagus flat in lateral view. **Female** abdominal terminalia (Fig. 90) with bursa colupatrix about six times as long as gonocoxites together, expanding about middle to apex; spermatheca with check valve (Fig. 91) as long as gonostyli, oval, bearing two hardened, cylindrical invaginations; both bottom and upper invaginations reaching the middle of check valve; paraprocts about as long as gonocoxites together; baculi of basal gonocoxites perpendicular to baculi of paraprocts; gonocoxites (Fig. 92) divided into three parts, subequal in length; apical gonocoxites narrower, bearing inner protuberances barely reaching the insertion of gonostyli; gonostyli about as long as and half as wide as apical gonocoxites, inserted almost apically.

Measurements. Male (in mm): TL 5.00, PL 1.38, PW 2.00, EL 2.88, EW 2.31, GD 1.81; ratios: PL/PW 0.69, EL/EW 1.24, EL/PL 2.09, GD/EW 0.78, TL/EW 2.16. Female (in mm): TL 4.88, PL 1.38, PW 2.00, EL 3.00, EW 2.25, GD 1.88; ratios: PL/PW 0.69, EL/EW 1.33, EL/PL 2.18, GD/EW 0.83, TL/EW 2.17.

Material examined. Three males and one female (ANIC) labelled: "Cordoba (Coffee Plant.), Ver. MEX. Aug. 4, 1969\ S. & J. Peck Collectors\ J.F. Lawrence Lot. 3088 [number handwritten]\ Ganoderma sp."; one male and one female (ANIC) labelled: "Barro Colorado Is. Canal Zone July 7, 1969".

Distribution. Belize; Costa Rica; Cuba; Dominican Republic; Guatemala; Guyana; Haiti; Jamaica; Mexico; Panama; USA.

***Neomida grossii* Aloquio and Lopes-Andrade sp.n.**

Figs 93–95

Diagnosis. This species resemble *N. deltocera* by its small frontal horns, but can be recognized by the frontal horns slightly bigger, the clypeal tubercles widely separate, the epipleura not extending to apex of elytra and the punctation seriate. From *N. vitula*, is recognized by its smaller size.

Etimology. Species dedicated to Dr. Paschoal Coelho Grossi, collector of this species.

Description. Male. Body (Figs. 93–94) moderately convex, shinny, glabrous; length 3.30–3.65 mm; elytra, pronotum, head and legs reddish brown; antennae and mouth parts light reddish brown. **Head** finely punctate; clypeus slightly raised, bearing two triangular tubercles, in contact with genal margins; frons armed with a pair of small, conical horns, pointed inward; vertex excavate. **Eyes** emarginated anteriorly by antennal insertions, forming a lower lobe about three times larger than upper lobe. **Antennae** with 11 antennomeres; antennomeres 4–11 expanding into a loose, long club, bearing multi-pronged sensilla (sensillifers) at the upper portion; antennal insertions concealed by genal margins; genal margins moderately expanded, following a subquadrate shape of head. **Pronotum** finely punctate, transverse, about one and a half times as wide as long, widest posteriorly and longest at middle; lateral edges explanate; visible dorsally for their entire lengths; anterior edge slightly curved outward. **Elytra** about two times as long as pronotum; sides subparallel at basal 2/3, then narrowing to apex; epipleura not extending to apex, ending beyond last abdominal suture; punctation seriate, with a large puncture separated by three fine series. **Hind wings** developed, apparently functional. **Ventral surface** coarsely punctate. **Protibiae** with outer edge simple; apex bearing a row of spines; inner apical angle with two long spines. **Aedeagus** (Fig. 95) with basale about

five times as long as apicale; apicale triangular, about twice as long as wide, convex, appearing narrowing to apex in lateral view; basale with sides subparallel, slightly curved ventrally at basal half; penis as long as basale, slightly expanding to apex, apex truncate; internal sac about twice and a half times as long as penis. **Female** unknown.

Measurements. Male holotype (in mm): TL 3.30, PL 1.00, PW 1.50, EL 2.05, EW 1.65, GD 1.05; ratios: PL/PW 0.67, EL/EW 1.24, EL/PL 2.05, GD/EW 0.64, TL/EW 2.00. Male paratype (in mm): TL 3.65, PL 1.05, PW 1.70, EL 2.15, EW 1.75, GD 1.10; ratios: PL/PW 0.62, EL/EW 1.23, EL/PL 2.05, GD/EW 0.63, TL/EW 2.09.

Type series. Male, holotype (CELC) labelled: "BRASIL: ES, Linhares 11–21.x.2001 P.C. Grossi\ *Neomida grossii* Aloquio & Lopes-Andrade, HOLOTYPE [printed on red label]"; male, paratype (CELC) labelled: "BRASIL: ES, Linhares 11–21.x.2001 P.C. Grossi\ *Neomida grossii* Aloquio & Lopes-Andrade, PARATYPE [printed on yellow label]".

Distribution: Brazil.

Neomida heterocera Triplehorn, 1994

Diagnosis. *Neomida heterocera* differs from all other known species of *Neomida* in having frontal horns that are asymmetrical (Triplehorn 1994, 2006).

Remarks. We did not had access to any specimens of this species to dissection and description of abdominal terminalia of male and female.

Distribution. Costa Rica; Panama.

Neomida hoffmanseggi (Laporte and Brullé, 1831)

Oplocephala hoffmanseggi Laporte and Brullé, 1831

Neomida hoffmanseggi (Laporte and Brullé), Triplehorn, 2006

Figs. 96–102

Diagnosis. This species lacks clypeal tupercles in either sex. The male have a pair of long, slender, straight frontal horns (Triplehorn 2006). The abdominal terminalia is quite distinctive, the male in having an apicale large, when compared with basale, and strongly

convex, spoon-shaped; the female with the ovipositor of the "Type 4", described here, and the large conical check valve of spermatheca.

Redescription. Body (Figs. 96–98) moderately convex, shinny, glabrous; length 4.69–5.31 mm; head, pronotum and elytra reddish to dark reddish brown; antennae and legs reddish brown; mouth parts light reddish brown. **Head** finely punctate; clypeus slightly raised, without tubercles; frons armed with a pair of long, slender, parallel horns, slightly flattened at base and curved posteriorly at apex, in males; females with a small elevation where the frontal horns are present in males; area behind horns with a small excavation; vertex not excavate. **Eyes** emarginated anteriorly, forming a lower lobe about three times larger than upper lobe. **Antennae** with 11 antennomeres, antennomeres 5–11 expanding into a loose, long club, bearing multi-pronged sensilla (sensillifers) at the upper portion; antennal insertions concealed by genal margins; genal margin moderately expanded, following the rounded shape of head. **Pronotum** finely punctate; transverse, about twice as wide as long, widest at 1/3 of base and longest at middle; lateral edges explanate, visible dorsally for their entire lengths; anterior edge slightly curved outward. **Elytra** about three times as long as pronotum; side subparallel at basal 2/3, then narrowing to apex; epipleura not extending to apex, ending after the last abdominal suture; punctation seriate, with large puncture separated by three fine series. **Hind wings** developed, apparently functional. **Ventral surface** finely punctate. **Protibiae** with outer edge simple; apex bearing a row of spines; inner apical angle with two long spines. **Aedeagus** (Fig. 99) with basale about three times as long as apicale; apicale strongly convex, drop-shaped, sharply point slightly curved ventrally; basale with sides subparallel, slightly curved ventrally at basal half, narrower than apicale; penis about as long as basale, enlarging from middle to truncate apex; internal sac about three times as long as penis. **Female** abdominal terminalia (Fig. 100) with bursa copulatrix about four times as long as gonocoxites together; spermatheca with check valve (Fig. 101) about three times as long as gonostyli, conical, bearing two conical, hardened invaginations; bottom invagination about 1/10 as long as check valve; upper invagination about 2/3 as long as check valve; paraprocts about one and a half times as long as gonocoxites together; baculi of basal gonocoxites large, perpendicular to baculi of paraprocts; gonocoxites (Fig. 102) divided into three parts; two basal gonocoxites subequal in length; apical gonocoxites oblique, reduced to only about the inner protuberance; inner protuberance as long as gonostyli, curved ventrally; gonostyli inserted laterally, about as long as apical gonocoxite.

Measurements. Males (in mm): TL 5.00–5.31 (5.16±0.16), PL 1.44–1.56 (1.50±0.06), PW 2.19–2.44 (2.31±0.13), EL 2.88–2.94 (2.91±0.03), EW 2.44–2.56 (2.50±0.06), GD 1.88; ratios: PL/PW 0.64–0.66 (0.65±0.01), EL/EW 1.12–1.21 (1.16±0.04), EL/PL 1.84–2.04 (1.94±0.10), GD/EW 0.73–0.77 (0.75±0.02), TL/EW 2.05–2.07 (2.06±0.01). Females (in mm): TL 4.69–4.75 (4.72±0.03), PL 1.25, PW 1.94, EL 2.81–2.88 (2.84±0.03), EW 2.13–2.31 (2.22±0.09), GD 1.69–1.81 (1.75±0.06); ratios: PL/PW 0.65, EL/EW 1.24–1.32 (1.28±0.04), EL/PL 2.25–2.30 (2.28±0.02), GD/EW 0.78–0.79 (0.78±0.01), TL/EW 2.05–2.21 (2.13±0.08).

Material examined. Two males and two females (CELC) labelled: "BRASIL: RJ, Rio de Janeiro 1990? Vaz-de-Mello leg."; 22 males and six females (CELC) labelled: "BRASIL: BA, Porto Seguro PN Tem. Pascoal 03.x.2009 A. Nemésio leg."; three females (CELC) labelled: "BRASIL: BA, PN Pau Brasil 20.iv.2009 A. Nemésio leg."; two males and one female (CELC) labelled: "BRASIL: MG, Lavras ix.2005 Louzada, JNC leg."; nine males and nine females (ANIC) labelled: "Barro Colorado Is. Canal Zone July 31, 1969".

Distribution. Bolivia; Brazil; Costa Rica; Guyana; Mexico; Panama; Peru; Trinidad; Venezuela.

Neomida inermis (Champion, 1886)

Arrhenoplita inermis Champion, 1886

Neomida inermis (Champion), Triplehorn, 1965

Figs. 103–105

Diagnosis. This species differs from all other *Neomida* by its small size and confusedly elytral puncture, except *N. pogonocera* and *N. triplehorni* **sp.n.**. Differs from both by its long curved inward frontal horns and the slender, flattened clypeal tubercles.

Complementary description. Aedeagus (Fig. 105) with basale about three times as long as apicale; apicale triangular, about twice as long as wide, curved ventrally at apical 1/3, apex shaply pointed; basale widest at basal 1/3, slightly curved ventrally at basal 1/4; penis as long as basale, enlarging from middle to truncate apex.

Measurements. Male (in mm): TL 3.00, PL 0.80, PW 1.20, EL 1.60, EW 1.48, GD 1.00; ratios: PL/PW 0.67, EL/EW 1.08, EL/PL 2.00, GD/EW 0.68, TL/EW 2.03.

Material examined. One male (CELC) lebelled: "COLÔMBIA: Meta Vista Hermosa, Vda. La Reforma 2–3,iv.2010 J.L Contreras".

Distribution. Colombia (new record); Costa Rica; Guatemala; Panama.

Neomida lateralis (Bates, 1873)

Hoplocephala lateralis Bates, 1873

Hoplocephala dytiscoides Chevrolat, 1877

Neomida lateralis (Bates), Triplehorn, 2006

Diagnosis. Neomida lateralis differs from all other species by its large size (greater than 8 mm in length) and the horizontal prosternal process. Differs from N. lecontei and N. lawrencei, other two large species, by the frontal horns, curved slightly backwards on those species and perfectly straight in N. lateralis (Triplehorn 2006).

Remarks. We did not had access to any specimens of this species to dissection and description of abdominal terminalia of male and female.

Distribution. Colombia; Costa Rica; Panama; Venezuela.

Neomida lawrencei Triplehorn, 1994

Figs. 106–108

Diagnosis. Closely resembles *N. lecontei*, differing by its lack of the sharp bridge connecting the frontal horns and the deep postocular pits. Internally differs by its longer apicale and the truncate lateral projections of basale.

Complementary description. Aedeagus (Fig. 108) with basale about five times as long as apicale; apicale triangular, abour twice as long as wide, convex, sharply pointed; basale widest at apical half, strongly curved ventrally at basal 1/3; basale with lateral projections towards apicale, reaching basal 1/3 of apicale; projections truncate at apex; penis as long as basale, sides subparallel, truncate at apex.

Measurements. Male (in mm): TL 5.54, PL 1.54, PW 2.46, EL 3.46, EW 2.46, GD 2.08; ratios: PL/PW 0.63, EL/EW 1.41, EL/PL 2.25, GD/EW 0.84, TL/EW 2.25.

Material examined. One male, paratype (ANIC) labelled: "COSTA RICA: Puntarenas Prov. Osa Peninsula 2.5 mi. SW Rincon III–1 to 7–1967 OTS Adv.Zoo.Course".

Remarks. We have received two paratypes, a male and a female, from ANIC. But when the package arrived, the female paratype was loose inside the box together with a few female of *N. lecontei*. We have dissected the one we found to be the female of *N. lawrencei* and also dissected the *N. lecontei* females, but we was not able to tell, for sure, what was the *N. lawrencei* female, so we preferred to only describe the male abdominal terminalia, and let the female abdominal terminalia to describe when we have access to other *N. lawrencei* female.

Distribution. Belize; Costa Rica; Mexico; Panama.

***Neomida lecontei* (Bates, 1873)**

Evoplus lecontei Bates, 1873

Arrhenoplita lecontei (Bates), Champion, 1886

Hoplocephala lecontei (Bates), Gebien, 1911

Neomida lecontei (Bates), Triplehorn, 1965

Figs. 109–115

Diagnosis. The frontal horns are slender, slightly divergent from base, curved backward and slightly convergent apically, with a sharp, abrupt bridge connecting the bases (Triplehorn 2006). Can be identified internally by its oddly aedeagus, with lateral projections of basale towards apicale, acute, differing from the most close species, *N. lawrencei*.

Complementary description. Aedeagus (Fig. 112) with basale about six times as long as apicale; apicale triangular, convex, about twice as long as wide, sharply pointed; basale widest at apical half, curved ventrally at basal 1/3; basale with lateral projections towards apicale, reaching basal 1/3 of apicale; lalteral projections sharply pointed; penis about as long as basale, slightly enlarging from apical 1/3 to truncate apex; internal sac as long as penis. **Female** abdominal terminalia (Fig. 113) with bursa copulatrix about six times as long as gonocoxites together; spermatheca with check valve (Fig. 114) about twice as long as gonostyli, oval, bearing two cylindrical invaginations; bottom invagination about 1/5 as long as check valve; upper invagination reaching the middle of check valve;

paraprocts about one and a half times as long as gonocoxites together; baculi of basal gonocoxites wide, perpendicular to baculi of paraproct; gonocoxites (Fig. 115) divided into three parts; basal gonocoxite as long as the other together; apical gonocoxites oblique, reduced to only about the inner protuberance; inner protuberance as long as gonostyli, curved ventrally; gonostyli inserted laterally.

Measurements. Male (in mm): TL 6.15, PL 1,77, PW 2.69, EL 3.54, EW 2.69, GD 2.31; ratios: PL/PW 0.66, EL/EW 1.31, EL/PL 2.00, GD/EW 0.86, TL/EW 2.29. Female (in mm): TL 5.85, PL 1.69, PW 2.46, EL 3.38, EW 2.62, GD 2.23; ratios: PL/PW 0.69, EL/EW 1.29, EL/PL 2.00, GD/EW 0.85, TL/EW 2.24.

Material examined. Three male and two female (ANIC) labelled: "Barro Colorado Canal Zone, Panama, III–18–67\ J.F. Lawrence Lot. 2063\ B. Petterson Collector\ ex Fomes sclerodermeus".

Distribution. Belize; Brazil; Costa Rica; Dominican Republic; Guadeloupe; Guyana; Honduras; Jamaica; Mexico; Montserrat; Panama; Puerto Rico; Suriname; Venezuela.

***Neomida luci* Aloquio and Lopes-Andrade sp.n.**

Figs 116–118

Diagnosis. Closelly resembles *N. divergicornis* by its size, coloration and divergent frontal horns, differing form this especies by its smaller and sharply forntal horns.

Etimology. Species dedicated to Dr[a]. Lucimar Soares de Araujo, collector of this species and many other species that compose this work. Name derived from her nickname "Luci".

Description. Male. Body (Figs. 116–117) moderately convex, shinny, glabrous; length 3.50–3.60 mm; head, pronotum, elytra and legs dark reddish brown; antenna and mouth parts light reddish brown. **Head** coarsely punctate; clypeus inconspicuously punctate, slightly raised, bearing two small tubercles, in contact with genal margins; frons armed with two small, conical, parrallel horns; vertex not excatate. **Eyes** emarginated anteriorly by antennal insertions, formina a lower lobe about three times larger than upper lobe. **Antennae** with 11 antennomeres; antennomeres 4–11 expanding into a loose, long club, bearing multi-pronged sensilla (sensillifers) at the upper portion; antennal insertions concealed by genal margins; genal margin moderately expanded, following a suquadrate

shape of head. **Pronotum** finely punctate, transverse, about twice as wide as long, widest at basal 1/3 and longest at middle; lateral edges explanate, visible dorsally for their entire lengths; anterior edge slightly curved outward. **Elytra** about three times as long as pronotum; slightly enlarging to middle, then narrowing to apex; epipleura not extending to apex, ending before last abdominal ventrite; puncture seriate, with large puncture separated by two irregular fine series. **Hind wings** developed, apparently functional. **Ventral surface** coarsely punctate. **Protibiae** with outer edge simple; apex bearing a row of spines; inner apical angle with two long spines. **Aedeagus** (Fig. 118) with basale about six times as long as apicale; apicale triangular, about as long as wide, with a rounded indentation at basal 1/5, pointed apex; basale with sides subparallel, slightly curved ventrally at basal 1/3, triangular apical intentation; penis about as long as basale, sides subparallel to apical 1/3, then enlarging for about half the length of apicale, then narrowing to truncate apex. **Female** unknown.

Measurements. Male holotype (in mm): TL 3.60, PL 1.00, PW 1.35, EL 2.15, EW 1.60, GD 1.00; ratios: PL/PW 0.74, EL/EW 1.34, EL/PL 2.15, GD/EW 0.63, TL/EW 2.25. Male paratype (in mm): TL 3.50, PL 0.85, PW 1.40, EL 2.25, EW 1.75, GD 1.00; ratios: PL/PW 0.61, EL/EW 1.29, EL/PL 2.65, GD/EW 0.57, TL/EW 2.00.

Type series. Male, holotype (CELC) labelled: "BRASIL:RJ, Teresópolis, "P N Serra dos Órgãos"; 14.xi.2011 leg. L.S. Araujo\ *Neomida luci* Aloquio & Lopes-Andrade, HOLOTYPE [printed on red label]"; male, paratype (CEIOC) labelled: "Itatiaia E. do Rio-Brasil J.F. Zikan 16–IX–47 [date hand writen]\ *Neomida luci* Aloquio & Lopes-Andrade, PARATYPE [printed on yellow label]".

Distribution: Brazil.

Neomida luteonotata (Pic, 1926)

Hoplocephala luteonotata Pic, 1926

Hoplocephala huedepohli Kulzer, 1961, Aloquio, Flores and Lopes-Andrade, Anexo A

Hoplocephala atricollis Kulzer, 1961

Neomida luteonotata (Pic), Triplehorn, 2006

Figs. 119–125

Diagnosis. Easily recognizable by its colored elytra. Resembles *N. bimaculata* **sp.n.** in that aspect, differing by its lighter band of elytra extending to apex.

Redescription. Body (Figs. 119–121) moderately convex, shinny, glabrous; length 4.69–5.63 mm; head and pronotum dark brown; elytra with a dark brown spot shield-shaped, in dorsal view, surrounded by a contiguous golden yellow band, in some specimens, this contiguous band is interrupted in the middle by the dark spot that extends to lateral of elytra; mouth parts, antennae and legs light reddish brown. **Head** finely punctate; clypeus slightly raised, bearing two small tubercles, in contact with genal margins; frons armed with a pair of small horns, truncate at apex, in males; females with no sign of clypeal tubercle nor frontal horns; vertex not excavate. **Eyes** emarginated anteriorly by antennal insertions, forming a lower lobe about three times larger than upper lobe. **Antennae** with 11 antennomeres; antennomeres 5–11 expanding into a loose, long club, bearing multi-pronged sensilla (sensillifers) at the upper portion; antennal insertions concealed by genal margins; genal margin moderately expanded, following the rounded shape of head. **Pronotum** finely punctate, transverse, about twice as wide as long, widest posteriorly and longest at middle; lateral edges explanate, visible dorsally for their entire lengths; anterior edge slightly curved outward. **Elytra** about three times as long as pronotum; sides subparallel at basal 2/3, then narrowing to apex; epipleura not extending to apex, ending beyond last abdominal suture; punctation seriate, with large puncture separate by three fine, almost inconspicuous, series. **Hind wings** developed, apparently functional. **Protibiae** with outer edge serrate; apex bearing a row of spines; inner apical angle with two long spines. **Aedeagus** (Fig. 122) with basale about five times as long as apicale; apicale triangular, about twice as long as wide, apex slightly truncate; basale widest at basal 1/3, slightly curved ventrally at basal half; penis as long as basale, sides subparallel, truncate at apex; internal sac about four times as long as penis. **Female** abdominal terminalia (Fig. 123) with bursa copulatrix about six times as long as gonocoxites together, expanding at apical 1/5; window of bursa about one and a half times as long as gonocoxites together; spermatheca with check valve (Fig. 124) about twice as long as gonostyli, oval, bearing two hardened, cylindrical invaginations; bottom invagination about 1/4 as long as check valve; upper invagination wider, about 1/3 as long as check valve; paraprocts as long as gonocoxites together; baculi of basal gonocoxites oblique to baculi of paraprocts; gonocoxites (Fig. 125) divided into three parts, subequal in length; apical gonocoxites slender, parallel, bearing a small inner protuberance, barely reaching

the insertion of gonostyli; gonostyli half as long as and half as wide as apical gonocoxites, inserted almost apically.

Measurements. Males (in mm): TL 5.31–5.63 (5.42±0.15), PL 1.44–1.50 (1.46±0.03), PW 2.44–2.50 (2.46±0.03), EL 3.31–3.50 (3.42±0.08), EW 2.69–2.81 (2.73±0.06), GD 2.00–2.19 (2.06±0.09); ratios: PL/PW 1.23–1.28 (1.25±0.02), EL/EW 1.23–1.28 (1.25±0.02), EL/PL 2.30–2.39 (2.34±0.04), GD/EW 0.71–0.81 (0.76±0.04), TL/EW 1.98–2.00 (1.98±0.01). Females (in mm): TL 4.69–5.31 (5.00±0.31), PL 1.25–1.38 (1.31±0.06), PW 2.19–2.25 (2.22±0.03), EL 2.81–3.44 (3.13±0.31), EW 2.44–2.69 (2.56±0.13), GD 1.88–2.13 (2.00±0.31); ratios: PL/PW 0.57–0.61 (0.59±0.02), EL/EW 1.15–1.28 (1.22±0.06), EL/PL 2.25–2.50 (2.38±0.13), GD/EW 0.77–0.79 (0.78±0.01), TL/EW 1.92–1.98 (1.95±0.03).

Material examined. Six males and four females (CELC) labelled: "BRASIL: MG, Rio Doce "Lago da Candonga, área de mata" 16.ix.2009 leg EF Barbosa"; one male and four females (CELC) labelled: "BRASIL: ES "Estrada Ibiraçú–Viçosa" 2011 J.C. Rengifo leg."; two males and four females (CELC) labelled: "BRASIL: MG, Ipatinga 05.i.2010 T. Nolasco & C. Lopes-Andrade"; four females (CELC) labelled: "BRASIL: GO, Goiânia iv.2009 Furieri, K.S."; two females (CELC) labelled: "BRASIL: ES, Anchieta 09.vii.2006 Santos, Z.A. & Teixeiras, M.C."; two males and two females (CELC) labelled: "BRASIL: MG, Jequerí Ramos Novos 08.ix.2009 E. Ferreira & E. Moura"; one male (CELC) labelled: "BRASIL: RJ, Nova Friburgo x.2004 leg. E.J. Grossi"; three males and four females (CELC) labelled: "BRASIL: MG, Florestal 08.xi.2003 D.J. de Souza"; one female (CELC) labelled: "BRASIL: MG, Viçosa Mata do Paraíso Coleta Ativa 12.iii.2015 leg LabCol"; one male (CEIOC) labelled: "Tijuca IV–[1]937 Souto"; one male and two females (DZUP) labelled: "Brasilien Nova Teutonia 27º11'B 52º23'L 300–500m x–1970 Fritz Plaumann".

Distribution. Argentina; Bolivia; Brazil; French Guiana; Paraguay; Suriname.

***Neomida nigricornis* (Champion, 1886)**

Arrhenoplita nigricornis Champion, 1886

Neomida nigricornis (Champion), Triplehorn, 2006

Figs. 126–132

Diagnosis. Easily recognizable by its double colored antennae, character only shared with *N. samurai* **sp.n.**. Differing from *N. samurai* **sp.n.** by its larger size, the long clypeal horns in males, and the ovipositor of the "Type 1".

Complementary description. Aedeagus (Fig. 129) with basale about five times as long as apicale; apicale triangular, about twice as long as wide; basale widest at basal 1/3, slightly curved ventrally at basal 1/3, basal half with distinct lateral ridges; penis as long as basale, sides subparallel, truncate at apex; internal sac about three times as long as penis. **Female** abdominal terminalia (Fig. 130) with bursa copulatrix about five times as long as gonocoxites together, expanding gradually to apex; spermatheca with check valve (Fig. 131) about half as long as gonocoxites together, oval, bearing two hardened invaginations; both bottom and upper invaginations about 1/6 as long as check valve; paraprocts as long as gonocoxites together; baculi of basal gonocoxites oblique to baculi of paraprocts; gonocoxites (Fig. 132) divided into three parts, subequal in length; gonostyli not observed.

Measurements. Male (in mm): TL 3.90, PL 1.05, PW 1.60, EL 2.25, EW 1.85, GD 1.20; ratios: PL/PW 0.66, EL/EW 1.22, EL/PL 2.14, GD/EW 0.65, TL/EW 2.11. Female (in mm): TL 4.10, PL 1.00, PW 1.65, EL 2.55, EW 2.00, GD 1.35; ratios: PL/PW 0.61, EL/EW 1.28, EL/PL 2.55, GD/EW 0.68, TL/EW 2.05.

Material examined. One male and one female (ANIC) lebelled: "Barro Colorado Is. CANAL ZONE Feb. 5, 1968\ J.F. Lawrence Lot. 2307 [number handwritten]\ ex Polyporus hydnoides".

Distribution. Belize; Costa Rica; Guatemala; Panama.

