UNIVERSIDADE FEDERAL DO RIO GRANDE DO SUL

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Uma nova era de estudos sobre os percevejos predadores: Sistemática, taxonomia e morfologia comparada de Asopinae (Hemiptera: Pentatomidae)

Tese de doutorado

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Tese apresentada ao Programa de Pós-Graduação em Biologia Animal, Instituto de Biociências da Universidade Federal do Rio Grande do Sul, como requisito parcial à obtenção do título de Doutor em Biologia Animal

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Aprovada em ____ de ________________ de 2019.

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Dedico esta tese aos meus pais,
Ivan C. Roell e Silvane L.F. Roell,
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SUMÁRIO

RESUMO

Asopinae inclui os percevejos predadores da família Pentatomidae que se distribuem mundialmente e apresentam, como características principais, lábio robusto inserido muito próximo ao labro, cabeça aparentemente retangular, pró-fêmures frequentemente dotados de espinhos, pigóforos contendo processos superiores do diafragma e phallus dividido em theca basal e theca apical. Além disso, machos de algumas espécies apresentam um conjunto de cerdas e modificações no abdômen que estão associadas à excreção de compostos feromônicos produzidos por glândulas internas na mesma região. Por apresentarem hábito predador, os asopíneos estão entre os insetos com potencial uso no controle biológico, no entanto, poucos estudos dedicaram-se à morfologia e sistemática do grupo, e nenhuma hipótese de relacionamento entre os gêneros da subfamília foi proposta até o momento. Reconhecendo que o material tipo guarda a história taxonômica e é importante para a correta identificação das espécies de Asopinae, esta tese traz um estudo dos espécimes-tipo depositados no Museu de História Natural de Londres em forma de catálogo ilustrado contendo informações históricas destes. Além disso, o gênero africano *Afrius* Stål, 1870 é revisado, e a genitália masculina é avaliada em um estudo de morfologia comparada. Por fim, o último capítulo apresenta a primeira hipótese filogenética para Asopinae, incluindo pelo menos uma espécie de todos os gêneros da subfamília. Este último demonstra a monofilia de Asopinae e de grupos de gêneros, além de apresentar como podem ter evoluído as estruturas que compõe as manchas glandulares abdominais nos machos de Asopinae.

Palavras chave: Heteroptera, controle biológico, filogenia, monofilético, sinapomorfia, genitalia masculina, morfologia.

ABSTRACT

Asopinae includes the predatory stink bugs from the family Pentatomidae which are worldwide distributed and have, as main characteristics, a robust labium inserted very closed to the labrum, head apparently rectangular, profemora frequently endowed with spines, pygophores with superior processes of diaphragm, and phallus divided in basal and apical theca. Besides that, males of some species have a set of setae on abdomen, which are associated with the excretion of pheromone compounds produced by inner glands in the same region. Because they have a predatory habit, the asopines are among the insects with potential use for biological control; however, few studies have already been conducted on the morphology and systematics of the group, and no phylogenetic hypothesis of relationships among genera was proposed up to the moment. Recognizing that the type-material keeps taxonomic history and is important for the correct identification of the Asopinae species, this thesis presents a study of the type-specimens deposited in The Natural History Museum of London in an illustrated catalogue containing historical information of them. Furthermore, the African genus *Afrius* Stål, 1870 is revised, and the male genitalia is evaluated in a study of compared morphology. Lastly, the final chapter shows the first phylogenetic hypothesis for Asopinae, including at least one species of all known genera of the subfamily. This last demonstrates the Asopinae monophyly and the monophyly of groups of genera, further presenting how the abdominal glandular patches on males of Asopinae could have evolved.

Keywords: Heteroptera, biological control, phylogeny, monophyletic, synapomorphy, male genitalia, morphology.

INTRODUÇÃO GERAL

Os insetos estão distribuídos em todas as regiões do mundo e constituem a linhagem de sucesso dominante e mais diversa de animais no planeta. Seu sucesso evolutivo deve-se provavelmente à capacidade de adaptação a diversos ambientes que está relacionada à presença de asas, de exoesqueleto formado de cutícula quitinizada, de uma grande variedade de estruturas morfológicas e dos seus pequenos tamanhos. Além disso, os insetos tem uma grande capacidade reprodutiva e apresentam relações ecológicas com angiospermas (Grimaldi & Engel 2005; Triplehorn & Jonnson 2011).

Hemiptera é uma ordem de insetos hemimetábolos que possuem aparelho bucal sugador em forma de rostro (Grazia *et al*. 2012). Sua subordem mais diversa, Heteroptera, inclui insetos terrestres, aquáticos ou semiaquáticos caracterizados pela presença de glândulas de cheiro de defesa em ninfas e adultos (Schuh & Slater 1995; Grimaldi & Engel 2005) e asas anteriores modificadas em hemiélitros (Grazia & Fernandes 2012) com venação bastante reduzida (Grimaldi & Engel 2005). Heteroptera contém mais de 40.000 espécies descritas e sua monofilia é reconhecida e documentada com base em dados moleculares e morfológicos (Weirauch & Schuh 2011). Pesquisas sistemáticas em Heteroptera tiveram grandes progressos nas últimas décadas. Análises filogenéticas em todos os níveis taxonômicos e o surgimento da sistemática molecular tem, cada vez mais, influenciado no entendimento das relações internas do grupo (Weirauch & Schuh 2011). A maioria dos heterópteros são fitófagos e muitas vezes pragas agrícolas, mas também podem ser hematófagos ou predadores. Os predadores vêm sendo estudados como controladores biológicos de pragas (Grazia & Fernandes 2012; Grazia *et al*. 2015).

Pentatomidae é uma das famílias mais numerosas e diversas de Heteroptera e apresenta grande distribuição mundial, com maior diversidade nos trópicos (Schuh & Slater 1995; Grazia *et al*. 2015). É uma família com limites bem estabelecidos, considerada monofilética, e está organizada em nove subfamílias: Aphylinae, Asopinae, Cyrtocorinae, Discocephalinae, Edessinae, Pentatominae, Phyllocephalinae, Podopinae e Stirotarsinae (Grazia et al., 2008; Grazia & Fernandes 2012).

Os pentatomídeos são fitófagos podendo, muitas vezes, causar danos a plantas (Hasan & Kitching 1993), com exceção dos representantes da subfamília Asopinae que são predadores. Estudos cladísticos para Pentatomidae foram efetuados por Gapud (1991) sobre as relações entre subfamílias e por Hasan & Kitching (1993) sobre o relacionamento entre tribos de Pentatomidae. Além disso, ao avaliar as relações entre famílias de Pentatomoidea, Grazia et al. (2008) resgatou a monofilia da família. Outras investigações foram efetuadas para as tribos Halyini, Nezarini, Procleticini, Chlorocorini, Discocephalini, Catacanthini e Ochlerini (Wall 2004; Campos & Grazia 2006; Ferrari 2009; Schwertner & Grazia 2012; Greve 2013; Garbelotto 2015; Fürstenau 2016; Roell & Campos 2018).

A subfamília Asopinae possui distribuição cosmopolita e está classificada em 64 gêneros e 295 espécies (Thomas 1992, 1994; Zhao 2013; Salini 2016; Zhao 2016; Zhao 2018; Roca-Cusachs 2018; Rider 2019; Roell *et al*. in press). Os asopíneos possuem uma morfologia geral muito similar aos outros pentatomídeos sendo diferenciados, principalmente, pelo lábio robusto com inserção muito próxima à base do labro, pró-fêmures frequentemente dotados de espinhos, numerosas cerdas no aparato tibial, pigóforos contendo processos superiores do diafragma e phallus dividido em theca basal e theca apical (ou thecal shield) (Gapud 1991; Thomas 1992, 1994; Gapon & Konstantinov, 2006; Grazia *et al.* 2012; Barão *et al*. 2013; Brugnera *et al*. 2019; Roell *et al*. in press; Roell *et al*. in prep). Além disso, os asopíneos apresentam muitos padrões de coloração que podem variar intraespecificamente, e 26 gêneros possuem manchas abdominais glandulares em machos (Thomas 1992, 1994; Kochenborger 2018). Estas últimas estão associadas a comportamentos reprodutivos, uma vez que expelem feromônios que atraem fêmeas (Aldrich & Lusby 1986). Muitos autores sugerem que Asopinae deve ser um grupo monofilético (p. ex. Schouteden 1907; McDonald 1966; Thomas 1992; Gapon & Konstantinov 2006).

Por apresentarem hábito predador, os asopíneos estão entre os insetos com potencial uso no controle biológico e o interesse sobre estes organismos no manejo integrado de pragas vem crescendo no Brasil, seguindo uma tendência mundial (Magistrali *et al*. 2014, Pires *et al*. 2015). É especialmente relevante o emprego de asopíneos no controle de lagartas desfolhadoras em diversas culturas como dendezeiro, eucalipto, algodão, arroz, batata, crucíferas em geral, erva mate, feijão, girassol, mandioca, maracujá, soja e tomate (Zanuncio *et al*. 1994, 2011; De Clercq *et al*. 1998, 2002; Malaguido & Panizzi 1998; Cavalcanti *et al*. 2000, Oliveira *et al*. 2002, Vivan *et al*. 2002; Angelini & Boiça Jr. 2009; Ribeiro *et al*. 2010; Menezes *et al*. 2013; Zibaee *et* *al*. 2012; Claver & Jaiswal 2013; Vacari 2013; Magistrali *et al*. 2014). A ideia de que os insetos podem controlar pragas agrícolas é muito antiga, e o sucesso do controle biológico vem sendo registrado desde 1888 em diferentes países (Caltagirone 1981; McFadyen 1998; Bellows 2001; Parra *et al*. 2002). O controle biológico assume uma importância cada vez maior, principalmente em um momento em que se discute o uso de agrotóxicos versus o desenvolvimento de uma agricultura sustentável (Parra *et al*. 2002, Sampaio 2018). Além da redução do impacto ambiental, o controle biológico de populações de pragas também evita a exposição dos trabalhadores rurais a produtos tóxicos (Abreu *et al*. 2015).

Asopinae foi incluída por Leston (1953) em um trabalho sobre Podopinae e por Pendergrast (1957) em um estudo sobre genitália em Heteroptera que, baseado principalmente na forma das estruturas genitais masculinas, indicou um possível agrupamento entre Asopinae, Discocephalinae, Pentatominae e Phyllocephalinae. Além disso, McDonald (1966), em uma avaliação sobre genitália em Pentatomoidea, apresentou possíveis relações entre gêneros de Asopinae e indicou que a estrutura genital dos asopíneos é muito similar com Pentatominae e Podopinae. Para McDonald, Asopinae e Podopinae são muito próximos e poderiam ser tribos de Pentatominae. Esta relação de proximidade entre Asopinae e Podopinae já havia sido apontada por Leston (1953) com a avaliação de caracteres de genitália masculina.

Gapud (1991), em um estudo sobre as relações filogenéticas entre as subfamílias de Pentatomidae, discorda dos resultados de McDonald (1966) sugerindo que as amostras estudadas por este foram mal preparadas e que o uso único de características de genitália interna masculina para inferir relações filogenéticas não é válido. Além disso, Gapud aponta que McDonald utilizou apenas amostras do Neártico, sendo esta amostragem insuficiente. Em seu estudo, Gapud (1991) indicou a monofilia de Asopinae e a proximidade desta subfamília com Pentatominae, principalmente pela observação de caracteres de cabeça. Nas relações propostas por ele, Podopinae resultou em três grupos, sendo que o clado que ele considerou válido para a subfamília ficou separado de Asopinae. O que separou Asopinae de Podopinae, principalmente, foram as estruturas genitais masculinas em Asopinae, além das búculas paralelas, lábio robusto, base do lábio e final da búcula associados e bases do lábio e labro associadas. Pentatominae é separado em 17 grupos de conveniência por Gapud que indicou Asopinae como grupo irmão de "Penta 10", que inclui quatro espécies da tribo

Strachiini, *Eurydema* Laporte, 1833, *Murgantia* Stål, 1862, *Stenozygum* Fieber, 1860 e *Strachia* Hahn, 1833. Asopinae e “Penta 10”, segundo ele, compartilham a base do lábio e labro associadas, base do lábio e final da búcula associados e longo peritrema ostiolar.

Além destes, Thomas (1992, 1994) contribuiu com dois grandes trabalhos para o conhecimento da subfamília. Em 1992 para os gêneros ocidentais e em 1994 para os gêneros do Velho Mundo. Em ambos os trabalhos ele disponibilizou uma chave de identificação para os gêneros, uma diagnose para cada gênero, chave de identificação para as espécies de cada gênero ocidental, listas sinonímicas, dados de distribuição, entre outras observações. Ainda não existem chaves de identificação para todas as espécies do hemisfério oriental.

Com base em características morfológicas quatro tribos já foram propostas para Asopinae: Discoceraria Schouteden, 1907 (= Stiretrides Amyot & Serville, 1843), Asoparia Schoudeten, 1907 (= Asopides Amyot & Serville, 1843), Jallini Dupuis, 1949, e Stilbotini Gapud, 2015.

Discoceraria inclui *Discocera* Laporte, 1833 e *Stiretrus* Laporte, 1833 e foi caracterizada pelo escutelo amplo que recobre grande parte do abdômen (Amyot & Serville 1843; Schouteden 1907). Asoparia inclui os outros asopíneos que possuem escutelo triangular. Segundo Thomas (1992), as espécies de *Oplomus* Spinola, 1837, *Perillus* Stål, 1862, *Heteroscelis* Latreille, 1829, *Coryzorhaphis* Spinola, 1837, e *Blachia* Walker, 1867 também possuem escutelo alargado, mas não tanto como em *Discocera*.

Jallini foi proposta para incluir *Jalla* Hahn, 1832 e *Zicrona* Amyot & Serville, 1843, que possuem o ápice do sétimo urosternito lobado, cobrindo as estruturas genitais (Dupuis 1949; Thomas 1992). De acordo com Thomas (1992), *Jalla* e *Zicrona* compartilham outras características, como a ausência de tubérculo abdominal e a ausência de manchas glandulares abdominais em machos, porém *Dorycoris* Mayr, 1864 apresenta uma condição similar do sétimo urosternito. Thomas (1992) sugeriu suspender as classificações de tribo para Asopinae por causa da falta de características bem definidas que separem grupos dentro da subfamília.

Complementando a divisão em tribos citada anteriormente, Gapon (2008) propôs em sua tese de doutorado que Asopinae seja classificada em cinco tribos: Amyoteini Schouteden, 1907, Glypsini Gapon, 2008 *nomen nudum*, Jallini Dupuis, 1949, Platynopini Gapon, 2008 *nomen nudum*, e Stiretrini Amyot & Serville, 1843. No entanto, estes dados não estão publicados.

Em 2015 a última proposição de tribo para a subfamília foi feita por Gapud (2015). Ele inferiu que *Stilbotes semperi* Stål, 1871 tem características únicas em relação à morfologia do phallus e sugeriu que esta espécie seja incluída na tribo Stilbotini Gapud, 2015.

Trabalhos sistemáticos recentes sobre Asopinae incluem a descrição de imaturos e revisões de gêneros africanos e asiáticos, incluindo algumas descrições de espécies e proposições de sinonímias (Zhao et al. 2013a, 2013b, 2016, 2018; Salini 2016; Brugnera & Grazia 2018; Roca-Cusachs *et al*. 2018; Roell *et al.* in press), no entanto nenhum trabalho filogenético foi proposto para a subfamília até o momento.

Trabalhos sistemáticos, filogenéticos e evolutivos podem ter muitos efeitos práticos na entomologia aplicada (Simpson & Cracraft 1995; Schaefer 1998; Nylin 2001) e a falta de estudos taxonômicos pode resultar em grandes prejuízos econômicos quando, por exemplo, as espécies controladoras e a serem controladas são mal identificadas (Zucchi 2002). A taxonomia é uma ciência que se dedica a classificar e nomear grupos de organismos e o sistema binomial para o nome de espécies proposto por Karl Linnaeus (1758) permite que os nomes científicos sirvam como uma forma de linguagem universal (Grimaldi & Engel 2005). A sistemática visa entender a relação entre grupos de organismos vivos ou extintos. Filogenias permitem a identificação de linhagens e a interpretação de padrões de interação e evolução dos organismos (Simpson & Cracraft 1995; Schaefer 1998; Nylin 2001; Grimaldi & Engel 2005).

Organização da tese

Nesta tese trazemos Asopinae para uma nova era de investigações, apresentando estudos cladísticos e taxonômicos modernos que permitem um grande avanço no conhecimento sistemático do grupo.

No primeiro capítulo apresentamos um catálogo ilustrado de 233 espécimes-tipo de Asopinae depositados no museu de história natural de Londres, UK, contemplando dados históricos de 121 espécies válidas. A maior parte do material tipo de Asopinae está depositado neste museu e as informações apresentadas neste capítulo servirão para futuros trabalhos taxonômicos e para a confirmação da identificação de diversas espécies. Este trabalho será submetido para a *Zootaxa*.

O segundo capítulo está em processo de publicação pelo *European Journal of Taxonomy* e aborda a revisão do gênero africano *Afrius* Stål, 1870. Neste trabalho propomos novas sinonímias, considerando válidas apenas três espécies, atualizamos os dados de distribuição e apresentamos uma chave de identificação para as espécies do gênero.

O terceiro capítulo trata de um estudo de morfologia comparada de estruturas genitais masculinas em Asopinae, isto é, parâmeros e processos superiores do pigóforo. Neste trabalho buscamos apresentar as principais variações morfológicas existentes nestas estruturas, propor caracteres para uso em estudos filogenéticos e propor uma uniformização da terminologia para as mesmas.

No quarto capítulo apresentamos a primeira hipótese filogenética para Asopinae incluindo pelo menos uma espécie de cada gênero conhecido da subfamília. Seguindo uma metodologia cladística, corroboramos a hipótese de monofilia da subfamília e recuperamos gêneros e grupos de gêneros monofiléticos. Além disso, avaliamos como podem ter evoluído as estruturas que compõe as manchas glandulares abdominais nos machos de Asopinae.

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CAPÍTULO 1

An Annotated Catalogue of the Types of Asopinae (Heteroptera: Pentatomidae) in the Collection of the Natural History Museum, London.*

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Key words: Hemiptera, Pentatomoidea, taxonomy, nomenclature, type status, lectotype designation

Abstract

We present a catalogue of the type material of the subfamily Asopinae located in the collection of the Natural History Museum, London. This work involves recognising types and their status, recording their label data and providing images of both the types and their labels.

We have refrained from designating lectotypes as the International Code of Zoological Nomenclature recommends that it should be done "as part of a revisionary or other taxonomic work" (ICZN 1999: Recommendation 74G), but we have accepted that lectotypes were designated by inference of "the type" or the "holotype" (ICZN 1999: Art. 74.6) in the following circumstances: Lectotypes were designated by inference of "the type" by Thomas (1992) for the following 29 species: *Apateticus halys* Dallas, *Arma ampla* Walker, *Arma fuscescens* Dallas, *Arma modesta* Dallas, *Arma nigrispina* Dallas, *Arma obscura* Dallas, *Mormidea semialba* Walker, *Oplomus equestris* Distant, *Oplomus festivus* Dallas, *Oplomus nigripennis* Dallas, *Oplomus pulcher* Dallas,

* Este trabalho será submetido à *Zootaxa* [https://www.mapress.com/j/zt/]

Oplomus rutilus Dallas, *Oplomus stellatus* Distant, *Oplomus ventralis* Dallas, *Oplomus violaceus* Dallas, *Podisus amulae* Distant, *Podisus falcatus* Distant, *Podisus gaumeri* Distant, *Podisus insignis* Distant, *Podisus nigriventris* Distant, *Podisus sculptus* Distant, *Podisus smithi* Distant, *Stiretrus annulatus* Distant, *Stiretrus caeruleus* Dallas, *Stiretrus ruficeps* Dallas, *Supputius typicus* Distant, *Tynacantha marginata* Dallas, *Tynacantha splendens* Distant, and *Zicrona marginella* Dallas.

Lectotypes were designated by inference of "holotype" by Synave (1969) for the following two species: *Mecosoma floridum* Distant, *Podisus volxemi* Distant, and by Thomas (1994) for the following 3 species: *Neoglypsus opulentus* Distant, *Incitatus primus* Distant, and *Jalloides versicolor* Distant.

The neotype of *Arma pallipes* Dallas, designated by Thomas (1992), is set aside as Dallas's type was found (ICZN 1999: Art. 75.8).

Informations regarding labels used by the first four curators of Hemiptera at the Museum (Adam White, William S. Dallas, Francis Walker and William L. Distant) are provided.

Introduction

The Natural History Museum, London (NHMUK) possesses a rich collection of type specimens in the subfamily Asopinae. These types are mainly of species described by early authors, notably F. Germar, W. S. Dallas, F. Walker, F. Buchanan-White, C. Berg and W. L. Distant, while some were more recently described by E. P. Van Duzee, R. L. Usinger and D. B. Thomas.

Thomas revised the subfamily in two publications, one concerning the New World (1992) and the other, the Old World (1994). In the latter publication, he claims in different ways having seen the type of the species. He may have considered the specimen that was marked as type but we cannot be sure as he gives no details. Where he mentioned a holotype male or female and the Museum owns only one specimen of this species, which we as well recognize as a type, we accept that it could only mean that Thomas examined that specimen and that he designated this individual specimen a lectotype by inference of holotype. In the former publication, he details the labels data, specimens can therefore be easily recognized and we have admitted that he had designated lectotypes by so doing. The designation of lectotypes by inference of the "holotype" or "the type" is regulated by the International Code of Zoological Nomenclature (ICZN 1999: Art. 74.6), which states: "Fixation of lectotype by inference of "holotype" or "the type" before 2000. When it has been accepted that a nominal species-group taxon was based on a single specimen and the original description neither implies nor requires that there were syntypes, and if it is considered subsequently that the original description was based on more than one specimen, the first author to have published before 2000 the assumption that the species-group taxon was based upon a single type specimen is deemed to have designated that specimen as the lectotype.".

We list below 233 specimens representing 156 described species or 121 currently valid species. We have noted that some types are missing; these may be found ulteriorly, when label data of all specimens will have been recorded.

Materials and methods

The type material of the Hemiptera Collection of the Natural History Museum London (NHMUK) was examined.

The type status is recorded with capital letters in accordance to the disc type labels of the museum. Data of the specimens labels are recorded verbatim in quotation marks (" ") and different labels separated by a semicolon (;). The reverse of a label is indicated after a slash (/). We have added notes on the type status and the condition of the specimen.

Some more information on assessing types statuses at the Natural History Museum, London may be obtained by reading the paragraphs "*Type authenticity – BMNH registrations numbers*", "*Type status*" and following in Kondorosy *et al*. 2006. To be thorough, we have herein included a table with registration numbers and the information they can offer (see Table 1). It seems Thomas was unaware of the significance of these numbers as he sometimes mentioned them as label data (e.g. *Arma grandis*) and sometimes not (e.g. *Bodetria scutellaris* Walker, *Oplomus violaceus*…).

We have pinned in the tray containing the type(s) a label with the original name of the species, the author, the year, the pagination and a disc with the type status. The same disc was also pinned with the specimen and its other labels. Specimens only bearing this type disc had not previously been recognised as types. A few specimens bearing an old type disc were found not to be types.

It is to be noted that we have also listed non-typical specimens in the following two situations: first, we have listed specimens for the varieties mentioned by Walker. The Code of Zoological Nomenclature does not recognize them as typical material (ICZN 1999: Art. 72.4.1) but we felt it was important, for historical reasons, to detail them. Secondly, we have listed specimens, which had been labelled as types but are not types (and which retain these erroneous type labels) so that all confusion could be avoided in future. Furthermore, we have listed the names of species whose types could have been expected to be in NHMUK but are not and their actual depository.

Imaging was done with the use of a Canon EOS 5D SR camera mounted with Canon Macro Lens EF 100 mm 1:2.8 L IS USM controlled with Helicon Remote software. Stacking was done with Helicon Focus software.

Results

List of species

***acuta* (*Macrorhaphis*?)** Dallas 1851: 88.

Original data: Syntype(s): "m#". "a. Congo. Presented by Sir John Richardson, M.D."

SYNTYPE m#: blue-margined syntype disc; red-margined type disc; "Congo / 43 56"; "2. Macrorhaphis acuta,"; "NHMUK 010592174". Carded specimen; third to fifth left antennomeres, and fourth and fifth right antennomeres missing (Fig. 1).