***Neomida obsoleta* (Champion, 1886)**

Arrhenoplita obsoleta Champion, 1886

Neomida obsoleta (Champion), Triplehorn, 2006

Figs. 133–139

Diagnosis. In this species the frontal horns are little developed, and the clypeal tubercles are quite prominent in males, with a slightly protuberance on the clypeus of females (Triplehorn 2006). The female abdominal terminalia is quite distinctive by its sharp apical gonocoxite and the alveolar apex of bursa copulatrix.

Complementary description. Aedeagus (Fig. 136) with basale about five times as long as apicale; apicale triangular, about as long as wide, apex slightly curved ventrally; basale widest at middle, slightly curved ventrally; penis as long as basale, enlarging from middle to truncate apex; internal sac about twice as long as penis. **Female** abdominal terminalia (Fig. 137) with bursa copulatrix about four times as long as gonocoxites together; apical 1/3 of bursa alvelolary texturized; spermatheca with check valve (Fig. 138) about one and a half times as long as gonostyli, oval, bearing two hardened, cylindrical invaginations; bottom invagination about 1/5 as long as check valve; upper invagination half as long as check valve; paraprocts as long as gonocoxites together; baculi of basal gonocoxites large, perpendicular to baculi of paraprocts; gonocoxites (Fig. 139) divided into three parts, subequal in length; apical gonocoxites slender, pointed at apex; gonostyli inserted laterally, about half as long as and half as wide as apical gonocoxite.

Measurements. Male (in mm): TL 5.13, PL 1.44, PW 2.00, EL 3.19, EW 2.50, GD 1.69; ratios: PL/PW 0.72, EL/EW 1.28, EL/PL 2.22, GD/EW 0.68, TL/EW 2.05. Female (in mm): TL 5.06, PL 1.44, PW 2.13, EL 2.94, EW 2.25, GD 1.88; ratios: PL/PW 0.68, EL/EW 1.31, EL/PL 2.04, GD/EW 0.83, TL/EW 2.25.

Material examined. Three males and three females (ANIC) lebelled: “Oaxaca, MEX, 1600’ 4.5 mi S Valle Nacional, VIII–16–73. A. Newton\ J.F. Lawrence Lot. 3503 [number handwritten]\ Ganoderma”; two males and two females (ANIC) labelled: “Turrialba COSTA RICA VIII–20–66\ Robin Andrews Collector”; one male (ANIC) labelled: “Barro Colorado Canal Zone Panama, III–18–67 B. Patterson Collector”; one male and one female (ANIC) labelled: “Córdoba (Coffee Plant.) Ver MEX Aug. 4, 1969”.

Distribution. Belize; Costa Rica; Mexico; Panama.

Neomida occidentalis (Champion, 1893)

Arrhenoplita occidentalis Champion, 1893

Neomida occidentalis (Champion), Triplehorn, 2006

Neomida myllocnema Triplehorn, 1965

Diagnosis. *Neomida occidentalis* is the only species with abrupt basal pronotal angles and interval between elytral striae, convex. *Neomida occidentalis* also have entire epipelura (Triplehorn 2006).

Remarks. We did not had access to any specimens of this species to dissection and description of abdominal terminalia of male and female.

Distribution. Costa Rica; Honduras; Mexico.

***Neomida paurocera* Triplehorn, 1994**

Diagnosis. *Neomida paurocera* is similar to *N. obsoleta*, but is smaller, lacks clypeal tubercles in either sex, and has very tiny frontal tubercles, even in the male (Triplehorn 2006).

Remarks. We did not had access to any specimens of this species to dissection and description of abdominal terminalia of male and female.

Distribution. El Salvador; Honduras.

***Neomida pentaphylloides* (Champion, 1886)**

Arrhenoplita pentaphylloides Champion, 1886

Neomida pentaphylloides (Champion), Triplehorn, 1994

Diagnosis. *Neomida pentaphylloides* differs from the other species of *Neomida* with entire epipleura in having a small barb near the base of each frontal horn, no trace of clypeal tubercles, and an excavation behind the frontal horns (Triplehorn 2006).

Remarks. We did not had access to any specimens of this species to dissection and description of abdominal terminalia of male and female.

Distribution. Guatemala.

***Neomida picea* (Laporte and Brullé, 1831)**

Oplocephala picea Laporte and Brullé, 1831

Arrhenoplita picea (Laporte and Brullé), Champion, 1886

Platydema piceum Fleutiaux and Sallé, 1889

Hoplocephala testaceipes Pic, 1926

Neomida picea (Laporte and Brullé), Triplehorn, 1965

Figs. 140–146

Diagnosis. Differs from all other *Neomida*, except *N. suilla*, in having a single clypeal tubercle. Differs from *N. suilla* by its parallel sided, truncate frontal horns. Is quite distinctive from the other species with entire epipleura by its elongate body and large window of bursa.

Redescription. Body (Figs. 140–142) moderately convex, opaque, with small vestiture covering the entire dorsum; length 3.95–4.0 mm; head, pronotum and elytra reddish brown; mouth parts, antennae and legs yellow brown. **Head** finely punctate; clypeus slightly raised, bearing a single, medial, triangular tubercle; frons armed with a pair of parallel, straight, broad horns, truncate and bearing a tuft of bristles at apex, in males; females with no sign of clypeal tubercle and with small protuberances where are found the frontal horns in males; vertex slightly excavate, in males. **Eyes** emarginated anteriorly by antennal insertions, forming a loer lobe about four times larger than upper lobe. **Antennae** with 11 antennomeres; antennomeres 4–11 expanding into a loo, long club, bearing multi-pronged sensilla (sensillifers) at the upper portion; antennal insertions concealed by genal margins; genal margins moderately expanded, following the rounded shape of head. **Pronotum** finely punctate, transverse, twice as wide as long, widest posteriorly and longest at middle; lateral edges explanate, visible ventrally for their entire lengths; anterior edge slightly curved outward. **Elytra** about three times as long as pronotum; sides subparallel at basal 2/3, then narrowing to apex; epipleura extending to apex; punctation seriate, with large puncture separated by almost inconspicuous punctures. **Hind wings** developed, apparently functional. **Ventral surfade** finely punctate. **Protibiae** with outer edge simple; apex bearing a row of spines; inner apical angle with two long spines **Aedeagus** (Fig. 143) with basale about three times as long as apicale; apicale triangular, about twice as long as wide, sharply pointed; basale widest at basal 1/3, slightly curved ventrally; penis about as long as basale, sides subparallel, truncate at apex. **Female** abdominal terminalia (Fig. 144) with bursa copulatrix about five times as long as gonocoxites together; window of bursa twice as long as gonocoxites togheter; spermatheca with check valve (Fig. 145) twice as long as gonostyli, oval, bearing two hardened, cylindrical invaginations; bottom invagination about 1/3 as long as check valve; upper invagination about half as long as check valve; paraprocts about as long as gonocoxites together; baculi of basal gonocoxites perpendicular to baculi of paraprocts; gonocoxites (Fig. 146) divided into three parts; basal gonocoxite as long as

the other two together; apical gonocoxite bearing a inner protuberance about 1/3 as long as gonostyli; gonostyli inserted apically, half as long as and half as wide as apical gonocoxites.

Measurements. Males (in mm): TL 3.95–4.00 (3.98±0.02), PL 1.00, PW 1.75; EL 2.25–2.30 (2.28±0.02), EW 1.75, GD 1.30–1.35 (1.33±0.03); ratios: PL/PW 0.57, EL/EW 1.29–1.31 (1.30±0.01), EL/PL 2.25–2.30 (2.28±0.02), GD/EW 0.74–0.77 (0.76±0.01), TL/EW 2.26–2.29 (2.27±0.01). Female (in mm): TL 4.00, PL 1.00, PW 1.75, EL 2.40, EW 1.85, GD 1.35; ratios: PL/PW 0.57, EL/EW 1.30, EL/PL 2.40, GD/EW 0.73, TL/EW 2.16.

Material examined. Two males and one female (CELC) labelled: "BRASIL: MG, Ubá "Faz. Córrego do Pari" x.2001 leg. F. Gumier-Costa"; one male and one female (CELC) labelled: "BRASIL: MG, Tabuleiro "Passa Cinco" 31.xii.2010 R.A. Borges"; four males and eight females (CELC) labelled: "BRASIL: ES, Santa Tereza "Estação Biológica de Santa Lúcia" 27.xi.2011 L.S. Araujo leg."; one male and one female (ANIC) labelled: "COSTA RICA Guanacaste Prov. 6 mi S 6 mi W Cañas, Taboga 10º19'N 85º09'W II–3 to 12–1967 OTS ADV. Zoo. Course"; one female (ANIC) Labelled: "8 mi S.W. Cañas Guanacaste, Costa Rica, Feb. 3–12.1967"; one female (ANIC) labelled: "Barro Colorado Canal Zone Panama III–18–67"; one female (ANIC) labelled: "Barro Colorado Is. Canal Zone Feb. 12, 1968"; one female (ANIC) labelled: "Canal Zone Is. Barro Colorado II/19–III/9–75 Lawrence, Erwin".

Distribution. Brazil; Costa Rica; French Guiana; Guatemala; Panama; Suriname; Venezuela.

Neomida pogonocera Triplehorn, 1994

Figs. 147–151

Diagnosis. Closely resemble *N. inermis* and *N. triplehorni* **sp.n.**, differing by its almost parallel horns, with a tuft of bristles apically and the broad, triangular clypeal tubercle.

Complementary description. Aedeagus (Fig. 150) with basale about five times as long as apicale; apicale triangular, twice as long as wide, slightly curved ventrally at apex; basale widest at middle, slightly curved ventrally; penis about as long as basale, enlarging from apical 1/3 to truncate apex. **Female** abdominal terminalia (Fig. 151) with paraprocts

about one and a half times as long as gonocoxites together; baculi of basal gonocoxites oblique to baculi of paraprocts; gonocoxites divided into three parts, subequal in length; gonostyli not observed.

Measurements. Male (in mm): TL 3.20, PL 0.80, PW 1.40, EL 1.80, EW 1.60, GD 1.04; ratios: PL/PW 0.57, EL/EW 1.13, EL/PL 2.25, GD/EW 0.65, TL/EW 2.00. Female (in mm): TL 3.40, PL 0.80, PW 1.36, EL 1.40, EW 1.60, GD 1.20; ratios: PL/PW 0.59, EL/EW 1.13, EL/PL 2.25, GD/EW 0.75, TL/EW 2.13.

Material examined. One male and seven females (CELC) labelled: "BRASIL: PA, Marabá "REBIO de Tapirapé; Amazônia Legal" 19.xi.2003 leg. F. Gumier-Costa"; one male and one female (ANIC) labelled: "Fort Sherman Canal Zone Panama IV–2–67".

Distribution. Bolivia; Brazil; Panama; Peru; Venezuela.

***Neomida punctatissima* (Champion, 1893)**

Arrhenoplita punctatissima Champion, 1893

Neomida punctatissima (Champion), Triplehorn, 1994

Diagnosis. In both male and female of this species, the head, pronotum and elytra are very coarsely and densely, almost rugosely punctured. In the male, the frontal horns are widely separate (as in *N. distans*), broadly flattened, curved slightly inward apically and abruptly truncate; the clypeal tubercles are acute, prominent and rather widely separated; another tubercle, almost equally prominent is situated on the antennary orbit between the clypeus and eye (Triplehorn 2006).

Remarks. We did not had access to any specimens of this species to dissection and description of abdominal terminalia of male and female.

Distribution. Mexico.

***Neomida samurai* Aloquio and Lopes-Andrade sp.n.**

Figs 152–158

Diagnosis. Differs from all other American *Neomida* by its long, slender and oddly shaped horn. Can be easily recognized by its colored antennae, character, within

Neomida, only shared with *N. nigricornis*, both species can be separated by its sizes, with *N. samurai* **sp.n.**, smaller (3.0 mm) and *N. nigricornis* bigger (4.0 mm), and the cephalic adorns, *N. nigricornis* with its big clypeal horns and no frontal horns, ad *N. samurai* **sp.n.** with its big frontal horns and small clypeal tubercles.

Etimology. The name "samurai" refers to the shape of the frontal horns, on males, that resembles some front crests (maedate) of the samurai's helmets (kabuto).

Description. Body (Figs. 152–154) moderately convex, opaque, glabrous; length 3.0–3.20 mm; head, pronotum and elytra reddish to dark reddish brown; mouth parts, legs golden yellow to light reddish brown; antennae reddish brown, with first three and last antennomeres golden yellow. **Head** finely punctate; clypeus slightly raised, bearing two small, triangular tubercles, in contact with genal margins; frons armed with two long, slender horns, in males; horns slightly diverging at basal half, then converging, apex slightly curved posteriorly; females with no sign of clypeal tubercles and bearing small protuberances where the frontal horns are found in males; vertex not excavate. **Eyes** emarginated anteriorly by antennal insertions, forming a lower lobe about three times larger than upper lobe. **Antennae** with 11 antennomeres; antennomeres 4–11 expanding into a loose, long club; antennomeres 5–11 bearing multi-pronged sensilla (sensillifers) at the upper portion; antennal insertions concealed by genal margins; genal margins moderately expanded, following a subquadrate shape of head. **Pronotum** finely punctate, transverse, about twice as wide as long, widest posteriorly and longest at middle; lateral edges explanate, visible dorsally for their entire lengths; anterior edge slightly curved outward, more prominent in females and males with small frontal horns. **Elytra** about two and a half times as long as pronotum; sides subparallel at basal 2/3, then narrowing to apex; epipleura not extending to apex, ending beyond last abdominal suture; punctation seriate, with large puncture separated by three series slightly smaller than large one. **Hind wings** developed, apparently functional. **Ventral surface** coarsely punctate. **Protibiae** with outer edges simple; apex bearing a row of spines; inner apical angle with two long spines. **Aedeagus** (Fig. 155) with basale about five times as long as apicale; apicale triangular, about twice as long as wide, basal angles truncate, squared indentation at base; basale widest at base, slightly curved ventrally at basal half; penis about 4/5 as long as basale, enlarging at apical half, apex truncate; internal sac about as long as penis. **Female** abdominal terminalia (Fig. 156) with bursa copulatrix about six times as long as gonocoxites together; expanded at apical 1/5; window of bursa as long as gonocoxites

together; spermatheca with check valve (Fig. 157) oval, about as long as gonostyli, bearing two hardened, cylindrical invaginations; bottom invagination about 1/4 as long as check valve; upper invagination as wide as check valve, reaching the bottom invagination; paraprocts about as long as gonocoxites together; baculi of basal gonocoxites oblique to baculi of paraprocts; gonocoxites (Fig. 158) transversely divided into three parts; middle and apical gonocoxites subequal in length; basal gonocoxite about one and a half times longer; apical gonocoxite slender, converging to apex; gonostyli as long and as wide as apical gonocoxite.

Measurements. Male holotype (in mm): TL 3.08, PL 0.80, PW 1.40, EL 1.80, EW 1.52, GD 1.00; ratios: PL/PW 0.57, EL/EW 1.18, EL/PL 2.25, GD/EW 0.66, TL/EW 2.03. Male paratype (in mm): TL 3.20, PL 0.88, PW 1.36, EL 1.92, EW 1.52, GD 1.20; ratios: PL/PW 0.65, EL/EW 1.26, EL/PL 2.18, GD/EW 0.79, TL/EW 2.11. Female paratype (in mm): TL 3.00, PL 0.80, PW 1.32, EL 1.88, EW 1.48, GD 1.12; ratios: PL/PW 0.61, EL/EW 1.27, EL/PL 2.35, GD/EW 0.76, TL/EW 2.03.

Type series. Male, holotype (CELC) labelled: "BRASIL: MG, Guaraciaba "Chalé do Turvo" Mata Ciliar; Rio Turvo 21.v.2012 Leg. C. Lopes-Andrade\ *Neomida samurai* Aloquio & Lopes-Andrade, HOLOTYPE [printed on red label]"; two males and one female, paratype (CELC) labelled: "BRASIL: MG, Guaraciaba "Chalé do Turvo" Mata Ciliar; Rio Turvo 21.v.2012 Leg. C. Lopes-Andrade\ *Neomida samurai* Aloquio & Lopes-Andrade, PARATYPE [printed on yellow label]"; one female, paratype (CELC) labelled: "BRASIL: MG, Viçosa "Mata da Biologia" 05.vii.2012 I.S.C. Pecci-Maddalena *et al.*\ *Neomida samurai* Aloquio & Lopes-Andrade, PARATYPE [printed on yellow label]".

Distribution: Brazil.

Neomida suilla (Champion, 1896)

Arrhenoplita suilla Champion, 1896

Neomida suilla (Champion), Triplehorn, 1965

Figs. 159–165

Diagnosis. Males of *N. suilla* differ from males of all other described New World *Neomida*, except *N. picea* (Laporte and Brullé), in having a single prominent median

clypeal tubercle (Triplehorn 2006). *Neomida suilla* differs from *N. picea* by its shorter length, and males in having triangular-shaped cephalic horns with a tuft of bristles at their tips (Aloquio and Lopes-Andrade 2015).

Remarks. Species redescribed, including description of abdominal terminalia of male and female, by Aloquio and Lopes-Andrade (2015).

Distribution. Brazil; Guadeloupe; St. Vincent.

Neomida telecera Triplehorn, 2006

Diagnosis. Resembles *N. distans*, mainly because of the widely separated frontal horns, differing for its small size (Triplehorn 2006).

Remarks. We did not had access to any specimens of this species to dissection and description of abdominal terminalia of male and female.

Distribution. Costa Rica.

Neomida triplehorni Aloquio and Lopes-Andrade sp.n.

Figs 166–172

Diagnosis. Easily recognized by its small size (<3.0 mm), convergent frontal horns and confusedly elytral puncture.

Etimology. Species named after Dr. Charles A. Triplehorn, eminent specialist of Tenebrionidae, who made great advance on the taxonomy of this genus.

Description. Body (Figs. 166–168) moderately convex, opaque, with a small vestiture covering the entire dorsum; length 2.31–2.59 mm; head, pronotum and elytra reddish brown; mouth parts, antennae and legs golden yellow. **Head** finely punctate; clypeus slightly raised, bearing two small, triangular tubercles, in contact with genal margins; frons armed with a pair of long, slender, conical, converging horns, in males; females with no sign of clypeal tubercles and bearing small protuberances where the frontal horns are found in males; vertex not excavate. **Eyes** emarginated anteriorly by antennal insertions, forming a lower lobe three times larger than upper lobe. **Antennae** with 11 antennomeres; antennomeres 4–11 expanding into a loose, long club, bearing multi-

pronged sensilla (sensillifers) at the upper portion; antennal insertions concealed by genal margins; genal margin moderately expanded, following a subquadrate shape of head. **Pronotum** finely punctate, transverse, about one and a half times as wide as long, widest posteriorly and longest at middle; lateral edges expanded, visible dorsally for their entire lengths; anterior edge slightly curved outward. **Elytra** about three times as long as pronotum; sides subparellel at basal 2/3, then narrowing to apex; epipleura not extending to apex, ending beyond last abdominal suture; confusedly punctate. **Hind wings** developed, apparently functional. **Ventral surface** finely punctate. **Protibiae** with outer edge simple; apex bearing a row of spines; inner apical angle with two long spines. **Aedeagus** (Fig. 169) with basale about three and a half times as long as apicale; apicale triangular, about twice as long as wide, convex, pointed apex curved ventrally; basale with sides subparallel, slightly curved ventrally at basal 1/3; penis about as long as basale, enlarging from middle to truncate apex; internal sac about twice as long as penis. **Female** abdominal terminalia (Fig. 170) with bursa copulatrix about five times as long as gonocoxites together; window of bursa as long as the two basal gonocoxites; spermatheca with check valve (Fig. 171) about twice as long as gonostyli, oval, bearing two hardened, cylindrical invaginations; bottom invaginations about 1/6 as long as check valve; upper invagination about 1/3 as long as check valve; paraprocts about one and a half time as long as gonocoxites together; baculi of basal gonocoxites perpendicular to baculi of paraprocts; gonocoxites (Fig. 172) subtriangular, divided into three parts; middle and apical gonocoxites subequal in length; basal gonocoxite about one and a half times as long as the other ones; apical gonocoxite oblique, bearing a small internal protuberance, barely passing the insertion of gonostyli; gonostyli about half as long and 1/3 as wide as apical gonocoxite, inserted almost apically.

Measurements. Male holotype (in mm): TL 2.50, PL 0.63, PW 1.09, EL 1.56, EW 1.16, GD 0.69; ratios: PL/PW 0.57, EL/EW 1.35, EL/PL 2.50, GD/EW 0.59, TL/EW 2.16. Male paratypes (in mm): TL 2.13–2.34 (2.33±0.02), PL 0.59–0.63 (0.61±0.02), PW 0.94–1.06 (1.00±0.06), EL 1.47, EW 1.09–1.16 (1.13±0.03), GD 0.81–0.94 (0.88±0.06); ratios: PL/PW 0.59–0.63 (0.61±0.02), EL/EW 1.27–1.34 (1.31±0.04), EL/PL 2.35–2.37 (2.41±0.06), GD/EW 0.74–0.81 (0.78±0.06), TL/EW 2.03–2.11 (2.07±0.04). Female paratypes (in mm): TL 2.34–2.59 (2.47±0.13), PL 0.66–0.72 (0.69±0.03), PW 0.94–1.09 (1.02±0.08), EL 1.41–1.56 (1.48±0.08), EW 1.19–1.28 (1.23±0.05), GD 0.91–0.94 (0.92±0.02); ratios: PL/PW 0.66–0.70 (0.68±0.02), EL/EW 1.18–1.22 (1.20±0.02),

EL/PL 2.14–2.17 (2.16±0.02), GD/EW 0.73–0.76 (0.75±0.02), TL/EW 1.97–2.02 (2.00±0.03).

Type series. Male, holotype (CELC) labelled: "BRASIL: GO, Niquelândia 2012\ *Neomida triplehorni* Aloquio & Lopes-Andrade, HOLOTYPE [printed on red label]"; four males and one female (CELC), one male and one female (OSUC), paratypes labelled: "BRASIL: GO, Niquelândia 2012\ *Neomida triplehorni* Aloquio & Lopes-Andrade, PARATYPE [printed on yellow label]".

Remarks. This species is found in the Cerrado, an endangered Brazilian Biome (Aloquio, Grossi and Lopes-Andrade in press), and in an area of extraction of nickel. Even with the locality being relatively close (about 100 km) to the Parque Nacional da Chapada dos Veadeiros, an important conservation area for the Cerrado, the fact of this species occurs in a mining area in the Cerrado Biome, which may place this species as endangered.

Distribution: Brazil.

***Neomida vespertilionis* Aloquio and Lopes-Andrade sp.n.**

Figs 173–179

Diagnosis. *Neomida vespertilionis* **sp.n.** differs from all other species, except *N. pentaphylloides* and *N. bimaculata* **sp.n.** by the excavation behind frontal horns. *Neomida vespertilionis* **sp.n.** differs from *N. pentaphylloides* in having clypeal tubercles, not having the epipleura extending to apex of elytra and the size, about twice as long, and from *N. bimaculata* **sp.n.** by its unicilored elytra.

Etymology. "Vespertilionis" is the Latin word for bat, a reference to the appearance of male in frontal view.

Description. Body (Figs. 173–175) moderately convex, shinny, glabrous; length 5.38–5.92 mm; elytra, pronotum and head dark reddish brown; antennae and legs reddish brown; mouth parts golden brown. **Head** finely punctate; clypeus slightly raised, bearing two small tubercles, in contact with genal margins; frons armed with a pair of short, conical horns, each rising close to an eye and directed upward; temple with post-orbital pits right behind the frontal horns, in male; female with no signs of clypeal tubercles, bearing small tubercles where are found frontal horn in males, no post-orbital pits; vertex

not excavate; **Eyes** emarginated anteriorly by antennal insertions, forming a lower lobe almost four times larger than the upper lobe, in male, and, in female, lower lobe three times as long as upper one. **Antennae** with 11 antennomeres; antennomeres 4–11 expanding into a loose, long club; antennomeres 6–11 bearing multi-pronged sensilla (sensillifers) at upper portion; antennal insertions concealed by genal margins; genal margin moderately expanded, following the rounded shape of head. **Pronotum** finely punctate, transverse, twice as wide as long, widest posteriorly and longest at middle; lateral edges explanate, visible dorsally for their entire lengths; anterior edge slightly curved outward. **Elytra** about two and a half times as long as pronotum; sides subparallel at basal 2/3, then narrowing to apex; epipleura not extending to apex, ending before last abdominal ventrite; punctation seriate, with a large puncture separated by three fine series. **Hind wings** developed, apparently functional. **Ventral surface** slightly lighter than dorsum, punctation sparser; prosternal process subparallel, apex narrowed, curved ventrally. **Protibiae** with outer edge serrate; apex bearing a row of spines; inner apical angle with two long spines. **Aedeagus** (Fig. 176) with basale about five times as long as apicale; basale with sides subparallel, bearing one lateral projection towards apicale on each side, lateral projection of basale, triangular, reaching the middle of apicale; apicale triangular, strongly narrowing at apical 1/3, about as long as wide; penis as long as basale, cylindrical, wide, sides subparallel and apex truncate. **Female** abdominal terminalia (Fig. 177) with bursa copulatrix about six times as long as gonocoxites together, expanded at the 1/5 apex; window of bursa absent; spermatheca with check valve (Fig. 178) about half as long as gonostyli, oval, bearing two hardened invaginations, bottom invagination reaching 1/3 of check valve, upper invagination almost reaching the bottom invagination; paraprocts as long as gonocoxites together; baculi of basal gonocoxites oblique in relation to baculi of paraprocts; gonocoxites (Fig. 179) transversely divided into three parts, subequal in length; apical gonocoxite narrower than the basal ones; gonostyli almost as long as and half as wide as the apical gonocoxites, inserted apically.

Measurements. Male holotype (in mm): TL 5.92, PL 1.54, PW 2.38, EL 3.62, EW 2.62, GD 1.92; ratios: PL/PW 0.65, EL/EW 1.38, EL/PL 2.35, GD/EW 0.74, TL/EW 2.26. Female paratype (in mm): TL 5.38, PL 1.00, PW 2.15, EL 3.23, EW 2.54, GD 0.76; ratios: PL/PW 0.46, EL/EW 1.27, EL/PL 3.23, GD/EW 0.76, TL/EW 2.12.

Type series. Male holotype (CELC) labelled: "BRASIL: ES, Santa Teresa, 'Estação Biológica de Santa Lúcia', 27.XI.2011, leg. L.S. Araujo\ T2 PE F6\ *Neomida*

vespertilionis Aloquio & Lopes-Andrade, HOLOTYPE [printed on red label]". Female paratype (CELC) labelled: "BRASIL: ES, Santa Teresa, 'Estação Biológica de Santa Lúcia', 27.XI.2011, leg. L.S. Araujo\ T2 PE F6\ *Neomida vespertilionis* Aloquio & Lopes-Andrade, PARATYPE [printed on yellow label]"

Distribution: Brazil.