Current status: *Macrorhaphis acuta* Dallas, 1851.

Note: Walker (1867a: 129) listed a unique specimen; it is likely that Dallas just had one (especially as Dallas had stated only one measurement and noted: "Antennae pale brown, with the apex of the third and fourth joints pitchy (fifth wanting)." [emphasis ours]. Still, we cannot be certain (although G. Schmitz had determined the specimen as the holotype male for this species). Thomas (1994: 185) did not mention having seen the type under the material he examined, we therefore consider the specimen a syntype.

***affinis* (*Podisus*)** Distant 1880: 38.

Original data: Syntypes. “*Hab*. Mexico (*coll*. *Sign*.), Oaxaca (*Mus*. *Berol*.); Guatemala, San Gerónimo (*Champion*). -- Colombia (*coll*. *Dist*.).”

SYNTYPE m#: blue-margined syntype disc; “S. Geronimo, Guatemala. Champion.”; “Distant Coll. 1911–383.”; “NHMUK 010592313”. Fourth and fifth left antennomere, and middle and posterior legs missing (Fig. 2).

SYNTYPE m#: blue-margined syntype disc; “S. Geronimo, Guatemala. Champion.”; “Distant Coll. 1911–383.”; “NHMUK 010592315”. Right middle leg missing (Fig. 3).

SYNTYPE f#: blue-margined syntype disc; “S. Geronimo. Guatemala. Champion.”; “affinis Dist. [Distant’s handwriting]”; “Distant Coll. 1911–383.”; “NHMUK 010592316”. Fourth and fifth left antennomeres, and right posterior leg missing (Fig. 4).

SYNTYPE m#: blue-margined syntype disc; “Bogota”; “Distant Coll. 1911–383.”; “NHMUK 010592317”. Fourth and fifth right and left antennomeres, and right posterior leg missing (Fig. 5).

SYNTYPE f#: blue-margined syntype disc; “S. Geronimo. Guatemala. Champion.”; “B.C.A., Hem. I. Podisus affinis.”; “NHMUK 010592318”. Fifth left antennomere, middle legs, and right posterior leg missing (Fig. 6).

Current status: *Podisus affinis* Distant, 1880.

Note: Thomas (1992: 96) remarked: “Some of Distant’s specimens in the British Museum (Natural History) are incorrectly labeled as types; the species was first described by Stål.” This is erroneous. The name *Podisus affinis* is not a replacement name for *Telepta fuscescens* Stål (1862: 90). Instead, Stål misidentified the specimens he saw in Signoret’s collection and in Berlin as *Telepta fuscescens* (Dallas’s *Arma fuscescens*). Having checked both these specimens and Dallas’s specimen(s) of *Arma fuscescens* (there is currently just one, but we cannot rule out that there may have been others), Distant (1880) reckoned they were not conspecific. He described a new species *Podisus affinis* from the specimens mentioned by Stål as well as from specimens he had received from Champion and others in his own collection. Both Stål’s specimens (Vienna & Berlin) and Distant’s (London) are syntypes.

***aggressor* (*Rhaphigaster*)** Walker 1867b: 359.

Original data: Holotype. “a. St. Domingo. From Mr. Hearne’s collection.”

HOLOTYPE f#: red-margined holotype disc; green-margined type disc; “St Domingo / 54 76”; “19. Raphigaster aggressor.”; “NHMUK 010592327”. Fourth and fifth antennomeres of right and left antennae, anterior legs, right middle leg, and left posterior leg missing (Fig. 7).

Current status: *Tyrannocoris jole* (Stål, 1862) (synonymised by Schouteden 1907: 72; see Thomas 1992: 126).

***ampla* (*Arma*)** Walker 1867a: 138.

Original data: 2 syntypes. “a. Constancia, Rio Janeiro. Presented by the Rev. H. Clark. b. Rio Janeiro.”

LECTOTYPE m# (designated by Thomas 1992: 52): purple-margined lectotype disc; green-margined type disc; “RIO JANEIRO Dec[r] 1856. J. Gray. / 57. 57.”; “34. Arma ampla.”; “NHMUK 010592413”. Fourth and fifth left antennomeres, fifth right antennomere, and left leg missing (Fig. 8).

Current status: *Marmessulus nigricornis* (Stål, 1865) (synonymised by Schouteden 1907: 26).

Notes: Thomas (1992: 52) explained: “I examined the male type of *Arma ampla* Walker, located in the British Museum (Natural History). It is labeled: (a) “Type,” (b) “57.57 Rio de Janeiro Dec 1856 J. Gray,” c) “Arma ampla.””. It is clear from the original description that Walker had two specimens. We have found just one in the collection. By giving its exact label data and calling it “the male type”, Thomas designated it as the lectotype by inference of “the type”. The second specimen is missing or has not been recognised.

***amulae* (*Podisus*)** Distant 1889: 319.

Original data: Syntype(s). “*Hab*. Mexico, Amula in Guerrero (*H. H. Smith*).”

LECTOTYPE m# (designated by Thomas 1992: 84): purple-margined lectotype disc; red-margined type disc; “Amula, Guerrero, 6000ft. Aug. H. H. Smith.”; “Podisus amulae Dist. [Distant’s handwriting]”; “NHMUK 010592319”. Specimen well preserved (Fig. 9).

Current status: *Podisus congrex* (Stål, 1862) (synonymised by Thomas 1992: 83–84).

Note: Thomas (1992: 84) explained: "The type of *Podisus amulae*, a male, was located in the British Museum (Natural History). It is labeled: a) "Type," b) "Podisus amulae Distant," c) "Amula Guat. 600 ft. Aug. H.H. Smith."" From Distant's original description, we do not know whether Distant had one or more specimens, nor the sex. We have found only one specimen in the collection but cannot be sure it was the only one Distant had. By giving its labels data (albeit unprecisely – "Guat" for "Guerrero" and "600" for "6000") and calling the specimen "the type", Thomas designated it as the lectotype by inference of "the type".

***annulatus* (*Stiretrus*)** Distant 1889: 317.

Original data: Syntype(s). "*Hab*. Mexico, Tepic (*Schumann*)."

LECTOTYPE f# (designated by Thomas 1992: 110): purple-margined lectotype disc; red-margined type disc; "Tepic, Mex. July. Schumann."; "Stiretrus annulatus Dist. [Distant's handwriting]"; "NHMUK 010592389". Left antenna, fourth and fitfth right antennomeres, and right anterior leg missing (Fig. 10).

Current status: *Stiretrus anchorago* (Fabricius, 1775) (synonymised by Thomas 1992: 109-110).

Note: Thomas (1992: 110) explained: "The type of *Stiretrus annulatus* Distant was located in the British Museum (Natural History). It is labeled: (a) "Type," (b) "Stiretrus annulatus," (c) "Tepic, Mex. July, Schumann." The specimen is a female and is metallic blue in color." From Distant's original description, we do not know whether Distant had one or more specimens, nor the sex. We have found only one specimen in the collection but cannot be sure it was the only one Distant had. By giving its labels data and calling the specimen "the type", Thomas designated it as the lectotype by inference of "the type".

***annulipes* (*Asopus*)** Germar 1838 : 187–188.

Original data: Syntype(s). Cape of Good Hope.

SYNTYPE f#: blue-margined syntype disc; "C.G.H/ 42 77"; "1162"; "a"; Asopus annulipes [hw] Germar det. [pr] "; "Cape Gd. Hope. 42-77. Ex.coll.Drège.No.[pr] 1162 [hw] "; "Zicrona [pr] pavonina [hw] Walker's catal. [pr]"; "NHMUK 010936229". Right posterior leg missing (Fig. 11).

Current status: *Dorycoris pavoninus* (Westwood, 1837) (synonymised by Dallas 1851: 108, to *Zicrona pavonina*; see Schouteden 1905: 134 for placement in *Dorycoris*).

Notes: The senior author did not locate any syntypes of *A. annulipes* in the Museum für Naturkunde Berlin (MFNB). A further four specimens, however, are deposited at the Benedict Dybowski Zoological Museum of Lviv National University (ZMD). Indeed, at the turn of the century, part of Germar's entomological collection was purchased by Count Mniszek for this museum. Ultra-high resolution images of the ten large wooden boxes are displayed on the Zoological Museum's website through the free Zoomify™ plug-in (Anonymous 2019). Holovachov *et al*. (2014) documented Germar's collection and detailed their imaging procedure. From images on the website, it is difficult to assess the type status of the specimens; it may be assumed that they are syntypes.

***annulipes* (*Canthecona*)** Dallas 1851: 90–91.

Original data: Syntype(s): "f#". "a. S. Africa. Presented by the Earl of Derby."

SYNTYPE f#: blue-margined syntype disc; "Int Africa / 4319"; "Canthecona figurata Walker's catal."; "a"; "NHMUK 010747805". Fourth and fifth right antennomeres, left antenna, and right middle and posterior legs missing. Abdomen smashed, genital plates disjointed (Fig. 12)

Current status: *Afrius purpureus* (Westwood, 1837) (synonymised by Roell *et al*. 2019: XXX).

Note: Walker (1867a: 131) listed only one specimen from the same provenance. It is likely that Dallas had just one (especially as Dallas stated only one measurement and noted: "the basal joint and the apex of the third black (**rest wanting**) " [emphasis ours]) but we cannot be sure. Thomas (1994) did not mention having seen the type, we therefore consider the specimen a syntype.

***atitlanensis* (*Podisus*)** Distant 1893: 454–455.

Original data: Holotype ["This species, of which we possess but a single example, [...]".]. "*Hab*. Guatemala, Volcan de Atitlan 2500 feet (*Champion*)."

HOLOTYPE m#: red-margined holotype disc; red-margined type disc; "V. de Atitlan, 25-3500 ft. Champion."; "Podisus atitlanensis Dist. [Distant handwriting]"; "NHMUK 010592320". Specimen well preserved (Fig. 13).

Current status: *Podisus congrex* (Stål, 1862) (synonymised by Thomas 1992: 83–84).

***badius* (*Platynopus*)** Walker 1867a: 125.

Original data: Holotype. “a. Old Calabar. From Mr. John Gray’s collection.”

HOLOTYPE f#: red-margined holotype disc; green-margined type disc; “Old Calab / 59 37”; “12. Platynopus badius.”; “NHMUK 010592451”. Right antenna, fourth and fifth left antennomeres, left anterior leg, and right posterior leg missing (Fig. 14).

Current status: *Platynopiellus septendecimmaculatus* (Palisot de Beauvois, 1811) (synonymised to *Platynopus rostratus* Drury, 1782 by Distant 1900a: 63; see Schouteden 1905: 160; Schouteden 1907: 48; Due to homonymy (see “Notes” below), the name of the species became that of the next available junior synonym: *Pentatoma 17-maculata* Palisot de Beauvois, 1811 (see Kirkaldy 1909: 12, as *Platynopus 17-maculatus*); Thomas (1994: 195) placed it in his new genus, *Platynopiellus*.).

Notes: *Platynopus rostratus* (Drury, 1782) was a primary homonym of *Cimex rostratus* DeGeer, 1773 (Pentatomidae), *C. rostratus* Goeze, 1778 (Coreidae) and *C. rostratus* Fabricius, 1781 (Pentatomidae). The next junior synonym for that species was *Cimex calens* Fabricius, 1803, a primary homonym of *C. calens* Linnaeus, 1767 (Miridae) (see Dolling *et al*. 1999: 18, 77). The specific epithet, originally spelled *17-maculata*, has been transliterated in two different ways: *septendecimaculata*/*-us* (Thomas 1994: 194-195; Maldès & Pluot-Sigwalt 2004) and *septemdecimmaculatus* (Dolling *et al*. 1999: 18, 77; Rider 2015); we have adopted the spelling *septendecimmaculata*/*-us* as we have chosen to follow Welter-Schultes (2012: 76); the set of rules provided there is convenient and useful to achieve consistency in transliterating older names or naming new species. We note, however, that the use of “septemdecim” is not erroneous (Gaffiot 1934: 1426), only less correct (Lewis & Short 1891: 1675). Furthermore, bearing in mind the explanations by Lewis & Short (1891:1091), we also understand the choice not to duplicate the “m” as logical.

***basalis* (*Oplomus*)** Walker 1867a: 122.

Original data: Holotype. “a. Ega. From Mr. Bates’ collection.”

HOLOTYPE m#: red-margined holotype disc; green-margined type disc; “Ega / 58 6”; “19. Oplomus basalis.”; “NHMUK 010592401”. Right antenna, fourth and fifth left antennomeres, and anterior legs missing (Fig. 15).

Current status: *Oplomus festivus* Dallas, 1851 (synonymised to *Oplomus tripustulatus* Fabricius by Stål 1870: 28, as Var. b; see Distant 1880: 31; Distant 1900a: 63; Schouteden 1907: 35; synonymised to Oplomus marginalis Westwood; Rider & Rolston 1995: 845–846 replaced preoccupied *O. marginalis* Westwood by *O. festivus* Dallas).

Note: Thomas (1992: 60) erroneously reported a label as reading “Equ.” and consequently listed Ecuador in the distribution of the species. The label actually reads “Ega/58 6” [Ega is now known as Tefé and is in Brazil].

***biarcuatus* (*Oplomus*)** Walker 1867a: 121.

Original data: Holotype. “a. Vera Cruz. From M. Sallé’s collection.”

HOLOTYPE f#: red-margined holotype disc; green-margined type disc; “Vera Cruz / 54 66”; “17. Oplomus biarcuatus.”; “NHMUK 010592407”. Left middle leg and right posterior leg missing. Genital plates disjointed (Fig. 16).

Current status: *Oplomus mundus* Stål, 1862 (synonymised to *Oplomus rutilus* Dallas by Distant 1880: 31; see Distant 1900a: 63; Schouteden 1907: 35; Thomas (1992: 61) synonymised *Oplomus biarcuatus* to *Oplomus mundus*, while explaining how to separate *O. mundus* and *O. marginalis* – now *O. festivus* – with which he had synonymised *O. rutilus*).

***bicolor* (*Damarius*)** Distant 1912: 89.

Original data: Syntype(s). “*Hab*. Uganda; Mabira (*C. C. Gowdey*, Brit. Mus.).”

SYNTYPE f#: blue-margined syntype disc; red-margined type disc; “Mabira 17.VII.11. No. 2907”; “1912 – 186”; “Damarius bicolor type Dist. [Distant’s handwriting]”; “NHMUK 010592420”. Fourth and fifth right antennomeres missing (Fig. 17).

SYNTYPE m#: blue-margined syntype disc; “Mabira 17.VII.11. No. 2905”; “1912 – 186”; “NHMUK 010747743”. Specimen well preserved (Fig. 18).

SYNTYPE m#: blue-margined syntype disc; “Mabira 17.VII.11. No. 2906”; “1912 – 186”; “NHMUK 010747806”. Fourth and fifth right antennomeres missing (fig 19).

Current status: *Damarius splendidulus* (Fabricius, 1803) (synonymised by Thomas 1994: 173, as a colour variety; there is, however, no mention of a new synonymy in the catalogue entry).

Note: From Distant’s original description, we do not know whether Distant had one or more specimens, nor the sex. We have found one female and two males in the collection. Strangely, Thomas (1994: 173) mentioned: “Distant's holotype female and two paratype females [sic!], in BM(NH) from Uganda were examined.” Thomas may have misread his notes concerning the sex of the specimens. Because he did not detail which of the three specimens was the holotype, mentioning he had three females (all three from Uganda), we do not consider this a valid lectotype designation and consider the three specimens syntypes.

***bimaculatus* (*Platynopus*)** Walker 1867a: 124.

Original data: Holotype. “a. Petropolis, Rio Janeiro. Presented by the Rev. H. Clark and by J. Gray, Esq.”

HOLOTYPE m#: red-margined holotype disc; green-margined type disc; “PETROPOLIS Feb.[y] 1857. J. Gray.”; “6. Platynopus bimaculatus.”; “NHMUK 010592394”. Specimen carded (Fig. 20).

Current status: *Heteroscelis bimaculata* (Walker, 1867) (see Distant 1900a: 55; Pirán 1961: 87; Thomas 1992: 49).

***binotata* (*Canthecona*)** Distant 1879: 47–48.

Original data: Syntype(s). “Naga hills, 2000 to 6000 feet.”

SYNTYPE f#: blue-margined syntype disc; red-margined type [H. T.] disc; “Naga hills 2000 to 6000 (Chennel) ”; “binotata (type) Dist. [Distant’s handwriting]”; “Distant Coll. 1911–383.”; “NHMUK 010592151”. Left middle leg missing (Fig. 21).

Current status: *Eocanthecona binotata* (Distant, 1879) (see Thomas 1994: 175).

Note: Thomas (1994: 175) mentioned having examined determined specimens in BM(NH) but did not mention having seen the type. Because we found only one type specimen, we cannot assume that Distant just described his species from this one. We, therefore, consider it a syntype.

***binotatus* (*Asopus*)** Walker 1867a:144–145.

Original data: Holotype. “a. Brazil. From Mr. Vigors’ collection.”

HOLOTYPE f#: red-margined holotype disc; green-margined type disc; “Brazil.”; “Brazil as a locality is erroneous. [Distant’s handwriting]”; “2. Asopus binotatus.”; “59·57 Vigors’ Coll.”; “NHMUK 010592411”. Right antenna, fourth and fifth left antennomeres, and left posterior leg missing (Fig. 22).

Current status: *Cermatulus nasalis nasalis* (Westwood, 1837) (synonymised by Distant 1900a: 55, 63; see Schouteden 1907: 67; Woodward 1953: 317–318).

Note: Walker (1867a: 144–145) described this species from Brazil, but Distant (1900a: 55, as well as on the label) indicated that the locality mentioned by Walker was erroneous. Thomas (1994: 172) mentioned this information as well.

***borneensis* (*Platynopus*)** Distant 1900b: 696.

Original data: Syntypes [range of measurements]. “*Habitat*. Borneo, S. E. Districts (Doherty—Coll. Dist.); Pampat (Shelford—Sarawak Mus.).”

SYNTYPE f#: blue-margined syntype disc; red-margined type [H. T.] disc; “S. E. BORNEO, DOHERTY.”; “borneensis Dist. [Distant’s handwriting]”; “Distant Coll. 1911–383.”; “NHMUK 010592429”. Left posterior leg missing (Fig. 23).

SYNTYPE m#: blue-margined syntype disc; “S. E. BORNEO, DOHERTY.”; “Distant Coll. 1911–383.”; “NHMUK 010592430”. Specimen well preserved (Fig. 24).

Current status: *Montrouzierellus borneensis* (Distant, 1900) (see Kirkaldy 1909: 11; Thomas 1994: 187).

***brenthoides* (*Bodetria*)** Walker 1867a: 119.

Original data: Holotype. “a. St. Paul, Amazon Region. From Mr. Bates’ collection.”

HOLOTYPE f#: red-margined holotype disc; green-margined type disc; “Amazon St Paul” / 60 32”; “1. Bodetria brenthoides.”; “NHMUK 010592390”. Fourth and fifth right and left antennomeres, and anterior legs missing (Fig. 25).

Current status: *Heteroscelis servillei* Laporte, 1833 (synonymised by Stål 1870: 31; see also Distant 1900a: 63).

***bryani* (*Oechalia* (*Hawaiicola*))** Usinger 1941: 81–82.

Original data: "Holotype, male, allotype, female, and five male and five female paratypes, Hookomo, South Slope of Mauna Kea, 8500 feet elevation, August 9, 1935, on *Sophora*, R. L. Usinger."

PARATYPE m#: yellow-margined paratype disc; "Mauna Kea, Haw. S. slope, 8500 ft. Hookomo VIII-9-35 "; "Sophora"; "R.L. Usinger Collector"; "*Oechalia bryani* Usinger Det. by R.L. Usinger"; "PARATYPE Oechalia bryani Usinger"; "NHMUK 010592456". Specimen well preserved (Fig. 26).

Current status: *Oechalia bryani* Usinger, 1941.

Note: Thomas (1994) only mentioned having examined a male without data, not a paratype.

***caerulea* (*Canthecona*)** Dallas 1851: 89–90.

Original data: Syntype(s): "m#". "a. Port Natal. From Dr. Krauss's Collection."

SYNTYPE m#: blue-margined syntype disc; red-margined type disc; "40.6.26.329."; "*Canthecona caerulea* identified by Dallas."; "a"; "NHMUK 010592171". Left antenna, and fourth and fifth right antennomeres missing (Fig. 27).

Current status: *Afrius purpureus* (Westwood, 1837) (first synonymised to *Canthecona Yolofa* (Guérin-Méneville, 1831), as a var. by Stål 1862: 496; synonymised by Stål 1870: 44; see Roell *et al*. 2019: XXX).

Note: In Walker (1867a: 130), as specimen "d" under *yolofa*. It is likely that Dallas had only one specimen but we cannot assume this. We, therefore, consider the specimen a syntype.

***caeruleus* (*Stiretrus*)** Dallas 1851: 79.

Original data: Syntype(s): "f#". "a. Mexico."

LECTOTYPE f# (designated by Thomas 1992: 110): purple-margined lectotype disc; red-margined type disc; "Mexico / 48 11"; "4. Stiretrus coeruleus,"; "a"; "NHMUK 010592388". Fourth and fifth right and left antennomeres, and left middle leg (which is glued on the first label) missing (Fig. 28).

Current status: *Stiretrus anchorago* (Fabricius, 1775) (synonymised by Thomas 1992: 109–110).

Note: Thomas (1992: 110) explained: "The type of *Stiretrus caerulaeus* Dallas was located in the British Museum (Natural History). It is labeled: (a) "Type," (b) "Mex." (c) "Stiretrus caerulaeus." The specimen is a female and is metallic blue in color." From Dallas's original description, we do not know whether Dallas had one or more specimens, only the sex: female. Walker (1867a: 115) listed one specimen with the same provenance ("a. Mexico") and we have found only one female specimen in the collection but cannot be sure it was the only one Dallas had. By giving its labels data and calling the specimen "the type", Thomas designated it as the lectotype by inference of "the type".

***caliginosa* (*Arma*)** Walker 1867a: 138.

Original data: Holotype. "a. Constancia, Rio Janeiro. Presented by the Rev. H. Clark."

HOLOTYPE f#: red-margined holotype disc; green-margined type disc; "CONSTANCIA Jan^{y} 1857. H. Clark."; "35. Arma caliginosa"; "NHMUK 010592321". Third, fourth and fifth left antennomeres missing (Fig. 29).

Current status: *Podisus distinctus* (Stål, 1860) (synonymised by Thomas 1992: 90).

***chrysochlora* (*Bodetria*)** Walker 1868: 528.

Original data: Holotype. "a. Amazon Region, From Mr. Bates' collection."

HOLOTYPE m#: red-margined holotype disc; green-margined type disc; blue square label; "Braz / 62 57"; "Bodetria chrysochlora."; "NHMUK 010592391". Specimen well preserved (Fig. 30).

Current status: *Heteroscelis servillei* Laporte, 1833 (synonymised by Stål 1870: 31; see also Distant 1900a: 63; Schouteden 1907: 19).

Note: It seems Thomas (1992: 46) misread one of the label; he noted: "67/5".

***chrysomela* (*Oplomus*)** Breddin 1901: 53.

Original data: Syntypes [Range of measurements]. "Ecuador."

PARALECTOTYPE m#: blue-margined paralectotype disc; “Santa Jnéz (Ecuad) R.Haensch S.”; “1903–322.”; “Co types, Breddin. Purch. of Haensch. Oplomus chrysomela Bredd.”; “6”; “NHMUK 010592600”. Fourth and fifth left antennomeres missing (Fig. 31).

Current status: *Oplomus ebulinus* (Herrich-Schäffer, 1844) (synonymised by Thomas 1992: 58).

Notes: Gaedike (1971: 82) designated a lectotype in DEI; its sex is not mentioned. Although Thomas (1992: 58) did not mention the synonymy as new, he justified it.

***chrysomelas* (*Oplomus*)** Walker 1867a: 121–122.

Original data: Holotype. “a. Cuenca, Province of Equador. From Mr. Fraser’s collection.”

HOLOTYPE m#: red-margined holotype disc; green-margined type disc; “Cuenca / 58 132”; “18. Oplomus chrysomelas.”; “NHMUK 010592403”. Third to fifth right and left antennomeres, left wings, and abdomen missing (the latter is glued on a card) (Fig. 32).