***Neomida vitula* (Chevrolat, 1878)**

Hoplocephala vitula Chevrolat, 1878

Neomida vitula (Chevrolat), Triplehorn, 2006

Figs. 180–186

Diagnosis. Moderately large (± 5mm), dark reddish brown to piceous, shiny, the elytral suture reddish. Male with two short, blunt cephalic horns and two very small and inconspicuous marginal clypeal tubercles. Female without clypeal tubercles, frons finely and sparsely punctured with short prominences laterally (where horns inmale are located). Elytra finely punctate-striate, striate not in grooves; intervals minutely punctate; epipleura abbreviated beyond last visible abdominal suture (Triplehorn 2006). This species is very similar to *N. castanea*, differing from the forntal horns pointed inward and vertex not excavate, in males, and the ovipositor, what we called "type 2", in *N. atlantica* **sp.n.**, and "type 4", in *N. castanea*.

Redescription. Body (Figs. 180–182) moderately convex, shinny, glabrous; length 5.0–6.0 mm; elytra, pronotum and head dark brown; mouth parts, antennae and legs reddish brown. **Head** coarsely punctate; clypeus finely punctate, slightly raised, bearing two small tubercles; frons with a pair of small, conical horns, pointed inward, on males; vertex not excavate; females with no sign of frontal horns or clypeal tubercles; **Eyes** emarginated anteriorly by antennal insertions, forming a lower lobe almost three times larger than the upper lobe. **Antennae** with 11 antennomeres; antennomeres 4–11 expanding into a loose, long club; antennomeres 5–11 bearing small, multi-pronged sensilla (sensillifers) at the upper portion; antennal insertions concealed by genal margin; genal margin moderately expanded, following the rounded shape of head. **Pronotum** finely punctate, transverse, about one and a half times as wide as long, widest about middle and longest at the middle line; lateral edges explanate, visible dorsally for their entire lengths; anterior edge slightly

curved outward. **Elytra** about two and a half times as long as pronotum; sides subparallel at basal 2/3, then narrowing to apex; epipleura not extending to apex, ending beyond last abdominal suture; punctation seriate, with a large puncture separated by three fine series. **Hind** wings developed, apparently functional. **Ventral surface** coarsely and sparsely punctate**. Protibiae** with outer edge serrate; apex bearing a row of spines; inner apical angle with two long spines. **Aedeagus** (Fig. 183) with basale about six times as long as apicale; apicale triangular; basale wider at basal 1/3; basal portion of basale curved, almost perpendicular, ventrally; penis as long as basale, sides subparallel, truncate at apex; internal sac about three times as long as penis. **Female** abdominal terminalia (Fig. 184) with bursa copulatrix about four times as long as gonocoxites together, expanded about half to apex; window of bursa about as long as gonocoxites together; spermatheca with check valve (Fig. 185) small, about as long as gonostyli; check valve oval, bearing two hardened, cylindrical invaginations; bottom invagination about 1/3 of the length of check valve; upper invagination, wider, almost reaching the bottom part of check valve; paraprocts as long as gonocoxites together; baculi of basal gonocoxites oblique in relation to baculi of paraprocts; gonocoxites (Fig. 186) transversely divided into three parts; basal and apical gonocoxites subequal in length; middle gonocoxite about half as long as the other two; apical gonocoxite narrower than the basal ones, bearing a internal protuberance about 1/4 as long as gonostyli; gonostyli almost as long and half as wide as the last gonocoxite, inserted apically.

Measurements. Males (in mm): TL 5.38–6.00 (5.69±0.31), PL 1.62–1.77 (1.69±0.08), PW 2.38–2.46 (2.42±0.04), EL 3.46–3.69 (3.58±0.12), EW 2.69, GD 2.00–2.31 (2.15±0.15); ratios: PL/PW 0.68–0.72 (0.70±0.02), EL/EW 1.29–1.37 (1.33±0.04), EL/PL 2.09–2.14 (2.11±0.03), GD/EW 0.74–0.86 (0.80±0.06), TL/EW 2.00–2.23 (2.11±0.11). Females (in mm): TL 5.00–5.69 (5.35±0.35), PL 1.46–1.69 (1.58±0.12), PW 2.00–2.77 (2.38±0.38), EL 3.08–3.38 (3.23±0.15), EW 2.62–2.85 (2.73±0.12), GD 2.00–2.08 (2.04±0.04); ratios: PL/PW 0.61–0.73 (0.67±0.06), EL/EW 1,18–1.19 (1.18±0.01), EL/PL 2.00–2.11 (2.05±0.05), GD/EW 0.73–0.76 (0.75±0.02), TL/EW 1.91–2.00 (1.96±0.04).

Material examined. One male and one female (CELC) labelled: “BRASIL: MG, Viçosa “Mata do Paraíso” 19.v.2015 Araujo, Orsetti & Aloquio”; four males and five females (FZRGS) labelled: “Cambará do Sul, RS 19–21/xii/1994 A. Franceschini [handwritten]”; two males and four females (FZRGS) labelled: “Triunfo, RS (COPESUL) 14–15.i.1997

A. Franceschini"; one female (CELC) labelled: "BRASIL: ES "Estrada Ibiraçú–Vitória" 2011 J.C. Rengifo leg."; three males and four females (CELC) labeled: "BRASIL: MG, Alto Caparaó PARNA do Caparaó 15.xii.2012 S. Aloquio leg."; two males and two females (CELC) labelled: "BRASIL: ES, Santa Tereza "Estação Biológica de Santa Lúcia" 27.xi.2011 L.S. Araujo"; one male and one female (CELC) labelled: "BRASIL: RS, Canela 02.v.2015"; two males and eight females (CELC) labelled: "BRASIL: BA, Prado PN Descobrimento 07.x.2009 A. Nemésio leg.".

Distribution. Argentina; Brazil; French Guiana.

***Neomida vivianae* Aloquio and Lopes-Andrade sp.n.**

Figs 187–189

Diagnosis. Differs from all other American *Neomida*, except *N. bicornis* and *N. aeneipennis*, by its metallic elytral reflections. Differing from *N. bicornis* in having bronze-green reflections, not metallic blue or green, and from both *N. bicornis* and *N. aeneipennis* in having a sharp, conical clypeal tubercle.

Etimology. Species dedicated to Drª. Vivian Eliana Sandoval Gómes, collector of this species.

Description. Male. Body (Figs. 187–188) moderately convex, shinny, glabrous; length 3.80 mm; head and pronotum dark brown; elytra dark brown with bronze-green reflections; mouth parts, antennae and legs light reddish brown. **Head** coarsely punctate; clypeus slightly raised, bearing two sharp, conical, small tubercles, in contact with genal margins; frons armed with a pair of broad, sharp, conical, straight horns; vertex excavate. **Eyes** emarginated anteriorly by antennal insertions, forming a lower lobe three times larger than upper lobe. **Antennae** with 11 antennomeres; antennomeres 4–11 expanding into a loose, long club, bearing multi-pronged sensilla (sensillifers) at the upper portion; antennal insertions concealed by genal margins; genal margin moderately expanded, following a subquadrate shape of head. **Pronotum** coarsely punctate, transverse, about twice as wide as long, widest at 1/3 of base and longest at middle; lateral edges explanate, visible dorsally for their entire lengths; anterior edge slightly curved outward. **Elytra** about three times as long as pronotum; sides parallel at basal 2/3, then narrowing to apex; epipleura not extending to apex, ending beyond last abdominal suture; punctation seriate,

with large puncture separated by three fine, about half as large, series. **Hind wings** developed, apparently functional. **Ventral surface** coarsely punctate. **Protibiae** with outer edge simple; apex bearing a row of spines; inner apical angle with two long spines. **Aedeagus** (Fig. 189) with basale about four and a half times as long as apicale; apicale triangular, about twice as long as wide, convex, curved ventrally about middle, then curving ventrally to apex; basale with sides subparallel, curved ventrally at basal half; penis about as long as basale, enlarging from middle to truncate apex; internal sac about two and a half times as long as penis. **Female** unknown.

Measurements. Male, holotype (in mm): TL 3.80, PL 0.96, PW 1.80, EL 2.44, EW 1.92, GD 1.40; ratios: PL/PW 0.53, EL/EW 1.27, EL/PL 1.54, GD/EW 0.73, TL/EW 1.98.

Type series. Male, holotype (CELC) labelled: "BRASIL: MT, Cuiabá "Parque Mãe Bonifácia" 27.xi.2012 Sandoval-Gómez leg.\ *Neomida vivianae* Aloquio & Lopes-Andrade, HOLOTYPE [printed on red label]".

Unplaced specimens

***Neomida* sp.1**

Figs. 190–193

Remarks. This specimens comprised of three females, two of them from El Naranjo, Mexico, identified as *N. clavicornis* in the ANIC and one from Casanare, Colombia, in the CELC, not identified. The characters who define *N. clavicornis*, as the expanded epistoma and the regular puncture of elytra, with the convex interstices are not found in these specimens. We have dissected the specimens and found the three to be the same species, but, since the whole taxonomy of *Neomida* is based on features found on males, we were not able to place the specimens within any known species, nor had enough information to propose a new species. By the description and photos of those species we had not access to any specimens, it is probably that these three females belongs to *N. inermis* or being a new species. Until we not see a female of *N. inermis*, we will let them as unidentified.

Measurements. Females (in mm): TL 2.80–3.12 (2.95±0.13), PL 0.76–0.80 (0.77±0.02), PW 1.16–1.28 (1.23±0.05), EL 1.80–1.88 (1.83±0.04), EW 1.36–1.40 (1.39±0.02), GD 0.96–1.00 (0.99±0.02); ratios: PL/PW 0.61–0.66 (0.63±0.02), EL/EW 1.29–1.34 (1.32±0.02), EL/PL 2.25–2.47 (2.36±0.09), GD/EW 0.71, TL/EW 2.06–2.23 (2.12±0.07).

Material examined. Two females (ANIC) labelled: "3mi. W El Naranjo, 1100" S.L.P. MEX., VI–10–71 A. Newton\ J.F Lawrence Lot. 3236\ Ganoderma sp.". One female (CELC) labelled: "COLÔMBIA: Casanare, Trinidad, Vereda La Esperança, Finca Canta Claro 158m, 5º22'08.9''N 71º 26'65.8''W, J.L. Contreras, *Hexagonia hydnoides*".

Key for the American *Neomida* (modified from Triplehorn 2006)

1. Antennae with 10 antennomeres; antennomeres 5–10 expanding into a loose club; genal margins expanded beyond the rounded shape of head; length 3.0–4.0 mm……..….*N. clavicornis* (Champion)

_ Antennae with 11 antennomeres…….……2

2(1'). Epipleura extending to elytral apex……..……..……..3

_ Epipelura not extending to elytral apex…….……..……9

3(2). Basal pronotal angles squared; interval between striae convex; length 4.0–5.0 mm……...…*N. occidentalis* (Champion)

_ Basal pronotal angles rounded; with intervals between striae not convex or confusedly punctate..……..…….……4

4(3'). Single clypeal tubercle…….5

_ Two clypeal tubercles……..……..……..……6

5(4). Eyes small, separated ventrally by about 3X the diameter of an eye; frontal horns triangular, with a tuft of bristles at their tips, on males; elytra confusedly punctate; clypeus protruding anteriorly, on females; body broad; length 1.85–2.20 mm……...…….…..…....*N. suilla* (Champion)

_ Eyes large, separated ventrally by about diameter of an eye; frontal horns parallel sided, truncate at apex, on males; elytra punctate-striate; clypeus following the line of head and

frontal horns reduced to small tubercles, on females; body elongate; length: 3.50–4.00 mm…….....……...……*N. picea* (Laporte and Brullé)

6(4’). Elytra punctate-striate; frontal horns subcylindrical and straight; length 1.74 mm……..…*N. diminuta* Aloquio and Lopes-Andrade

_ Elytra confusedly punctate……..7

7(6’). Frontal horns long, slender, bent sharply forward, joited by a sharp bridge sometimes bearing two small, acute tubercles; conspicuously setose dorsally (on both pronotum and elytra); surface luster dull…….……..…...*N. cioides* (Champion)

_ Frontal horns short, blunt, triangular; setae usually absent on pronotum; elytral setae short, fine……...8

8(7’). Clypeal tubercles present; no excavation behind frontal horns; deeply and longitudinally excavate between frontal horns……*N. deltocera* Triplehorn

_ Clypeal tubercles absent; transversally and deeply excavate behind frontal horns, but not deeply excavate between them……*N. pentaphylloides* (Champion)

9(2’). Elytra reddish brown to dark brown, with spots ligther, from golden yellow to reddish yellow……..……10

_ Elytra unicolored……..…….11

10(9). Lighter coloration of elytra extending to apex, forming a shield-shaped dark spot dorsally; frontal horns truncate at apex…….....……....*N. luteonotata* (Champion)

_ Lighter coloration of elytra not extending to apex, forming one light spot on each elytra; frontal horns acute apically, on males; small depression behind frontal horns…...……..……*N. bimaculata* **sp.n.**

11(9’). Elytral coloration metallic green, blue or with bronze-green reflections; shiny……...…..12

_ Elytral surface not metallic colored; luster variable…….…..14

12(11). Elytral coloration metallic green (for specimens collected on insular America) or metallic blue (continental America); clypeal tubercle prominent and acute; frontal horns sharp and straight…….……*N. bicornis* (Fabricius)

_ Elytral coloration with a bronze-green reflection……..……13

13(12’). Clypeal tubercles short and blunt; pronotum finely punctate; intervals between elytral striae fine punctate…….……..*N. aeneipennis* Triplehorn

_ Clypeal tubercles prominent and acute; pronotum coarsely punctate; interval between elytral striae with puncture about half of those on striae……....*N. vivianae* **sp.n.**

14(11’). Frontal horns represente by no more than blunt tubercles (as in females of most other species……...……..15

_ Frontal horns well developed……17

15(14). Clypeal tubercles present ……..……*N. obsoleta* (Champion)

_ Clypeal tubercles absent……16

16(15’). Ventral surface of head coarsely and densely, almost rugosely punctured; frontal tubercles distinct……..…….*N. paurocera* Triplehorn

_ Ventral surface of head finely and sparsely punctured; frontal tubercles barely evident, sexes indistinguishable externally…….…….……..*N. acera* Triplehorn

17(14’). Prosternal process horizontal, apex acute and prominent; eye not quite in contact with base of frontal horn; size large (>7.5 mm)…….….*N. lateralis* (Bates)

_ Prosternal process deflexed between procoxae, apex not prominent; eye almost always in contact with base of frontal horn; size varable but usually less than 7.0 mm…….….18

18(17’). Frontal horns asymmetrical, right always longer, stouter and expanded apically……..……..…….*N. heterocera* Triplehorn

_ Frontal horns symmetrical…….……19

19(18’). Elytra confused punctured (pigment spots may give illusion of striae); frontal horns thin, strongly converging from base to apex……..…….20

_ Elytra distinctly punctate-striate; frontal horns not as above……..……...22

20(19). Clypeal tubercles short; frontal horns with inconspicuous setae; no excavation between frontal horns……...…….....…*N. triplehorni* **sp.n.**

_ Clypeal tubercles prominent and acute; frontal horns conspicuously setose; vertex excavate……...21

21(20’). Frontal horns with dense brush of long, golden setae at apex; elytral setae inconspicuous…….…...….*N. pogonocera* Triplehorn

_ Frontal horns with only a few short, dark setae at apex; elytral setae short but conspicuous……...……..……*N. inermis* (Champion)

22(19’). Head deeply concave behind eye and frontal horn tubercle……..…….....23

_ Head not or only shallowly concave behind eye and horn or tubercle……..……26

23(22). Pronotum with lateral punctures fine and sparse, each separated by 2 to 4 times their diameter……...…….…...…..*N. lawrencei* Triplehorn

_ Pronotum with lateral puncture coarse and dense, each separated by less than their own diameters……..24

24(23’). Frontal horns not widely separated, porrect, subparallel or slightly divergent, bluntly rounded apically; pronotum with medial punctures much finer and more widely separated than lateral ones; elytra with punctures usually in grooves with intervals convex and minutely punctured…….……...……...……..*N. ferruginea* (LeConte)

_ Frontal horns widely separated at base, strongly bowed outwardly, then converging apically…….....25

25(24’). Apex of horns truncate; pronotum rugosely punctured laterally with punctures only slightly smaller medially; elytra subrugosely punctured, punctures of intervals not much smaller than those of striae…….……*N. punctatissima* (Champion)

_ Apex of horns bluntly rounded apically; pronotum with no distinction between medial and lateral punctures; elytra subrugosely punctured, punctures of interval not much more than those of striae; antennae bicolored, first three and last antennomeres lighter……..……...…....……*N. samurai* **sp.n.**

26(22’). Clypeus without horns or tubercles, anterior margin narrowly reflexed and continuous with genal margins which are also narrowly reflexed……..…..…….*N. hoffmanseggi* (Laporte and Brullé)

_ Clypeus usually with at least traces of two tubercles or horns on anterior margin, margin not at all reflexed……..……..……..27

27(26'). Frons with deep, usually abrupt median concavity behind horns or behind each horn……..……28

_ Frons flat, without median concavity behind horns…….……...…..30

28(27). Clypeal tubercles prominent, sharply pointed, slightly divergent; frontal horns straight upward; small size (<4.0 mm)……...……..*N. atricollis* (Pic)

_ Clypeal tubercles short (>5.0 mm)…….……....……..29

29(28'). Frontal horns with a deep concavity behind each horn; vertex not much excavated; frontal horns sharply pointed; clypeal tubercle widely separated fron each other ……...……..……..**.....**……*N. vespertilionis* **sp.n.**

_ Vertex strongly excavated medially; forntal horns truncate at apex; clypeal tubercles touching each other at base……..…..……*N. castanea* (Bates)

30(27). Clypeus with a pair of long, thin, porrect horns (not merely tubercles); frontal horns absent; antennae with three basal and apical antennomeres light reddish brown, antennomeres 4–10 black…….……..……..…….*N. nigricornis* (Champion)

_ Clypeus with a pair of short tubercles or none; frontal horns, or at least blunt projections, usually present; antennal segments concolorous…….……..……..31

31(30'). Frontal horns connected at base by an abrupt, narrow bridge…….…….....*N. lecontei* (Bates)

_ Frontal horns distinctly separated at base, the area between them flat…….…..…..…32

32(31'). Smaller species, less than 4.0 mm in length……..…..……....33

_ Larger species, grater than 5.0 mm in length……..…….37

33(32). Elytral punctures fine, separated by their diameter or less, interval punctures coarse and dense, striae poorly defined; clypeal tubercles obtuse, not prominent…….…….*N. telecera* Triplehorn

_ Elytral punctures coarse, separated by their diameters or more…….……..…….34

34(33’). Elytral striae in shallow grooves; interval punctures fine and dense; frontal horn small, triangular and pointed forward…….……..……*N. grossii* **sp.n.**

_ Elytral striae not in grooves; interval punctures fine and sparse; frontal horns slightly long, pointed upward and divergent…….…...……..…35

35(34’). Interval puncture almost inconspicuous; pronotum sparsely punctate; frontal horns with sides subparallel, truncate at apex……..….*N. divergicornis* Triplehorn

_ Interval puncture conspicuous; pronotum densely punctate; frontal horns not as above……36

36(35’). Frontal horns widely separated at base; apex sharp; clypeal tubercle blunt, slightly directed upward……..…….…….……*N. luci* **sp.n.**

_ Frontal horns not widely separated at base; frontal horns larger at base, then narrowing to middle; apex truncate slightly directed forward; clypeal tubercle sharp, directed inward……..……*N. capixaba* **sp.n.**

37(32’). Frontal horns short, blunt, dorsum dark reddish brown to piceus, with the elytral suture reddish…….....……*N. vitula* (Chavrolat)

_ Frontal horns long……...……..38

38(37’). Frontal horns extremely widely separated at base, bowed slightly outward medially, sometimes a distinct tooth or barb about middle on the inner side; pronotum uniformly deflexed anteriorly……...…….……...*N. distans* (Champion)

_ Frontal horns not widely separated at base. Extremely long and slender, subparallel, curved slightly caudad; pronotum with prominent V-shaped depression anteriorly…….……..…..*N. dolichocera* Triplehorn

Checklist of American *Neomida* Latreille, 1829

Neomida acera Triplehorn, 1994
Neomida aeneipennis Triplehorn, 1965
Neomida atricollis (Pic, 1926)
Neomida bicornis (Fabricius, 1776)
Neomida bimaculata Aloquio and Lopes-Andrade **sp.n.**
Neomida capixaba Aloquio and Lopes-Andrade **sp.n.**

Neomida castanea (Bates, 1873)
Neomida cioides (Champion, 1886)
Neomida clavicornis (Champion, 1886)
Neomida deltocera Triplehorn, 1994
Neomida diminuta Aloquio and Lopes-Andrade, 2015
Neomida distans (Champion, 1886)
Neomida divergicornis Triplehorn, 1994
Neomida dolichocera Triplehorn, 1994
Neomida ferruginea (LeConte, 1866)
Neomida grossii Aloquio and Lopes-Andrade **sp.n.**
Neomida heterocera Triplehorn, 1994
Neomida hoffmanseggi (Laporte and Brullé, 1831)
Neomida inermis (Champion, 1886)
Neomida lateralis (Bates, 1873)
Neomida lawrencei Triplehorn, 1994
Neomida lecontei (Bates, 1873)
Neomida luci Aloquio and Lopes-Andrade **sp.n.**
Neomida luteonotata (Pic, 1926)
Neomida nigricornis (Champion, 1886)
Neomida obsoleta (Champion, 1886)
Neomida occidentalis (Champion, 1893)
Neomida paurocera Triplehorn, 1994
Neomida pentaphylloides (Champion, 1886)
Neomida picea (Laporte and Brullé, 1831)
Neomida pogonocera Triplehorn, 1994
Neomida punctatissima (Champion, 1893)
Neomida samurai Aloquio and Lopes-Andrade **sp.n.**
Neomida suilla (Champion, 1896)
Neomida telecera Triplehorn, 2006
Neomida triplehorni Aloquio and Lopes-Andrade **sp.n.**
Neomida vespertilionis Aloquio and Lopes-Andrade **sp.n.**
Neomida vitula (Chevrolat, 1878)
Neomida vivianae Aloquio and Lopes-Andrade **sp.n.**

Discussion

Characteristics of female abdominal terminalia proved to be important in delimiting and recognizing *Neomida* species, being, in some cases, even more informative than the aedeagus. Without that information, only males would be identified with certainty. We believe that the female abdominal terminalia will help to solve problems with diagnoses of genera and phylogenetic relationships within Diaperinae, therefore it is necessary to conduct a robust comparative morphological study of female terminalia in this taxon. The

presence of what we called internal protuberance in each apical gonocoxite is quite intriguing. The other tenebrionoid we know that this structure occurs is *Cis regius* Orsetti and Lopes-Andrade (in press) (Ciidae) and the authors said that it is uncommon in the family. We have not seen this structure in other taxa, even Lawrence et al. (2011) does not mention this characteristic. Therefore, its function and phylogenetic significance are unknown.

The number of *Neomida* species will certainly grow with collection effort and sampled biomes. In recent field collections (2011–2015), performed in few localities, there were eight new species, described here. Another factor to consider is the lack of or poor field collections of micetophagous beetles in most Neotropical biomes. Considering only Brazil, which comprises almost 50% of the Neotropical region, collections are almost inexistent in biomes such as Cerrado, Caatinga, Pantanal and Pampas. Even in the Brazilian Atlantic Forest and Amazonian Forest, the most well represented biomes in this work, we had records from only 10 localities of the former and two locatities of the latter.

Data from literature and recent collections showed a high diversity of host fungi utilized by *Neomida*. Those fungi are classified in nine families, from four orders, all within the class Agaricomycetes, phylum Basidiomycota (Table 1). From all species with records of host fungi, only *N. cioides* were found in soft, gelatinous fungus (*Auricularia nigricans*), with the other species only found in hard basidiomes. There are few available records of host fungi of *Neomida* species, which makes hard to classificate species as specialists or generalists.

The suprageneric and generic classification of Diaperinae deserves attention and will probably change as far as new genera are described and more comparative studies of structures are conducted. Characteristics of mentum, buccal pieces, size, number and position of antennal sensillifers, and female abdominal terminalia are very important to the taxonomy of Diaperinae (Aloquio pers.obs.), but still barely or unstudied in the taxon. The few diagnostic characteristics of currently recognized Diaperinae genera make their identification difficult, even for specialists who works on them (Schawaller pers.com.).

We think that *Neomida* is not a monophyletic taxon, comprising species that are, probably, members from another genus, such as *N. clavicornis*, showed as a strange species within the genus, from both the author of the species, Champion (1886), and Triplehorn (2006), who worked with almost all *Neomida* species. In addition, genera that

are place as close related to *Neomida*, are very difficult to discriminate. However, without a good definition of the genera and suprageneric taxa within Diaperinae, any statement on its phylogeny is subjective.

Acknowledgments

We wish to express our thanks to Miguel Monné and Marcela Monné, Museu Nacional do Rio de Janeiro (MNRJ), and Jane Costa, Márcio Félix and Danielle Cerri, Coleção Entomológica do Instituto Oswaldo Cruz (CEIOC), for kindly receive the senior author and loan specimens to this work; to John F. Lawrence, Australian National Insect Collection (ANIC) for loan specimens from Central America; Margaret Thayer and Crystal Maier, Field Museum of Natural History (FMNH) for kindly separate Diaperinae specimens and send to us; Luciano de Almeida Moura, Fundação Zoobotânica do Rio Grande do Sul (FZRGS) for loan specimens. Financial support was provided by the Fundação de Amparo à Pesquisa do Estado de Minas Gerais (FAPEMIG: Universal APQ-00653-12; PPM-00026-14), Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq: Universal nº 479737/2012-6, research grant to CLA nº 302480/2012-9), Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES: master degree grant to the senior author; PVE nº 88881.030447/2013-01).

References

Aloquio S, Grossi PC, Lopes-Andrade C (in press) Description of the first genus and species of Brazilian Esemephina (Coleoptera: Tenebrionidae: Cossyphodini). *Zootaxa*.

Aloquio S, Lopes-Andrade C (2015) A new species of *Neomida* Latreille from Colombia, with additional records and a complementary description for *Neomida suilla* (Champion) (Coleoptera, Tenebrionidae, Diaperini). *ZooKeys* **495**: 133–142. doi: 10.3897/zookeys.495.8737

Evenhuis NL (2008) A compendium of zoological type nomenclature: A reference source. *Bishop Museum Technical Report* **41**, 23 pp.

Lawrence JF, Ślipiński A, Seago AE, Thayer MK, Newton AF, Marvaldi AE (2011) Phylogeny of the Coleoptera based on morphological characters of adults and larvae. *Annales Zoologici* **61(1)**: 1–217. doi: 10.3161/000345411X576725

Matthews EG, Bouchard P (2008) Tenebrionid beetles of Australia: descriptions of tribes, keys to genera, catalogue of species. Australian Biological Resources Study. Canberra, Australia.

Matthews EG, Lawrence JF, Bouchard P, Steiner Jr. WE, Ślipiński A (2010) 11.14. Tenebrionidae Latreille, 1802, In: Leschen RAB, Beutel RG & Lawrence JF (Eds.), *Handbook of Zoology. A Natural History of the Phyla of the Animal Kingdom*. Vol. IV. Arthropoda: Insecta. Part 38. Coleoptera, Beetles. Vol. 2. Systematics (Part 2). Walter de Gruyter, Berlin, pp. 574–659.

Orsetti A, Lopes-Andrade C (in press) A new species of *Cis* Latreille (Coleoptera: Ciidae) from South Africa. *Zootaxa*.

Schawaller W (2002) Taxonomic notes on Paleartic and Oriental species of *Neomida* Latreille, 1829 (Coleoptera, Tenebrionidae), with description of a new species from southern India. *Entomologica Basiliensia* **24**: 281–287.

Triplehorn CA (1965) Revision of Diaperini of America north of Mexico, with notes on extralimital species (Coleoptera: Tenebrionidae). *Proceedings of the Unites States National Museum* **3515**: 349–458.

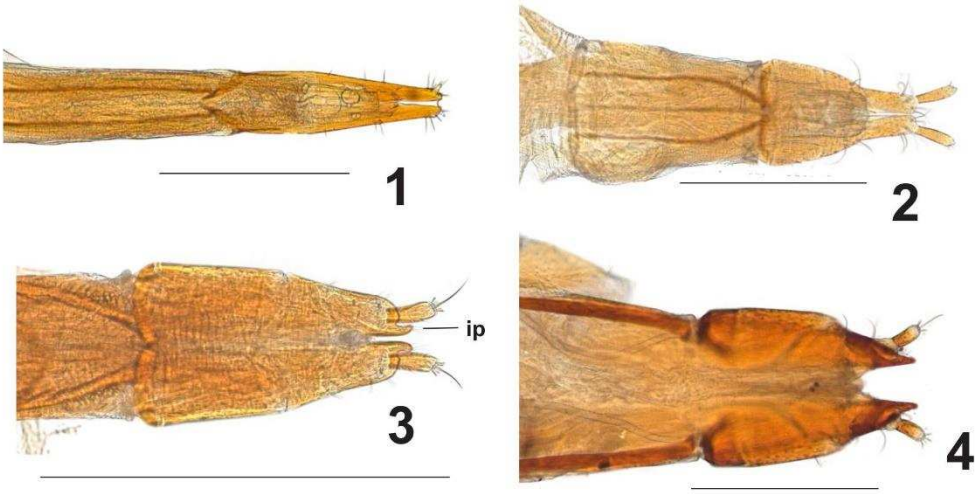
Triplehorn CA (1994) Studies in Neotropical *Neomida*: descriptions of eight new species (Coleoptera: Tenebrionidae). *Proceedings of the Entomological Society of Washington* **96(3)**: 417–427.

Triplehorn CA (2006) Studies in Neotropical *Neomida*: A synopses of the genus *Neomida* (Coleoptera: Tenebrionidae: Diaperini) from America north of Colombia with notes on other western hemisphere species. *Proceedings of the Entomological Society of Washington* **108(2)**: 312–334.

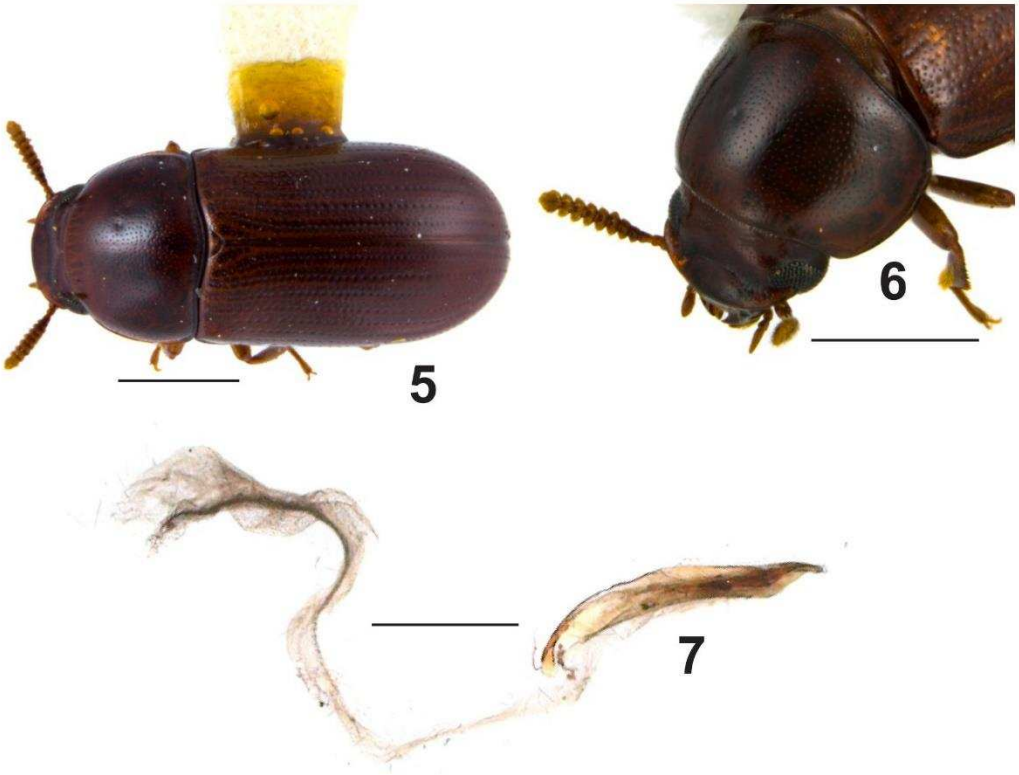
Tschinkel WR, Doyen JT (1980) Comparative anatomy of the defensive glands, ovipositor and female genital tubes of tenebrionid beetles (Coleoptera). *International Journal of Insect Morphology and Embryology* **9**: 321-368.

Table 1. Relation between *Neomida* species and host fungi.

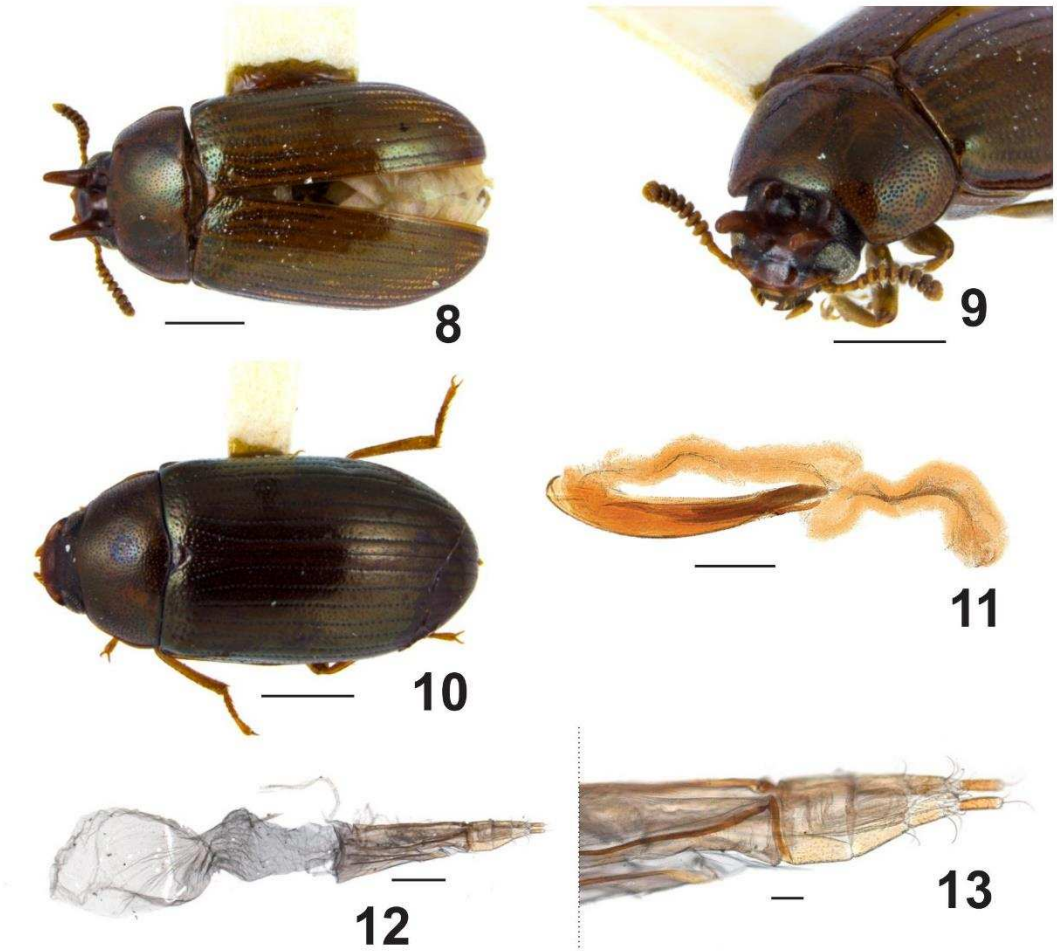
Order	Family	Fungus	Associate species
Agaricales	Agaricaceae		*Neomida cioides*
	Pleurotaceae	*Pleurotus* sp.	*Neomida cioides*
Auriculariales	Auriculariaceae	*Auricularia nigricans*	*Neomida cioides*
Hymenochaetales	Hymenochaetaceae	*Phellinus* aff. *gilvus*	*Neomida samurai* **sp.n.**
		Phellinus sp.	*Neomida divergicornis*
			Neomida hoffmanseggi
			Neomida lawrencei
Polyporales	Fistulinaceae	*Fistulina hepatica*	*Neomida nigricornis*
	Ganodermataceae	*Ganoderma applanatum*	*Neomida castanea*
			Neomida cioides
			Neomida deltocera
			Neomida ferruginea
			Neomida lawrencei
			Neomida occidentalis
			Neomida picea
		Ganoderma nitidum	*Neomida deltocera*
			Neomida lawrencei
		Ganoderma sp.	*Neomida cioides*
			Neomida distans
			Neomida hoffmanseggi
			Neomida obsoleta
			Neomida picea
			Neomida pogonocera
			Neomida suilla
		Ganoderma zonatum	*Neomida castanea*
			Neomida deltocera
			Neomida ferruginea
	Meripilaceae	*Rigidoporus microporus*	*Neomida cioides*
	Polyporaceae	*Earliella scabrosa*	*Neomida picea*
			Neomida punctatissima
			Neomida clavicornis
			Neomida cioides
		Fomes fasciatus	*Neomida castanea*
			Neomida deltocera
			Neomida distans
			Neomida ferruginea
			Neomida lecontei
		Hexagonia hydnoides	*Neomida inermis*
			Neomida nigricornis
			Neomida sp.1
		Hexagonia tenuis	*Neomida cioides*
		Nigrofomes melanoporus	*Neomida acera*
		Trichaptum sector	*Neomida cioides*



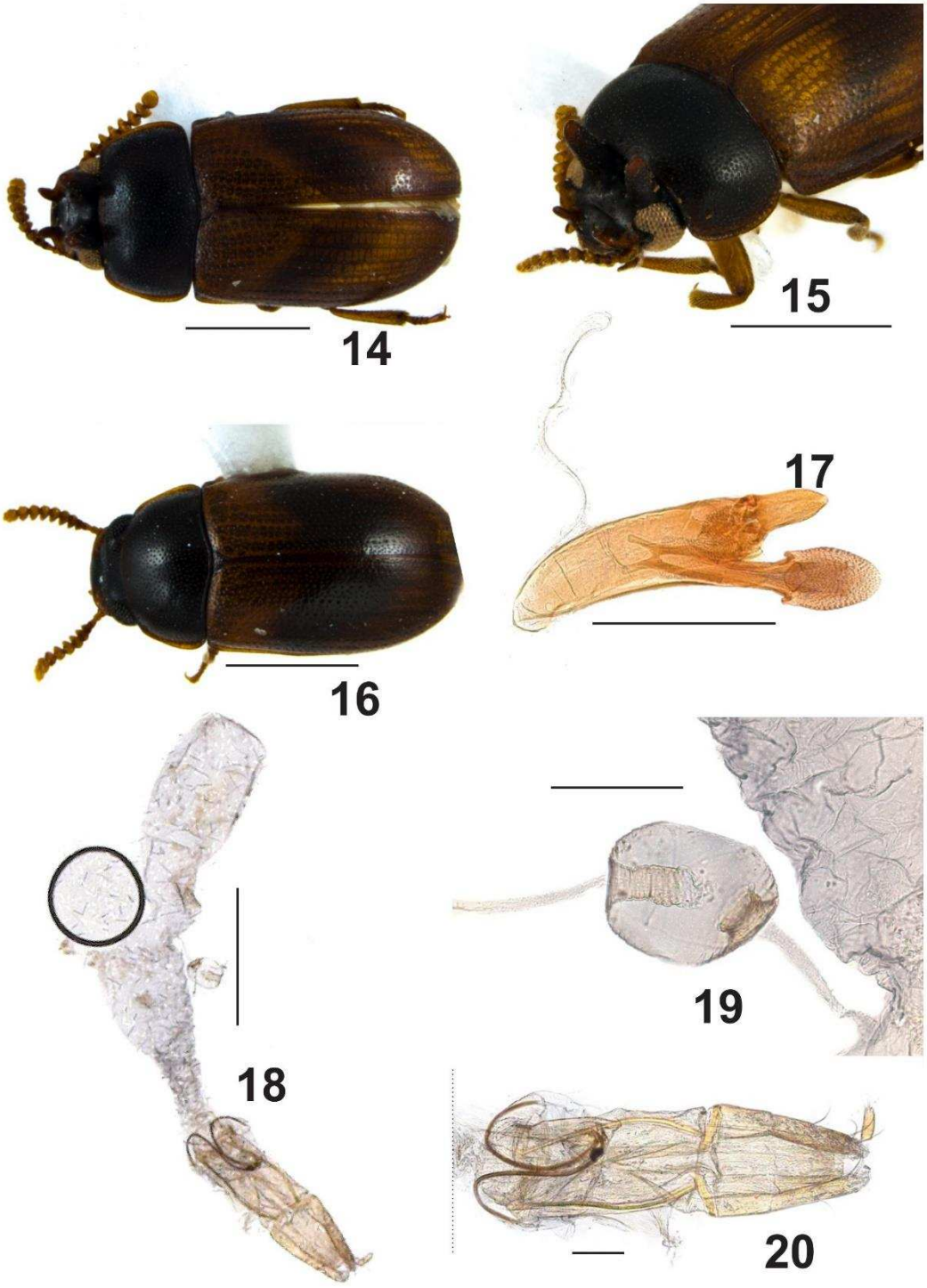
Figures 1–4. Morphological types of ovipositors. **1** Type 1 (*Neomida distans*) **2** Type 2 (*Neomida divergicornis*) **3** Type 3 (*Neomida deltocera*) **4** Type 4 (*Neomida hoffmanseggi*). **ip** – internal protuberance of last gonocoxite. Scale bars: 0.5mm.



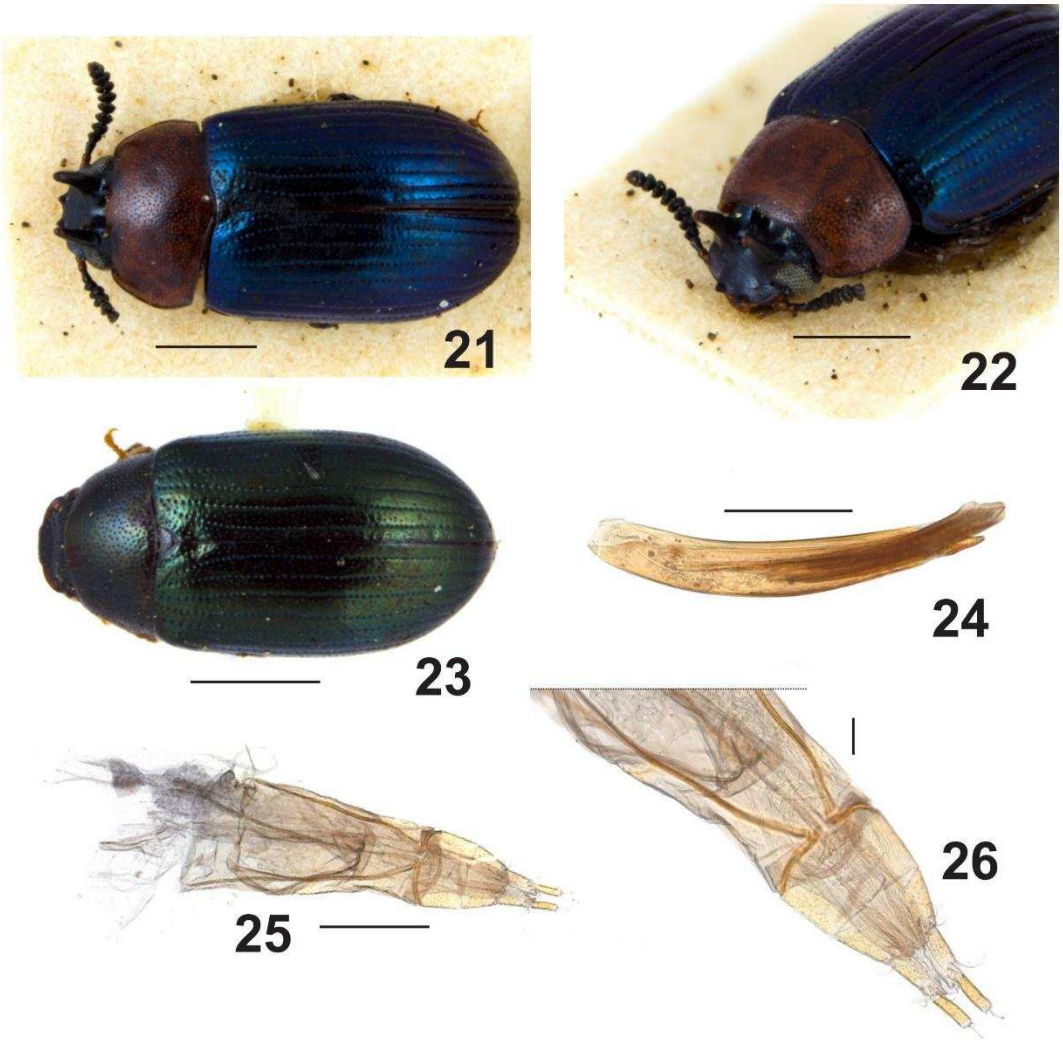
Figures 5–7. *Neomida acera* male. **5** Dorsal view **6** Diagonal view of head **7** Aedeagus. Scale bar: 1mm (Figs. 5–6); 0.5mm (Fig. 7).



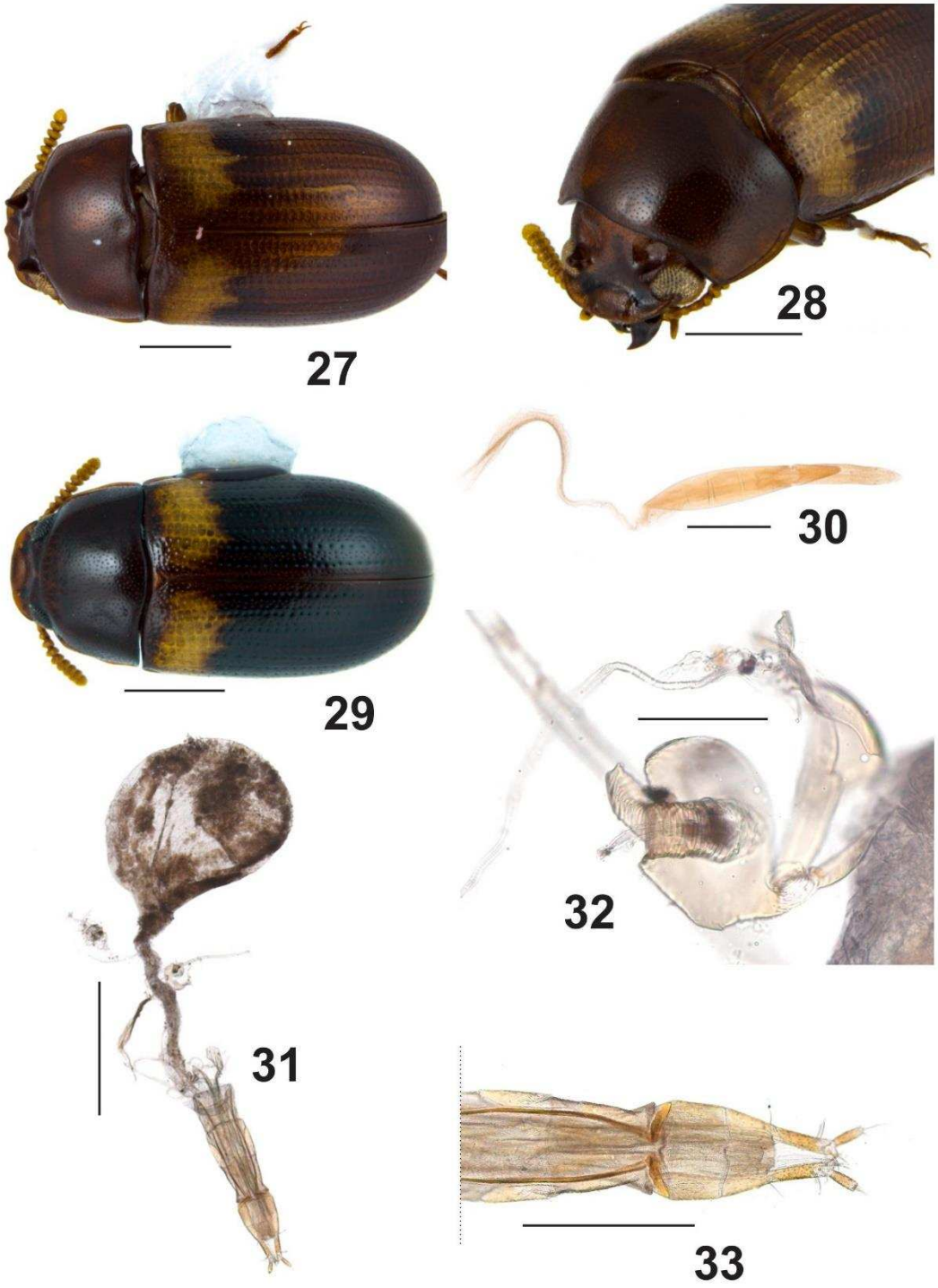
Figures 8–13. *Neomida aeneipennis*. **8** Dorsal view of male **9** Diagonal view of male's head **10** Dorsal view of female **11** Aedeagus **12** Female abdominal terminalia **13** Ovipositor. Scale bar: 1mm (Figs. 8–10); 0.5mm (Figs. 11–12); 0.1mm (Fig. 13).



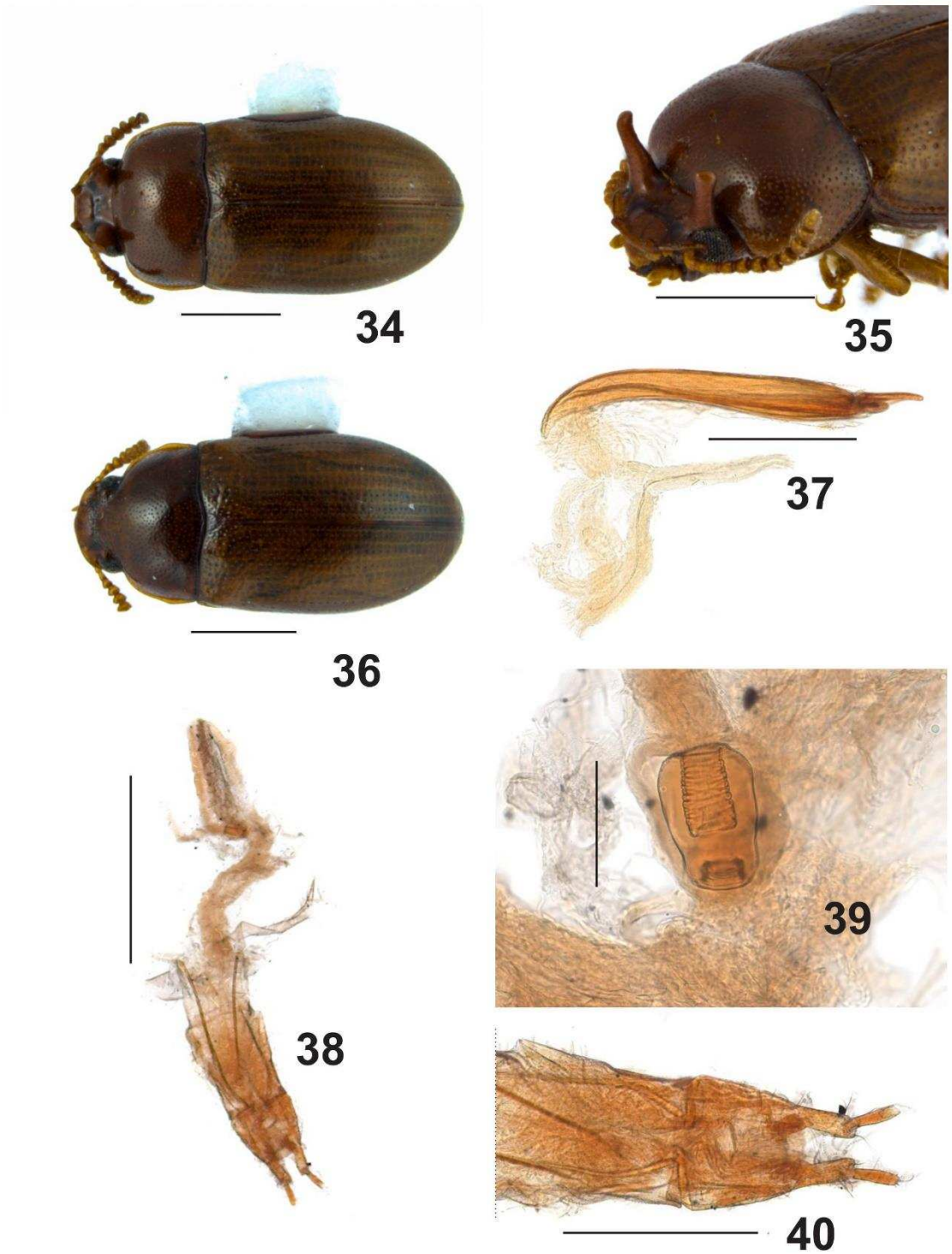
Figures 14–20. *Neomida atricollis.* **14** Dorsal view of male **15** Diagonal view of male head **16** Dorsal view of female **17** Aedeagus **18** Female abdominal terminalia **19** Check valve of spermatheca **20** Ovipositor. Scale bar: 1mm (Figs. 14–16); 0.5mm (Figs. 17–18); 0.1mm (Figs. 19–20).