Current status: *Oplomus salamandra* (Burmeister, 1835) (synonymised to *Oplomus tripustulatus* Fabricius by Stål 1870: 28, as Var. c; see Distant 1880: 31; Distant 1900a: 63; Schouteden 1907: 35; Kirkaldy 1909: 8, as *Oplomus salamandra*; Thomas, 1992: 59).

Note. As shown in Thomas (1992: 59), the name *tripustulatus* was preoccupied and so was that of *tibialis* Fabricius, the next junior synonym, the name of the species therefore became *salamandra* Burmeister, 1835, the next non preoccupied junior synonym.

***coeruleus* (*Hoploxys*)** Dallas 1851: 103.

Original data: Syntype(s): ”f#”. “a. Congo. Presented by Sir John Richardson, M. D.”

SYNTYPE f#: blue-margined syntype disc; red-margined type disc; “Congo / 43 56”; “1. Hoploxys caeruleus,”; “a”; “NHMUK 010592440”. Antennae and legs (except the left middle leg and a part of the left anterior leg) missing. The specimen is also missing its right wing, while its abdomen is partially disconnected from its thorax (Fig. 33).

Current status: *Hoploxys coeruleus* Dallas, 1851.

Note: Because Dallas (1851: 103) noted “Antennae with the two basal joints black (rest wanting)”, it is likely that he had only one specimen. Walker (1867a: 141) listed only one specimen and we have found only one female specimen in the collection. Still, we cannot assume that Dallas just described the species from one specimen, we therefore consider it a syntype. Especially as Thomas (1994: 181) only mentioned having examined specimens from the Democratic Republic of the Congo (as Zaire), Gabon and Cameroon and not the type.

***cognata* (*Canthecona*)** Distant 1882: 157.

Original data: Syntype(s). “Hab.: Sumatra (Forbes).”

SYNTYPE f#: blue-margined syntype disc; “Sumatra (Forbes)”; “cognata Dist. [Distant’s handwriting]” “Distant Coll. 1911 – 383.”; “NHMUK 010592152”. Left antenna, fourth and fifth right antennomeres, and right middle leg missing (Fig. 34).

Current status: *Cantheconidea javana* (Dallas, 1851) (see Breddin 1903: 203; Schouteden 1907: 45).

Note. The description of *C. cognata* was actually a comparison with *C. javana*, highlighting what separated the two species (differences in the lateral angles of the pronotum).

***colorata* (*Arma*)** Walker 1867a: 136.

Original data: Holotype (four specimens and three varieties). “a, b. Oajaca. From M. Sallé’s collection. c. Mexico. Presented by W. W. Saunders, Esq. d. Vera Cruz. Presented by W. W. Saunders, Esq.”

HOLOTYPE f#: red-margined holotype disc; “58.135 MEX. (Oajaca.)”; “Euthyrhynchus punicus. Walker’s catal.”; “NHMUK 010592347”. Fifth right antennomere, and fourth and fifth left antennomeres missing. Wings opened (Fig. 35).

NON TYPE m# (Var β): “V Cruz”; “Euthyrhynchus punicus. Walker’s catal.”; “Saunders. 65-13.”; “NHMUK 010592601”. Right antenna ill-formed. Fourth and fifth left antennomeres, and right posterior leg missing (Fig. 36).

NON TYPE f# (Var γ): "Mex"; "66. 12."; "Euthyrhynchus punicus. Walker's catal."; "NHMUK 010592133". Fourth and fifth right and left antennomeres, and left posterior leg missing (Fig. 37).

NON TYPE f# (Var δ): "58-135 MEX. (Oajaca.)"; "Euthyrhynchus punicus. Walker's catal."; "NHMUK 010592348". Third, fourth and fifth left antennomeres, and left posterior leg missing. Wings opened (Fig. 38).

Current status: *Euthyrhynchus floridanus* (Linnaeus, 1767) (first synonymised by Walker (1868: 533) to *Euthyrhynchus punicus* (Linnaeus, 1767), as a variety. Stål 1870: 54–55 synonymised *E. punicus* to *E. floridanus*; see also Distant 1880: 41; 1900a: 63; Schouteden 1907: 56).

Note: Walker (1867a: 136) mentioned three additional varieties for this species: "*Var. β*. – femora red, except the tips"; "*Var* γ. – Testaceous instead of red"; "*Var.* δ like *Var* γ. Stripes of the thorax connected near the hind border". We have found these specimens in the collection but, according to the Internationsl Code of Zoological Nomenclature (ICZN 1999: Art. 72.4.1) the varieties are not to be counted in the type series. We, therefore, consider the second specimen from Mexico (Oajaca) as the holotype.

***concinna* (*Canthecona*)** Walker 1867a: 131.

Original data: Holotype. "a. Hong Kong. Presented by J. C. Bowring, Esq."

HOLOTYPE f#: red-margined holotype disc; green-margined type disc; "Hong Kong / 61 49"; "9. Canthecona concinna."; "NHMUK 010592153". Posterior legs missing (Fig. 39).

Current status: *Eocanthecona concinna* (Walker, 1867) (see Miyamoto 1965: 229; Thomas, 1994: 175).

Note: Strangely enough, Thomas (1994: 176) mentioned having examined determined specimens " in British Museum" but not the holotype.

***conspersus* (*Platynopus*)** Walker 1867a: 123–124.

Original data: 2 syntypes. "a, b. Orizaba. From M. Sallé's collection."

LECTOTYPE m# (designated by Thomas 1992: 58): purple-margined lectotype disc; green-margined type disc; "3. Platynopus conspersus."; "NHMUK 010592398".

Fifth left antennomere, fourth and fifth right antennomeres, right middle leg, and left posterior leg missing (Fig. 40).

PARALECTOTYPE sex?: blue-margined paralectotype disc; “Mex / 56.143”; “Oplomus conspersus Walker’s catal.”; “NHMUK 010592400”. Right antenna, third to fifth left antennomeres, middle and posterior legs, and the abdomen missing (preventing the sex determination) (Fig. 41).

Current status: *Oplomus mutabilis* Stål, 1862 (*Platynopus conspersus* Walker, 1867 was synonymised to *Oplomus* (*Stictocnemus*) *proteus* Stål, 1862 by Stål 1870: 30 [see also Distant 1900a: 63; Schouteden 1907: 36]; the latter species was synonymised to *Oplomus mutabilis* Stål, 1862 by Thomas 1992: 58).

Notes: Walker (1867a: 124) had noted: “The spines of the thorax in this species are hardly apparent, and thus it resembles *Oplomus*.” Indeed, the species was later synonymised to *Oplomus mutabilis* Stål, 1862. Thomas (1992: 58) stated: “The type of *Platynopus conspersus*, a female, was located in the British Museum (Natural History). It is labeled: (a) “Type,” (b) “Platynopus conspersus.””. Walker (1867a: 124) described: “abdomen blackish blue, except at tip; under side with a large quadrate spot of whitish tomentum on each side of the hinder disk, which is wholly black”. The “whitish tomentum” mentioned by him is a bristles set which occurs only in males of some species of Asopinae (glandular patches). Therefore, we assume that Thomas made a mistake when copying the sex of this specimen from his notes. Even so, as he detailed the labels, we consider he has designated a lectotype, by inference of “the type”.

***cornuta* (*Arma*)** Dallas 1851: 98–99.

Original data: Syntype(s): “f#”. “a. Columbia. From M. Goudot’s Collection.”

Current status: *Podisus cornutus* (Dallas, 1851) (see Stål 1870: 54).

Note: Thomas (1992: 82) noted: “I was unable to locate the type at the British Museum (Natural History). Distant (1880) had remarked that it was not in the “National Collection” and that Walker had not included it in his catalog. The type is therefore lost”. Walker (1867a: 135, 136) only mentioned the species twice in passing. The type(s) may be lost or has/have not been recognised yet.

***cuprea* (*Zicrona*)** Dallas 1851: 108.

Original data: Syntypes: “m# f#”. “a. Hudson’s Bay. Presented by G. Barnston, Esq.”

LECTOTYPE f# (designated by Thomas 1992: 129): purple-margined lectotype disc; red-margined type disc; “Hudson’s Bay / 44 17”; “3. Zicrona cuprea,”; “NHMUK 010592443”. Fourth and fifth right and left antennomeres, right middle and posterior legs, and left middle leg missing (Fig. 42).

PARALECTOTYPE f#: blue-margined paralectotype disc; “Hudson’s Bay / 44 17”; “Zicrona cuprea Walker’s catal.”; “NHMUK 010592444”. Fourth and fifth right antennomeres, fifth left antennomere, right anterior and middle legs, and left anterior leg missing (Fig. 43).

PARALECTOTYPE sex?: blue-margined paralectotype disc; “Hudson’s Bay / 44 17”; “Zicrona cuprea Walker’s catal.”; “NHMUK 010592445”. Fourth and fifth right and left antennomeres, anterior and posterior legs, and abdomen missing (preventing the sex determination; it is presumably the male mentioned in the original description) (Fig. 44).

PARALECTOTYPE f#: blue-margined paralectotype disc; “Hudson’s Bay / 44 17”; “108”; “Zicrona cuprea Walker’s catal.”; “NHMUK 010592446”. Fourth and fifth right antennomeres missing (Fig. 45).

Current status: *Zicrona caerulea* (Linnaeus, 1758) (synonymised by Uhler 1872: 395; see Schouteden 1907: 74).

Notes: Walker (1867a: 145) listed four specimens from the same provenance (Hudson's Bay, Dr. Barnston). We have found them all. When Thomas (1992: 129) noted: “The type of *Zicrona cuprea*, a female, was located in the British Museum (Natural History). It is labeled: (a) “Type,” (b) “Zicrona cuprea. ””, he thereby designated as lectotype the female specimen bearing the red “type” label. Burks (1975: 140) precised that, although the labels read “Hudson Bay”, Barnston actually collected his specimens at St Martin’s Falls on the Albany River, in Ontario, Canada. This locality is mentioned in the Museum Accessions Register. At least one specimen of this species was sent to the Museum of Victoria by Francis Walker (Walker 1985: 15). Indeed, Public Library, Museums and National Gallery (Vic.), *et al*. (1890: 52) listed one specimen (Number 52876) coming from Hudson’s Bay. It could be a specimen from the type series. This needs to be further investigated.

***dallasi* (*Macrorhaphis*)** Schouteden 1905: 181–182.

Original data: Syntype(s): “f#”. “*Habitat*: Madagascar: Forêt Tanala. (Mus. Paris).”

NON TYPE m#: rectangular orange allotype label; “INSTITUT SCIENTIFIQUE MADAGASCAR”; “Perinet”; “Macrorhaphis dallasi SCHOUTEDEN m# (hw) G. Schmitz det. 19[pr]76[hw]”; “ALLOTYPUS [pr] Macrorhaphis dallasi m# [hw]”; “Brit.Mus. 1965-338”; “NHMUK 010592177”. Specimen carded, right fourth and fifth antennomeres missing (Fig. 46).

Current status: *Macrorhaphis dallasi* Schouteden, 1905.

Notes: This specimen was labelled by Schmitz as “ALLOTYPUS”; it cannot be a type as its data is not matching that of the original description (the species was described from the female only and Perinet is more to the north than the area that is usually thought of as the Tanala country). Furthermore, Day (1964: 559) explained that the large collection of Madagascan Pentatomidae received from Dr. P. Malzy was one of undetermined specimens specifically sent for identification; it could not have contained types. It is, however, clear that Schmitz (1976: 371) perceived the word “ALLOTYPUS” as referring not only to the type of the opposite sex designated in the original description but also as the first, ulteriorly collected, example of the opposite sex to that already known for the species. A female syntype for the species and a female holotype for its variety are reported in Paris (Maldès & Pluot-Sigwalt 2004: 25–26).

***distinctus* (*Oplomus*)** Distant 1880: 30.

Original data: Syntype(s). “*Hab*. Mexico (*coll*. *Sign*.).”

Current status: *Oplomus catena* (Drury, 1782) (synonymised by Thomas 1992: 57).

Notes: Thomas (1992: 57) noted: “Two female specimens labeled: (a) “Oplomus distinctus Distant,” were located in the British Museum (Natural History). They were not labeled as types, nor could they have originated from Mexico because *Oplomus catena* does not occur there. However, they are the only specimens in the British Museum (Natural History) collection labeled as *O. distinctus*.” Herbert Zettel (personnal communication) denied that the type was in Vienna, where is now located most of Signoret’s collection. He explained: “I could not find a type, or any specimen labeled as such. Among our specimens of *O. catena* there is only a single one with a colour pattern like the specimen illustrated in BCA, but it was collected by Natterer in Brazil." Only one measurement and "remainder wanting" could support the fact that there was only one specimen. This unique specimen may now be lost.

***dollingi* (*Coryzorhaphis*)** Thomas 1992: 39–40.

Original data: "Holotype: female, labeled: (a) "Ecuador, Pichincha, Toachi, 20.I.86, Legit: A. Burieta" (deposited BMNH). Paratype: female, labeled with same data as holotype (deposited BMNH)."

HOLOTYPE f#: red-margined holotype disc; "Ecuador Pichincha Toachi 20-I-86 Legit: A. Burieta"; "HOLOTYPE Coryzorhaphis dollingi Thom."; "NHMUK 010592141". Specimen well preserved (Fig. 47).

PARATYPE f#: yellow-margined paratype disc; "Ecuador Pichincha 20-I-86 Legit: A. Burieta"; "PARATYPE Coryzorhaphis dollingi THOM. "NHMUK 010747741". Specimen well preserved (Fig. 48).

Current status: *Coryzorhaphis dollingi* Thomas, 1992.

***dotatus* (*Platynopus*)** Walker 1867a: 128.

Original data: Holotype. "a. Celebes. Presented by W. W. Saunders, Esq."

HOLOTYPE f#: red-margined holotype disc; "Platynopus dotatus Walker's catal."; "Saunders 65·13"; "Tond"; "NHMUK 010937663" (Fig. 49).

NON TYPE [formerly marked as type] m#: green-margined type disc; "Celebes Manado / 60 76"; "20. Platynopus dotatus."; "NHMUK 010592432". Left antenna missing (Fig. 50).

NON TYPE f#: "Platynopus dotatus Walker's catal."; "52 68 / Batch"; "NHMUK 010937662".

NON TYPE f#: "Platynopus dotatus Walker's catal."; "Saunders 65·13"; "Kai"; "NHMUK 010937664".

Current status: *Montrouzierellus laetus* (Walker, 1867) (synonymised by Distant 1900a: 58, 63; see Kirkaldy 1909: 11; Thomas 1994: 187).

Notes: Walker (1867a: 128) had noted: "Closely allied to *P*. *laetus*; the body and the spines of the thorax are a little shorter." Still it was later synonymised to *laetus*.

The presence in *Montrouzierellus laetus* box of four specimens bearing the printed square Walker's catal label (three with the name "*Platynopus dotatus*", as detailed above, and one with the name "*Platynopus semiscitus*", see the details of its labels under that name) in addition to the three specimens marked and accepted so far as the holotypes of *Platynopus dotatus, P. laetus* and *P. semiscitus* urged us to re-examine the holotypes and further to query how this could have happened. It was found out that the holotype of *P. dotatus* was not the type as the register number on its label indicated that it was bought of Stevens whereas the original description stated that the specimen from Celebes (Sulawesi) had been presented by Saunders; this matched the specimen labelled "Tond" (Tondano, Sulawesi). How it could have happened, is best explained by those who studied Walker's types. Butler (1876: 402, 432) gave an insight into Walker's *modus operandi* while he was preparing descriptions for his manuscripts. Here we glean that, occasionally, Walker omitted to label his types but Distant (1899: 30) is clear "He never labelled his specimens". Signoret (1853: 178), however, explained that the types were missing and that there was not even the hole left by a pin above the determination label. Smith (1893: 7) confirmed that: "None of the specimens were labeled until the descriptions were in type, and then, using a proof sheet, the printed names were cut out and pinned below the series of specimens, not on the insects themselves." This led to types going missing and to other numerous errors. These errors were further compounded as Walker shifted specimens after the catalogues were published and seldom recorded these changes as noted by Distant (1899: 30). We can only speculate that Walker shifted the extra specimens from other positions and placed three with the holotype of *P. dotatus* and one with that of *P. semiscitus*, above each determination label. During his curation, Distant found them and labelled them, giving the long label to the type, much as Butler had done with the Lepidoptera (Smith 1893: 8), and square labels to the others, without spotting that they were not mentioned in the catalogue. Assumedly, the specimen marked as type was chosen because one of its labels conspicuously stated "Celebes [...]" whereas the label of the actual type did not clearly state the type locality that had been published. Incidentally, both specimens were collected in June 1859 by Charles M. Allen, Alfred R. Wallace's assistant; they only reached the Museum through different channels (Baker 1995: 176–178, 193).

***ducalis* (*Blachia*)** Walker 1867a: 117.

Original data: Holotype. "a. Siam. From M. Mouhot's collection."

HOLOTYPE f#: red-margined holotype disc; green-margined type disc; “Siam / 62 73”; “1. Blachia ducalis.”; “NHMUK 010592144”. Left wings glued on a card. Fourth and fifth right antennomeres, and left antenna missing (Fig. 51).

Current status: *Blachia ducalis* Walker, 1867.

Note: Referring to *Blachia ducalis*, Thomas (1994: 167) wrote: “The type series, one male and three females, were examined in the BM[NH]. Also, from India (1 female).” It is difficult to understand what he meant as Walker mentioned only one specimen for *Blachia ducalis* and we have found only one male syntype for its synonym, *Sesha manifesta* Distant.

***egeri* (*Coryzorhaphis*)** Thomas 1992: 37–39.

Original data: “Paratypes: […]. Male, labeled: (a) “Costa Rica, Heredia Prov.” (b) “Puerto Viejo, February 1983, J.H. Martin Coll.” (deposited BMNH).”

PARATYPE m#: “COSTA RICA: N. Heredia Province, ”; “Puerto Viejo. February 1983 J.H. Martin coll.”; “BM 1983-478”; “PARATYPE Coryzorhaphis EGERI THOM.” (Fig. 52)

Current status: *Coryzorhaphis egeri* Thomas, 1992.

Note: The specimen is currently still on loan to Dr Thomas and could not be barcoded.

***elongatus* (*Oplomus*)** Dallas 1852: 6–7.

Original data: Syntype(s): “m#”. “Hab. in Brasilia? In Mr. Westwood’s collection.”

Current status: *Damarius splendidulus* (Fabricius, 1803). (synonymised by Distant 1900a: 58; see Schouteden 1905 : 154; Schouteden 1907: 49, placed in *Damarius*).

Note: The type(s) may have been in Mr. Westwood’s collection but none is to be found nowadays in the Oxford Museum nor is it at the Natural History Museum, London.

***equestris* (*Oplomus*)** Distant 1911a: 253.

Original data: Syntype(s). “*Hab*. Centr. Brazil; Chapada (*A. Robert*, Brit. Mus.).”

LECTOTYPE f# (designated by Thomas, 1992: 60): purple-margined lectotype disc; red-margined type disc; “Cent. Brazil. Chapada. 2600. ft. Nov, 1902. A. Robert. 1903 – 96”; “Oplomus equestris type Dist. [Distant’s handwriting]”; “NHMUK 010592396”. Right antenna and fifth left antennomere missing (Fig. 53).

Current status: *Oplomus festivus* Dallas, 1851 (*Oplomus equestris* Distant, 1911 was synonymised to *Oplomus marginalis* (Westwood, 1837) by Thomas 1992: 60; Rider & Rolston 1995: 845 chose the junior synonym *Oplomus festivus* Dallas, 1851, after assessing that the name of the species *Oplomus marginalis* was preoccupied).

Notes: Thomas (1992: 60) explained: “The type of *Oplomus equestris* was located in the British Museum (Natural History). It is labeled: (a) “Type,” (b) “Oplomus equestris Dist.” (c) “Cent. Brazil, Chapada, 2600 ft. Nov. 1902, A. Robert 1903-96.” The specimen is a female and is red dorsally with a black head and black blotches on the pronotum, scutellum and corium.” From Distant’s original description, we do not know whether Distant had one or more specimens, nor the sex. We have found only one specimen in the collection but cannot be sure it was the only one Distant had. By giving its labels data, describing it and calling the specimen “the type”, Thomas designated it as the lectotype by inference of “the type”. Interestingly, the variety, also a female, was labelled by Distant as “Oplomus equestris <u>var</u> Dist. <u>type</u>”, showing that, in those days, for each variety, a type was to be chosen as well (at least in the collection). Other labels: “Distant Coll. 1911-383.”; “NHMUK 013585588”.

***erubescens* (*Glypsus*)** Distant 1890c: Lv.

Original data: Syntypes. “Hab. Niam-Niam (Bohndorff).” “National Museum of Brussels”.

PARALECTOTYPE f#: blue-margined paralectotype disc; “Niam-Niam Bohndorff”; “Distant Coll. 1911–383.”; “NHMUK 010592305”. Third to fifth right antennomeres, fourth and fifth left antennomeres, and right anterior leg missing (Fig. 54).

PARALECTOTYPE f#: blue-margined paralectotype disc; red-margined type disc; “Niam-Niam Bohndorff”; “erubescens Dist. [Distant’s handwriting]”; “Distant Coll. 1911–383.”; “Distant Coll. 1911–383.”; “NHMUK 010592306”. Fourth and fifth right antennomeres, left anterior leg, and right posterior leg missing (Fig. 55).

Current status: *Glypsus erubescens* Distant, 1890.

Notes: Clearly, having identified and named the specimens from "the National Museum of Brussels", Distant was able to retain some specimens for his own collection. These, in turn, were received by the British Museum (Natural History) as the first of the instalments from Distant's collection (presented in late October 1911, despite the fact that the register mentions only moths and Cicadidae in this instalment). Synave (1969: 10) recorded two further typical specimens in the Brussels Museum (the lectotype and a paratype [sic!]). Linnavuori (1975: 125) designated the lectotype but it may be argued that Synave (1969: 10) actually published the designation first; all other typical specimens are to be considered paralectotypes.

***erythromela*(*Strachia*)** Walker 1867b: 339.

Original data: Holotype. "a. Kaisaa. Presented by W. W. Saunders, Esq."

HOLOTYPE f#: red-margined holotype disc; green-margined type disc; "Kai" "Asopus erythromelas." Saunders. 65·13."; "NHMUK 010592372". Fourth and fifth left antennomeres missing (Fig. 56).

Current status: *Amyotea erythromela* (Walker, 1867) (see Schouteden 1907: 54; Kirkaldy 1909: 23).

Note: The long label from Walker's catalogue reads: "Asopus erythromelas.". While this is not the original combination, this is the one used by Walker (1868: 534).

***falcatus* (*Podisus*)** Distant 1889: 318.

Original data: Syntype(s). "*Hab*. Guatemala, San Gerónimo (*Champion*)."

LECTOTYPE f# (designated by Thomas 1992: 80): purple-margined lectotype disc; red-margined type disc; "S. Geronimo, Guatemala, Champion."; "B. C. A., Hem. I. Podisus falcatus."; "NHMUK 010592322". Specimen well preserved (Fig. 57).

Current status: *Podisus falcatus* Distant, 1889.

Note: Thomas (1992: 80) explained: "The type of *Podisus falcatus*, a female, was located in the British Museum (Natural History). It is labeled: (a) "Type," (b) "S. Geronimo, Guatemala, Champion," (c) "B.C.A. Hem. I. Podisus falcatus."." From Distant's original description, we do not know whether Distant had one or more specimens, nor the sex. We have found only one specimen in the collection but we cannot be sure it was the only one Distant had. By giving its labels data and calling the specimen "the type", Thomas designated it as the lectotype by inference of "the type".

***festivus* (*Oplomus*)** Dallas 1851: 85.

Original data: Syntype(s): “m#”. “a. Columbia. From M. Goudot’s Collection.”

LECTOTYPE m# (designated by Thomas 1992: 60): purple-margined lectotype disc; red-margined type disc; “Columbia / 46 20”; “Magdelain, Janv -”; “13. Oplomus festivus,”; “a”; “NHMUK 010592397”. Fifth right and left antennomeres, and middle and posterior legs missing (Fig. 58).

Current status: *Oplomus festivus* Dallas, 1851.