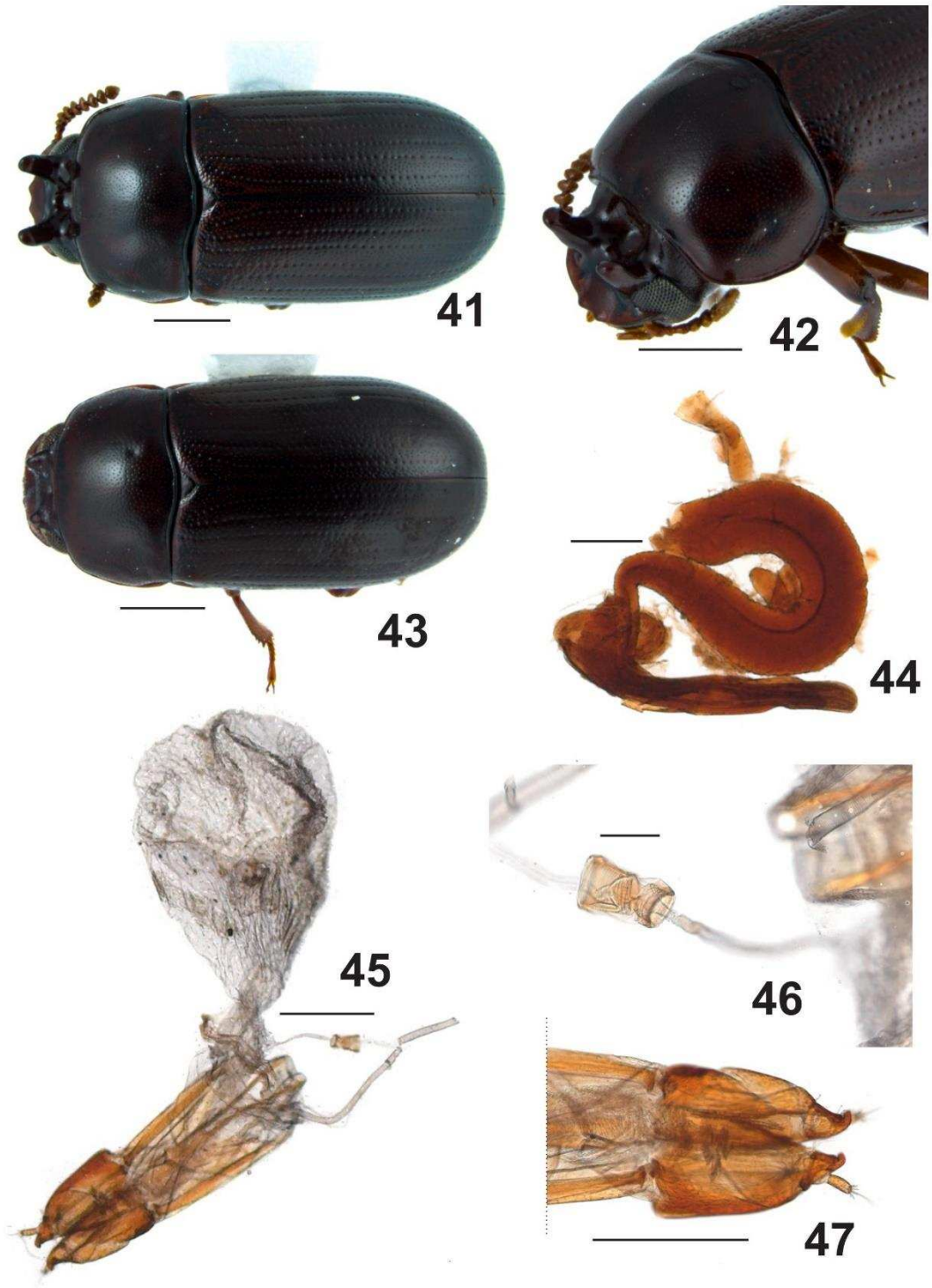
Figures 21–26. *Neomida bicornis.* **21** Dorsal view of male **22** Diagonal view of male head **23** Dorsal view of female **24** Aedeagus **25** Female abdominal terminalia **26** Ovipositor. Scale bar: 1mm (Figs. 21–23); 0.5mm (Figs. 24–25); 0.1mm (Fig. 26).



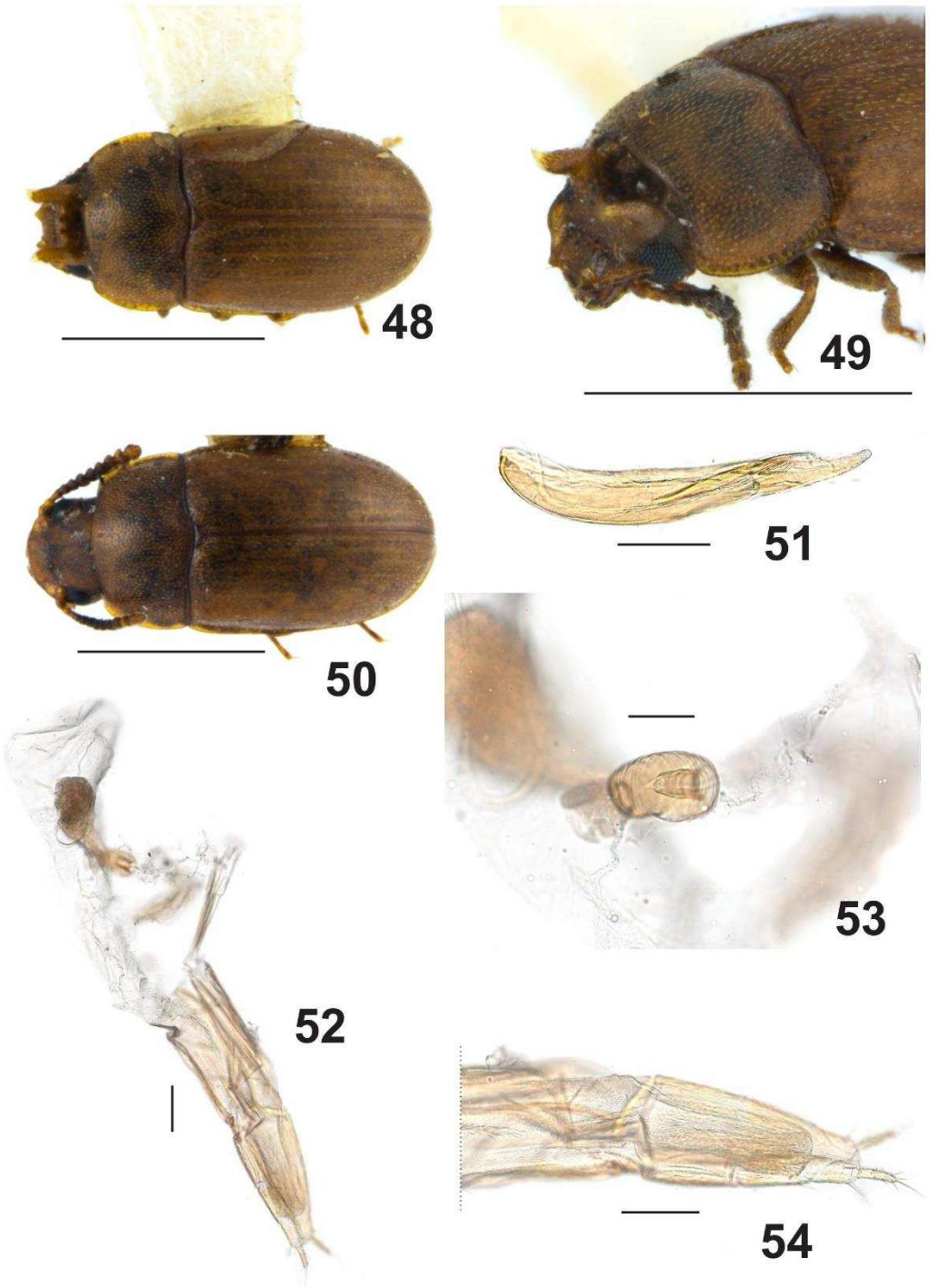
Figures 27–33. *Neomida bimaculata* **sp.n.**. **27** Dorsal view of male **28** Diagonal view of male head **29** Dorsal view of female **30** Aedeagus **31** Female abdominal terminalia **32** Check valve of spermatheca **33** Ovipositor. Scale bar: 1mm (Figs. 27–29, 31); 0.5mm (Figs. 30, 33); 0.1mm (Fig. 32).



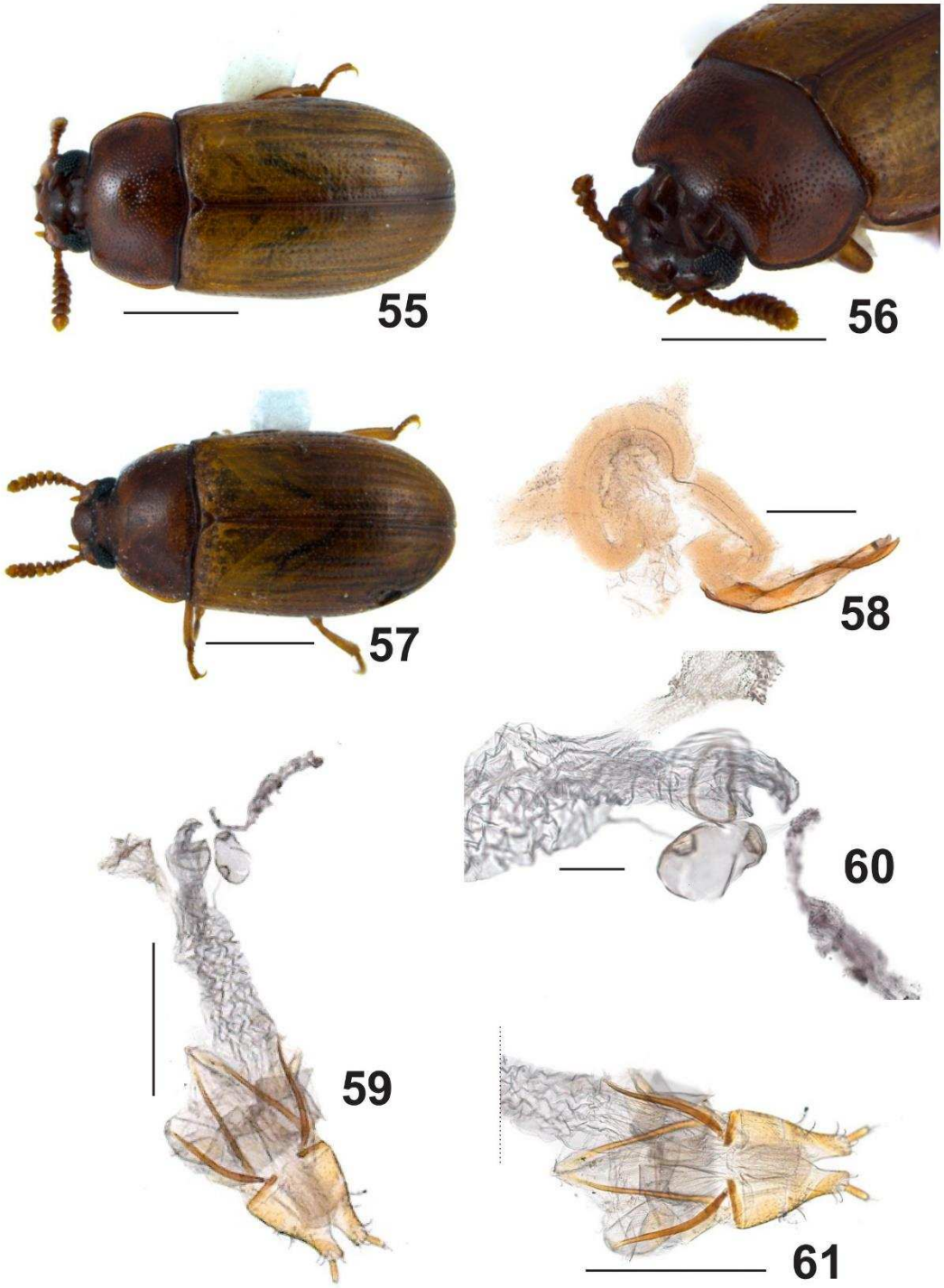
Figures 34–40. *Neomida capixaba* **sp.n.**. **34** Dorsal view of male **35** Diagonal view of male head **36** Dorsal view of female **37** Aedeagus **38** Female abdominal terminalia **39** Check valve of spermatheca **40** Ovipositor. Scale bar: 1mm (Figs. 34–36, 38); 0.5mm (Figs. 37, 40); 0.1mm (Fig. 39).



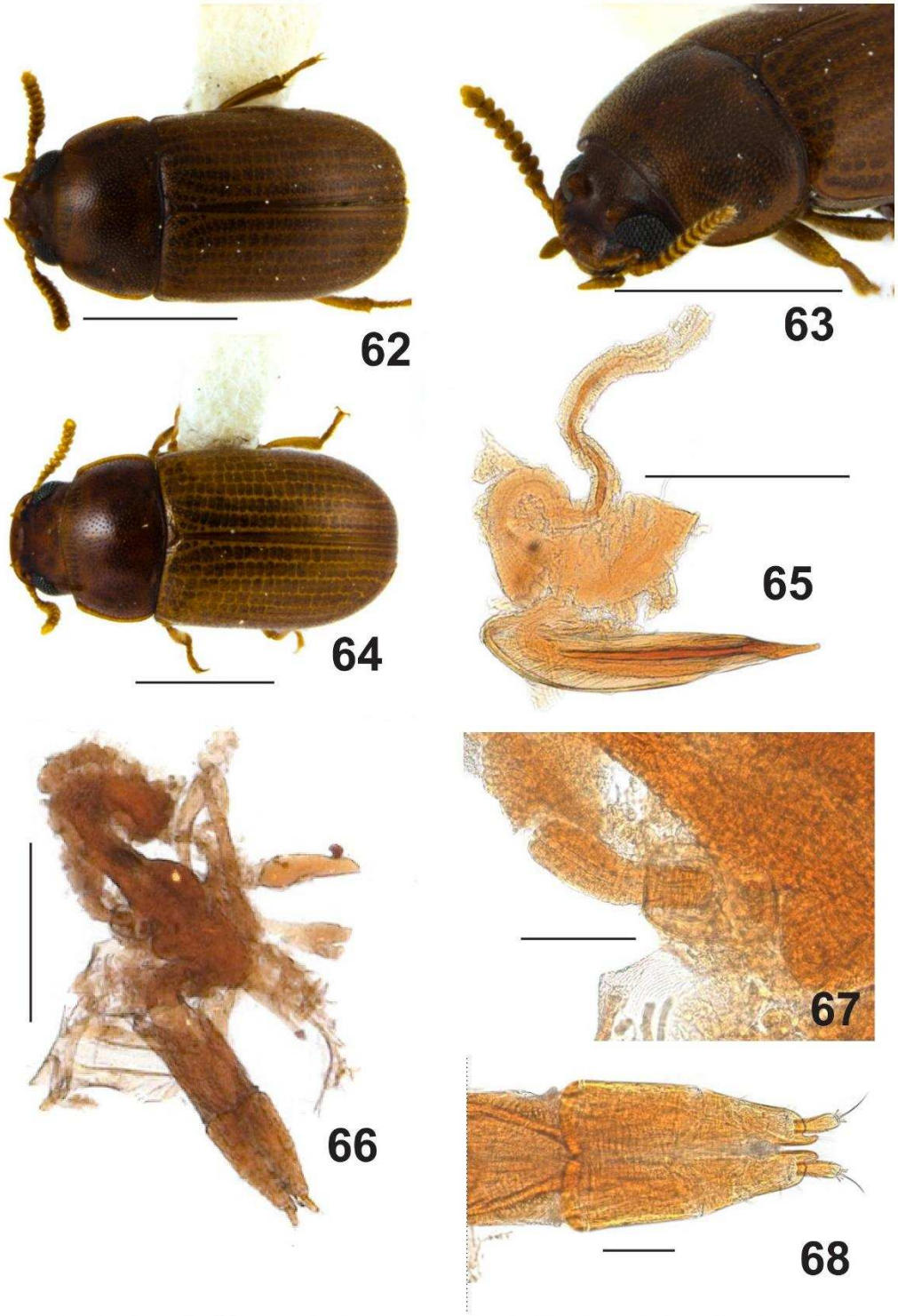
Figures 41–47. *Neomida castanea.* **41** Dorsal view of male **42** Diagonal view of male head **43** Dorsal view of female **44** Aedeagus **45** Female abdominal terminalia **46** Check valve of spermatheca **47** Ovipositor. Scale bar: 1mm (Figs. 41–43); 0.5mm (Figs. 44–45, 47); 0.1mm (Fig. 46).



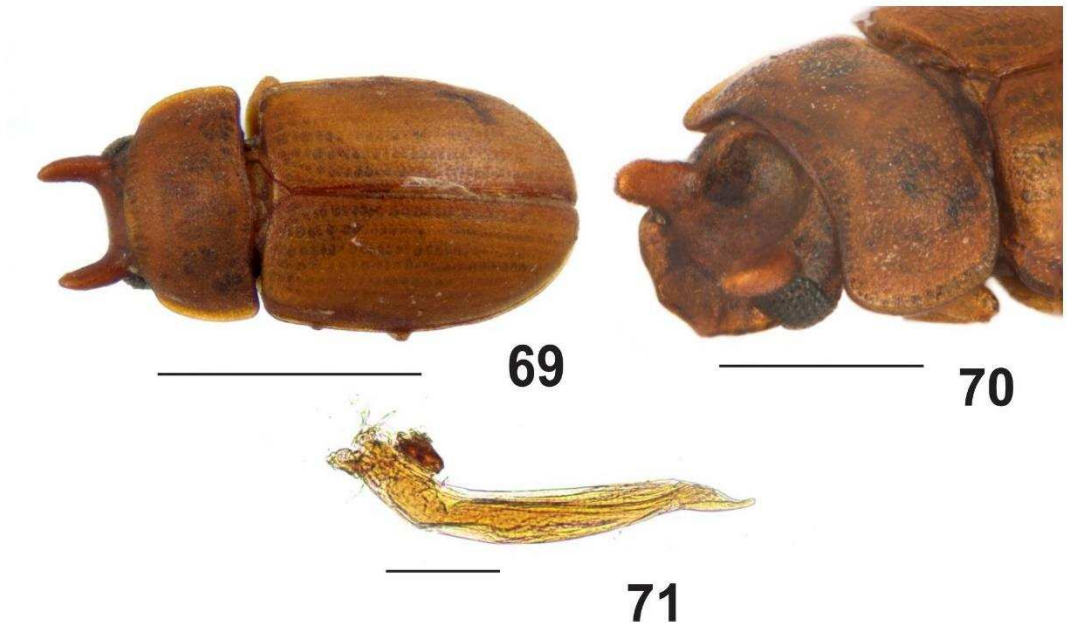
Figures 48–54. *Neomida cioides.* **48** Dorsal view of male **49** Diagonal view of male head **50** Dorsal view of female **51** Aedeagus **52** Female abdominal terminalia **53** Check valve of spermatheca **54** Ovipositor. Scale bar: 1mm (Figs. 48–50); 0.1mm (Figs. 51–52, 54); 0.05mm (Fig. 53).



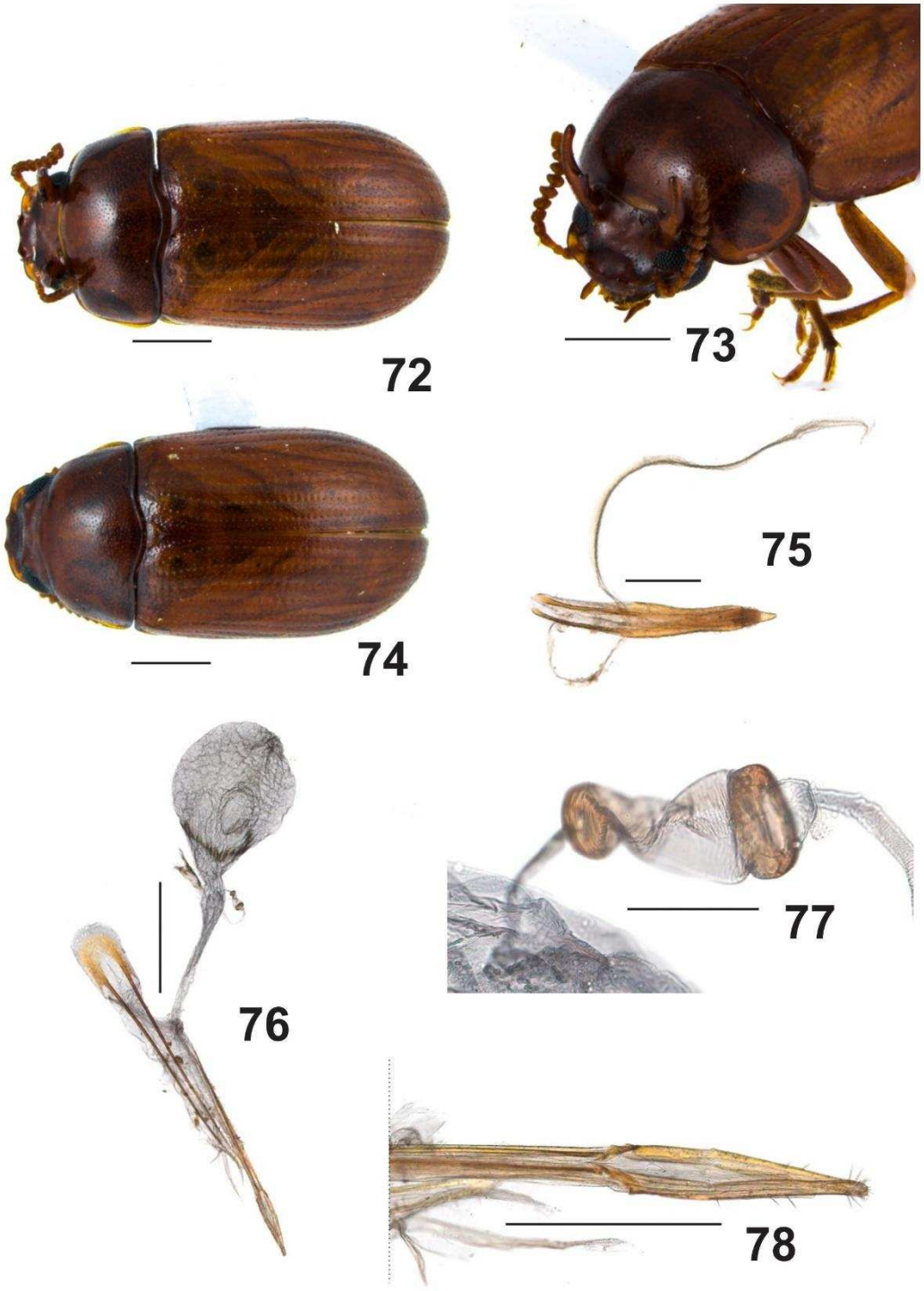
Figures 55–61. *Neomida clavicornis*. **55** Dorsal view of male **56** Diagonal view of male head **57** Dorsal view of female **58** Aedeagus **59** Female abdominal terminalia **60** Check valve of spermatheca **61** Ovipositor. Scale bar: 1mm (Figs. 55–57); 0.5mm (Figs. 58–59, 61); 0.1mm (Fig. 60).



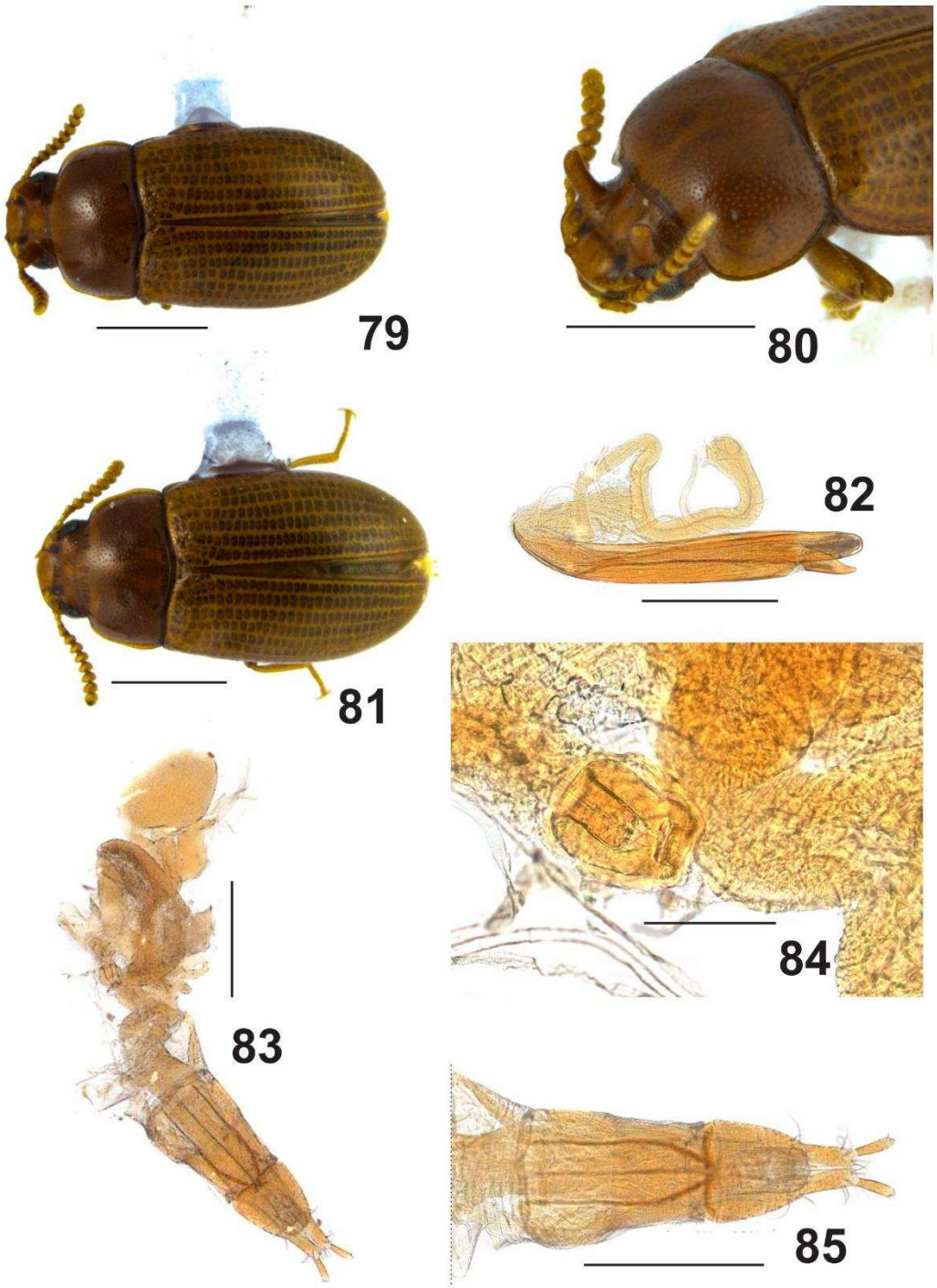
Figures 62–68. *Neomida deltocera.* **62** Dorsal view of male **63** Diagonal view of male head **64** Dorsal view of female **65** Aedeagus **66** Female abdominal terminalia **67** Check valve of spermatheca **68** Ovipositor. Scale bar: 1mm (Figs. 62–64); 0.5mm (Figs. 65–66); 0.1mm (Figs. 67–68).