Notes: Thomas (1992: 60) explained: “The type of *Oplomus festivus* is a male, also located in the British Museum (Natural History). It is labeled: (a) “Type,” (b) “Magdalain, Jande [sic!],” (c) “Oplomus festivus.” The specimen is metallic blue with red spots at the basal angles of the scutellum and on the midline of the pronotum.” From Dallas’s original description, we do not know whether Dallas had one or more specimens, only the sex: male. Walker (1867a: 121) listed one specimen and we have found only one specimen in the collection but cannot be sure it was the only one Dallas had. By giving its labels data, describing it and calling the specimen “the type”, Thomas designated it as the lectotype by inference of “the type”.

***florida* (*Mecosoma*)** Distant 1890c: Liv.

Original data: Syntype(s). “Hab. Niam-Niam (Bohndorff).” “belonging to the National Museum of Brussels”.

Current status: *Mecosoma floridum* Distant, 1890 (see Schouteden 1905: 185; Schouteden 1907: 63; Schouteden 1909: 66; Villiers 1954: 230; Thomas 1994: 186).

Note: Synave (1969: 11) recorded the presence of the holotype in the Brussels Museum. As nothing in the original description indicates that there was only one specimen, we accept Synave’s mention of the holotype published before 2000 as a lectotype designation by inference of “holotype” (ICZN 1999: Art. 74.6).

***frontalis* (*Strachia*)** Walker 1867b: 338–339.

Original data: 2 syntypes. “a. Batchian. Presented by W. W. Saunders, Esq. b. Batchian. From Mr. Wallace's collection.” and two varieties: “Var. *β*.: c, d. Kaisaa. Presented by W. W. Saunders, Esq. Var. γ.: e. Batchian. Presented by W. W. Saunders, Esq.”

SYNTYPE f#: blue-margined syntype disc; “Batch”; “Strachia frontalis Walker’s catal.”; “NHMUK 010592376”. Specimen well preserved (Fig. 59).

SYNTYPE f#: blue-margined syntype disc; “Bac.”; “Strachia frontalis Walker’s catal.”; “Saunders 65·13.”; “NHMUK 010592378”. Fourth and fifth right antennomere, and fifth left antennomere missing (Fig. 60).

Current status: *Amyotea frontalis* (Walker, 1867) (see Schouteden 1907: 54; Thomas 1994: 155).

Notes: Walker (1867b: 338–339) mentioned two varieties for this species: “*Var. β*. – “Thorax more completely pale yellow in front; the purple spots very small or quite wanting. c, d Kaisaa. Presented by W.W. Saunders, Esq” and “*Var* γ. – The purple spots of the thorax connected and forming a large patch. e. Batchian. Presented by W.W. Saunders, Esq.”. We have found these two male specimens in the collection, respectively with the barcodes number 1052377 and 1052375 (one specimen of *Var. β*. is missing), but according to the Zoological Code of Nomenclature (ICZN 1999: Art. 72.4) “the varieties are not considered types”, so we just considered the females listed above as syntypes. Thomas (1994: 155) wrote: “**Material Examined**. Walker's type specimen was examined in the BM(NH).”. Strangely, he mentioned just one specimen. As he did not give any details to recognize the specimen, we do not consider he designated a lectotype. The specimen of var. γ is the one that was marked as type with the long label: “ASOPUS FRONTALIS.” and the green-margined type label. While “Asopus frontalis.” is not the original combination, this is the one used by Walker (1868: 533).

***funebris* (*Anasida*)** Distant 1900a: 59.

Original data: Syntype(s). “*Hab*. Natal (*Gueinzius*: Brit. Mus.).”

SYNTYPE m#: blue-margined syntype disc; red-margined type disc; “Pt Natal / 58 13”; “Anasida funebris Distant [Distant’s handwriting]”; “NHMUK 010592343”. Right antennae, fourth and fifth left antennomeres, and anterior legs missing (Fig. 61).

Current status: *Anasida funebris* Distant, 1900.

Note: Thomas (1994: 160) wrote: “Distant’s male type specimen was examined in BM(NH).” Because he did not clearly distinguish the type from other specimens, we do not consider this a valid lectotype designation.

***fuscescens* (*Arma*)** Dallas 1851: 102.

Original data: Syntype(s): "f#". "a. Mexico."

LECTOTYPE f# (designated by Thomas 1992: 88): purple-margined lectotype disc; red-margined type disc; "Mexico / 48 11"; "7. Arma fuscescens,"; "a"; "NHMUK 010592323". Right hemelytra, fourth and fifth right and left antennomeres, left legs, and posterior right leg missing (Fig. 62).

Current status: *Podisus sagitta* (Fabricius, 1794) (synonymised by Thomas 1992: 87).

Note: Thomas (1992: 88) explained: "I also examined the type of *Arma fuscescens*. The specimen, a female, was located in the British Museum (Natural History). It is labeled: a) "Type," b) "Mexico," c) "a," d) "7. Arma fuscescens. "" From Dallas's original description, we do not know whether Dallas had one or more specimens, only the sex: female. Walker (1867a: 134) listed one specimen from Mexico, from Mr. Argent's collection, Dallas had not mentioned the donor. We have found only one specimen in the collection but cannot be sure it was the only one Dallas had (although it is likely as Dallas stated only one measurement and noted: "Antennae slender, testaceous, with apex of the fourth joint dusky (fifth wanting)." [emphasis ours]). By giving its labels data and calling the specimen "the type", Thomas designated it as the lectotype by inference of "the type".

***gaumeri* (*Podisus*)** Distant 1889: 320.

Original data: Syntype(s). "*Hab*. Mexico, Temax in North Yucatan (*Gaumer*)."

LECTOTYPE f# (designated by Thomas 1992: 126): purple-margined lectotype disc; red-margined type disc; "Temax, N. Yucatan, Gaumer."; "Podisus gaumeri Dist. [Distant's handwriting]"; "NHMUK 010592477". Right antenna, fourth and fifth left antennomeres, right anterior and middle legs missing (Fig. 63).

Current status: *Tyrannocoris jole* (Stål, 1862) (synonymised by Thomas 1992: 126).

Note: Thomas (1992: 126) explained: "I examined the type of *Podisus gaumeri*, a female, located in the British Museum (Natural History). It is labeled: (a) "Type," (b) "Podisus gaumeri Dist." (c) "Temex, N. Yucatan, Gaumer." It differs from other specimens of *T. jole* by being pale above." From Distant's original description, we do not know whether Distant had one or more specimens, nor the sex. We have found only one specimen in the collection but cannot be sure it was the only one Distant had. By giving its labels data and calling the specimen "the type", Thomas designated it as the lectotype by inference of "the type".

***grandis* (*Arma*)** Dallas 1851: 96–97.

Original data: Syntypes: "m# f#". "a. Trenton Falls. Presented by E. Doubleday, Esq. b. ———."

LECTOTYPE f# (designated by Thomas 1992: 27): purple-margined lectotype disc; red-margined type disc; "41. 5. 17 90."; "E. Doubleday."; "3. Arma grandis"; "a"; "NHMUK 010592478". Second to fifth right antennomeres, fourth and fifth left antennomeres, and anterior legs missing. Wings partially displaced (Fig. 65).

PARALECTOTYPE f#: blue-margined paralectotype disc; "41. 5. 17. 91."; "E. Doubleday"; "Arma grandis Walker's catal."; "a"; "NHMUK 010747385".

Fifth right antennomere, fourth and fifth left antennomeres, and left middle leg missing (Fig. 66).

PARALECTOTYPE f#: blue-margined paralectotype disc; "41 5. 17. 89."; "E. Doubleday"; "Arma grandis Walker's catal."; "a"; "NHMUK 010747386". Right antenna, fourth and fifth left antennomeres, and right anterior leg missing. Wings disjointed (Fig. 67).

PARALECTOTYPE f#: blue-margined paralectotype disc; "Arma grandis Walker's catal."; "93a"; "b"; "NHMUK 010935520". Second to fifth antennomeres, and middle and posterior legs missing (Fig. 68).

Current status: *Apoecilus cynicus* (Say, 1831) (synonymised by Uhler 1886: 4 ; see Distant 1900a: 59; Schouteden 1907: 71; Thomas 1992: 27).

Notes: Dallas had at least two specimens, since he listed male and female; Walker (1867a: 134) listed four specimens from Trenton Falls, presented by Doubleday. We have found four, all females (which matches the fact that Dallas had given a range of measurements for the female, "f# lin. 9–10"). One of our four specimens, however, is not from Trenton Falls but is the specimen for which Dallas gave no provenance. Walker (1867a: 134) did not mention under *Arma grandis* any specimens from an unknown provenance. The male reported by Dallas must have been the fourth specimen from Trenton Falls. The label "93a" refers to the first specimen on page 93 in White's unpublished "Catalogue of Hemiptera". There reference is made to Samouelle's

Register: “Reg. 999”. However, on page 174 of that register, no provenance is recorded for records 995 to 1001. Genus *Pentatoma* is dittoed for all specimens on this page. The provenance for record 994 (“New Holland” [Australia]) can certainly not be dittoed. For further informations on White’s Catalogue of Hemiptera and other early catalogues at the Museum, see Wheeler (1996). Did Walker know that “93a” meant “Trenton Falls” or was there another specimen labelled similarly to the three from Trenton Falls, which is missing now? According to Burks (1975: 139), the specimens Doubleday collected at St John’s Bluff may be variously labelled: "St John’s Bluff", "East Florida, Doubleday" and "North America, Doubleday". The same may be true with “Trenton Falls” for which labels could also read: “New York, Doubleday” and “North America, Doubleday. We know that, at least, one specimen of that species was sent to Melbourne by Francis Walker (Walker 1985: 11). Public Library, Museums and National Gallery (Vic.), *et al*. (1890: 52) listed two specimens (numbers 52827 and 52828). They, however, cannot be from the type series as they come from Lake Huron. Thomas (1992: 27) stated: “I examined the female type of *Arma grandis*, located in the British Museum (Natural History). It is labeled (a) “Type,” (b) “E. Meday.” (c) “5-49 90.17,” (d) “3. Arma grandis.”” He thereby designated that specimen a lectotype (although the data of labels (b) and (c) are erroneous).

***grandis* (*Canthecona*)** Dallas 1851: 91–92.

Original data: 4 syntypes: 2 males, 2 females [“Of the four specimens in the Collection, two are males and two females”]. “a. Columbia. From M. Goudot’s Collection. b. Mexico. Presented by E. P. Coffin, esq. c. ———.”

SYNTYPE m#: blue-margined syntype disc; red-margined type disc; “Columbia / 46 20”; “Canthecona grandis identified by Dallas”; “NHMUK 010592339”. Right and left antennae missing (Fig. 69).

SYNTYPE f#: blue-margined syntype disc; “Mexico / 43 13”; “Mutyca phymatophora Walker’s catal.; “b”; “NHMUK 010747381”. Fifth left antennomere missing (Fig. 70).

SYNTYPE f#: blue-margined syntype disc; “Mexico”; “Mutyca phymatophora Walker’s catal.”; “b”; “NHMUK 010747382” Fourth and fifth right antennomeres, and fifth left antennomere missing. The abdomen is smashed (Fig. 71).

Current status: *Alcaeorrhynchus grandis* (Dallas, 1851) (see Bergroth 1891: 235, who gave a new name to preoccupied *Mutyca* Stål, 1862; Schouteden 1907: 32; Kirkaldy 1909: 9).

Notes: Dallas had stated he had four specimens, 2 males and 2 females. Walker (1867a: 131) had placed the species under *Mutyca phymatophora* Beauvois, 1811 and listed 3 specimens with the provenances mentioned by Dallas ("a. Columbia. From M. Goudot's collection. b, c. Mexico. Presented by E. P. Coffin, Esq.") as well as a specimen with no data, just like Dallas had ("h. ———?"). We have found three specimens; the specimen bearing the letter "c" is missing or was not recognised. Thomas (1992: 21) explained: "I examined a male specimen in the British Museum (Natural History) labeled: (a) "Type," (b) "Canthecona grandis, identified by Dallas."". We do not consider this a valid lectotype designation as Thomas just stated having examined a male specimen, one label of which read "Type".

***grisea* (*Canthecona*)** Dallas 1851: 92–93.

Original data: Syntype(s): "f#". "a. ———. Presented by General Hardwicke."

SYNTYPE f#: blue-margined syntype disc; red-margined type disc; "Hardwicke Bequest"; "10. Canthecona grisea,"; "178a"; "a"; "NHMUK 010592293". Third to fifth right antennomeres, fifth left antennomere, right anterior leg, and left middle leg missing (Fig. 72).

Current status: *Picromerus griseus* (Dallas, 1851) (see Schouteden 1907: 25; Thomas 1994: 192).

Notes: Walker (1867a: 131) listed only one specimen; it is likely that Dallas just had one but we cannot be sure and therefore consider the specimen a syntype. The label "178a" refers to the first specimen on page 178 in White's unpublished "Catalogue of Hemiptera", more information is given there: White had determined the specimen as belonging to genus *Halys* and stated it was part of Hardwicke's bequest. For further informations on White's Catalogue of Hemiptera and other early catalogues at the Museum, see Wheeler (1996).

***halys* (*Apateticus*)** Dallas 1851: 105–106.

Original data: Syntypes: "f#". "a. Venezuela. From Mr. Dyson's Collection."

LECTOTYPE f# (designated by Thomas 1992: 25): purple-margined lectotype disc; red-margined type disc; “Venezuela / 47 26”; “1. Apateticus halys,”; “a”; “NHMUK 010592340”. Fifth right antennomere, and fourth and fifth left antennomeres missing; abdomen smashed; genital plates disjointed (Fig. 73).

PARALECTOTYPE f#: blue-margined paralectotype disc; “Venezu / 46 75”; “Arma Apateticus halys Walker’s catal.”; “a”; “NHMUK 010747384”.

Fourth and fifth right and left antennomeres missing (Fig. 74).

Current status: *Apateticus lineolatus* (Herrich-Schäffer, 1840) (first synonymised to *Podisus punctipennis* Herrich-Schäffer by Stål 1867: 498, then synonymised to *Podisus* (*Apateticus*) *lineolatus* Herrich-Schäffer by Stål 1872: 129; see Schouteden 1907: 70, who pointed out the priority of *Apateticus* Dallas, 1851 over *Podisus* Herrich-Schäffer, 1853).

Note: Dallas did not state the number of specimens from which he described the species (although we can assume he had at least two since he gave a range of measurements, “Long. Lin. 6½–7.”), only the sex: female. Walker (1867a: 143) listed 2 specimens from the same provenance (Venezuela, Mr Dyson). We have found 2 female specimens in the collection, with matching data. Thomas (1992: 25) explained: “I examined the female type of *Apateticus halys* located in the British Museum (Natural History). It is labeled (a) “Type,” (b) “Venezuela,” (c) “1. Apateticus halys.”” In so doing, he designated that specimen as the lectotype for this species.

***hamata* (*Strachia*)** Walker 1867b: 342.

Original data: Holotype and Var. *β*. “a, b. New Guinea. Presented by W. W. Saunders, Esq.”

HOLOTYPE m#: red-margined holotype disc; “S”; “Strachia hamata Walker’s catal.”; “Saunders. 65·13.”; “NHMUK 010592380”. Fourth and fifth right and left antennomeres missing; left hemelytra disjointed; left membranous wing deteriorated (Fig. 75).

Current status: *Amyotea hamata* (Walker, 1867) (see Schouteden 1907: 54).

Notes: Walker (1867b: 342) mentioned another variety of this species: “*Var. β*. – Scutellum with a cruciform pale luteous stripe”. We have found this female specimen in the collection (barcode number NHMUK 010592379) but according to the International Code of Zoological Nomenclature (ICZN 1999: Art. 72.4. 1) the varieties are not to be counted as part of the type series, therefore we consider only the specimen with the uniform coloured scutellum as the holotype. This specimen, presented by William W. Saunders to the Museum in 1865, was collected early in 1861 by Charles M. Allen, Alfred R. Wallace's assistant; the handwritten "S" on the disc label may stand for Sorong or "Saylee" [Sele] (Baker, 1995: 195). The female specimen, var. *β*, was the one marked as type with both the long label: "ASOPUS HAMATUS" and the green-margined type label. It also bears three other labels: "Wallace"; "Saunders 65·13." and "N.Guin. S.W.". While "ASOPUS HAMATUS." is not the original combination, this is one used by Walker (1868: 533).

***humeralis* (*Canthecona*)** Distant 1908: 452.

Original data: Syntype(s): "m#". "*Hab*. Tenasserim; Mergui (*Coll*. *Dist*.)."

SYNTYPE f#: blue-margined syntype disc; red-margined type [H. T.] disc; "Tenasserim Mergui"; "Canthecona humeralis type Dist. [Distant's handwriting]"; "Distant Coll. 1911–383."; "NHMUK 010592154". Left hemelytra and right anterior leg missing, abdomen and scutellum disjointed from pronotum (Fig. 76).

Current status: *Cantheconidea humeralis* (Distant, 1908) (see Schouteden 1907: 44).

Note: Distant did not state the number of his specimens. Thomas (1994: 168) mentioned "Type specimens in BMNH". We have found only one specimen in the collection, a female.

***indecora* (*Bodetria*)** Walker 1868: 528.

Original data: Holotype. "a. Amazon Region, From Mr. Bates' collection."

HOLOTYPE f#: red-margined holotype disc; green-margined type disc; "Braz /62 57"; "Bodetria indecora."; "NHMUK 010592393". Specimen in double mounting; fourth and fifth right and left antennomeres, left anterior leg, and posterior legs missing (Fig. 77).

Current status: *Heteroscelis servillei* Laporte, 1833 (synonymised by Stål 1870: 31; see also Distant 1900a: 63; Schouteden 1907: 19).

***indicus* (*Platynopus*)** Chatterjee 1934: 24–26.

Original data: Holotype. “Described from eight examples. Type in British Museum, Natural History, London. Locality: COORG: Fraserpet, IX-30 (1 ex.), on *spiked sandal* (N.C.C.); plot 1, IX, XI-30 (2 ex.); plot 2, VII, IX-30 (2 ex.); plot 3, VIII-30 (1 ex.); plot 4, VIII, IX-30 (2 ex.).”

Current status: *Platynopus indicus* Chatterjee, 1934

Note: Although Chatterjee (1934: 25) noted that the type of this species was deposited at the “British Museum, Natural History, London”, we failed to find the specimen in the collection. It is possible that it has been misplaced and will be found ulteriorly. Alternatively, the whole type series may be deposited at the Forest Research Institute (FRI, which had organised the survey reported by Chatterjee 1934) or at the Northern Regional Centre (NRC) of the Zoological Survey of India (ZSI), both located in Dehradun, Uttarakhand. Because Chatterjee did not state which of the eight specimens was the type in the original description, if the whole type series is to be found in the same depository, all specimens should be regarded as syntypes unless they each clearly bear a label stating either “Holotype” or “Paratype”.

***infuscata* (*Macrorhaphis*)** Walker 1868: 531.

Original data: Holotype. “a. Whydah. From Mr. Fraser’s collection.”

HOLOTYPE f#: red-margined holotype disc; green-margined type disc; “53 74”; “Macrorhaphis infuscata. f# sp. n. F. Walker 1868”; “G. Schmitz det. 1976 Macrorhaphis acuta DALLAS”; “NHMUK 010592176”. Specimen carded; antennae and left legs missing; abdomen loose; genital plates inside a vial glass (Fig. 78).

Current status: *Macrorhaphis acuta* Dallas, 1851 (synonymised by Schouteden 1905: 177; see Schouteden 1907: 39).

Note: Walker (1868) had noted: “This may be a variety of *M. acuta*, from which it is distinguished by the longer ventral spine.” Indeed, the species was later synonymised to *M. acuta* by Schouteden.

***insignis* (*Moyara*)** Distant 1898: 314–315.

Original data: Syntype(s). “*Hab*. Nyasaland, Zomba (*Dr. P. Rendall*).”

SYNTYPE f#: blue-margined syntype disc; red-margined type [H. T.] disc; “Zomba Brit. Centr Afr. (P. Rendall)”; “insignis Dist. [Distant’s handwriting]”; “Distant Coll. 1911–383.”; “NHMUK 010592142”. Specimen well preserved (Fig. 79).

Current status: *Leptolobus insignis* (Distant, 1898) (see Schouteden 1905: 172; Schouteden 1907: 17; Bergroth 1908 : 181; Kirkaldy 1909 : 29; Thomas 1994 : 183).

Note: Thomas (1994: 183) stated "Type specimen in BM(NH)". Similarly, we have found only one.

***insignis* (*Podisus*)** Distant 1880: 39.

Original data: Syntype(s). "*Hab*. Guatemala, San Gerónimo (*Champion*)."

LECTOTYPE m# (designated by Thomas 1992: 98): purple-margined lectotype disc; red-margined type disc; "San Geronimo Verapaz"; "insignis Dist. (type) [Distant's handwriting]"; "NHMUK 010592324". Fourth and fifth left antennomeres, and right posterior leg missing (Fig. 80).

Current status: *Podisus insignis* Distant, 1880.

Notes: Thomas (1992: 98) explained: "I examined the male type of *Podisus insignis*. It is located in the British Museum (Natural History) and is labeled: a) "Type," b) "insignis Dist. (type)," c) "San Geronimo, Verapaz."" From Distant's original description, we do not know whether Distant had one or more specimens, nor the sex. We have found only one specimen in the collection but cannot be sure it was the only one Distant had. By giving its labels data and calling the specimen "the type", Thomas designated it as the lectotype by inference of "the type".

***insularis* (*Canthecona*)** Kirby 1891: 79.

Original data: Syntype(s). "Ceylon": "Pundaloya"("E. Ernest Green").

SYNTYPE f#: blue-margined syntype disc; "Pundalova [sic, with "y" handwritten in blue after "Ceylon."] Ceylon."; "Ceylon. Green Coll. 91–29"; "Canthecona insularis Kb. cotype"; "L//1"; "NHMUK 010592157". Fourth and fifth right and left antennomeres, and middle and posterior left legs missing (Fig. 81).

SYNTYPE f#: blue-margined syntype disc; "Pundaloya Ceylon."; "Ceylon. Green Coll 91–26"; "Canthecona insularis Kb. type figd."; "NHMUK 010592158". Specimen well preserved (Fig. 82).

Current status: *Cantheconidea javana* (Dallas, 1851) (synonymised to *Canthecona cognata* Distant,1882 by Distant 1900a: 58, which itself was synonymised to *C. javana* Dallas, 1851 by Breddin 1903: 203; see Schouteden 1907: 45).

***internexa* (*Cazira*)** Walker 1867a: 118.

Original data: Holotype. “a. Cambodia. Presented by W. W. Saunders, Esq.”

HOLOTYPE f#: red-margined holotype disc; green-margined type disc; “Cambo”; “4. Cazira internexa.”; “Saunders 65·13.”; “NHMUK 010592146”. Right antenna missing; wings disjointed (Fig. 83).

Current status: *Cazira internexa* Walker, 1867.

***invaria* (*Arma*)** Walker 1867a: 135.

Original data: Holotype. “a. Oajaca. From M. Sallé’s collection.”

HOLOTYPE m#: red-margined holotype disc; green-margined type disc; “58·135 MEX. (Oajaca.)”; “15. Arma invaria.”; “NHMUK 010592325”. Fourth and fifth left antennomeres missing (Fig. 84).

Current status: *Apoecilus invarius* (Walker, 1867) (see Thomas 1992: 28).

***javanus* (*Glypsus*?)** Dallas 1851: 94.

Original data: Syntype(s): “m#”. “a. Java. From the East India Company's Collection.”

SYNTYPE m#: blue-margined syntype disc; red-margined type disc; “Java”; “6. Glypsus javanus,”; “a”; “NHMUK 010592156”. Antennae missing (Fig. 85).

Current status: *Cantheconidea javana* (Dallas, 1851) (see Schouteden 1907: 45).

Note: Walker (1867a: 132) listed one specimen. It is likely that Dallas only had the one for his description yet we cannot be sure of this, we therefore consider the specimen a syntype.

***laetus* (*Platynopus*)** Walker 1867a: 127–128.

Original data: Holotype. “a. New Guinea. Presented by W. W. Saunders, Esq.”

HOLOTYPE m#: red-margined holotype disc; green-margined type disc; “N”; “19. Platynopus laetus.”; “Saunders 65·13.”; “NHMUK 010592431”. Fourth and fifth right antennomeres, and right anterior and left middle legs missing. The legs are glued on the first label (Fig. 86).

Current status: *Montrouzierellus laetus* (Walker, 1867) (see Kirkaldy 1909: 11; Thomas 1994: 187).

***lateralis* (*Arma*)** Walker 1867a: 138–139.

Original data: 2 syntypes. "a. Constancia. Presented by the Rev. H. Clark and by J. Gray, Esq. b. Petropolis. Presented by the Rev. H. Clark and by J. Gray, Esq."

LECTOTYPE f# (designated by Thomas 1992: 114): purple-margined lectotype disc; green-margined type disc; "CONSTANCIA Jan.[y] 1857 J. Gray."; "36. Arma lateralis"; "NHMUK 010592364". Fourth and fifth right antennomeres, second to fifth left antennomeres, right anterior leg, and middle legs missing (Fig. 87).

PARALECTOTYPE f#: blue-margined paralectotype disc; "Arma lateralis lurida Walker's catal."; "PETROPOLIS Feb.[y] 1857. J. Gray. / 57. 57"; "NHMUK 010939179". Specimen carded (Fig. 88).

Current status: *Supputius cincticeps* (Stål, 1860) (synonymised to *Tynacantha cincticeps* Stål by Distant 1887: Lix; see Distant 1900a: 63; Schouteden 1907: 59, placed in *Supputius* Distant).

Note: Thomas (1992: 114) explained: "The type of *Arma lateralis* Walker was located in the British Museum (Natural History). It is labeled: (a) "Type," (b) "Constancia, Jan 1857, J. Gray," (c) "36. Arma lateralis." The specimen is a female." We know from the original description that Walker described the species from two specimens. By distinguishing the syntype from Constancia as "The type", Thomas has designated it as lectotype by inference of "the type".

***leprosus* (*Asopus*)** Germar 1838: 186.

Original data: Syntype(s). Cape of Good Hope.

SYNTYPE sex unknown: blue-margined syntype disc; faded red-margined type disc; "C.G.H/ 42 77"; "1165. "; "a"; "Asopus leprosus [hw] Germar det. [pr] "; "Cape Gd. Hope. 42-77. Ex.coll.Drège.No.[pr] 1165 [hw] "; "1. MACRORHAPHIS TRISTIS. [pr] "; "NHMUK 010937295". Antennae, anterior legs, left middle and posterior legs, and abdomen missing (Fig. 89).

Current status: *Macrorhaphis* (*Macrorhaphis*) *leprosa* (Germar, 1838) (see Dallas 1851: 88, who first placed the species in his newly described genus *Macrorhaphis* and Thomas 1994: 184–185, for the subgeneric placement).

Notes: The senior author located a male syntype of *A. leprosus* in MFNB. None is to be found in Lviv. Walker (1867a: 129) recorded two specimens of *Macrorhaphis tristis* (Herrich-Schäffer, 1844) coming from the Cape and Drège's collection. The

Accessions register does not record any specimen of *Asopus tristis* under number 42 77 nor the count of specimens for *Asopus leprosus* as it does for other species. We have found one specimen of *Asopus leprosus* in the collection. Walker (1867a: 129) was obviously unaware that the two specimens he had recorded under *Macrorhaphis tristis* were Germar's syntypes of *Asopus leprosus* (or, at least, one of them is). He must have interpreted both species from Herrich-Schäffer's (1844) figures and held that the true *Asopus leprosus* (a species for which he listed no specimens) possibly belonged in *Platynopus* (see Walker 1867a: 126). Stål (1870: 44) had noted that the type series was not conspecific. The male specimen examined in Berlin belongs in *Macrorhaphis* as does the specimen examined in London.

***lewisi* (*Picromerus*)** Scott 1874: 293–294.

Original data: Syntype(s). Japan (George Lewis).

SYNTYPE f#: blue-margined syntype disc; red-margined type [H. T.] disc; “Type. Scott Coll. 88–11.”; “Picromerus Lewisi, n. sp.”; “NHMUK 010592297”. Specimen well preserved (Fig. 90).

Current status: *Picromerus lewisi* Scott, 1874.

***lineatus* (*Oplomus*)** Walker 1867a: 122.

Original data: Holotype. “a. Abyssinia. Presented by the Secretary for Indian Affairs.”

HOLOTYPE f#: red-margined holotype disc; red-margined type disc; green-margined type disc; “Abyss”; “5 19 [sic!]”; “20. Oplomus lineatus.” “PERILLUS near CONFLUENS (H.-S.) Det. V. Gapud 1972”; “NHMUK 010592423”. Second to fifth right antennomeres, fourth and fifth left antennomeres, left middle leg, and posterior legs missing (Fig. 91).

Current status: *Perillus confluens* (Herrich-Schäffer, 1840) (synonymised by Thomas 1992: 70).

Notes: Walker (1867a: 122) had noted: “It differs much in aspect from the American species of the genus.” and indeed the specimen was found not to belong in *Oplomus*. The Accessions Register number on the label was erroneously reproduced on the card; the reverse of the original label should not read “5 19” but “61 9”.

***luridus* (*Cimex*)** Fabricius 1775: 701.

Original data: Syntype(s). “Habitat in Anglia. *Mus*. *Banks*.”

SYNTYPE m#: red-margined type disc; “England”; “BRIT. MUS. TYPE No. HEM. 393”; “Cimex luridus Fab. Entom. n. 701.25 ”; “BMNH(E) #668923”. Specimen well preserved (Fig. 92).

Current status: *Troilus luridus* (Fabricius, 1775) (see Reuter 1881: 156; Thomas 1994: 199).

Note: The specimen may be found in the Banks collection at the Natural History Museum, London.

***luridus* (*Glypsus*)** Dallas 1851: 93–94.

Original data: Syntype(s): “m#”. “a. Corea. Presented by Capt. Sir Edward Belcher.”

SYNTYPE m#: blue-margined syntype disc; red-margined type disc; “Corea / 47 21”; “5. Glypsus luridus,”; “Glypsus erubescens Distant Det. V. Gapud 1973”; “a”; “NHMUK 010592307”. Fourth and fifth right antennomeres, and third to fifth left antennomeres missing (Fig. 93).

Current status: *Glypsus luridus* Dallas, 1851.

Note: Walker (1867a: 132) listed one specimen. Thomas (1994: 180) stated: “I was unable to locate the type at the BM(NH).” We have found one male specimen. It is likely that Dallas described the species from this unique specimen (especially as he stated one measurement and noted: “Antennae black? (<u>the two apical joints wanting</u>).” [emphasis ours]), but we cannot be sure, therefore we consider it a syntype.

***manifesta* (*Sesha*)** Distant 1887a: 343–344.

Original data: Syntype(s). “Hab. Sikkim (Calc. Mus. and coll. *Dist*.).”

SYNTYPE m#: blue-margined syntype disc; “Sikkim.”; “manifesta Dist. [Distant’s handwriting]”; “NHMUK 010592140”. Fourth and fifth right and left antennomeres, left anterior leg, and right posterior leg missing. There are two antennomeres and two legs glued on a card pinned below the specimen (Fig. 94).

?SYNTYPE m#: blue-margined syntype disc; “Sikkim”; “Atkinson Coll. 92–6.”; “NHMUK 010592145”. Second to fifth right and left antennomeres missing (Fig. 95).

Current status: *Blachia ducalis* Walker, 1867 (synonymised by Atkinson 1888: 171; see Distant 1902: 247; Schouteden 1907: 29).

Notes: Referring to *Blachia ducalis*, Thomas (1994: 167) wrote: "The type series, one male and three females, were examined in the BM[NH]. Also, from India (1 female)." It is difficult to understand what he meant as Walker mentioned only one specimen for *Blachia ducalis* and we have found only one male syntype for its synonym, *Sesha manifesta* Distant. The specimen from Atkinson's collection was accessioned in 1892 but was reported by Atkinson (1888); Distant may have used it when he described his species.

***marginata* (*Tynacantha*)** Dallas 1851: 107.

Original data: Syntype(s): "f#". "a. Venezuela. From Mr. Dyson's Collection."

LECTOTYPE f# (designated by Thomas 1992: 122): purple-margined lectotype disc; red-margined type disc; "Venezuela / 47 1"; "1. Tynacantha marginata,"; "a"; "NHMUK 010592371". Second to fifth right antennomeres, fourth and fifth left antennomeres, and right posterior leg missing (Fig. 96).

Current status: *Tynacantha marginata* Dallas, 1851.

Note: Thomas (1992: 122) explained: "I examined the type of *Tynacantha marginata*, a female, located in the British Museum (Natural History). It is labeled: (a) "Type," (b) "61 Venezuela," (c) "a," (d) "Tynacantha marginata."" From Dallas's original description, we do not know whether Dallas had one or more specimens, only the sex: female. Walker (1867a: 147) listed one specimen and we have found only one specimen in the collection but cannot be sure it was the only one Dallas had. By giving its labels data (albeit somewhat erroneously) and calling the specimen "the type", Thomas designated it as the lectotype by inference of "the type".

***marginella* (*Canthecona*)** Dallas 1851: 89.

Original data: Syntype(S): male. a. Sierra Leone. Presented by the Rev. D.F. Morgan."

SYNTYPE m#: blue-margined syntype disc; red-margined type disc; "87 a"; "Canthecona marginella identified by Dallas."; "a"; "NHMUK 010592170". Fourth and fifth right antennomeres, second to fifth left antennomeres, and left posterior leg missing (Fig. 97).

Current status: *Afrius purpureus* (Westwood, 1837) (first synonymised to *Canthecona Yolofa* (Guérin-Méneville, 1831), as a var. by Stål 1862: 496; synonymised by Stål, 1870: 44; see Roell *et al*., 2019: XXX).

Notes: Walker (1867a: 130) listed one specimen from Sierra Leone under the name *Canthecona yolofa*. It is likely that Dallas only described the species from this unique specimen (especially as he stated only one measurement and noted: "Antennae black (two apical joints wanting)." [emphasis ours]), but we cannot be sure, we therefore consider it a syntype. The label "87a" refers to the first specimen on page 87 in White's unpublished "Catalogue of Hemiptera" There, reference is made to a record in Samouelle's Register: "Reg. 1224". On page 182 of Samouelle's Register, we can find information on the determination of the specimen: "*Pentatoma*" and on its provenance: "Sierra Leone Rvd Morgan". A cross-reference to White's Catalogue of Hemiptera is as well noted: "Cat. Hem. II 87a". For further informations on White's Catalogue of Hemiptera and other early catalogues at the Museum, see Wheeler (1996).

***marginella* (*Zicrona*)** Dallas 1851: 109.

Original data: Syntypes: "m# f#". "a. Hudson's Bay. Presented by G. Barnston, Esq."

LECTOTYPE f# (designated by Thomas 1992: 70): purple-margined lectotype disc; red-margined type disc; "Hudson's Bay / 44 17"; "4. Zicrona marginella,"; "NHMUK 010592410". Right middle leg missing (Fig. 98).

PARALECTOTYPE m#: blue-margined paralectotype disc; "Hudson's Bay / 44 17"; "Zicrona marginella Walker's catal."; "NHMUK 010747388". Second to fifth left antennomeres missing (Fig. 99).

PARALECTOTYPE f#: blue-margined paralectotype disc; "Hudson's Bay / 44 17"; "Zicrona marginella Walker's catal."; "NHMUK 010747389". Antennae and left anterior leg missing (Fig. 100).

Current status: *Perillus exaptus* (Say, 1825) (synonymised by Uhler 1861: 23, to *Zicrona exapta*; see Stål 1870: 32; Uhler 1876: 281, placed in *Perillus*).

Notes: Walker (1867a: 146) listed five specimens from the same provenance. (Hudson's Bay, Dr. Barnston). Thomas (1992: 70) stated: "The female type of *Zicrona marginella* Dallas was located in the British Museum (Natural Museum). It is labeled: (a) "Type," (b) "Zicrona marginella."". With these words, he designated the specimen marked as type as the lectotype by inference of "the type". Burks (1975: 140) precised that, although the labels read "Hudson Bay", Barnston actually collected his specimens at St Martin's Falls on the Albany River, in Ontario, Canada. This locality is mentioned in the Museum Accessions Register. Walker (1985: 15) listed the name *Zicrona marginella* among those of named species sent by Francis Walker to the Museum of Victoria. Public Library, Museums and National Gallery (Vic.), *et al*. (1890: 52) listed one specimen (Number 52875) of this species coming from Hudson's Bay. It could be one of the two missing paralectotypes. This needs to be further investigated.

***marmorata* (*Canthecona*)** Dallas 1851: 90.

Original data: Syntype(s): "m#". "a. S. Africa. Presented by the Earl of Derby."

SYNTYPE m#: blue-margined syntype disc; red-margined type disc; "Int. S. Africa / 43 19"; "3. Canthecona marmorata,"; "a"; "NHMUK 010592164". Right middle and posterior legs missing (Fig. 101).

Current status: *Afrius purpureus* (Westwood, 1837) (synonymised by Roell *et al*. 2019: XXX).

Notes: Walker (1867a: 130) listed only one specimen from the same provenance (South Africa, Earl of Derby); it is likely that Dallas described the species from this unique specimen but we cannot be totally sure, we therefore consider the specimen a syntype. Strangely, Thomas (1994: 151) wrote "the Holotype female of *Canthecona marmorata* Dallas was located in the BM(NH)". Dallas described the species from one (or more) male, and we have also found a male in the collection.

***Marshalli* (*Mecosoma*)** Distant 1898: 308–309.

Original data: Syntype(s). "*Hab*. Mashonaland, near Salisbury (*G. A. K. Marshall*)."

SYNTYPE f#: blue-margined syntype disc; red-margined type [H. T.] disc; "Salisbury Mashonaland (S Marshall)"; "Marshalli Dist. [Distant's handwriting]"; "66"; "Distant coll. 1911–383."; "NHMUK 010592414". Fifth right antennomere, fourth and fifth left antennomere, right legs, and left middle leg missing (Fig. 102).

Current status: *Mecosoma mensor* (Germar, 1838) (synonymised by Schouteden 1905: 183, 185 ; see Schouteden 1907: 63; Kirkaldy 1909: 25).

***megaspila* (*Strachia*)** Walker 1867b: 341.

Original data: Holotype. "a. Mysol. Presented by W. W. Saunders, Esq."

HOLOTYPE f#: red-margined holotype disc; green-margined type disc; "Saunders 65.13."; "M"; "Asopus megaspilus."; "NHMUK 010592385". Fifth right and left antennomeres missing (Fig. 103).

Current status: *Amyotea reciproca* (Walker, 1867) (synonymised by Stål 1870: 57; see Schouteden 1907: 54).

Notes: Walker (1867b: 341) had noted: "This may be a mere variety of *S. reciproca*." And, indeed, the species was later synonymised to *reciproca*. The handwritten "M" on the disc label was the way Charles M. Allen, Alfred R. Wallace's assistant recorded "Mysol" (Baker, 1995: 173). The long label from Walker's catalogue reads: "Asopus megaspilus.". While this is not the original combination, this is the one used by Walker (1868: 534).

***megaspilus* (*Hoploxys*)** Walker 1867a: 141.

Original data: Holotype. "a. Santarem. From Mr. Bates' collection."

HOLOTYPE m#: red-margined holotype disc; green-margined type disc; "Santarem / 53 72"; "2. Hoploxys megaspilus."; "NHMUK 010592365". Specimen well preserved (Fig. 104).

Current status: *Tylospilus megaspilus* (Walker, 1867) (see Distant 1900a: 59).

Note: Walker (1867a: 141) had noted: "This species will form a distinct section in the genus."; Distant (1900a: 59) referred it to *Tylospilus* Stål, 1870.

***mexicanus* (*Podisus*)** Distant 1880: 38.

Original data: Syntype(s). "*Hab*. Mexico (*coll*. *Sign*.)."

Current status: *Podisus mexicanus* Distant, 1880.

Note: Thomas (1992: 96) explained: "A female specimen located in the British Museum (Natural History) is labeled: (a) "Type," (b) "Omilteme Guerrero 800 ft July H.H. Smith." (c) "Mexicanus Dist." As with some of the other specimens labeled as types in the British Museum (Natural History), this is not the specimen referred to by Distant (1880) in his original description. My colleague William Dolling, curator of Hemiptera at the British Museum, informs me that these type labels were added early in the twentieth century at the direction of the museum management." Indeed, the original description stating that the type(s) was/were in "coll. Sign[oret]", we contacted Dr Herbert Zettel, who informed us (personnal communication) that a female specimen, unique type, was under his care in NHMW, Vienna. We regard this Viennese specimen as a syntype.

***micans* (*Asopus*)** Distant 1888: 476.

Original data: Syntype(s). "*Received from Baron von Müller, and collected by Mr. Sayer in New Guinea during Mr. Cuthbertson's Expedition*."

SYNTYPE f#: blue-margined syntype disc; red-margined type [H. T.] disc; "L1 N. GUINEA COLL. SAYER"; "micans Dist. [Distant's handwriting]"; "Distant Coll. 1911–383"; "NHMUK 010592382". Left antenna and left posterior leg missing (Fig. 105).

Current status: *Amyotea micans* (Distant, 1888) (see Schouteden 1907: 54; Thomas 1994: 157).

Notes: Thomas (1994: 158) mentioned: "Distant's type specimen was examined in BM(NH)".We do not deem that Thomas (1994) gave enough detail to recognise the specimen and do not consider his having mentioned examining "Distant's type specimen" as a valid lectotype designation.

***migratoria* (*Cantheconidea*)** Distant 1913: 144–145.

Original data: Syntype(s). "*Loc*. Aldabra, 1907 (Thomasset)."

SYNTYPE f#: blue-margined syntype disc; red-margined type disc; "Aldabra. APT. 1907."; "Percy Sladen Trust Expedition. 1911–497."; "Canthecona migratoria type Dist. [Distant's handwriting]"; "NHMUK 010592166". Carded specimen. Fifth left antennomere, right antenna, and right posterior leg missing (Fig. 106).

Current status: *Afrius* (*Subafrius*) *flavirostrum* (Signoret, 1861) (synonymised by Roell *et al*., 2019: XXX).

Note: Thomas (1994: 151) explained: "I am convinced that the specimen labeled "Afrius nigritarsis Distant," "Type," and, "Aldabra," is actually the lost type of *C. migratoria* Distant. The specimen from Aldabra is markedly similar to *Afrius flavirostrum*, a Madagascan species, but I hesitate to synonymize Distant's name because of the uncertainty attending the true identity of the specimen, it's [sic!] exotic geographic origin, and the paucity of material for study. With those provisos in mind I am transferring *Cantheconidea migratoria* Distant to the genus *Afrius*, subgenus *Subafrius*." It seems clear to us that he misread the specific epithet *migratoria* for *nigritarsis* and we do not doubt the identity of the specimen.

***minax* (*Ealda*)** Walker 1867b: 409.

Original data: 2 syntypes. "a, b. New Caledonia. From Mr. Macgillivray's collection."

SYNTYPE f#: blue-margined syntype disc; green-margined type disc; "New Caled. / 59 63"; "1. Ealda minax."; "NHMUK 010592421". Second to fifth left antennomeres, and right legs missing (Fig. 107).

SYNTYPE f#: blue-margined syntype disc; "New Caled / 59 63"; "*Ealda minax* Walker's catal."; "NHMUK 010592422". Wings opened (Fig. 108).

Current status: *Ealda minax* Walker, 1867.

Note: Thomas (1994: 175) also mentioned having examined two female syntypes.

***modesta* (*Arma*)** Dallas 1851: 101–102.

Original data: Syntypes: "m# f#". "a. N. America. From Lieut. Redman's Collection. b. Cincinnati. Presented by G. Lea, Esq. c. Trenton Falls. Presented by E. Doubleday, Esq. d. N. America. From Mr. Children's Collection."

LECTOTYPE m# (designated by Thomas 1992: 92): purple-margined lectotype disc; red-margined type disc; "5. Arma modesta,"; "698"; "a"; "NHMUK 010592326". Second to fifth right and left antennomeres, left legs, and abdomen missing. The abdomen is inside a vial (Fig. 109).

PARALECTOTYPE m#: blue-margined paralectotype disc; "Cincinnati / 44 76"; "Arma modesta Walker's catal."; "b"; "NHMUK 010747390". Double mounted; Fourth and fifth left antennomeres, and right middle leg missing (Fig. 110).

PARALECTOTYPE f#: blue-margined paralectotype disc; "688"; "a"; "R"; "NHMUK 010747391". Second to fifth right antennomeres, fourth and fifth left antennomeres, anterior legs, and posterior legs missing (Fig. 111).

PARALECTOTYPE f#: blue-margined paralectotype disc; "E. Doubleday. Trenton Falls, New York"; "Arma modesta Walker's catal."; "41.5.17.87"; "c";

“NHMUK 010747392”. Double mounted. Fourth and fifth right antennomeres, and right hemelytra missing (Fig. 112).

Current status: *Podisus maculiventris* (Say, 1831) (synonymised by Phillips 1983: 136; see Thomas 1992: 93; Rider 2012: 324).

Notes: Dallas listed four different provenances. Walker (1867a: 134) listed one specimen per provenance. It is likely that Dallas had, at least four specimens when he described the species. We have found four in the collection but the North American specimen from Children’s collection (“d”) is missing or has not been recognised (these little labels with the first letters of the alphabet are in Dallas’s handwriting and still mark on most of his specimens the provenances listed in his catalogue). Thomas (1992: 92) explained: “The type of *Arma modesta*, a male, was located in the British Museum (Natural History). It is labeled: (a) “Type,” (b) “5. Arma modesta,” (c) “a.”.” By giving its labels data and sex and calling the specimen “the type”, Thomas designated it as the lectotype by inference of “the type”. Phillips’s (1983) thesis remained unpublished; her new synonymies, however, were validated by Thomas as was her new species *Podisus brevispinus*, which as Rider (2012: 324) noted, should carry the following authorship: Phillips, 1992.

moesta **(*Edessa*)** Germar 1838: 161–162.

Original data: Syntypes. Cape of Good Hope.

NON TYPE m#: red-margined type disc; “Cape Gd. Hope. 42--77. Ex. coll. Drège. No. 1126.”; “C.GH 42 77”; “Edessa moesta type [with the latter word added in red ink, in a different hand] Germar det.”; “3. Glypsus moestus,”; “a”; “NHMUK 010592304”. Fourth and fifth right antennomeres, and third to fifth left antennomeres missing (Fig. 113).

Current status: *Glypsus conspicuus* (Westwood, 1837) (synonymised by Schouteden 1905: 206; see Schouteden 1907: 31, as a variety).

Note: *Edessa moesta* was described from the female. Thomas examined three female syntypes in MFNB and so did the senior author. Nevertheless, our specimen is mentioned by Germar in the original description (“Specimen possideo, reliquis simillimum, sed antennae rufae, articulis apice nigris, ventris spina usque ad pede [sic!] anticos porrecta, compressa, apice falcata; an hujus mas?”). Although it was marked as type, we do not consider it a syntype as it was only dubiously associated to the type series. The reply to Germar's question is positive; it is the male of the species.

***monospila* (*Arma*)** Walker 1867a: 136.

Original data: Holotype. "a. Mexico. Presented by W. W. Saunders, Esq."

HOLOTYPE f#: red-margined holotype disc; green-margined type disc; "66. 12."; "16. Arma monospila."; "NHMUK 010592455". Third to fifth right and left antennomeres, right middle and posterior legs, and left posterior leg missing (Fig. 114).

Current status: *Podisus sagitta* (Fabricius, 1794) (synonymised by Distant 1880: 37; see Distant 1900a: 63; Schouteden 1907: 72).

***nigripennis* (*Oplomus*)** Dallas 1851: 83.

Original data: Syntype(s): "f#". "a. Mexico. Presented by E. P. Coffin, Esq."

LECTOTYPE f# (designated by Thomas 1992: 62): purple-margined lectotype disc; red-margined type disc; "Mexico / 43 13"; "2. Oplomus nigripennis,"; "a"; "NHMUK 010592405". Right antenna, and right anterior and posterior legs missing (Fig. 115).

Current status: *Oplomus pulcher* Dallas, 1851 (synonymised by Stål 1870: 29, as Var. f).