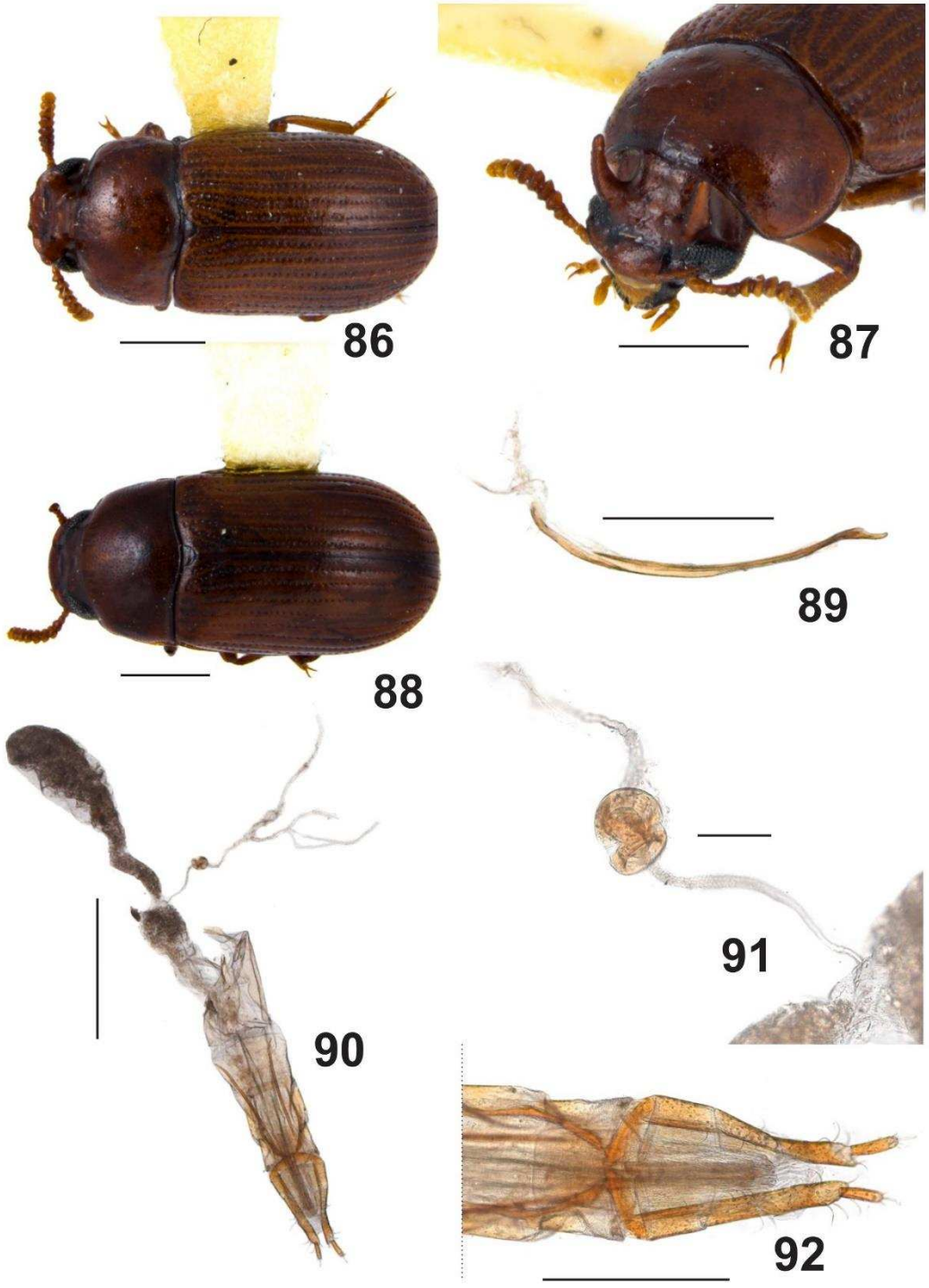
Figures 69–71. *Neomida diminuta.* **69** Dorsal view of male **70** Diagonal view of male head **71** Aedeagus. Scale bar: 1mm (Figs. 69–70); 0.1mm (Fig. 71).



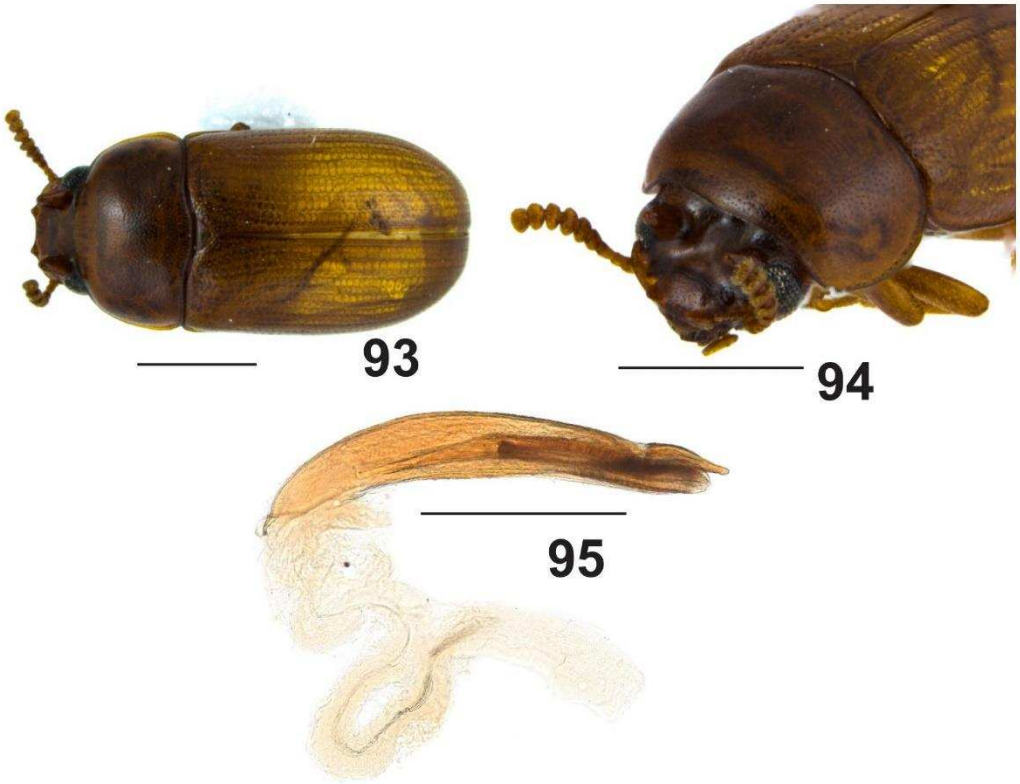
Figures 72–78. *Neomida distans.* **72** Dorsal view of male **73** Diagonal view of male head **74** Dorsal view of female **75** Aedeagus **76** Female abdominal terminalia **77** Check valve of spermatheca **78** Ovipositor. Scale bar: 1mm (Figs. 72–74, 76); 0.5mm (Figs. 75, 78); 0.1mm (Fig. 77).



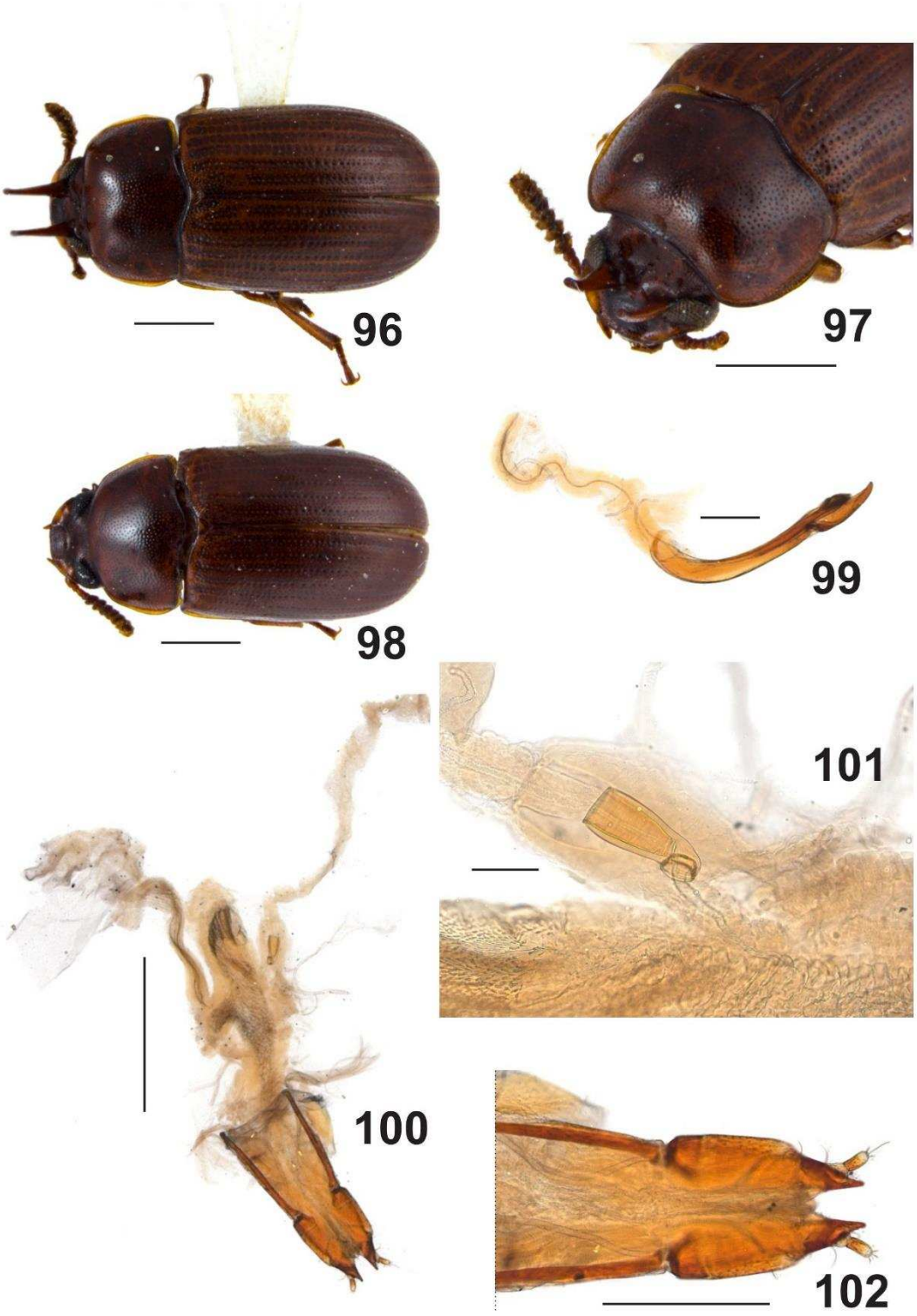
Figures 79–85. *Neomida divergicornis.* **79** Dorsal view of male **80** Diagonal view of male head **81** Dorsal view of female **82** Aedeagus **83** Female abdominal terminalia **84** Check valve of spermatheca **85** Ovipositor. Scale bar: 1mm (Figs. 79–81); 0.5mm (Figs. 82–83, 85); 0.1mm (Fig. 84).



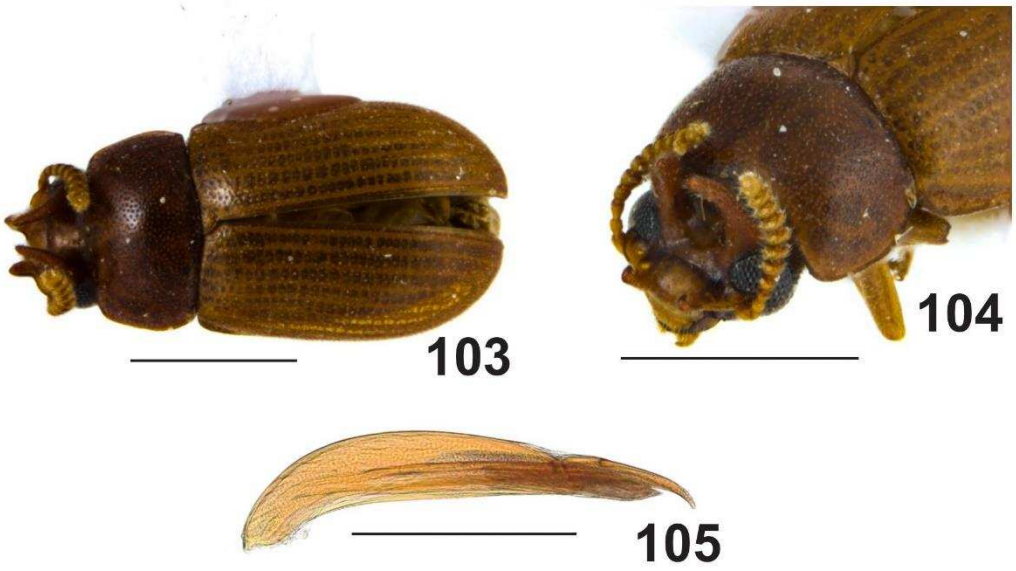
Figures 86–92. *Neomida ferruginea.* **86** Dorsal view of male **87** Diagonal view of male head **88** Dorsal view of female **89** Aedeagus **90** Female abdominal terminalia **91** Check valve of spermatheca **92** Ovipositor. Scale bar: 1mm (Figs. 86–90); 0.5mm (Fig. 91); 0.1mm (Fig. 92).



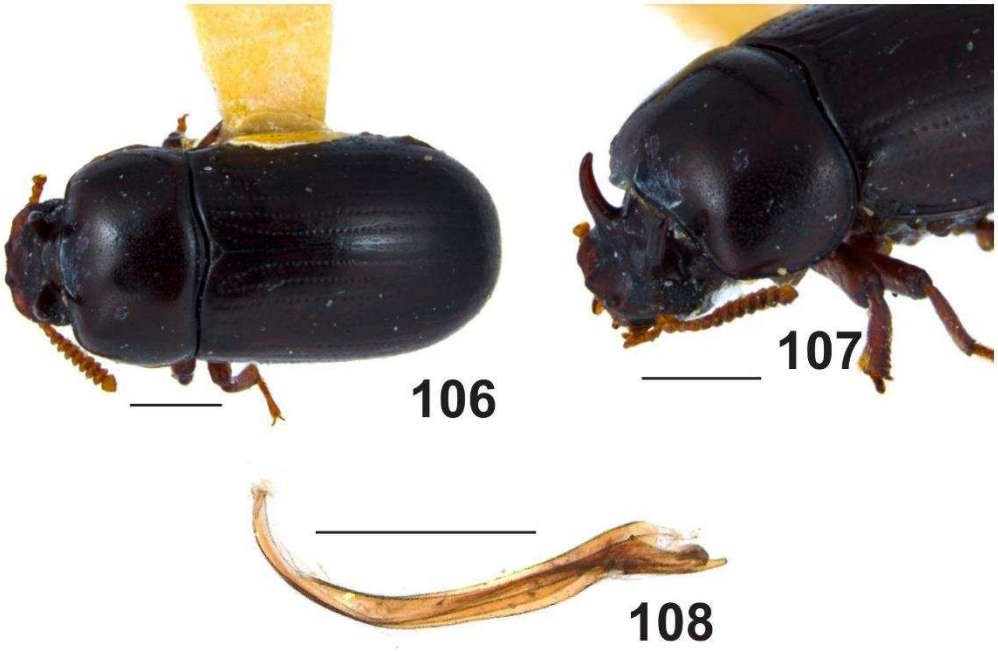
Figures 93–95. *Neomida grossii* **sp.n.**. **93** Dorsal view of male **94** Diagonal view of male head **95** Aedeagus. Scale bar: 1mm (Figs. 93–94); 0.5mm (Fig. 95).



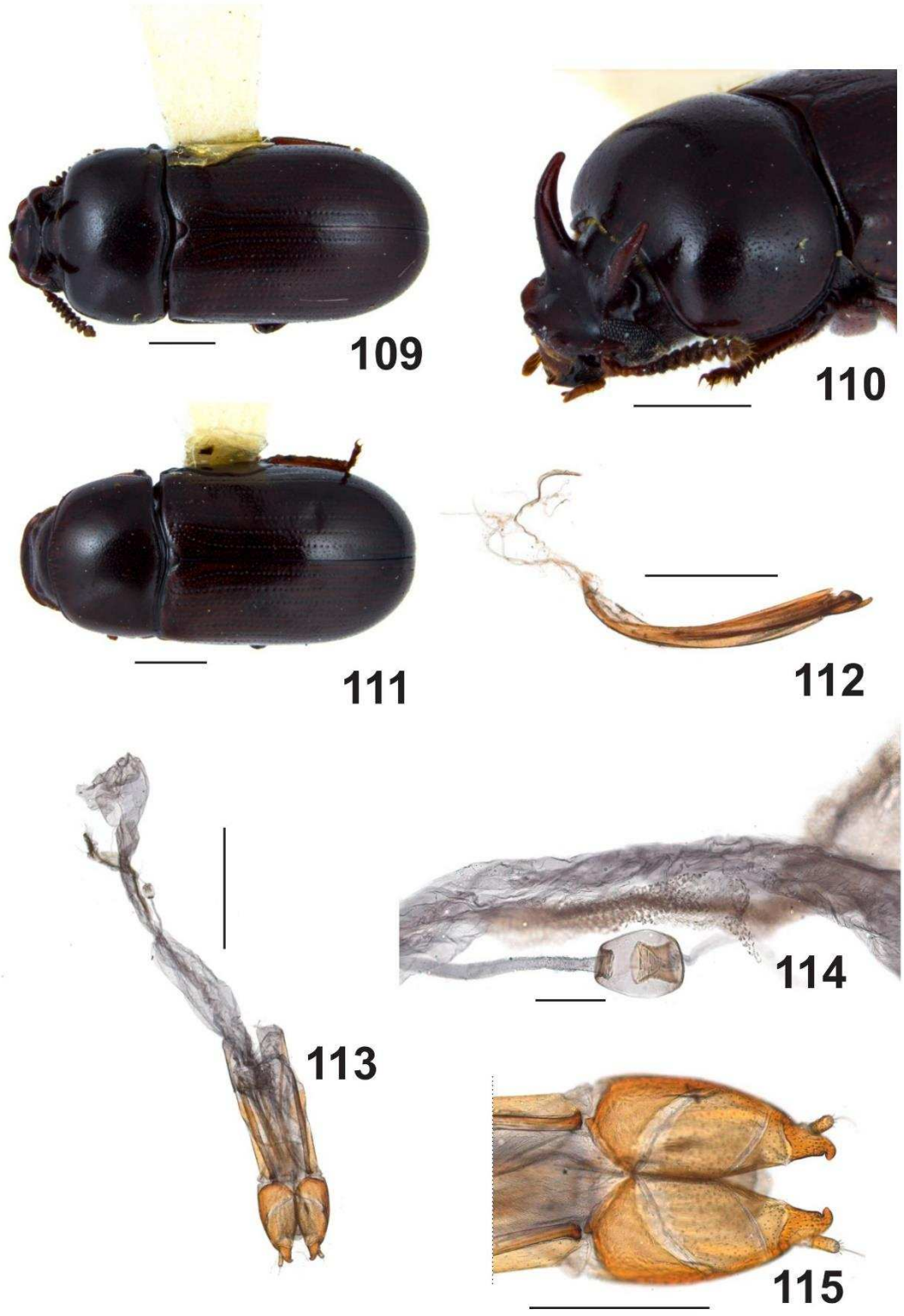
Figures 96–102. *Neomida hoffmanseggi.* **96** Dorsal view of male **97** Diagonal view of male head **98** Dorsal view of female **99** Aedeagus **100** Female abdominal terminalia **101** Check valve of spermatheca **102** Ovipositor. Scale bar: 1mm (Figs. 96–100); 0.5mm (Fig. 102); 0.1mm (Fig. 101).



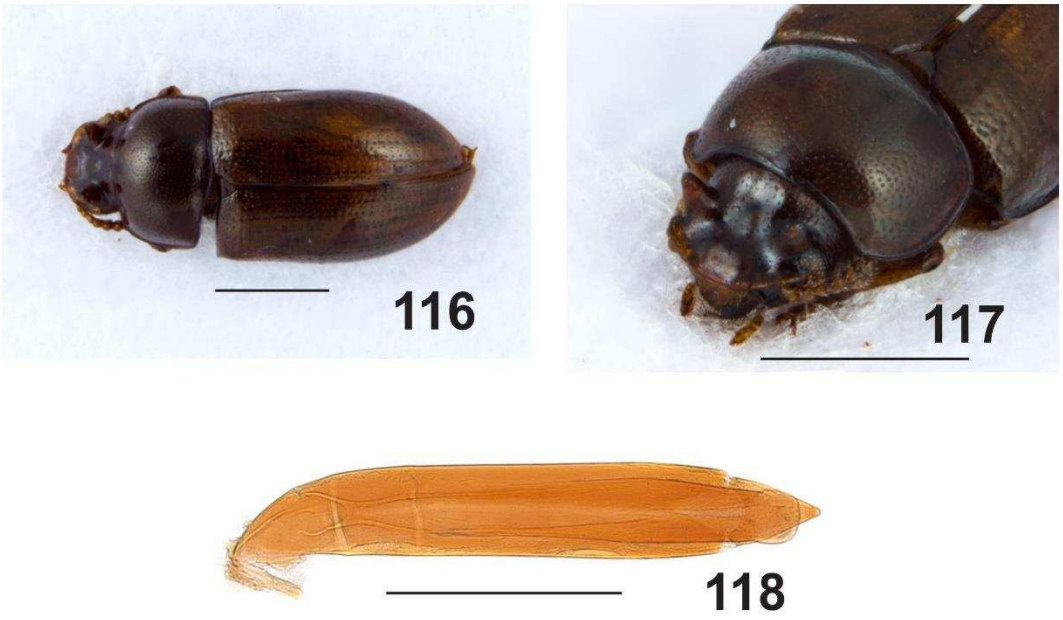
Figures 103–105 *Neomida inermis.* **103** Dorsal view of male **104** Diagonal view of male head **105** Aedeagus. Scale bar: 1mm (Figs. 103–104); 0.5mm (Fig. 105).



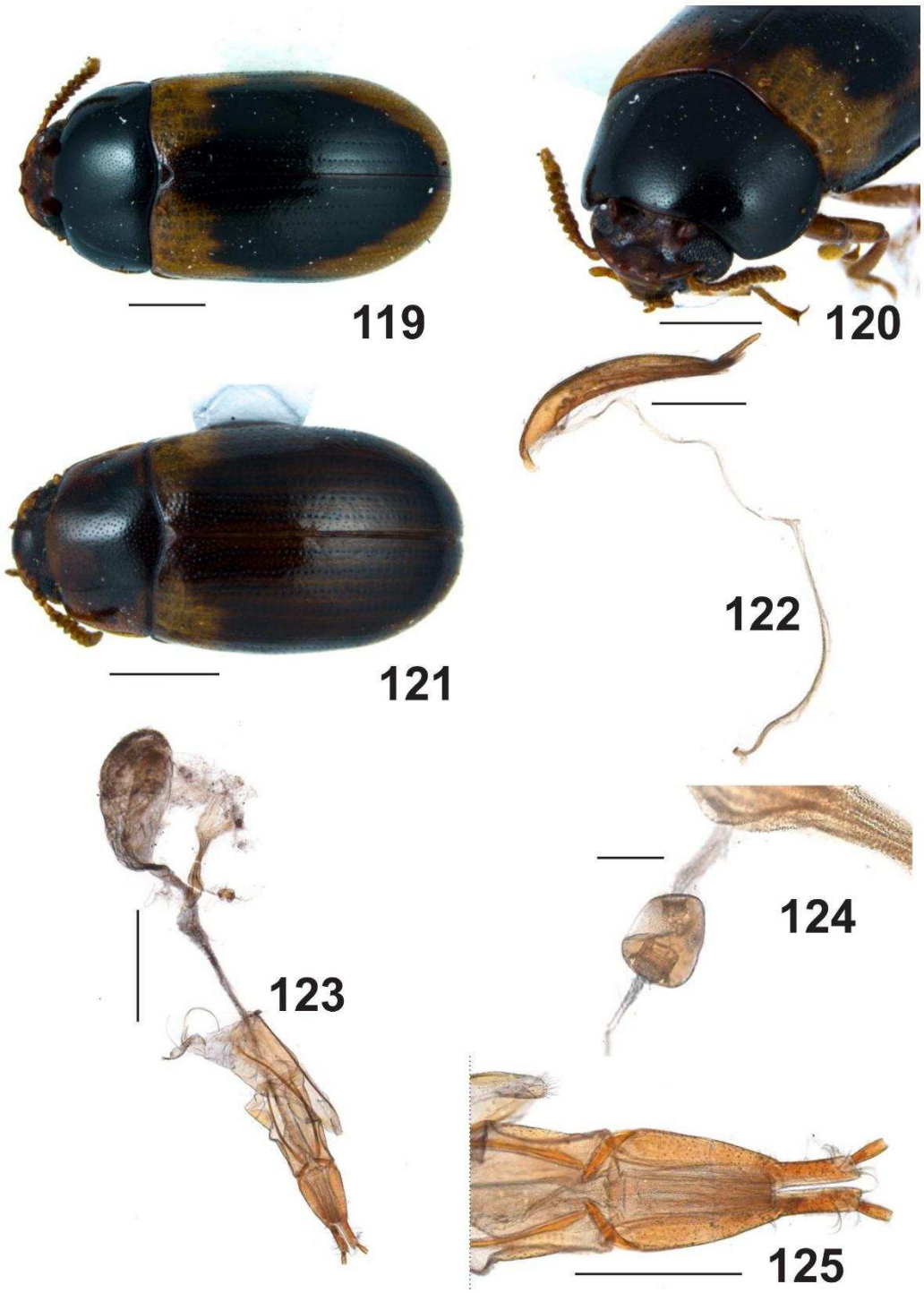
Figures 106–108. *Neomida lawrencei*, paratype. **106** Dorsal view of male **107** Diagonal view of male head **108** Aedeagus. Scale bar: 1mm.