Note: Thomas (1992: 62) explained: "The type of *Oplomus nigripennis* is also a female and was also located at the British Museum (Natural History). It is labeled: (a) "Type," (b) "Mexico," (c) "Oplomus nigripennis." It is yellow with a black head and black blotches on the thoracic dorsum." From Dallas's original description, we do not know whether Dallas had one or more specimens, only the sex: female. Walker (1867a: 120) only listed one specimen with the same provenance as Dallas and we have found only one specimen in the collection but cannot be sure it was the only one Dallas had (although it is likely). By giving its labels data, describing it and calling the specimen "The type", Thomas designated it as the lectotype by inference of "the type".

***nigrispina* (*Arma*)** Dallas 1851: 99.

Original data: Syntypes: "m# f#". "a. Brazil. Presented by E. Doubleday, Esq."

LECTOTYPE f# (designated by Thomas 1992: 89): purple-margined lectotype disc; red-margined type disc; "Brazil / 45 67"; "19. Arma nigrispina,"; "NHMUK

010592328”. Left hemelytra, fourth and fifth right and left antennomeres, anterior legs, left middle leg, and posterior legs missing (Fig. 116).

PARALECTOTYPE m#: blue-margined paralectotype disc; “Brazil / 45 67”; “Arma nigrispina Walker’s catal.”; “NHMUK 010747393”. Second to fifth right and left antennomeres, and right anterior leg missing (Fig. 117).

Current status: *Podisus nigrispinus* (Dallas, 1851) (see Stål 1867: 497).

Note: Dallas had at least two specimens since he mentioned male and female. Indeed, Walker (1867a: 137) listed two specimens from the same provenance. Yet Thomas (1992: 89) only reported one: “The type of *Arma nigrispina*, a female, was located in the British Museum (Natural History). It is labeled: (a) “Brazil,” (b) “Type,” (c) 19. Arma nigrispina.”” By giving its labels data and calling the specimen “The type”, Thomas designated it as the lectotype by inference of “the type”.

***nigriventris* (*Podisus*)** Distant 1880: 39.

Original data: Syntype(s). *Hab*. Guatemala, San Gerónimo (*Champion*).

LECTOTYPE f# (designated by Thomas 1992: 97): purple-margined lectotype disc; red-margined type disc; “S. Geronimo, Guatemala. Champion.”; “nigriventris Dist. (type) [Distant’s handwriting]” “Distant Coll. 1911–383.”; “NHMUK 010592330”. Specimen well preserved (Fig. 118).

Current status: *Podisus nigriventris* Distant, 1880.

Note: Thomas (1992: 97) explained: “The type of *Podisus nigriventris*, a male, was located in the British Museum (Natural History). It is labeled: (a) “Type,” (b) “(Type) nigriventris Dist.” (c) “S. geronimo [sic!] Guatemala Champion,” (d) “Distant Coll. 1911-383.”” From Distant’s original description, we do not know whether Distant had one or more specimens, nor the sex. We have found only one specimen in the collection but cannot be sure it was the only one Distant had, despite the fact that it matches Distant’s description and illustration. By giving its labels data and calling the specimen “the type”, Thomas designated it as lectotype by inference of “the type” although he erroneously recorded its sex.

***nigrivitta* (*Picromerus*)** Walker 1867a: 133–134.

Original data: Holotype. “a. Silhet. Presented by J. C. Bowring, Esq.”

HOLOTYPE m#: red-margined holotype disc; green-margined type disc; “Sylhet”; “7. Picromerus nigrivitta.”; “Bowring 63·47*”; “NHMUK 010592295”. Fifth right and left antennomeres, and left posterior leg missing (Fig. 119).

Current status: Picromerus griseus (Dallas, 1851) (synonymised by Distant 1900a: 58, to *Picromerus obtusus* Walker; Schouteden 1907: 25 synonymised the latter to *P. griseus*).

***nigro-binotata* (*Mormidea*)** Berg 1879: 279–280.

Original data: Syntypes: “m# et f#”. “Patria: Buenos Aires.”

TYPE f#: “Buenos Aires”; “nigrobinotata Berg.”; “Distant Coll. 1911–383.”; “NHMUK 010592366”. Specimen well preserved (Fig. 120).

TYPE m#: “Buenos Aires”; “Tylospilus nigrolimbatus [sic!] 199 Berg”; “Distant Coll. 1911–383.”; “NHMUK 010592367”. Specimen carded; Fourth and fifth right antennomeres missing (Fig. 121).

TYPE f#: “Buenos Aires”; “nigrobinotata Berg.”; “Distant Coll. 1911–383.”; “NHMUK 010592368”. Specimen carded; well preserved (Fig. 122).

Current status: *Tylospilus nigrobinotatus* (Berg, 1879) (see Thomas 1992: 117). [Berg considered *Tylospilus* a subgenus of *Podisus*]

Note: The senior author examined and imaged two female specimens labeled as types in La Plata Museum. While Berg (1879: 279–280) did describe the species from two specimens (“Los dos individuos que poseo, fueron recojidos en Buenos Aires, por los Sres. Guenther y Lynch.”), he however noted that he had male and female. Although he later (Berg 1883: 203) explained that he had made an “equivocacion inexplicable” when he described the species in *Mormidea* instead of *Podisus*, subgenus *Tylospilus*, he could not have made a mistake concerning the sex of his specimens. There could have been an error in the typesetting of the sex symbols but it seems unlikely as Berg gave a wide range of measurements, which would support the fact that there was a male and a female (females are usually much larger than males). The male type thus would appear to be missing in MLPA La Plata. Bachmann (1999, 2012) did not mention any type of the species in MACN Buenos Aires where some more of Berg’s typical material can be found. Three specimens were found in NHMUK, one male and two females collected in Buenos Aires. Because these three specimens came from Distant’s collection, it is difficult to assess how he obtained them. Berg did make donations to the NHMUK in the mid 1880s, it could well be that he donated specimens to Distant or exchanged some with him. With so little data, it would be preposterous to claim that the male specimen in NHMUK is the male that Berg had before him when he described the species. That specimen may be lost. We chose to call “TYPE” each specimen held by NHMUK as, according to Oldfield Thomas (1893: 242)’s definitions, also repeated by Charles Schuchert (1897: 637–638), the male could be a SYNTYPE if Berg had offered it to Distant and it was from the type series, all specimens could be METATYPES if Berg had offered them to Distant, they were not part of the type series but Berg himself had identified them as his species and finally, because whichever was the way they came into Distant’s possession, they definitely are TOPOTYPES and specimens of historical value.

A specimen of *Acanalonia chloris* (Berg, 1879) found at the Natural History Museum, London would seem to invalidate our theory that the male specimen could be the missing syntype or that any of the specimens could be metatypes. Indeed, this specimen bears the following labels "*Acanonia chloris* Berg. [hw]"; "Scott Coll. 88-11."; "Cum typo comparat"; "Ex Coll. Bergiana". The last two labels are typical of Berg's collection: white rectangles with border and text printed in red. If Berg always labelled his specimens so clearly as coming from his collection ("Ex Coll. Bergiana") and as metatypes ("Cum typo comparat"), then our theory is de facto invalidated. Nevertheless, this specimen and its labels are the proof that Berg sent specimens to his colleagues. Another proof may also be found in Berg (1879: 44). Similarly, the missing type could have been sent to a colleague or even exchanged or, if it were not conspecific with the other, it could have been ulteriorly described as another species. Indeed, one of the syntypes of *Myrmecalydus celeripes* Berg, 1879 became a paratype.of *Cydamus delpontei* Kormilev, 1953.

***obscura* (*Arma*)** Dallas 1851: 100.

Original data: Syntype(s): “f#”. “a. Brazil. Presented by E. Doubleday, Esq.”

LECTOTYPE f# (designated by Thomas 1992: 89): purple-margined lectotype disc; red-margined type disc; “Brazil / 45 67; “20. Arma obscura,”; “a”; “NHMUK 010592329”. Fifth right antennomere, third to fifth left antennomere, and right anterior and posterior legs missing; genital plates disjointed (Fig. 123).

Current status: *Podisus nigrispinus* (Dallas, 1851) (synonymised by Thomas 1992: 88).

Note: Thomas (1992: 89) explained: "The type of *Arma obscura*, a female, was located in the British Museum (Natural History). It is labeled: (a) "Type," (b) "Brazil," (c) "a," (d) "20. Arma obscura."" From Dallas's original description, we do not know whether Dallas had one or more specimens, only the sex: female. Walker (1867a: 137) listed one specimen from the same provenance and we have found only one female specimen in the collection but cannot be sure it was the only one Dallas had. By giving its labels data and calling the specimen "the type", Thomas designated it as the lectotype by inference of "the type".

***obtusus* (*Picromerus*)** Walker 1867a: 133.

Original data: Holotype. "a. North Hindostan. From Capt. Reid's collection."

HOLOTYPE f#: red-margined holotype disc; green-margined type disc; "n Ind / 55 76"; "6. Picromerus obtusus."; "NHMUK 010592294". Fifth left antennomere missing (Fig. 124).

Current status: *Picromerus griseus* (Dallas, 1851) (synonymised by Schouteden 1907: 25; see Distant 1908: 453; Zhao, Liu and Bu 2013: 149).

***optabilis* (*Platynopus*)** Walker 1867a: 126.

Original data: Holotype. "a. West Africa. From M. du Chaillu's collection."

HOLOTYPE f#: red-margined holotype disc; green-margined type disc; "64 75"; "W. Africa."; "13. PLATYNOPUS OPTABILIS"; "NHMUK 010592452". Fourth and fifth right antennomeres missing (Fig. 125).

Current status: *Platynopiellus septendecimmaculatus* (Palisot de Beauvois, 1811) (*Platynopus optabilis* was synonymised to *Platynopus rostratus* (Drury, 1782) by Distant 1900a: 56, as a variety; see Schouteden 1905: 160; Schouteden 1907: 48; Due to homonymy (see "Notes" below), the name of the species became that of the next available junior synonym: *Pentatoma 17-maculata* Palisot de Beauvois, 1811 (see Kirkaldy 1909: 12, as *Platynopus 17-maculatus*); Thomas (1994: 195) placed it in his new genus, *Platynopiellus*.).

Notes: *Platynopus rostratus* (Drury, 1782) was a primary homonym of *Cimex rostratus* DeGeer, 1773 (Pentatomidae), *C. rostratus* Goeze, 1778 (Coreidae) and *C.*

rostratus Fabricius, 1781 (Pentatomidae). The next junior synonym for that species was *Cimex calens* Fabricius, 1803, a primary homonym of *C. calens* Linnaeus, 1767 (Miridae) (see Dolling *et al*. 1999: 18, 77). The specific epithet, originally spelled *17-maculata*, has been transliterated in two different ways: *septendecimaculata*/*-us* (Thomas 1994: 194-195; Maldès & Pluot-Sigwalt 2004) and *septemdecimmaculatus* (Dolling *et al*. 1999: 18, 77; Rider 2015); we have adopted the spelling *septendecimmaculata*/*-us* as we have chosen to follow Welter-Schultes (2012: 76); the set of rules provided there is convenient and useful to achieve consistency in transliterating older names or naming new species. We note, however, that the use of "septemdecim" is not erroneous (Gaffiot 1934: 1426), only less correct (Lewis & Short 1891: 1675). Furthermore, bearing in mind the explanations by Lewis & Short (1891:1091), we also understand the choice not to duplicate the "m" as logical.

***opulentus* (*Jalloides*)** Distant 1911b: 349–350.

Original data: Syntype(s). "*Hab*.: N. Queensland (*Kelsall*, Brit. Mus.): Cairns (Coll. Dist.); near Port Moresby (Coll. Dist.)."

SYNTYPE f#: blue-margined syntype disc; red-margined type disc; "N. Queensland. (Kelsall Coll.) 1910–168."; "Jalloides opulentus type Dist. [Distant's handwriting]"; "NHMUK 010592180". Fifth left antennomere missing (Fig. 126).

Current status: *Jalloides opulentus* Distant, 1911.

Note: Distant described this species from specimens having "head and pronotum testaceous" or "Var. *a*.— Pronotum with a prominent, central, oblong, bluish-black spot.", and "Var. *b*. — Resembling var. *a*, but pronotum with an additional bluish-black spot on each lateral margin.". Because Distant had two varieties and three provenances, he had, at least three specimens. These may not be all the specimens Distant had. We have found three specimens in the collection. According to the International Code of Zoological Nomenclature, varieties are not to be counted as part of the type series (ICZN 1999: Art 72.4.1), therefore we are considering only the specimen with the general characteristics as a syntype. Thomas (1994: 183) simply wrote "holotype in BM(NH) was examined", without giving any details about the labels. We consequently do not accept this as a valid lectotype designation. The specimen marked as type by Distant has no markings on the pronotum but a specimen from Cairns marked "cotype”, also by Distant, clearly belong to Var. a. as do two other specimens from Port Moresby.

***opulentus* (*Neoglypsus*)** Distant 1890a: 159.

Original data: Syntype(s). China: “Hab. Chang Yang. (Pratt.)”.

LECTOTYPE f# (designated by Thomas 1994: 174): purple-margined lectotype disc; red-margined type [H. T.] disc; “Chang Yang (Pratt)”; “opulentus Dist. [Distant’s handwriting]” “Distant Coll. 1911–383.”; “NHMUK 010592303”. Genital plates disjointed (Fig. 127).

Current status: *Dinorhynchus opulentus* (Distant, 1890) (see Schouteden 1907: 64).

Note: Thomas (1994: 174) stated: “Holotype female of *Neoglypsus opulentus* was examined in BM(NH).” It is clear that Thomas examined the specimen labelled as type that we have found. There is no evidence that this was the only specimen Distant used to describe the species, but this is the only specimen of this species in the collection and we therefore accept that, by calling the specimen “Holotype”, Thomas has designated a lectotype by inference of “holotype”.

***orientalis* (*Anasida*)** Distant 1910: 195–196.

Original data: Syntypes: “m#”, “f#”. “*Hab*. Bombay Province; Dharwar. [...] found by Dr. Harold Mann among stones in a railway cutting.”

SYNTYPE m#: blue-margined syntype disc; red-margined type [H. T.] disc; “Dharwar (Mann)”; “Anasida orientalis type Dist. [Distant’s handwriting]”; “Distant coll 1911–383.”; “NHMUK 010592344”. Fifth right antennomere missing (Fig. 128).

SYNTYPE f#: blue-margined syntype disc; “Dharwar (Mann)”; “Distant coll 1911–383.”; “NHMUK 010592345”. Antennae missing (Fig. 129).

SYNTYPE m#: blue-margined syntype disc; “Dharwar (Mann)”; “Anasida orientalis Dist. [Distant’s handwriting]”; “NHMUK 010592346”. Fourth and fifth right antennomeres, and second to fifth left antennomeres missing (Fig. 130).

Current status: *Anasida orientalis* Distant, 1910.

Note: Thomas (1994: 160) stated: “Distant’s male Holotype in BM[NH] was examined.” We know that Distant had at least two specimens as he mentions male and female. The mention of “Distant’s male Holotype in BM[NH]” can therefore not constitute a valid designation of lectotype by inference of holotype (see ICZN 1999: Art. 74.5). We have found three specimens, 2 males and 1 female; we consider them all syntypes.

***ornatula* (*Canthecona*)** Distant 1908: 451.

Original data: Holotype or holotype and paratype(s): “m#”. “*Hab*. Darjeeling (*Coll*. *Dist*.).”

HOLOTYPE m#: red-margined holotype disc; red-margined type disc; “-Pussumhug Darjeeling 4700 ft. 13/11/06”; “Canthecona ornatula type Dist. [Distant’s handwriting]”; “Distant Coll. 1911–383”; “NHMUK 010592159”. Fifth right antennomere, second to fifth left antennomeres, anterior legs, and left middle leg missing (Fig. 131).

Current status: *Eocanthecona ornatula* (Distant, 1908) (see Thomas 1994: 177).

Note: Strangely, Thomas (1994: 177) mentioned “Type specimens in BM(NH).” We have only found one male specimen in the collection. Mentions such as “fifth joint mutilated in type” and “anterior legs mutilated in typical specimen” in the original description could support either the fact that Distant had other specimens but designated one as the type (holotype) or that he just had one (only one measurement). Whether Distant had many specimens or not, this specimen matches the description and Distant labelled it as type. We therefore consider it the holotype.

***ornatus* (*Stiretrus*)** Dallas 1851: 80–81.

Original data: Syntype(s): “f#”. “a. Mexico.”

SYNTYPE f#: blue-margined syntype disc; red-margined type disc; “Mexico / 48 11”; “6. Stiretrus ornatus,”; “a”; “NHMUK 010592386”. Fourth and fifth right and left antennomeres, and legs (except the right anterior one) missing (Fig. 132).

Current status: *Stiretrus anchorago* (Fabricius, 1775). (First synonymised by Stål 1870: 25 to *S*. (*Oncogaster*) *personatus* Germ.; then synonymised by Distant 1880: 28 to *Siretrus anchorago* (Fabricius); see Schouteden 1907: 9; yet Thomas 1992: 109–110 listed a new synonymy.).

Note: From Dallas’s original description, it is impossible to know how many specimens he had, but we know that they were female. Walker (1867a: 115) listed one specimen from Mexico, adding a precision: it came from Mr Argent’s collection. We have found one female specimen matching these details. It is likely that Dallas just had this unique specimen when he described the species, but we cannot be sure about it. Thomas (1992: 110) did not mention any type material for the species. We, therefore, consider this female specimen a syntype.

***pallipes* (*Arma*)** Dallas 1851: 101.

Original data: Syntype(s): “m#”. “a. Venezuela. From Mr. Dyson’s Collection.”

SYNTYPE m#: blue-margined syntype disc; “29. ARMA CRASSIMARGO.”; “a”; “Venezuela/ 47 26”; “Podisus sp. 1-198”; “BRIT. MUS.”; “NHMUK 010938912”. Right third to fifth antennomeres missing (Fig. 133).

NEOTYPE [hereby set aside] m#: red-margined neotype disc; “VENEZUELA: Mérida Las Cruces 9 July 1986 R.S. Miller colr.”; “B.M. 1991-55”; “J. E. Eger collection”; “NEOTYPE ARMA PALLIPES (DALLAS 1851) Desig. D. B. Thomas.”; “NHMUK 010592332”. Specimen well preserved (Fig. 134).

Current status: *Podisus pallipes* (Dallas, 1851) (see Stål 1870: 54).

Notes: Dallas did not mention the number of specimens he had when he described the species, only the sex: male. Walker (1867a: 137) listed one specimen. It is likely that there was just one. This specimen could not be found and Thomas (1992: 101–102) designated a neotype: “I was unable to locate the type specimen in the British Museum (Natural History) and it must be presumed lost. In the interest of fixing the identity of this species I am designating the following specimen as neotype: Male, labeled: (a) “VENEZUELA, Merida Las Cruces, 9 July 1986, R.S. Miller Colr.,” (b) “NEOTYPE *Arma pallipes* Dallas 1851, designated by D. B. Thomas.” I am depositing the specimen in the British Museum (Natural History).” Among the undetermined specimens of *Podisus* in the collection, we have however found a male specimen with the following labels: “29. ARMA CRASSIMARGO.”; “a”; “Venezuela/ 47 26”; “Podisus sp. 1-198”; “BRIT. MUS.”; “NHMUK 010938912”. The specimens of only three *Arma* species (now in *Podisus*), listed both by Dallas and Walker, were collected in Venezuela by Dyson: *Arma ventralis* Dallas, *Arma pallipes* Dallas and *Arma didyma* Stål (now *Podisus sagitta* (Fabricius, 1794). Walker listed one for each of these species; it is likely that there were three specimens, one for each species. We have found a female type for *Arma ventralis* and a male non-type among the specimens of *Podisus sagitta* (bearing the following labels: “8. Arma didyma. ”; “Venezuela / 47 52”; “a”;

"NHMUK 010938788”, with a leg glued on the label.), the specimen labelled “29. Arma crassimargo” is the only other one coming from Venezuela. It perfectly matches the description of *Arma pallipes* given by Dallas. Dallas did not mention the cordate ivory spot, a character that Thomas (1992: 99) used to separate *Podisus pallipes* Dallas from the four other species of *Podisus* in the *ventralis* group. Dallas’s description is so detailed that had the specimen had that spot, he would undoubtedly have mentioned it. Our specimen has no spot. Furthermore, Walker (1867a: 137) reported no specimens of *Arma crassimargo* (Stål) in his catalogue. We therefore believe that Distant made an error in using the label “29. Arma Crassimargo.” (it may also have been Walker who had determined it as such after his catalogue had been published and shifted it without recording this shift, as he was wont, according to Distant, 1899: 30) and that this specimen is the type of Dallas’s *Arma pallipes*. As a consequence, Thomas’s neotype is hereby set aside (ICZN 1999: Art. 75.8). The latter is thought to be the specimen of a different species whereas Dallas’s syntype of *A. pallipes* would seem to be the male of Dallas’s female syntype of *A. ventralis*.

***parva* (*Canthecona*)** Distant 1902: 250–251.

Original data: Syntypes [Range of measurements]. “*Hab*. Bengal. Mysore (*Coll. Dist*.).”

SYNTYPE m#: blue-margined syntype disc; red-margined type disc; “Ranchi; Irvine.”; “parva Dist. [Distant’s handwriting]”; “Distant Coll. 1911–383.”; “NHMUK 010592179”. Carded specimen. Second to fifth left antennomeres, and legs (except the left middle one) missing (Fig. 135).

SYNTYPE m#: blue-margined syntype disc; “Bangalore Cameron.”; “Distant Coll. 1911–383.”; “NHMUK 010592299”. Fourth and fifth left antennomeres, and right anterior leg missing (Fig. 136).

Current status: *Eocanthecona parva* (Distant, 1902) (see Thomas 1994: 177).

Note: Thomas (1994: 177) did not mention any type in the material he examined.

***parvus* (*Platynopus*)** Distant 1900a: 56–57.

Original data: Syntypes [Range of measurements and two countries]. “*Hab*. Sierra Leone (Brit. Mus.); Congo (Coll. Dist.).”

SYNTYPE m#: blue-margined syntype disc; “Popocabacca F. Loos”; “parvus Dist. [Distant’s handwriting]”; “Distant Coll. 1911–383.”; “NHMUK 010592424”. Fourth and fifth right antennomeres, second to fifth left antennomeres, and left posterior leg missing (Fig. 137).

SYNTYPE m#: blue-margined syntype disc; red-margined type disc; “Sierra Leone / 42 31”; “parvus Dist. [Distant’s handwriting]”; “a”; “NHMUK 010592450”. Second to fifth right antennomeres, fourth and fifth left antennomeres, anterior legs, left middle leg, and right posterior leg missing (Fig. 138).

Current status: *Platynopiellus septendecimmaculatus* (Palisot de Beauvois, 1811) (synonymised by Schouteden 1905 : 160, 162; see Schouteden 1907: 48, as *P. rostratus*. Due to homonymy (see “Notes” below), the name of the species became that of the next available junior synonym: *Pentatoma 17-maculata* Palisot de Beauvois, 1811 (see Kirkaldy 1909: 12, as *Platynopus 17-maculatus*); Thomas (1994: 195) placed it in his new genus, *Platynopiellus*.).

Notes: Compared to *P. rostratus* in the original description and said to be much smaller, later synonymised to it. *Platynopus rostratus* (Drury, 1782) was a primary homonym of *Cimex rostratus* DeGeer, 1773 (Pentatomidae), *C. rostratus* Goeze, 1778 (Coreidae) and *C. rostratus* Fabricius, 1781 (Pentatomidae). The next junior synonym for that species was *Cimex calens* Fabricius, 1803, a primary homonym of *C. calens* Linnaeus, 1767 (Miridae) (see Dolling *et al*. 1999: 18, 77). The specific epithet, originally spelled *17-maculata*, has been transliterated in two different ways: *septendecimaculata*/*-us* (Thomas 1994: 194-195; Maldès & Pluot-Sigwalt 2004) and *septemdecimmaculatus* (Dolling *et al*. 1999: 18, 77; Rider 2015); we have adopted the spelling *septendecimmaculata*/*-us* as we have chosen to follow Welter-Schultes (2012: 76); the set of rules provided there is convenient and useful to achieve consistency in transliterating older names or naming new species. We note, however, that the use of “septemdecim” is not erroneous (Gaffiot 1934: 1426), only less correct (Lewis & Short 1891: 1675). Furthermore, bearing in mind the explanations by Lewis & Short (1891:1091), we also understand the choice not to duplicate the “m” as logical. Thomas (1994: 195) mentions having examined 151 African specimens (“Material examined: Ghana (3), Zaire (6), Cameroon (140), Kenya (1), Uganda (1).”) but not the types.

***pentatomoides* (*Rhaphigaster*)** Walker 1867b: 370.

Original data: 4 syntypes. “a. Australia. From Mr. Damel’s collection. b. Moreton Bay. From Mr. Diggles’ collection. c. Tasmania. Presented by W. W. Saunders, Esq. d. New Zealand. Presented by Col. Bolton.”

SYNTYPE f#: blue-margined syntype disc; green-margined type disc; “58·124 Australia.”; “Rhaphigaster pentatomoides, (Type) Walker”; “81. Rhaphigaster pentatomoides.”; “NHMUK 010592412”. Fourth and fifth left antennomeres missing. Wings opened (Fig. 139).

SYNTYPE f#: blue-margined syntype disc; “Rhaphigaster pentatomoides Walker’s Catal.” “Saunders 65·13.”; “VDL”; “NHMUK 010592447”. Fourth and fifth right and left antennomeres missing (Fig. 140).

SYNTYPE f#: blue-margined syntype disc; “Moreton Bay / 57 130”; “Rhaphigaster pentatomoides Walker’s Catal.”; “NHMUK 010592448”. Fifth right and left antennomeres missing (Fig. 141).

SYNTYPE f#: blue-margined syntype disc; “N. Zeal, / 54.4.”; “Rhaphigaster pentatomoides Walker’s Catal.”; “NHMUK 010592449”. Second to fifth left antennomeres, right medium leg, and left posterior leg missing (Fig. 142).

Current status: *Cermatulus nasalis nasalis* (Westwood, 1837) (synonymised by Butler 1874: 25; see Schouteden 1907: 67; Woodward 1953: 317–318).

Note: Thomas (1994: 173) did not mention any types in the material he examined.

***perfectus* (*Rhaphigaster*)** Walker 1867b: 371.

Original data: 4 syntypes. “a, b. Australia. From Mr. Damel’s collection. c. Moreton Bay. From Mr. Diggles’ collection. d. New Zealand. Presented by Col. Bolton.”

SYNTYPE f#: blue-margined syntype disc; green-margined type disc; “Moretn Bay”; “83. Raphigaster perfectus.”; “NHMUK 010592341”. Right antenna, fourth and fifth left antennomeres, and posterior legs missing (Fig. 143).

SYNTYPE f#: blue-margined syntype disc; “N. Zeal. 54.4.”; “Rhaphigaster perfectus Walker’s catal.”; “NHMUK 010592479”. Fourth and fifth right antennomeres, and left middle and posterior legs missing (Fig. 144).

SYNTYPE f#: blue-margined syntype disc; “58-124 Australia”; “Rhaphigaster perfectus Walker’s catal.”; “NHMUK 010592480”. Fourth and fifth right antennomeres, and fifth left antennomere missing. Wings opened (Fig. 145).

SYNTYPE m#: blue-margined syntype disc; “Cazira Rhaphigaster perfectus [Distant's handwriting] Walker's catal.”; “58·124 Australia.”; “NHMUK 010937718”. Wings opened, left hemelytra missing (Fig. 146).

Current status: *Oechalia schellenbergii* (Guérin Menéville, 1831). (synonymised by Butler 1874: 25, to *Oechalia consocialis* (Boisduval) ; see Usinger 1941: 74; Woodward 1953: 317; Woodward 1956: 429–430, with *O*. s*chellembergii* (Guérin-Meneville) as the valid name).

Notes: Thomas (1994: 189) did not mention any type in the material examined (“Material examined: Australia (34), New Zealand (2), Marshall Is. (7), Polynesia (8), Christmas Id. (7), Wake Is. (2), Marquesas (3).”). Woodward (1956: 429–430) demonstrated the priority of *Oechalia schellembergii* (Guérin-Meneville) over *Oechalia consocialis* (Boisduval) and noted that the specific epithet should certainly be *schellenbergi* although he retained the spelling *schellembergii*. It was ultimately changed to *schellenbergi* (see Thomas 1994: 189; Aldrich *et al*. 1996; Cassis & Gross 2002: 436, 648; Rider 2015, as *schellenbergii*).

***perornatus* (*Rhaphigaster*)** Walker 1868: 567.

Original data: Holotype. “a. Whydah. From Mr. Fraser’s collection.”

HOLOTYPE f#: red-margined holotype disc; green-margined type disc; “Whydah / 53 74”; “Rhaphigaster perornatus.”; “NHMUK 010592442”. Right middle and posterior legs missing; part of abdomen disjointed from thorax; right hemelytra opened (Fig. 147).

Current status: *Dorycoris pavoninus* (Westwood, 1837) (synonymised by Schouteden 1905: 135, as *personatus* [sic!] Walker; see Schouteden 1907: 58).

***platyrhinoides* (*Cecyrina*)** Walker 1867a: 119.

Original data: 3 syntypes. “a–c. Hindostan. From Mr. Stevens’ collection.”

SYNTYPE m#: blue-margined syntype disc; green-margined type disc; “1. CECYRINA PLATYRHINOIDES.”; “E. Ind / 52 109”; “LECTOTYPUS CECYRINA

PLATYRHINOIDES Walker, 1867 des. Salini & P. Kment 2016”; . Wings opened (Fig. 148).

SYNTYPE f#: blue-margined syntype disc; “Stiretrus Cecyrina platyrhinoides”; “E. Ind / 52 109”; “PARALECTOTYPUS CECYRINA PLATYRHINOIDES Walker, 1867 des. Salini & P. Kment 2016”; Left antenna missing (Fig. 149).

SYNTYPE f#: blue-margined syntype disc; “Stiretrus Cecyrina platyrhinoides”; “PARALECTOTYPUS CECYRINA PLATYRHINOIDES Walker, 1867 des. Salini & P. Kment 2016”. Wings opened (Fig. 150).

Current status: *Cecyrina platyrhinoides* Walker, 1867.

Notes: Thomas (1994: 172) mentioned having examined “Type specimen in BM(NH)”. Although, we believe he examined the specimen marked as type, there is no sufficient evidence. His statement does not constitute a valid lectotype designation. No barcodes could be added as the specimens were on loan to Petr Kment.

***polygraphus* (*Platynopus*)** Walker 1867a: 126–127.

Original data: Holotype. “a. Ceram. Presented by W. W. Saunders, Esq.”

HOLOTYPE f#: red-margined holotype disc; green-margined type disc; “Cer.”; “17. Platynopus polygraphus.”; “Saunders 65·13.”; “NHMUK 010592434”. Right middle leg missing (Fig. 151).

Current status: *Platynopus melanoleucus* (Westwood, 1837) (synonymised by Distant 1900a: 57, 63, see Schouteden 1907: 47).

Note: Walker (1867a: 127) had noted: “The markings of this species and the longer spines of the thorax distinguish it from *P. melanoleucus*.”, the species was nevertheless synonymised to *P. melanoleucus* by Distant, 33 years later.

***praecipua* (*Strachia*)** Walker 1867b: 339–340.

Original data: Holotype. “a. Batchian. Presented by W. W. Saunders, Esq.”

HOLOTYPE f#: red-margined holotype disc; green-margined type disc; “Bac”; “Asopus praecipuus.”; “Saunders 65·13.”; “NHMUK 010592373”. Fourth and fifth right antennomeres missing; pronotum disjointed; left hemelytra opened (Fig. 152).

Current status: *Amyotea erythromela* (Walker, 1867) (synonymised by Schouteden 1907: 54, as a variety).

Note: The long label from Walker's catalogue reads: “Asopus praecipuus.”. While this is not the original combination, this is the one used by Walker (1868: 533).

***primus* (*Incitatus*)** Distant 1908: 453–454.

Original data: Syntype(s): “m#”. India, Assam, Dikrum: “*Hab*. Dikran Valley (*Coll*. *Dist*.).”

LECTOTYPE f# (designated by Thomas 1994: 186): purple-margined lectotype disc; red-margined type [H. T.] disc; “Assam.”; “Incitatus primus type Dist. [Distant’s handwriting]”; “Distant Coll. 1911–383.”; “NHMUK 010592155”. Fourth and fifth right antennomeres, left middle leg, and posterior legs missing (one leg glued on the first label) (Fig. 153).

Current status: *Martinina prima* (Distant, 1908) (see Thomas 1994: 186).

Note: Strangely, Distant (1908: 454) indicated that he was describing (a) male specimen(s), yet the specimen that he marked as type in the collection is a female. Nevertheless, it matches the one in Distant’s description. Moreover, it is lacking its posterior legs and Distant had figured them in dotted lines. Finally, it measures 15 mm as mentioned by Distant. Females are usually bigger than males and we think that had he had a male, it would have been smaller. Thomas (1994: 186) concurred with us concerning the sex of the only specimen when he mentioned: “holotype, female (BM[NH]).” Either Distant made an error when stating the sex of the specimen or the wrong symbol was used in the typesetting process. By referring to this very specimen as the holotype, Thomas actually designated it as lectotype by inference of “the holotype”.

***pulcher* (*Oplomus*)** Dallas 1851: 84–85.

Original data: Syntypes: “f#”. “a. Mexico.”

LECTOTYPE f# (designated by Thomas 1992: 62): purple-margined lectotype disc; red-margined type disc; “Mexico / 48 11”; “3. Oplomus pulcher,”; “a”; “NHMUK 010592406”. Right posterior leg missing (Fig. 154).

PARALECTOTYPE f#: blue-margined paralectotype disc; “Mexico / 48 11”; “Oplomus pulcher Walker’s catal.”; “a”; “NHMUK 010747387”. Fourth and fifth right antennomeres missing (Fig. 155).

Current status: *Oplomus pulcher* Dallas, 1851.

Note: From Walker (1867a: 120), we know that Dallas had, at least, two specimens from Mexico, from Mr Argent (this is corroborated by the fact that Dallas gave a range of measurements: “Long. lin. 6½–7½”). We have found them both. Thomas (1992: 62) explained: “The type of *Oplomus pulcher* is a female and was located in the British Museum (Natural History). It is labeled: (a) “Type,” (b) “a,” (c) “Oplomus pulcher” The specimen is metallic blue with humeral angles and tip of the scutellum red.” By giving its labels data, describing it and calling the specimen “the type”, Thomas designated it as the lectotype by inference of “the type”.

***purpurascens* (*Platynopus*)** Walker 1868: 530.

Original data: Holotype. “a. Ceram. Presented by W. W. Saunders, Esq.”

HOLOTYPE f#: red-margined holotype disc; green-margined type disc; “Cer.”; “Saunders 65·13.”; “Platynopus purparascens.”; “NHMUK 010592435”. Fourth and fifth right antennomeres, and second to fifth left antennomeres missing (Fig. 156).

Current status: *Montrouzierellus purpurascens* (Walker, 1868) (see Kirkaldy 1909: 12; Thomas 1994: 187).

***pyrophila* (*Strachia*)** Walker 1867b: 340.

Original data: Holotype. “a. Batchian. Presented by W. W. Saunders, Esq.”

HOLOTYPE f#: red-margined holotype disc; green-margined type disc; “Bac”; “Asopus pyrophilus.”; “Saunders 65·13.; “NHMUK 010592374”. Fourth and fifth right antennomeres missing (Fig. 157).

Current status: *Amyotea erythromela* (Walker, 1867) (synonymised by Schouteden 1907: 54, as a variety).

Notes: Walker (1867b: 340) had noted: “Very closely allied to the preceding species [*Strachia praecipua* Walker, 1867].” Indeed, Schouteden later synonymised both *Strachia praecipua* and *Strachia pyrophila* to *Strachia erythromela* Walker, 1867, while as well placing them in the genus *Amyotea*. The long label from Walker's catalogue reads: “Asopus pyrophilus.”. While this is not the original combination, this is the one used by Walker (1868: 534).

***reciproca* (*Strachia*)** Walker 1867b: 340–341.

Original data: 2 syntypes. “a. New Guinea. Presented by W. W. Saunders, Esq. b. New Guinea. From Mr. Wallace's collection.”

SYNTYPE f#: blue-margined syntype disc; green-margined type disc; “New Guin / 62 91”; “Asopus reciprocus.”; “N”; “NHMUK 010592383”. Specimen well preserved (Fig. 158).

SYNTYPE f#: blue-margined syntype disc; “Strachia reciproca Walker’s catal.” “Saunders 65·13.”; “S”; “NHMUK 010592384”. Fourth and fifth right and left antennomeres missing; genital plates disjointed (Fig. 159).

Current status: *Amyotea reciproca* (Walker, 1867) (see Schouteden 1907: 54).

Notes: Thomas (1994: 158) mentioned “Walker’s material was examined in the BM(NH).”, without further detail. The long label from Walker's catalogue reads: “Asopus reciprocus.”. While this is not the original combination, this is the one used by Walker (1868: 534). The handwritten “N” on the disc label was the way Charles M. Allen, Alfred R. Wallace’s assistant recorded “New Guinea” (Baker, 1995: 173).

***robustus* (*Picromerus*)** Distant 1879: 48.

Original data: Syntypes: “m# f#”. India: “Sadia [“north of Brahmaputra”, 350 feet.” “collected by Mr. A. W. Chennell, of the Indian Topographical Survey”.

SYNTYPE m#: blue-margined syntype disc; red-margined type disc; “Sadia 350 ft.”; “robustus (type) Dist. [Distant’s handwriting]”; “Distant Coll. 1911–383.”; “NHMUK 010592160”. Fourth and fifth right and left antennomeres, anterior legs, and posterior legs missing (Fig. 160).

SYNTYPE f#: blue-margined syntype disc; “Sadia 350 ft.”; “Distant Coll. 1911–383.”; “NHMUK 010592162”. Right antenna, fourth and fifth left antennomeres, right middle and posterior legs, and left anterior and posterior legs missing (Fig. 161).

Current status: *Eocanthecona robusta* (Distant, 1879) (see Thomas 1994: 177).

Note: Thomas (1994: 177) did not mention having examined types, only “Determined specimens in BM(NH).”

***rubro-maculatus* (*Podisus*)** Distant 1880: 41.

Original data: Syntype(s). “*Hab*. Mexico (*Belimek*; *Mus*. *Vind*. *Caes*.).”

Current status: *Tylospilus acutissimus* (Stål, 1870) (synonymised by Phillips 1983: 136; see Thomas 1992: 118).

Notes: The types are not deposited in the Natural History Museum, London but, as the original description stated in NHMW, Vienna (historically referred to as "Mus. Vind. Caes."). In a personal communication, Dr Herbert Zettel (NHMW, Vienna) informed us of the following: "There are five specimens in the collection which were collected by Bilimex [sic!] in Mexico in 1871, three with identical locality labels, the two others with slightly expanded information (Orizaba and Cuernavacca). Only one specimen, the photographed male, has an identification label, and it is the one illustrated in BCA (unique colour pattern). If the five specimens are regarded as syntypes, this specimen is the candidate for a lectotype." Phillips (1983: 73) further detailed the specimen and its labels. Phillips's (1983) thesis remained unpublished; her new synonymies, however, were validated by Thomas as was her new species *Podisus brevispinus*, which as Rider (2012: 324) noted, should carry the following authorship: Phillips, 1992.

ruficeps **(*Stiretrus*)** Dallas 1851: 79–80.

Original data: Syntype(s): "f#". "a. Honduras. From Mr. Dyson's Collection."

LECTOTYPE f# (designated by Thomas 1992: 110): purple-margined lectotype disc; red-margined type disc; "Honduras / 45 123"; "13. Stiretrus ruficeps,"; "a"; "NHMUK 010592387". Fourth and fifth right and left antennomeres, and legs (except the left anterior leg) missing. Abdomen partially disjointed from thorax (Fig. 162).

Current status: *Stiretrus anchorago* (Fabricius, 1775) (synonymised by Thomas 1992: 110, although there is no mention of a new synonymy.).DO YOU KNOW? I have found *S. ruficeps* still used in the 1950s!

Note: Thomas (1992: 110) explained: "The type of *Stiretrus ruficeps* Dallas was located in the British Museum (Natural History). It is labeled: (a) "Type," (b) "a," (c) "Honduras," (d) "Stiretrus ruficeps." The specimen is a female with a red head and metallic blue body." From Dallas's original description, we do not know whether Dallas had one or more specimens, only the sex: female. Walker (1867a: 115) listed one specimen from the same provenance and we have found only one specimen in the collection but cannot be sure it was the only one Distant had. By giving its labels data, its sex, describing it and calling the specimen "The type", Thomas designated it as the lectotype by inference of "the type".

***rutherfordi* (*Dolycoris*)** Distant 1892: 187–188.

Original data: Holotype [“Body beneath (imperfectly seen, owing to specimen being carded) bluish-black”]. “Hab., Old Calabar (*Rutherford*).”

HOLOTYPE f#: red-margined holotype disc; red-margined type [H. T.] disc; “Old Calabar (Rutherford)”; “rutherfordi Dist. [Distant’s handwriting]”; “Distant Coll. 1911–383.”; “NHMUK 010592441”. Specimen carded (Fig. 163).

Current status: *Dorycoris pavoninus* (Westwood, 1837) (synonymised by Schouteden 1905: 135; see Schouteden 1907: 58).

***rutilus* (*Oplomus*)** Dallas 1851: 83–84.

Original data: ST(S): “f#”. “a. Columbia. From M. Goudot’s Collection.”

LECTOTYPE f# (designated by Thomas 1992: 60–61): purple-margined lectotype disc; red-margined type disc; “Columbia / 46 20 ”; “Magd. Avril”; “12. Oplomus rutilus,”; “a”; “NHMUK 010592399”. Second to fifth right and left antennomeres, and legs missing; right hemelytra broken (Fig. 164).

Current status: *Oplomus festivus* Dallas, 1851 (Synonymised to *Oplomus marginalis* (Westwood, 1837) by Thomas 1992: 60 but see Rider & Rolston, 1995: 845).

Notes: Thomas (1992: 60–61) explained: “The type of *Oplomus rutilus* was located in the British Museum (Natural History). It is labeled: (a) “Type,” (b) “Mayo-Abril,” (c) “46 20,” (d) “Oplomus rutilus.” The specimen is a female and is missing the legs. It is orange dorsally with dark brown blotches on the pronotum and scutellum.” From Dallas’s original description, we do not know whether Dallas had one or more specimens, only the sex: female. Walker (1867a: 121) listed only one specimen with the same data and we have found only one specimen in the collection but cannot be sure it was the only one Dallas had (although it is likely he had just this one). By giving its labels data, describing it and calling the specimen “The type”, Thomas designated it as the lectotype by inference of “the type”. Thomas misread one of the labels as “Mayo-Abril”, it actually reads “Magd. Avril”. “Magd.” refers to the Colombian Department of Magdalena, while “Avril” is the French for “April”. “M. Goudot” can only refer to Justin Goudot, the French naturalist who collected in Colombia between 1822 and 1842 and died there around 1850 (see Lasègue 1845: 471–472 and Palmer 1918: 240–241).

***saturata* (*Strachia*)** Walker 1867b: 342–343.

Original data: Holotype. "a. Ceram. From Madame Ida Pfeiffer's collection."

HOLOTYPE f#: red-margined holotype disc; green-margined type disc; "Ceram / 55 8"; "Asopus saturatus."; "NHMUK 010592381". Fourth and fifth right antennomeres, third to fifth left antennomeres, and right anterior leg missing. Wings partially disjointed (Fig. 165).

Current status: *Amyotea hamata* (Walker, 1867) (synonymised by Stål 1870: 57; see Schouteden 1907: 54).

Note: The long label from Walker's catalogue reads: "Asopus saturatus.". While this is not the original combination, this is the one used by Walker (1868: 534). There, Walker also suspected that *Asopus saturatus* was a variety of *Asopus hamatus*.

***sculptus* (*Podisus*)** Distant 1889: 320.

Original data: Syntype(s). "*Hab*. Panama, Bugaba (*Champion*)."

LECTOTYPE f# (designated by Thomas 1992: 78): purple-margined lectotype disc; red-margined type disc; "Bugaba, 800-1500 ft. Champion."; "Podisus sculptus Dist. [Distant's handwriting]"; "NHMUK 010592369". Specimen well preserved (Fig. 166).

PARALECTOTYPE m#: blue-margined paralectotype disc; "Bugaba, Panama. Champion."; "sculptus Dist. [Distant's handwriting]"; "Distant Coll. 1911–383."; "NHMUK 010592370". Fourth and fifth left antennomeres missing (Fig. 167).

Current status: *Podisus sculptus* Distant, 1889.

Note: Thomas (1992: 78) explained: "The type of *Podisus sculptus*, a female, was located in the British Museum (Natural History). It is labeled: (a) "Type," (b) Podisus sculptus Dist.," (c) "Bugaba 800-1590 ft Champion."" From Distant's original description, we do not know whether Distant had one or more specimens, nor the sex. We have found only one specimen in the collection but cannot be sure it was the only one Distant had. By giving its labels data and calling the specimen "The type", Thomas designated it as the lectotype by inference of "the type".

***scutellaris* (*Bodetria*)** Walker 1868: 529.

Original data: Holotype. "a. Vera Cruz. From M. Sallé's collection."

HOLOTYPE m#: red-margined holotype disc; green-margined type disc; "Vera Cruz / 54 66"; "Bodetria scutellaris."; "NHMUK 010592395". Legs missing (Fig. 168).

Current status: *Heteroscelis lepida* (Stål, 1862) (synonymised by Stål 1870: 31; see also Distant 1900a: 63; Thomas 1992: 48).

***scutellatus* (*Platynopus*)** Distant 1900a: 57.

Original data: Syntype(s). "*Hab*. Upper Congo, Bopoto (Coll. Dist)."

SYNTYPE f#: blue-margined syntype disc; "Bopoto Upper Congo"; "scutellatus Dist. [Distant's handwriting]; "Distant Coll. 1911–383."; "NHMUK 010592436". Fifth right and left antennomeres missing (Fig. 169).

Current status: *Platynopiellus scutellatus* (Distant, 1900) (see Thomas 1994: 194-195).

Note: Thomas (1994: 195) did not mention any type in the material examined; it may be because the specimen was not marked as type prior to this study. Possibly because Distant had not distinguished it as such by writing the word "type" on its label. This urged us to query at what point Distant had added this indication on his determination labels. Since our set was wide-ranging (1879–1882, 1887–1890, 1892–1893, 1898, 1902–1902, 1908, 1910–1913), we could determine that Distant started adding the word "type" on his labels in 1908 (see herein *Canthecona humeralis, Canthecona ornatula* and *Incitatus primus*, all Distant, 1908). The year was later refined to sometime between 1904 and 1906 after examination of our Lygaeoidea and Coreoidea images (see, for example, *Aphanus raja* Distant, 1906 but not *Kennetus alces* Distant, 1904; Dellapé & Henry, 2018 and CoreoideaSF Team, 2018, respectively). This range was shortened to 1904–1905 after having studied images of Cicadidae from Distant's (1905) paper (see *Platylomia assamensis* Distant, 1905, Anonymous, 2018a). We further noticed that Distant also went back to earlier types (1878–1880) and added "(type)" to their determination labels. Examples in this catalogue are the following: *Canthecona binotata*, *Canthecona tibialis* and *Picromerus robustus*, all Distant, 1879 and *Podisus insignis* and *Podisus nigriventris* but not *Podisus affinis*, all Distant, 1880. Types from Distant's (1878) Cicadidae paper are the first to bear the indication "(type)" (see *Platypleura andamana* Distant, 1878, Anonymous, 2018b). The implications of this study being that when Distant has mentioned the type in the original description and given a specimen a type label in the collection, it may be claimed that Distant has designated a holotype in the original description.

***semialba* (*Mormidea*)** Walker 1868: 553.

Original data: 2 syntypes. “a, b. Constancia, Rio Janeiro. Presented by the Rev. H. Clark.”

LECTOTYPE m# (designated by Thomas 1992: 80): purple-margined lectotype disc; green-margined type disc; “CONSTANCIA Jan 1857. H. Clark.”; “Mormidea semialba.”; “NHMUK 010592333”. Fourth and fifth right and left antennomeres missing (Fig. 170).