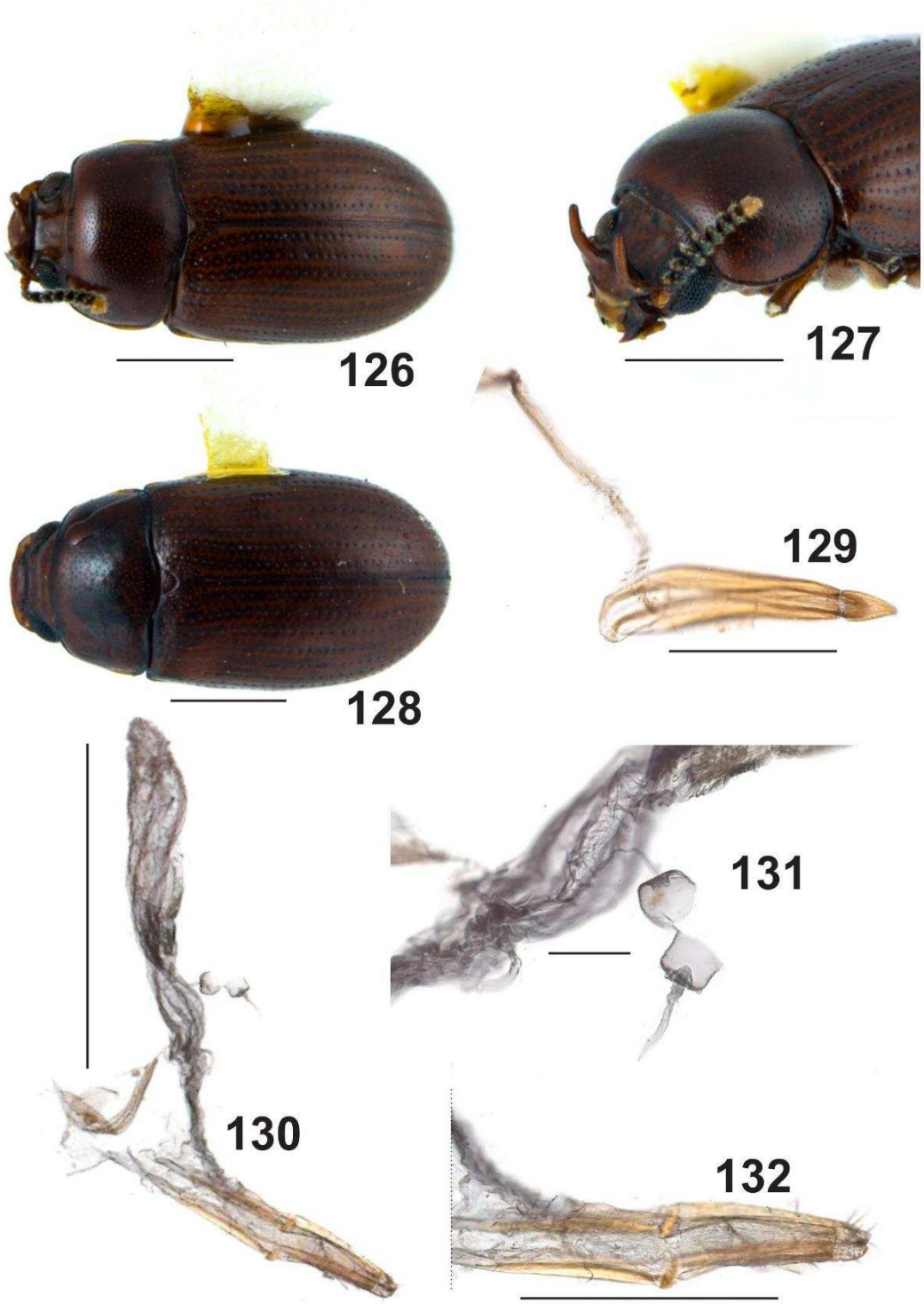
Figures 109–115. *Neomida lecontei.* **109** Dorsal view of male **110** Diagonal view of male head **111** Dorsal view of female **112** Aedeagus **113** Female abdominal terminalia **114** Check valve of spermatheca **115** Ovipositor. Scale bar: 1mm (Figs. 109–113); 0.5mm (Fig. 115); 0.1mm (Fig. 114).



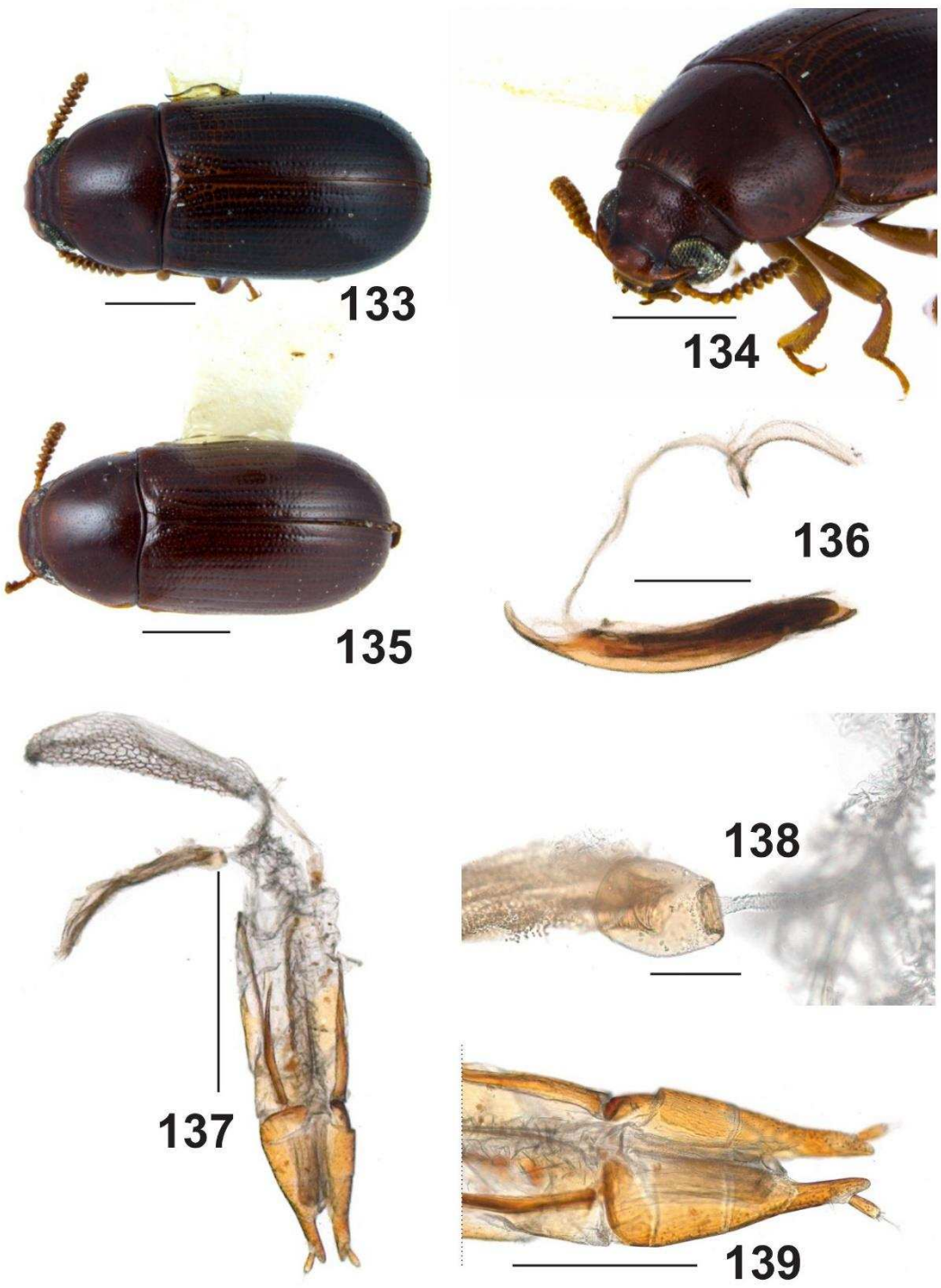
Figures 116–118. *Neomida luci* **sp.n.**. **116** Dorsal view of male **117** Diagonal view of male head **118** Aedeagus . Scale bar: 1mm (Figs. 116–117); 0.5mm (fig. 118).



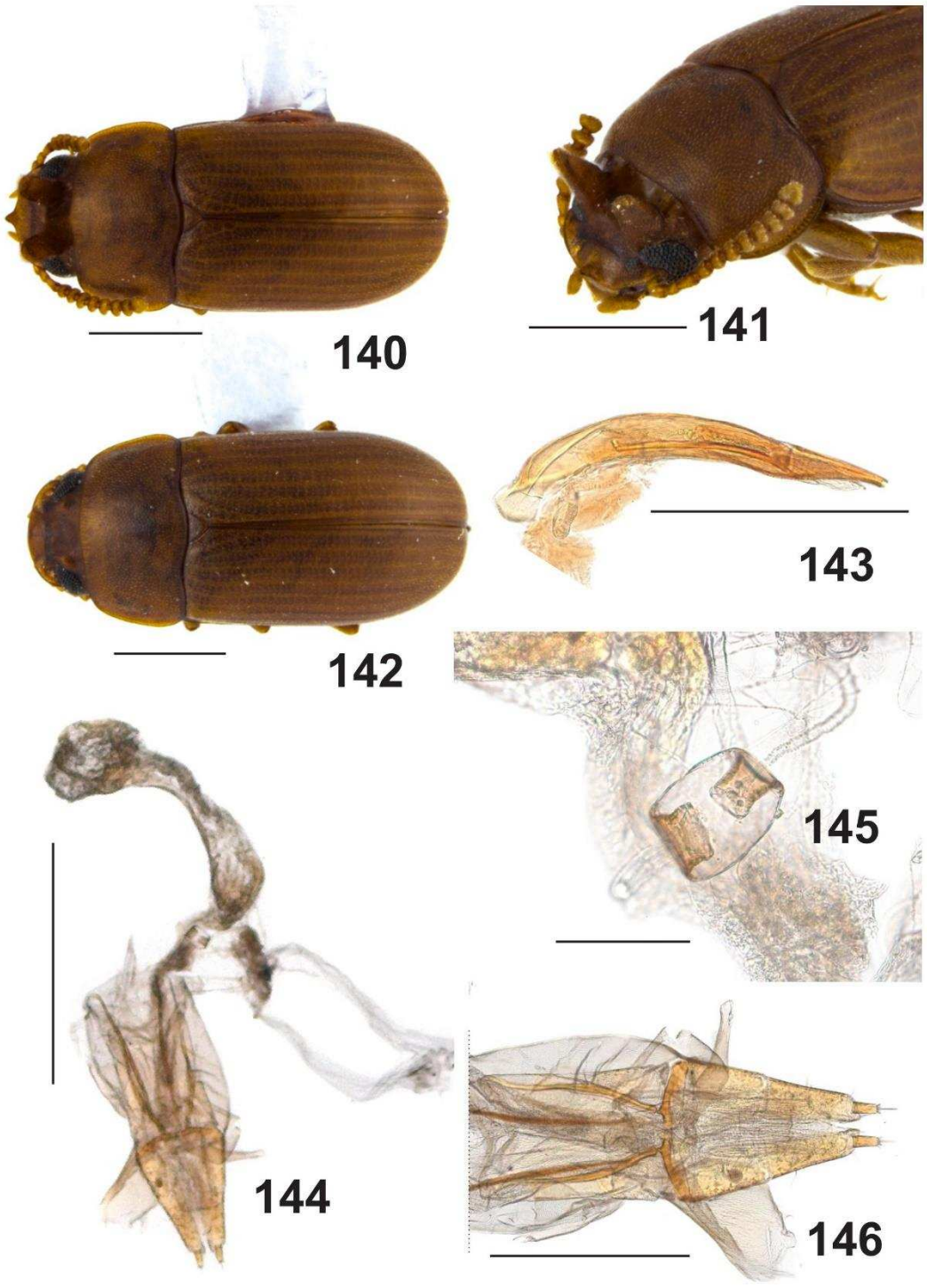
Figures 119–125. *Neomida luteonotata.* **119** Dorsal view of male **120** Diagonal view of male head **121** Dorsal view of female **122** Aedeagus **123** Female abdominal terminalia **124** Check valve of spermatheca **125** Ovipositor. Scale bar: 1mm (Figs. 119–121, 123); 0.5mm (Figs. 122, 125); 0.1mm (Fig. 124).



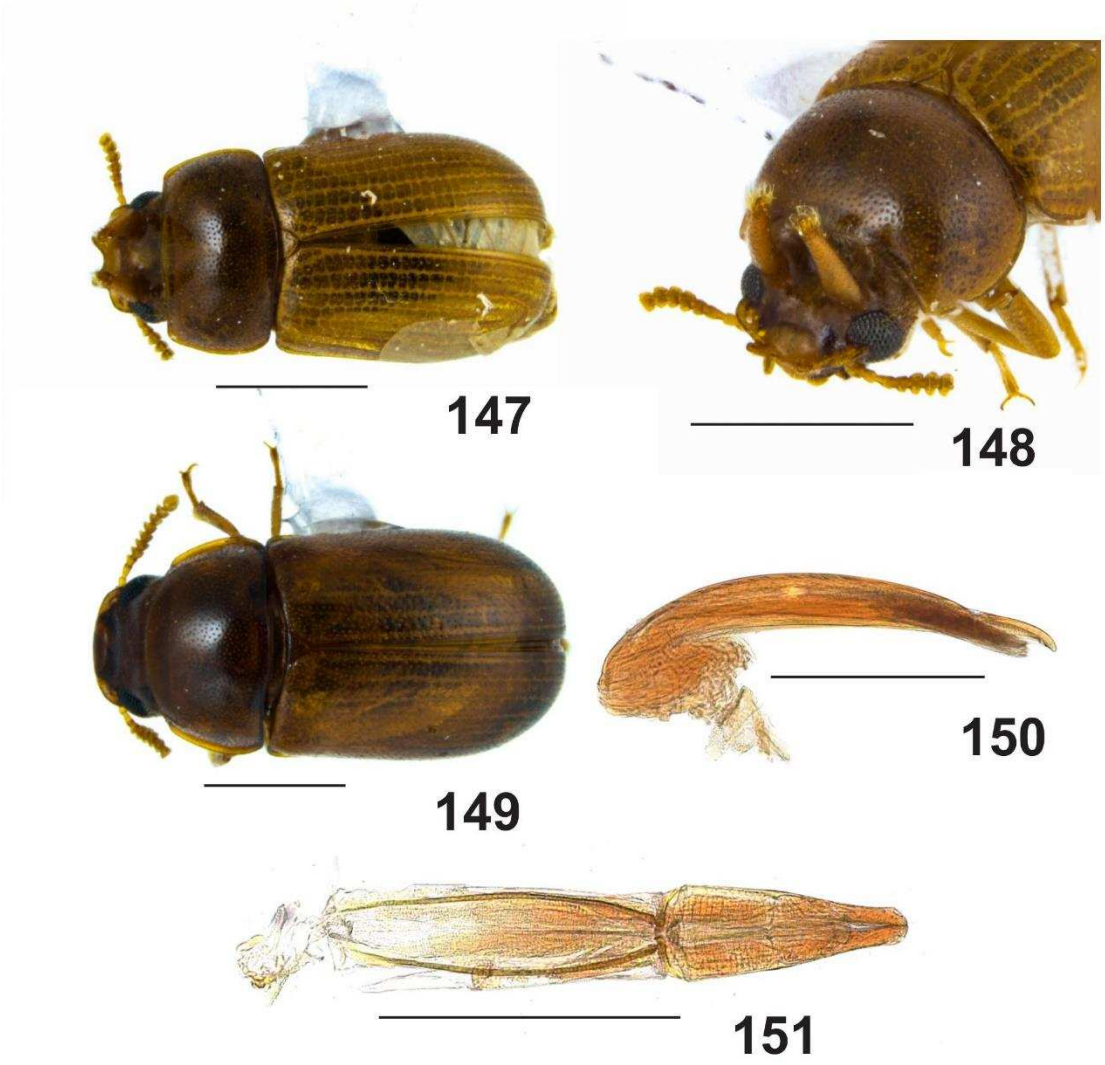
Figures 126–132. *Neomida nigricornis*. **126** Dorsal view of male **127** Diagonal view of male head **128** Dorsal view of female **129** Aedeagus **130** Female abdominal terminalia **131** Check valve of spermatheca **132** Ovipositor. Scale bar: 1mm (Fig. 126–128, 130); 0.5mm (Figs. 129, 132); 0.1mm (Fig. 131).



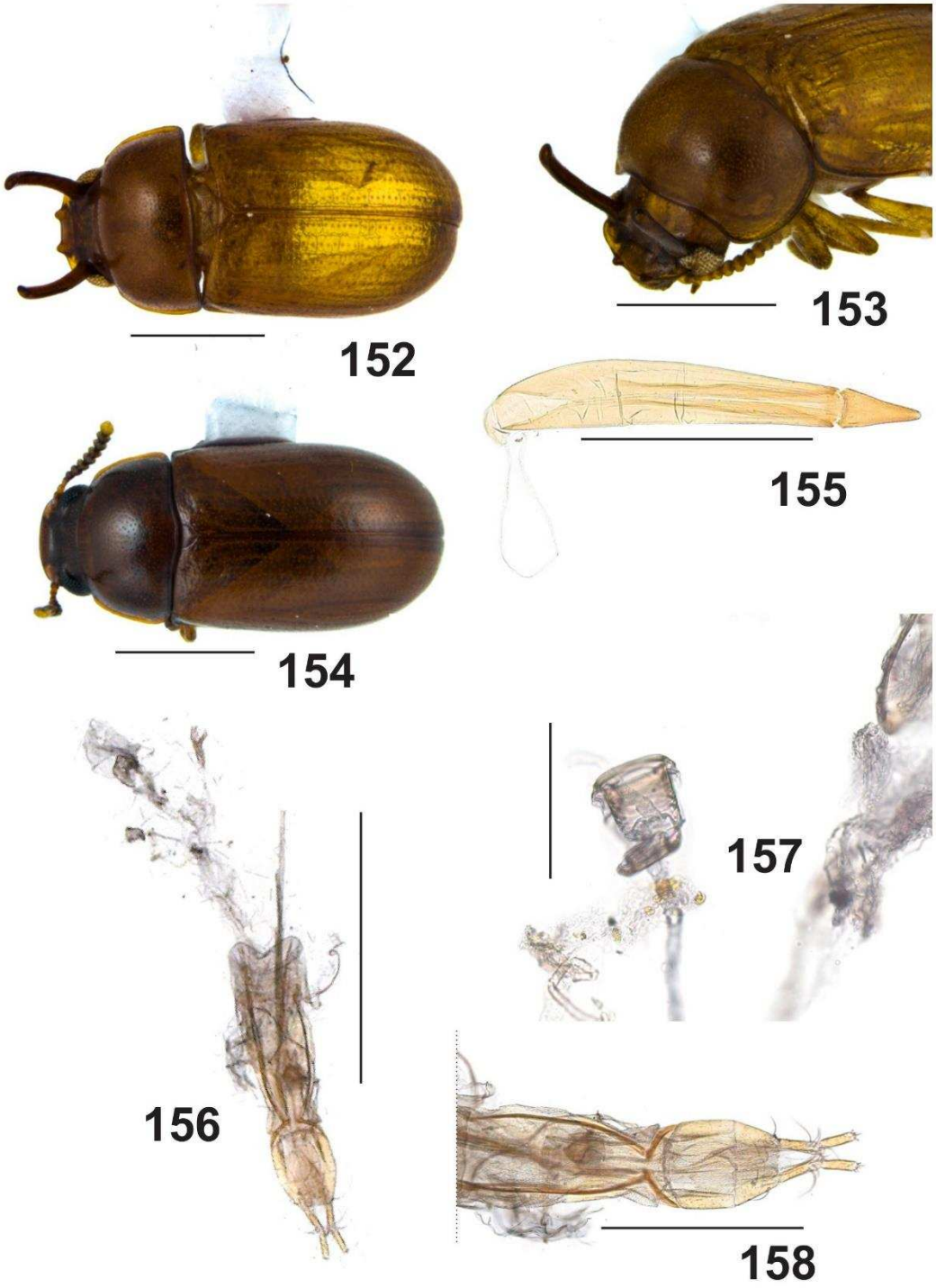
Figures 133–139. *Neomida obsoleta.* **133** Dorsal view of male **134** Diagonal view of male head **135** Dorsal view of female **136** Aedeagus **137** Female abdominal terminalia **138** Check valve of spermatheca **139** Ovipositor. Scale bar: 1mm (Figs. 133–135, 137); 0.5mm (Figs. 136, 139); 0.1mm (Fig. 138).



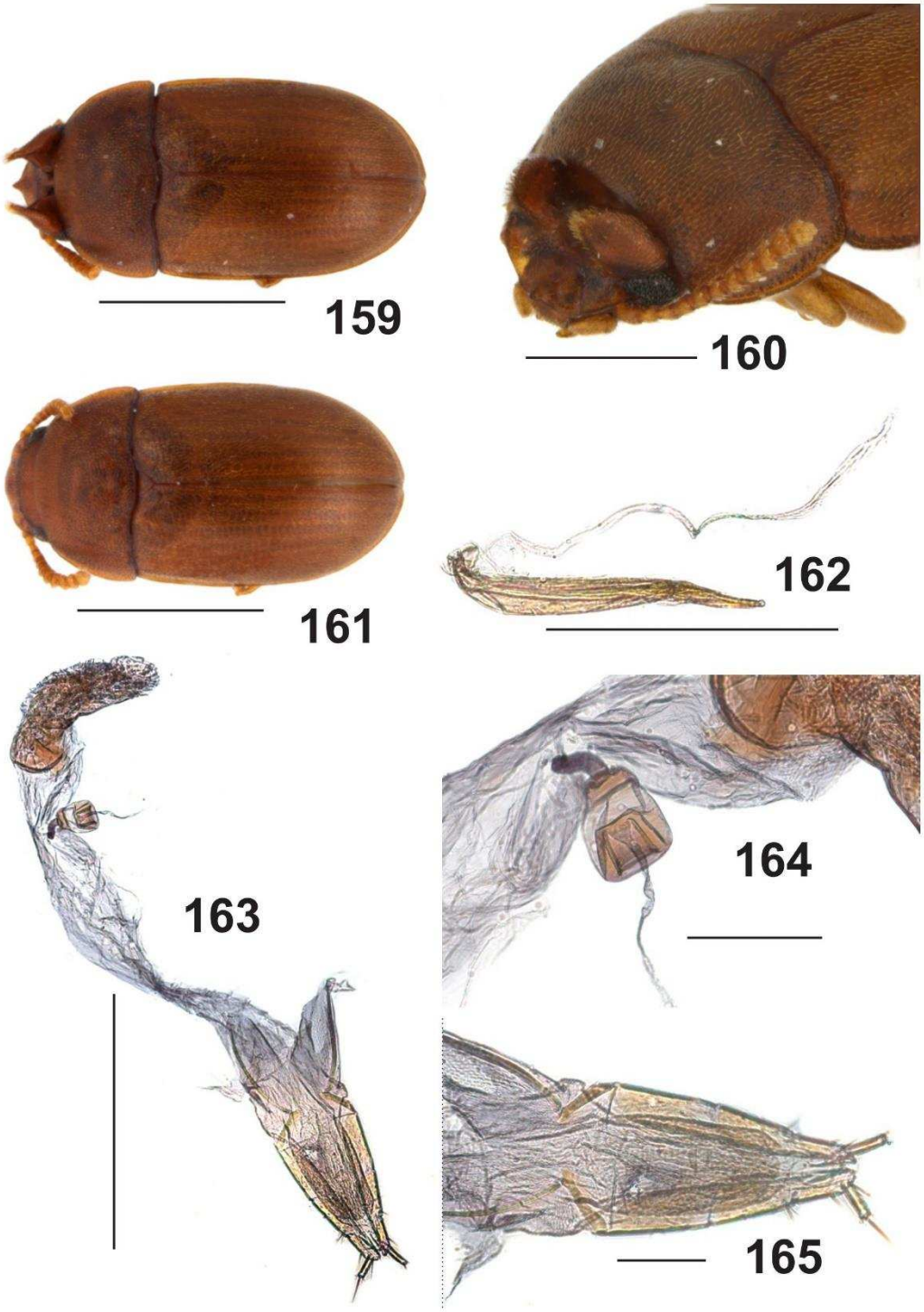
Figures 140–146. *Neomida picea.* **140** Dorsal view of male **141** Diagonal view of male head **142** Dorsal view of female **143** Aedeagus **144** Female abdominal terminalia **145** Check valve of spermatheca **146** Ovipositor. Scale bar: 1mm (Figs. 140–142, 144); 0.5mm (Figs. 143, 146); 0.1mm (Fig. 145).



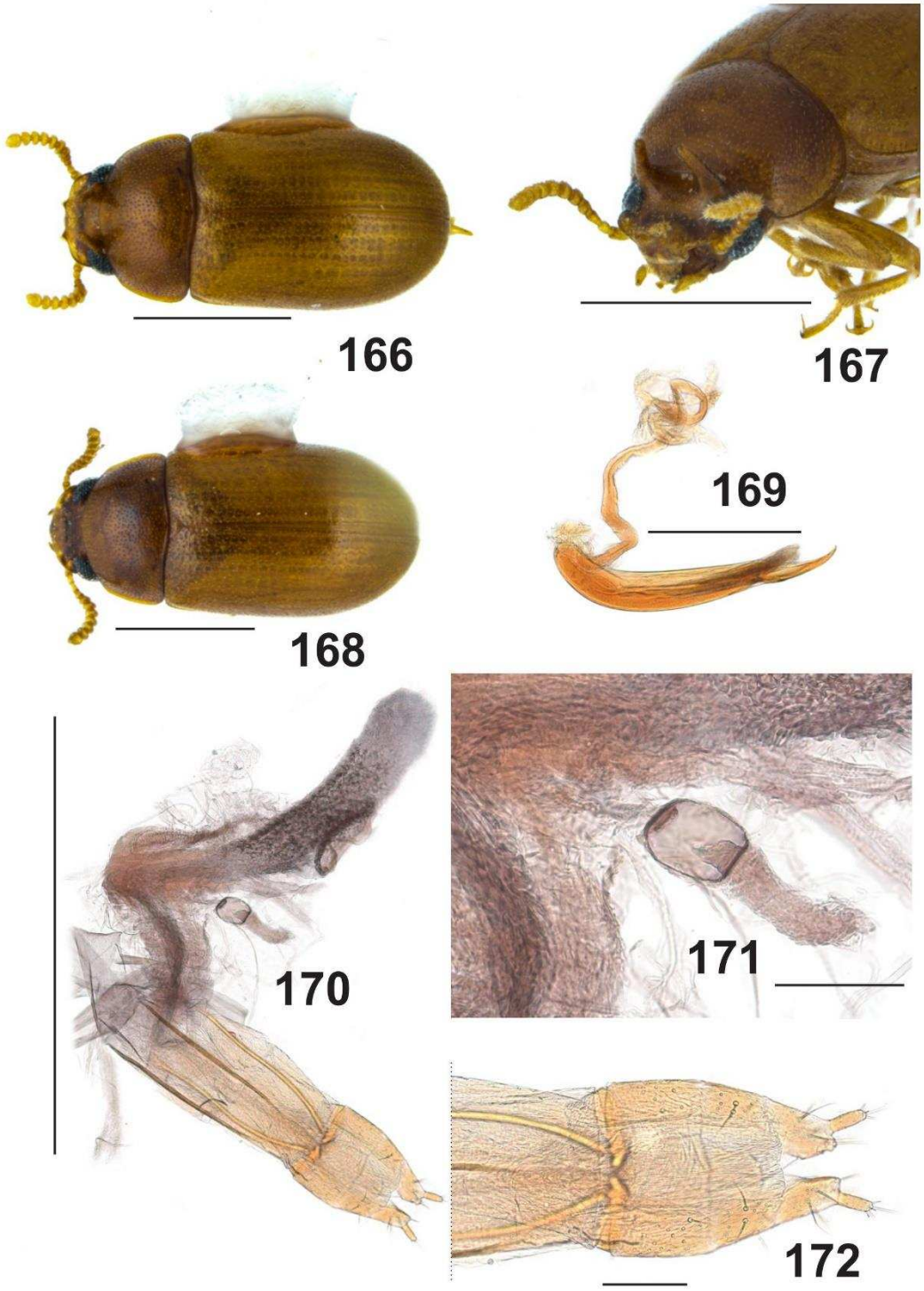
Figures 147–151. *Neomida pogonocera.* **147** Dorsal view of male **148** Diagonal view of male head **149** Dorsal view of female **150** Aedeagus **151** Ovipositor. Scale bar: 1mm (Figs. 147–149); 0.5mm (Figs. 150–151).



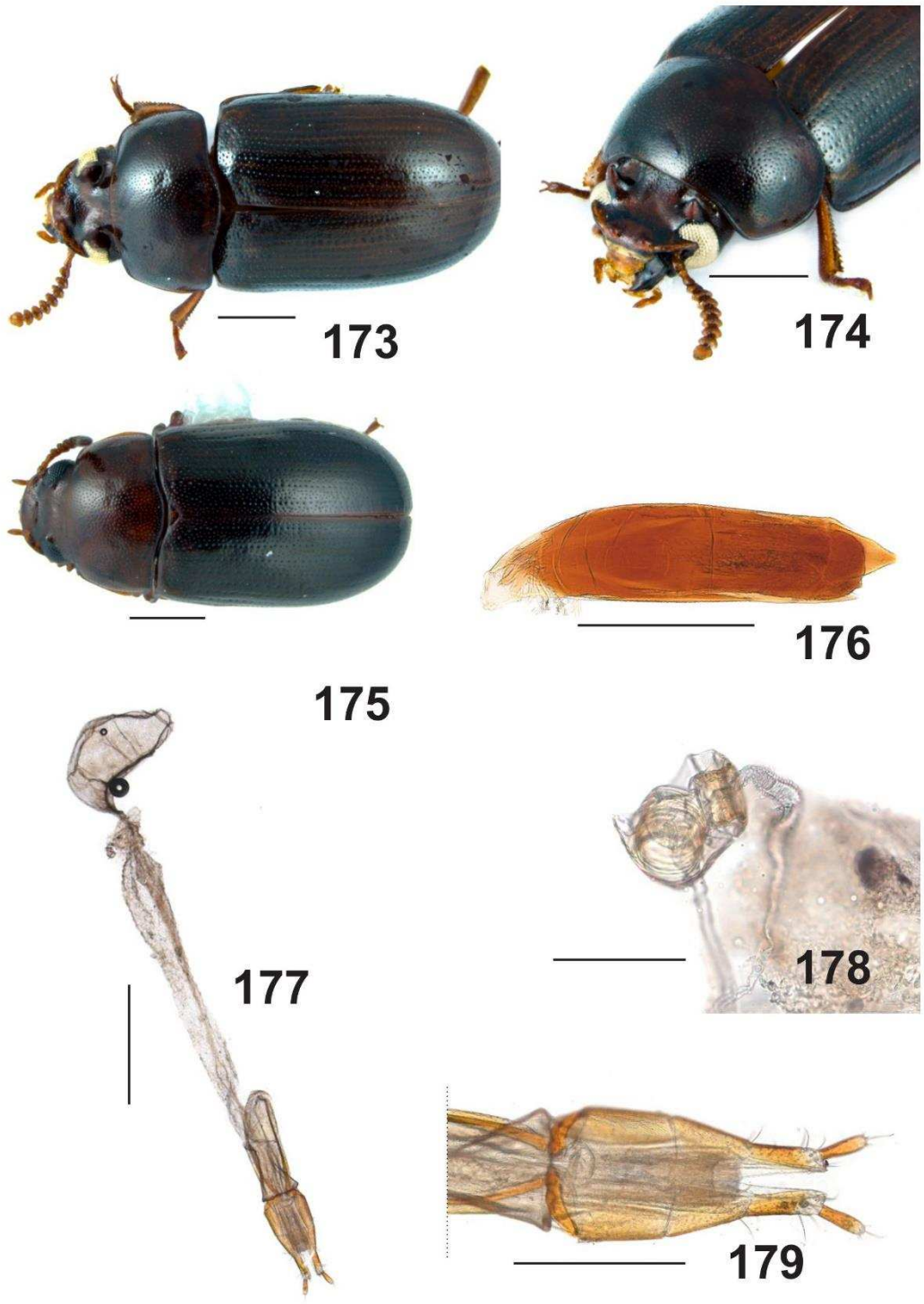
Figures 152–158. *Neomida samurai* **sp.n.**. **152** Dorsal view of male **153** Diagonal view of male head **154** Dorsal view of female **155** Aedeagus **156** Female abdominal terminalia **157** Check valve of spermatheca **158** Ovipositor. Scale bar: 1mm (Figs. 152–154, 156); 0.5mm (Figs. 155. 158); 0.1mm (Fig. 157).



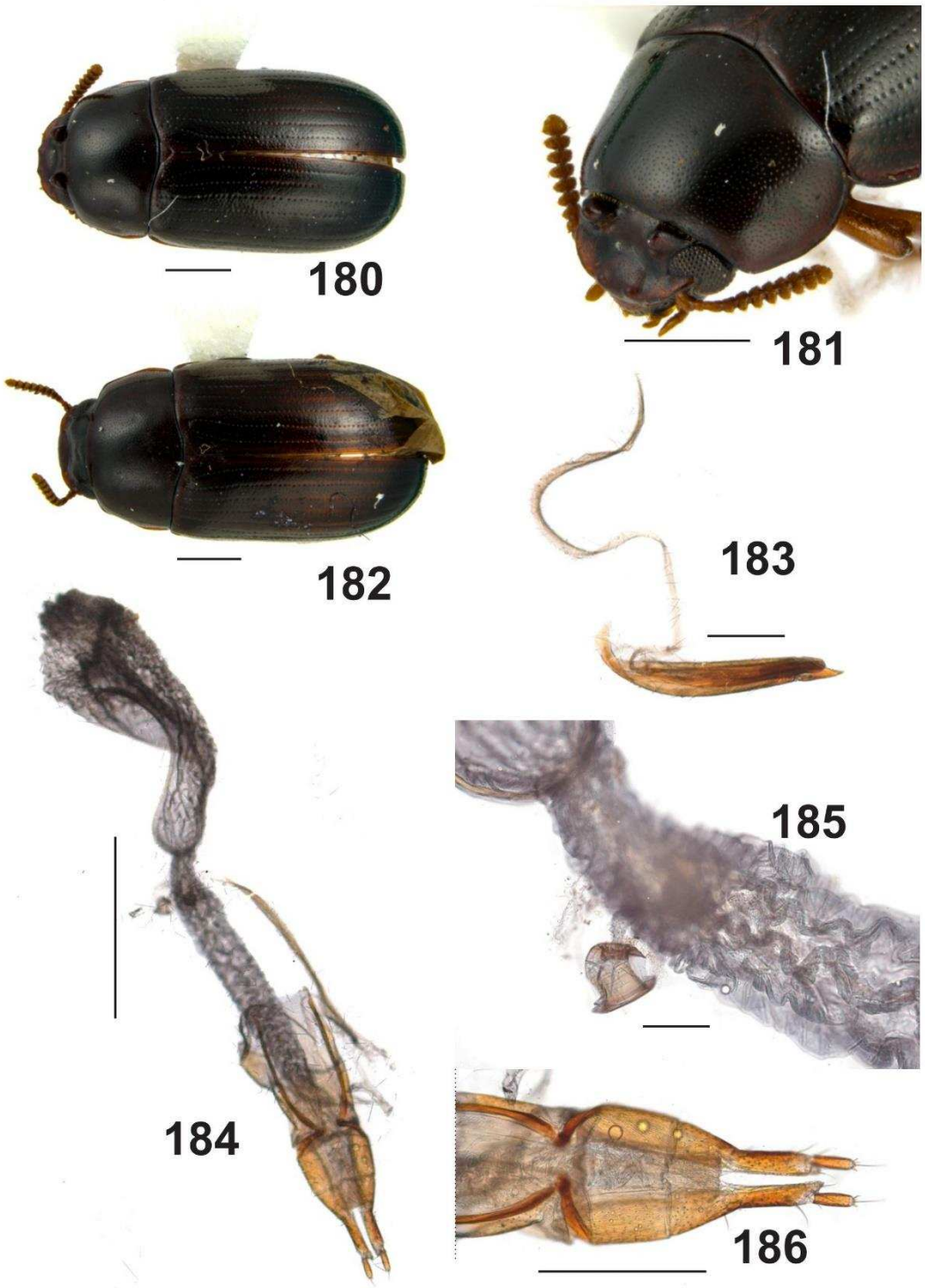
Figures 159–165. *Neomida suilla.* **159** Dorsal view of male **160** Diagonal view of male head **161** Dorsal view of female **162** Aedeagus **163** Female abdominal terminalia **164** Check valve of spermatheca **165** Ovipositor. Scale bar: 1mm (Figs. 159–161); 0.5mm (Figs. 162–163); 0.1mm (Figs. 164–165).



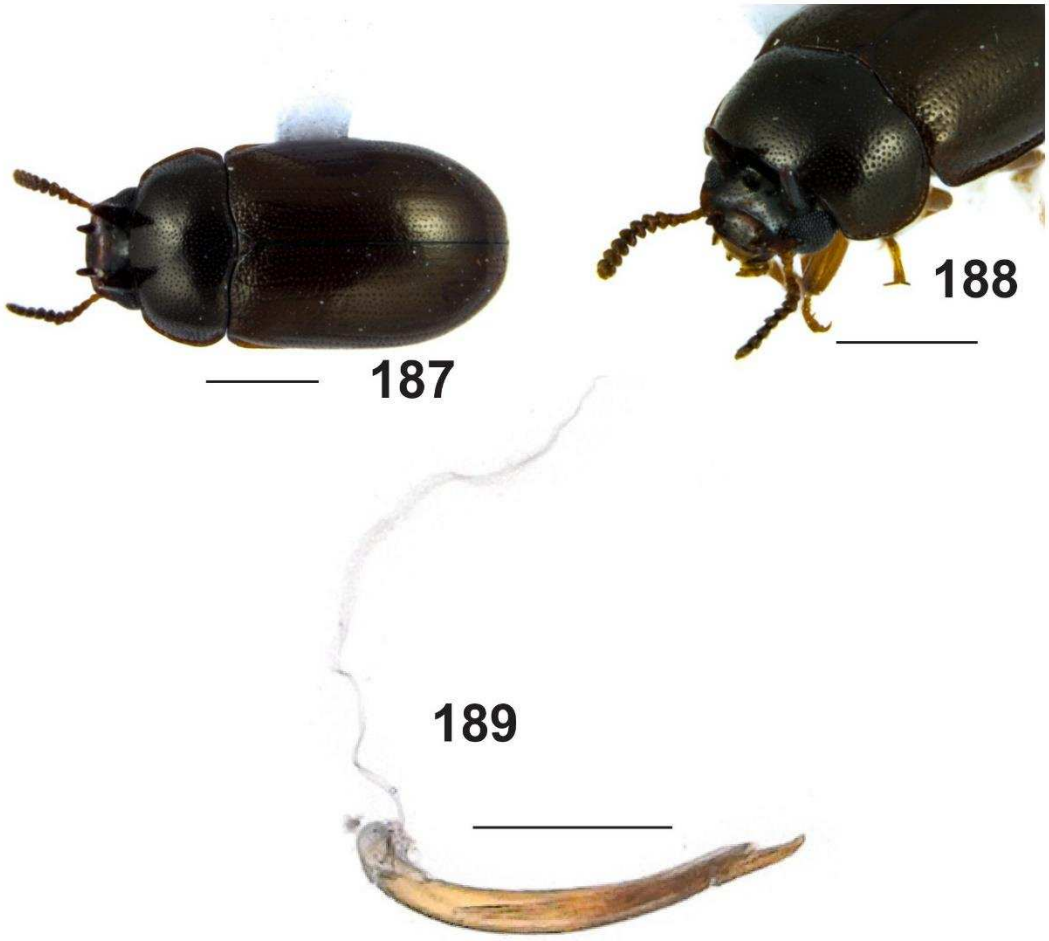
Figures 166–172. *Neomida triplehorni* **sp.n.**. **166** Dorsal view of male **167** Diagonal view of male head **168** Dorsal view of female **169** Aedeagus **170** Female abdominal terminalia **171** Check valve of spermatheca **172** Ovipositor. Scale bar: 1mm (Figs. 166–168,170); 0.5mm (Fig. 169); 0.1mm (Figs. 171–172).



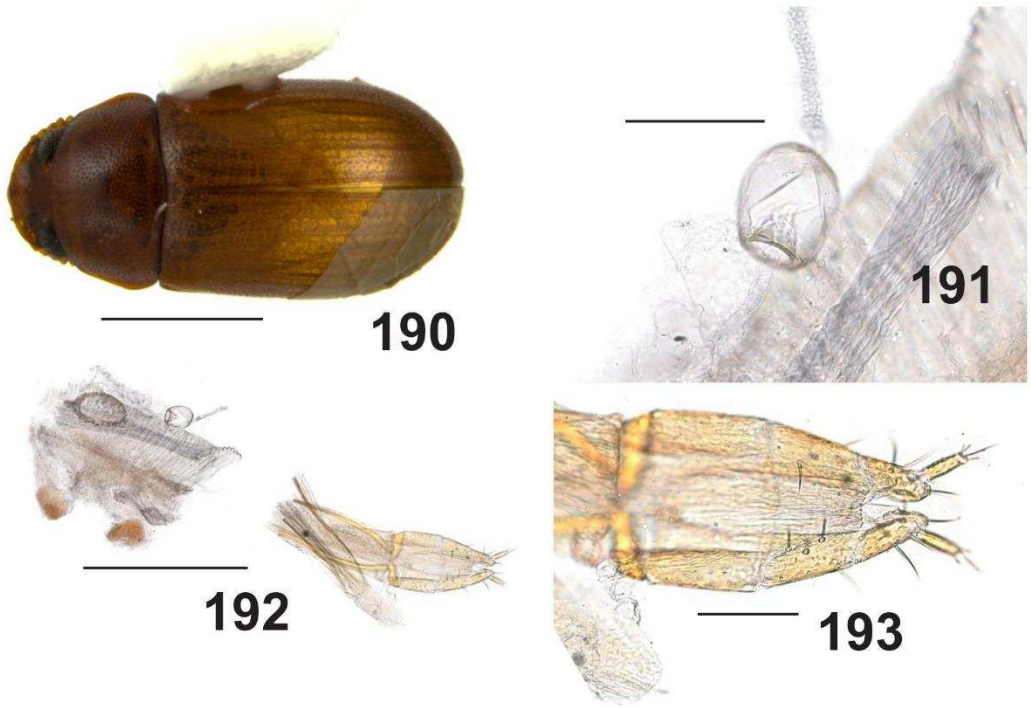
Figures 173–179. *Neomida vespertilionis* **sp.n.**. **173** Dorsal view of male **174** Diagonal view of male head **175** Dorsal view of female **176** Aedeagus **177** Female abdominal terminalia **178** Check valve of spermatheca **179** Ovipositor. Scale bar: 1mm (Figs 173–175, 177); 0.5mm (Figs. 176, 179); 0.1mm (Fig. 178).



Figures 180–186. *Neomida vitula.* **180** Dorsal view of male **181** Diagonal view of male head **182** Dorsal view of female **183** Aedeagus **184** Female abdominal terminalia **185** Check valve of spermatheca **186** Ovipositor. Scale bar: 1mm (Figs. 180–182, 184); 0.5mm (Figs. 183, 186); 0.1mm (Fig. 185).



Figures 187–189. *Neomida vivianae* **sp.n.**. **187** Dorsal view of male **188** Diagonal view of male head **189** Aedeagus. Scale bar: 1mm (Figs. 187–188); 0.5mm (Fig. 189).



Figures 190–1193. *Neomida* sp.1. **190** Dorsal view of female **191** Female abdominal terminalia **192** Check valve of spermatheca **193** Ovipositor. Scale bar: 1mm (Fig. 190); 0.5mm (Fig. 192); 0.1mm (Figs. 191, 193).

CONCLUSÕES GERAIS

Neste trabalho descrevemos oito novas espécies para a região Neotropical, uma reportada para a Colômbia e sete para o Brasil. Isso representa um acréscimo de cerca de 25% na diversidade de *Neomida* encontrada nas Américas.

Também ampliamos a distribuição de 11 espécies, *N. suilla*, *N. clavicornis* (para o Brasil), *N. divergicornis* (para o Brasil), *N. castanea*, *N. deltocera*, *N. hoffmanseggi*, *N. inermis* (para a Colômbia), *N. distans*, *N. picea*, *N. obsoleta* e *N. cioides*.

Pudemos também evidenciar o baixo conhecimento sobre fungos hospedeiros das espécies do gênero, com apenas 20 espécies apresentando tais registros, em muitos casos, pontuais, possivelmente não abrangendo toda a diversidade de hospedeiros que a espécies possuem. Isso, certamente, deve-se ao fato de a taxonomia de basidiomicetos ser difícil, e apresentando poucos especialistas, tornando o trabalho de reconhecimento das espécies de fungos hospedeiros complicado ou mesmo impossível.

E, principalmente, evidenciamos o baixo conhecimento do grupo no Brasil. Com esse trabalho, o Brasil sai da quarta posição para a primeira, em número de espécies de *Neomida*. Um número ainda baixo se olharmos para as segunda e terceiras posições, Costa Rica e Panamá, respectivamente, que apresentam um número próximo de espécies e, unidos, uma área equivalente a cerca de 1,5% do território brasileiro, ou o equivalente às áreas dos estados do Espírito Santo, Rio de Janeiro, Alagoas e Sergipe, juntas. Isso se deve, provavelmente, à falta de especialistas da família no Brasil, até então, e também ao incentivo ao conhecimento da biodiversidade da Costa Rica, com o Instituto Nacional de Biodiversidad (INBio) e do Panamá, com o Canal do Panamá e o fácil acesso de especialistas Norte-Americanos à região, visto que a região do Canal foi controlada pelos Estados Unidos até meados de 1999.

REFERÊNCIAS BIBLIOGRÁFICAS

Aloquio S, Lopes-Andrade C (2015) A new species of *Neomida* Latreille from Colombia, with additional records and a complementary description for *Neomida suilla* (Champion) (Coleoptera, Tenebrionidae, Diaperini). *ZooKeys* **495**: 133–142. doi: 10.3897/zookeys.495.8737

Lawrence JF, Ślipiński A, Seago AE, Thayer MK, Newton AF, Marvaldi AE (2011) Phylogeny of the Coleoptera based on morphological characters of adults and larvae. *Annales Zoologici* **61(1)**: 1–217. doi: 10.3161/000345411X576725

Schawaller W (2002) Taxonomic notes on Paleartic and Oriental species of *Neomida* Latreille, 1829 (Coleoptera, Tenebrionidae), with description of a new species from southern India. *Entomologica Basiliensia* **24**: 281–287.

Triplehorn CA (1965) Revision of Diaperini of America north of Mexico, with notes on extralimital species (Coleoptera: Tenebrionidae). *Proceedings of the Unites States National Museum* **3515**: 349–458.

Triplehorn CA (1994) Studies in Neotropical *Neomida*: descriptions of eight new species (Coleoptera: Tenebrionidae). *Proceedings of the Entomological Society of Washington* **96(3)**: 417–427.

Triplehorn CA (2006) Studies in Neotropical *Neomida*: A synopses of the genus *Neomida* (Coleoptera: Tenebrionidae: Diaperini) from America north of Colombia with notes on other western hemisphere species. *Proceedings of the Entomological Society of Washington* **108(2)**: 312–334.

ANEXO A

A new synonym for *Neomida luteonotata* (Pic) (Coleoptera: Tenebrionidae: Diaperini)

Sergio ALOQUIO[1], Gustavo E. FLORES[2] and Cristiano LOPES-ANDRADE[3]

[1]Programa de Pós-Graduação em Biologia Animal, Departamento de Biologia Animal, Universidade Federal de Viçosa, 36570-900, Viçosa, MG, Brazil

[2]CONICET, Laboratorio de Entomología, Instituto Argentino de Investigaciones de las Zonas Áridas (IADIZA, CCT CONICET Mendoza), Casilla de correo 507, 5500 Mendoza, Argentina

[3]Departamento de Biologia Animal, Universidade Federal de Viçosa, 36570-900, Viçosa, MG, Brazil

Corresponding author: Sergio Aloquio (sergio.aloquio@gmail.com)

Neomida luteonotata (Pic, 1926) is easily recognized among other described species in the genus by its unique elytral coloration, which consists of a large shield-shaped black spot bordered by yellowish to reddish brown spots close to the anterior, lateral and posterior edges. Thus the species is easily recognizable even by photographs. However, the size of black and light spots on elytra is highly variable within a single population.

Hoplocephala luteonotata was described by Pic (1926) based on a single specimen of undetermined gender and labeled "Brasilia meridionalis". Triplehorn (2006) transferred it to *Neomida* Latreille and synonymized *Hoplocephala huedepohli* Kulzer, 1961 with the species, based only in the original description. In the same work, he said that *Hoplocephala atricollis* Kulzer, 1961 was probably another junior synonym of *Neomida luteonotata*, but he did not examine the type and information available on the description was not sufficient to propose a synonym.

We had the opportunity to see photographs of the types of *H. huedepohli* (Fig. 1) and *H. atricollis* (Fig. 2) and confirm that both are synonymies of *Neomida luteonotata*. Here, *H. atricollis* is officially proposed as a junior synonym of *N. luteonotata*.

Neomida luteonotata (Pic, 1926)

Hoplocephala luteonotata Pic, 1926

Hoplocephala huedepohli Kulzer, 1961

Hoplocephala atricollis Kulzer, 1961 **New synonym**

Distribution: Brazil, French Guiana and Argentina.

Acknowledgements

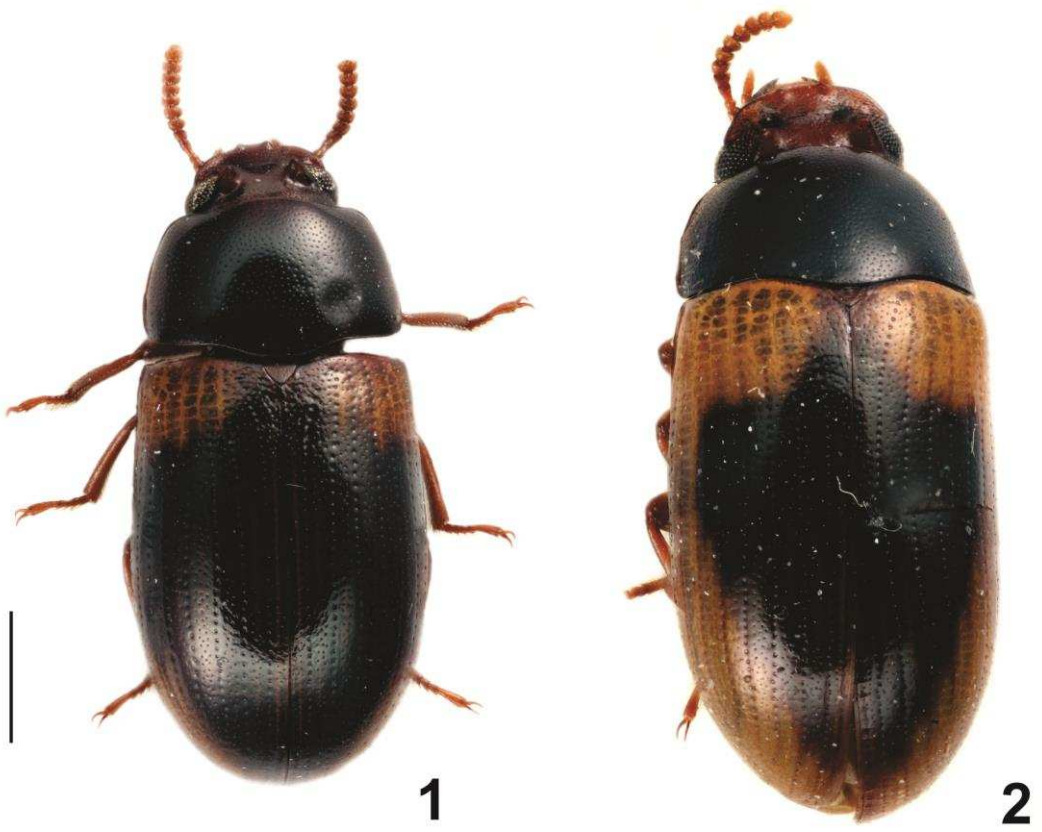
We especially thank Eva Sprecher and Matthias Borer who kindly searched for the types in the Frey Collection, deposited at the Museum of Basel, and made available their photos to us. Financial support was provided by Fundação de Amparo à Pesquisa do Estado de Minas Gerais (FAPEMIG: Universal APQ-00653-12; PPM-00026-14), Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq: Universal nº 479737/2012-6, research grant to CLA nº 302480/2012-9) and Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES: master degree grant to the senior author; PVE nº 88881.030447/2013-01).

References

Kulzer, H. 1961. Neue Tenebrioniden aus Südamerika (Col.). *Entomologische Arbiten aus dem Museum G. Frey Munich* **12**: 205–234.

Pic, M. 1926. Nouveautés diverses. *Mélanges Exotico-Entomologiqes* **fasc. 46**: 1–32.

Triplehorn, C.A. 2006. Studies in Neotropical *Neomida*: A synopses of the genus *Neomida* (Coleoptera: Tenebrionidae: Diaperini) from America north of Colombia with notes on other western hemisphere species. *Proceedings of the Entomological Society of Washington* **108** (2): 312–334.



Figures 1–2. *Hoplocephala huedepohli* Kulzer, 1961, Holotype (1) and *Hoplocephala atricollis* Kulzer, 1961, Holotype (2). (photos by Matthias Borer).