PARALECTOTYPE m#: blue-margined paralectotype disc; “CONSTANCIA Jan 1857. H. Clark.”; “Mormidea semialba Walker’s catal”; “Asopinae 198 Podisus semialbus Walk”; “NHMUK 010592334”. Specimen carded; third to fifth right antennomeres missing (Fig. 171).

Current status: *Podisus semialbus* (Walker, 1868) (see Distant 1900a: 58).

Note: Thomas (1992: 80) explained: “The type, a male, was located in the British Museum (Natural History). It is labeled: (a) “Type,” (b) “Constancia, Jan 1857, H. Clark,” (c) “Mormidea semialba.”” Walker lists two specimens and we have found two. By giving the labels data for one of them and calling it “the type”, Thomas designated it as the lectotype by inference of “the type”.

***semiscitus* (*Platynopus*)** Walker 1867a: 129.

Original data: Holotype. “a. Gilolo. Presented by W. W. Saunders, Esq.”

HOLOTYPE f#: red-margined disc; green-margined type disc; “Gil.”; “21. Platynopus semiscitus.”; “NHMUK 010592433”. Left antenna missing; left humeral angle broken (Fig. 172).

NON TYPE f#: “Platynopus semiscitus Walker’s catal.”; “Saunders 65·13”; “Bac”; “NHMUK 010937665”.

Current status: *Montrouzierellus laetus* (Walker, 1867) (synonymised by Distant 1900a: 63; see Kirkaldy 1909: 11; Thomas 1994: 187).

Notes: Walker had noted: “It has more affinity to *P. dotatus* than to *P. laetus,* and the three may perhaps be considered as varieties of one species.” Indeed, Distant (1900a: 63) synonymised Walker’s three species. For explanations concerning the extra specimen listed above, not mentioned in Walker's catalogue, see above under *P. dotatus*).

***silvaticus* (*Platynopus*)** Distant 1890b: 475.

Original data: Syntype(s). Democratic Republic of the Congo: "Collection of Rhynchota made at Yambuya on the River Aruwimi, by Mr. W. Bonny of the Emin Pasha Relief expedition under Mr. H. M. Stanley."

SYNTYPE f#: blue-margined syntype disc; red-margined type disc; "Yambuya R. Aruwimi (Bonny)"; "silvaticus Dist. [Distant's handwriting]"; "Distant Coll. 1911–383."; "NHMUK 010592150". Third to fifth right antennomeres, second to fifth left antennomeres, and legs (except the right middle leg) missing; abdomen partially disjointed from thorax (Fig. 173).

Current status: *Planopsis silvatica* (Distant, 1890) (see Schouteden 1907: 50; Bergroth 1908 : 182; Thomas 1994 : 194).

Note: In the original description, the words "antennae mutilated" may mean that Distant just described the species from this single specimen, but we cannot be sure; there may have been many, all with antennae mutilated; we therefore consider the specimen a syntype.

***similis* (*Cazira*)** Distant 1902: 245–246.

Original data: Syntypes [Range of measurements]. "*Hab*. Naga Hills (*Doherty*)."

SYNTYPE m#: blue-margined syntype disc; red-margined type disc; "Naga Hills (Doherty)"; "similis Dist. [Distant's handwriting]"; "Distant Coll. 1911–383."; "NHMUK 010592147". Fourth and fifth right antennomeres, second to fifth left antennomeres, left middle leg, and posterior legs missing (Fig. 174).

SYNTYPE m#: blue-margined syntype disc; red-margined type disc; "Naga Hills (Doherty)"; "Distant Coll. 1911–383."; "NHMUK 010592148". Fourth and fifth right antennomeres, third to fifth left antennomeres, and left anterior leg missing (Fig. 175).

SYNTYPE m#: blue-margined syntype disc; "Naga Hills (Doherty)"; "Distant Coll. 1911–383."; "NHMUK 010592149". Fifth right and left antennomeres, and left middle leg missing (Fig. 176).

Current status: *Cazira similis* Distant, 1902.

***similis* (*Picromerus*)** Distant 1883: 421.

Original data: Syntype(s). "*Hab*. Hakodatè."

SYNTYPE m#: blue-margined syntype disc; red-margined type disc; "Japan (Lewis)"; "similis (Dist.) [Distant's handwriting]"; "Ha Ko"; "NHMUK 010592296". Specimen well preserved (Fig. 177).

SYNTYPE f#: blue-margined syntype disc; "Hakodatè / 8831"; "NHMUK 010592298". Specimen well preserved (Fig. 178). NOT SURE ABOUT THE STATUS OF THIS SPECIMEN; IT ARRIVED AT THE MUSEUM AFTER THE DATE OF THE DESCRIPTION!… AND ALSO, WHICH IS WORSE, MAY HAVE BEEN COLLECTED IN 1887!

Current status: *Picromerus lewisi* Scott, 1874 (synonymised by Josifov & Kerzhner 1978: 180).

Note: Distant had noted "In colour, markings, and general appearance almost undistinguishable from *P*. *lewisi* Scott, [...]" and indeed *Picromerus similis* Distant was synonymised to *P*. *lewisi* Scott by Josifov & Kerzhner (1978).

***smithi* (*Podisus*)** Distant 1889: 319.

Original data: Syntype(s). "*Hab*. Mexico, Orizaba (*H*. *H*. *Smith* & *F*. *D*. *G*.)."

LECTOTYPE f# (designated by Thomas 1992: 97): purple-margined lectotype disc; red-margined type disc; "Orizaba. H. H. S. & F. D. G. Dec 1887."; "B.C.A., Hem. I. Podisus smithi Dist."; "NHMUK 010592331". Fourth and fifth right and left antennomeres missing (Fig. 179).

Current status: *Podisus nigriventris* Distant, 1880 (synonymised by Thomas 1992: 97).

Note: Thomas (1992: 97) explained: "The type of *Podisus smithi*, a female, was located in the BMNH. It is labeled: (a) "Type," (b) "Orizaba HHS + FDG Dec 1887 BCA Hem. Podisus smithi Dist."" From Distant's original description, we do not know whether Distant had one or more specimens, nor the sex. We have found only one specimen in the collection but cannot be sure it was the only one Distant had. By giving its labels data and calling the specimen "The type", Thomas designated it as the lectotype by inference of "the type".

***spinosa* (*Arma*)** Dallas 1851: 98.

Original data: Syntype(s): "m#". "a. Trenton Falls. Presented by E. Doubleday, Esq."

SYNTYPE m#: blue-margined syntype disc; red-margined type disc; "E. Doubleday. Trenton Falls, New York."; "41. 5. 17. 86."; "4. Arma spinosa,"; "NHMUK 010592454". Left hemelytra, third to fifth right antennomeres, second to fifth left antennomeres, and right posterior leg missing (Fig. 180).

Current status: *Podisus maculiventris* (Say, 1831) (synonymised by Uhler *in* Scudder 1899: 307; see Van Duzee 1904: 71; Schouteden 1907: 72).

Notes: From Dallas's original description, we do not know whether Dallas had one or more specimens, only the sex: male. Walker (1867a: 134) listed only one specimen with the right data. We have found it. Because we cannot be sure that it was the only one Dallas had when he described the species (although it is likely as Dallas stated only one measurement and noted: "Antennae with the two basal joints dusky ferrugineous, <u>the rest wanting</u>" [emphasis ours]), we consider it a syntype. This, especially as Thomas (1992: 92) did not mention having examined any type for this species, although he thoroughly detailed those he did examine for other species. According to Burks (1975: 139), the specimens Doubleday collected at St John's Bluff may be variously labelled: "St John's Bluff", "East Florida, Doubleday" and "North America, Doubleday". The species *Arma spinosa* is reported by Walker (1985: 11) as having been sent to Museum Victoria by Francis Walker. Therefore the specimen (number 52829) of this species from N. America listed by Public Library, Museums and National Gallery (Vic.), *et al*. (1890: 52) may be from the type series. This needs to be further investigated.

***splendens* (*Tynacantha*)** Distant 1889: 321.

Original data: Syntype(s). "*Hab*. Panama, Bugaba (*Champion*)."

LECTOTYPE m# (designated by Thomas 1992: 123): purple-margined lectotype disc; red-margined type disc; "Bugaba, 800-1500ft. Champion."; "B.C.A., Hem. I. Tynacantha splendens Dist."; "NHMUK 010592342". Right middle leg, and left posterior leg missing (Fig. 181).

Current status: *Tynacantha splendens* Distant, 1889.

Note: Thomas (1992: 123) explained: "I examined the type of *Tynacantha splendens*, a male, located in the British Museum (Natural History). It is labeled: (a) "Type," (b) "B.C.A. Hem. I. Tynacantha splendens Dist.," "c) "Bugaba, 800-1500 ft. Champion."" From Distant's original description, we do not know whether Distant had one or more specimens, nor the sex. We have found only one specimen in the collection but cannot be sure it was the only one Distant had. By giving its labels data and calling the specimen "the type", Thomas designated it as the lectotype by inference of "the type".

***spurcata* (*Macrorhaphis*)** Walker 1868: 531–532.

Original data: 2 syntypes. "a, b. Natal. From M. Gueinzius' collection."

SYNTYPE m#: blue-margined syntype disc; green-margined type disc; "P^{t} Natal 55.96."; "Macrorhaphis spurcata. sp. n. F. WALKER 1868"; "G. Schmitz det. 1976 Macrorhaphis acuta m# DALLAS"; "NHMUK 010592175". Specimen carded; fourth and fifth right antennomeres, fifth left antennomere missing. Pygophore kept inside a glass vial (Fig. 182).

Current status: *Macrorhaphis acuta* Dallas, 1851 (synonymised by Schouteden 1905: 177; see Schouteden 1907: 39).

Notes: Strangely enough, Walker had noted "The spines of the thorax are more acute than those of *M. tristis*" [emphasis ours], but he did not think it could be *M. acuta* Dallas to which Schouteden later synonymised it. One syntype is missing or was not recognised.

***stellatus* (*Oplomus*)** Distant 1911a: 252–253.

Original data: Syntype(s). "*Hab.* Argentina; Tucuman Prov. (Brit. Mus.)."

LECTOTYPE m# (designated by Thomas 1992: 65): purple-margined lectotype disc; red-margined type disc; "Argentina. Tucuman Prov. 1902–288."; "Oplomus stellatus type Dist. [Distant's handwriting]"; "NHMUK 010592408". Fifth right antennomere, and right posterior leg missing (Fig. 183).

Current status: *Oplomus punctatus* Montandon, 1895 (synonymised by Horváth, 1911: 430; Horváth noted that *Oplomus stellatus* Distant was merely the male of *O. punctatus* Montandon: "*Oplomus stellatus* DIST. est tantum mas *O. punctati* MONTD.")

Note: Thomas (1992: 65) explained: “The male type of *Oplomus stellatus* was located in the British Museum (Natural History). It is labeled: (a) “Type,” (b) “Oplomus stellatus Dist.,” (c) “Argentina, Tucuman 1902-288.”” From Distant’s original description, we do not know whether Distant had one or more specimens, nor the sex. We have found only one specimen in the collection but cannot be sure it was the only one Distant had. By giving its labels data and calling the specimen “The […] type”, Thomas designated it as the lectotype by inference of “the type”.

submarginata* (*Arna [*sic*!]**)** Walker 1867a: 139.

Original data: Holotype. “a. Tejuca, Rio Janeiro. Presented by the Rev. H. Clark.”

HOLOTYPE f#: red-margined holotype disc; green-margined type disc; “TEJUCA, Jan^{y} 1857. H. Clark.”; “37. Arna [*sic*!] submarginata.”; “NHMUK 010592338”. Fifth right antennomere, and fourth and fifth left antennomeres missing (Fig. 184).

Current status: *Podisus ventralis* (Dallas, 1851) (synonymised by Thomas 1992: 99).

Note: Walker saw the difference with *A. obscura* (“The longer thoracic spines distinguish it from *A. obscura*”), now a synonym of *Podisus nigrispinus*, but did not think the specimen could be one of the species *A. ventralis*.

***tabida* (*Arma*)** Signoret 1863: 544.

Original data: ST(S): Chile.

NON TYPE m#: “Balzapamba (Ecuad.) R. Haensch S.”; “1903-322”; “NHMUK 010939527”. Left fourth and fifth antennomeres missing (Fig. 185).

NON TYPE f#: “Balzapamba (Ecuad.) R. Haensch S.”; “Co-types Breddin. Purch. of Haensch Podisus tabidus Sign.”; “1903-322”; NHMUK 010939525”. Left fourth and fifth antennomeres, and right fifth antennomere missing (Fig. 186).

NON TYPE f#: “Balzapamba (Ecuad.) R. Haensch S.”; “BRIT. MUS.”; “Podisus sp. (1-198)”; “Label 4”; “Label 5”; “NHMUK 010939526”. Left fourth and fifth antennomeres, right fifth antennomere, and left middle leg missing (Fig. 187).

Current status: *Brontocoris tabidus* (Signoret, 1863) (see Thomas 1992: 31) However, see “Note”.

Note: Thomas (1992: 84–85) noted that the had located in the collection a pair of Ecuadorian specimens labeled as “cotypes” of *Podisus tabidus* (Signoret, 1863), a male and a female which he identified as *P. crassimargo* (Stål, 1860). We have actually found three such specimens in the collection, one male and two females. The senior author identified the male as *P. congrex* (Stål, 1862) and the females as *P. pallipes* (Dallas, 1851). We, however, share Thomas’s puzzlement as to the meaning of “cotypes” and also believe that these specimens could have explained Breddin’s erroneous concept of *P. tabidus*.

***tenellus* (*Platynopus*)** Walker 1867a: 127.

Original data: 3 syntypes. “a. New Guinea. Presented by W. W. Saunders, Esq. b. New Guinea. From Mr. Wallace's collection. c. New Guinea. Presented by Sir John Liddell.”

SYNTYPE m#: blue-margined syntype disc; green-margined type disc; “Dor.”; “18. Platynopus tenellus.” “Dorey Wallace”; “Saunders 65·13.”; “NHMUK 010592425”. Right middle leg missing (Fig. 188).

SYNTYPE m#: blue-margined syntype disc; “Platynopus tenellus Walker’s catal. “; “M”; “Saunders. 65·13.”; “NHMUK 010592427”. Fourth and fifth right and left antennomeres, and right anterior leg missing (Fig. 189).

SYNTYPE f#: blue-margined syntype disc; “56 85”; “258”; “Platynopus tenellus Walker’s catal.”; “NHMUK 010592428”. Antennae missing (Fig. 190).

Current status: *Montrouzierellus falleni* (Guérin-Méneville, 1831) (synonymised to *Platynopus melacanthus* Boisduval, 1835 by Distant (1900a: 63), Dupuis (1952: 453) demonstrated the priority of *Pentatoma Fallenii* Guérin, 1831 over *Pentatoma melacanthum* Boisduval, 1835.).

***thomsoni* (*Cantheconidea*)** Distant 1911b: 351.

Original data: Holotype or holotype and paratype(s): “m#”. “*Hab*. N.E. China; Shan-hai-kwan (*F. M. Thomson*, Brit. Mus.).”

HOLOTYPE m#: red-margined holotype disc; red-margined type disc; “Shan-hai-Kwan. In Mountains. I.IX.06. F.M. Thomson. 1907–200.”; “Cantheconidea thomsoni type Dist. [Distant’s handwriting]”; “NHMUK 010592161”. Fifth right, and fourth and fifth left antennomeres missing (Fig. 191).

Current status: *Eocanthecona thomsoni* (Distant, 1911) (see Thomas 1994: 178).

Note: We have only found one male specimen in the collection. Mentions such as “fifth mutilated in type” in the original description could support either the fact that Distant had other specimens but designated one as the type (holotype) or that he just had one (only one measurement). Whether Distant had many specimens or not, this specimen matches the description and Distant labelled it as type. We therefore consider it the holotype.

***thoracata* (*Mecosoma*)** Distant 1901: 61–62.

Original data: Syntype(s). “*Hab*. Mashonaland, near Salisbury (*G. A. K. Marshall*).”

SYNTYPE f#: blue-margined syntype disc; red-margined type [H. T.] disc; “Salisbury (Marshall)”; “thoracata Dist. [Distant’s handwriting]”; “Distant Coll. 1911–383.”; “NHMUK 010592415”. Antennae, second to fourth labial segments, and right anterior and posterior legs missing (Fig. 192).

SYNTYPE f#: blue-margined syntype disc; “Salisbury (Marshall)”; “Distant Coll. 1911–383.”; “NHMUK 010592416”. Antennae missing (Fig. 193).

SYNTYPE f#: blue-margined syntype disc; “Salisbury (Marshall)”; “Distant Coll. 1911–383.”; “NHMUK 010592417”. Antennae, second to fourth labial segments, and left posterior leg missing (Fig. 194).

SYNTYPE f#: blue-margined syntype disc; “Salisbury Mashonaland (G A K Marshall)”; “Distant Coll. 1911–383.”; “NHMUK 010592418”. Second to fifth right antennomeres, fourth and fifth left antennomeres, and left anterior and middle legs missing (Fig. 195).

SYNTYPE m#: blue-margined syntype disc; “Salisbury (Marshall)”; “Distant Coll. 1911–383.”; “NHMUK 010592419”. Antennae missing (Fig. 196).

Current status: *Mecosoma mensor* (Germar, 1838) (synonymised by Schouteden 1905: 183, 185 ; see Schouteden 1907: 63; Kirkaldy 1909: 25).

Note: A proof, if ever one was needed, that “Antennae missing” in an original description does not obligatorily mean that the author of the species was facing a single specimen!

***tibialis* (*Canthecona*)** Distant 1879: 46–47.

Original data: Syntype(s). “North Khasia hills, 1500 to 3000 feet.”

SYNTYPE f#: blue-margined syntype disc; red-margined type disc; “N. Khasia 1500 to 3000”; “tibialis Dist. (type) [Distant’s handwriting]”; “Distant Coll. 1911–383.”; “NHMUK 010592163”. Right middle leg missing; left wings disjointed (Fig. 197).

NON TYPE (Var. a.): “N. Khasia 1500 to 3000 (Chennel) ”; “Distant Coll. 1911–383.”; “NHMUK 010936562”.

Current status: *Eocanthecona tibialis* (Distant, 1879) (see Thomas 1994: 178).

Note: Thomas (1994: 178) noted: “Material examined: Determined specimens in BMNH. Also, India (1 male).” but did not mention our syntype.

***tincta* (*Arma*)** Dallas 1851: 97.

Original data: Syntype(s): “f#”. “a. Columbia. From M. Goudot’s Collection.”

SYNTYPE f#: blue-margined syntype disc; red-margined type disc; “Columbia / 46 20”; “Bogota”; “18. Arma tincta,”; “a”; “NHMUK 010592335”. Specimen well preserved (Fig. 198).

Current status: *Podisus tinctus* (Dallas, 1851) (see Distant 1880: 37).

Note: Walker (1867a: 137) listed only one specimen, but it does not mean that Dallas just had one (although it is likely). Thomas (1992: 86) mentioned “A female type specimen was located in the British Museum (Natural History). It is labeled: (a) “Type,” (b) “Bogata,” [sic!] (c) “49 [sic!] 20,” (d) “18. Arma tincta.”” He used the indefinite article and does not imply having seen “the” type. Taking the foregoing remarks into account, we consider the specimen a syntype.

***trijunctus* (*Platynopus*)** Walker 1867a: 125.

Original data: Holotype and var. β. “a, b. Whydah, West Africa. From Mr. Fraser’s collection.”

HOLOTYPE f#: blue-margined syntype disc; green-margined type disc; “Whydah / 53 74”; “11. Platynopus trijunctus.”; “NHMUK 010592453”. Right hemelytra, fourth and fifth right antennomeres, third to fifth left antennomeres, and right posterior leg missing; abdomen partially disjointed from thorax (Fig. 199).

Current status: *Platynopiellus septendecimmaculatus* (Palisot de Beauvois, 1811) (synonymised to *Platynopus rostratus* Drury, 1782 by Distant 1900a: 56, as a variety; see Schouteden 1905: 160; Schouteden 1907: 48; Due to homonymy (see "Notes" below), the name of the species became that of the next available junior synonym: *Pentatoma 17-maculata* Palisot de Beauvois, 1811 (see Kirkaldy, 1909: 12, as *Platynopus 17-maculatus*); Thomas (1994: 195) placed it in his new genus, *Platynopiellus*.).

Notes: *Platynopus rostratus* (Drury, 1782) was a primary homonym of *Cimex rostratus* DeGeer, 1773 (Pentatomidae), *C. rostratus* Goeze, 1778 (Coreidae) and *C. rostratus* Fabricius, 1781 (Pentatomidae). The next junior synonym for that species was *Cimex calens* Fabricius, 1803, a primary homonym of *C. calens* Linnaeus, 1767 (Miridae) (see Dolling *et al*. 1999: 18, 77). The specific epithet, originally spelled *17-maculata*, has been transliterated in two different ways: *septendecimaculata*/*-us* (Thomas 1994: 194-195; Maldès & Pluot-Sigwalt 2004) and *septemdecimmaculatus* (Dolling *et al*. 1999: 18, 77; Rider 2015); we have adopted the spelling *septendecimmaculata*/*-us* as we have chosen to follow Welter-Schultes (2012: 76); the set of rules provided there is convenient and useful to achieve consistency in transliterating older names or naming new species. We note, however, that the use of "septemdecim" is not erroneous (Gaffiot 1934: 1426), only less correct (Lewis & Short, 1891: 1675). Furthermore, bearing in mind the explanations by Lewis & Short (1891:1091), we also understand the choice not to duplicate the "m" as logical. In the collection, we have also found the specimen representing var. β. It is a female bearing the following labels "Platynopus trijunctus Walker's catal."; "Whydah / 53 74"; "NHMUK 010938345".

***truculentus* (*Glypsus*)** Walker 1867a: 132.

Original data: Holotype. "a. Madagascar. From Madame Ida Pfeiffer's collection."

HOLOTYPE m#: red-margined holotype disc; green-margined type disc; "Madagascar / 58 85"; "4. Glypsus truculentus."; "NHMUK 010592312". Fourth and fifth right and left antennomeres missing (Fig. 200).

Current status: *Glypsus truculentus* Walker, 1867.

***turbida* (*Arma*)** Walker 1867a: 140–141.

Original data: Holotype. "a. ———? Presented by W. W. Saunders, Esq."

HOLOTYPE f#: red-margined holotype disc; green-margined type disc; "Saunders 65·13."; "43. Arma turbida."; "NHMUK 010592336". Left hemelytra, fourth and fifth right and left antennomeres, and posterior legs missing. The legs are glued on the first label (Fig. 201).

Current status: *Podisus distinctus* (Stål, 1860) (synonymised by Thomas 1992: 90).

***turneri* (*Platynopus*)** Distant 1911b: 351–352.

Original data: Syntypes: "m# f#". "*Hab*. Queensland; Mackay (*R. E. Turner*, Brit. Mus.); Townsville (*F. P. Dodd*, Brit. Mus.)."

SYNTYPE f#: blue-margined syntype disc; red-margined type disc; "Queensland. A.J Turner. 1905–125."; "Mackay 2.99"; "Platynopus turneri type Dist. [Distant's handwriting]"; "NHMUK 010592437". Fourth and fifth left antennomeres missing (Fig. 202).

SYNTYPE m#: blue-margined syntype disc; "Queensland F. P. Dodd. 1907–54."; "NHMUK 010592438". Second to fifth right antennomeres, fourth and fifth left antennomeres missing; wings opened (Fig. 203).

SYNTYPE f#: blue-margined syntype disc; "Queensland F. P. Dodd. 1907–54."; "NHMUK 010592439". Specimen well preserved (Fig. 204).

SYNTYPE sex?: blue-margined syntype disc; "Queensland F. P. Dodd. 1907–54."; "NHMUK 010747742". Fifth left antennomere, anterior legs, and abdomen missing (preventing the sex determination) (Fig. 205).

Current status: *Montrouzierellus turneri* (Distant, 1911) (see Thomas 1994: 188).

***typicus* (*Supputius*)** Distant 1889: 321–322.

Original data: Syntype(s). "*Hab*. Panama, Bugaba (*Champion*)."

LECTOTYPE f# (designated by Thomas 1992: 113): purple-margined lectotype disc; red-margined type disc; "Bugaba, 800-1,500 ft. Champion."; "Supputius typicus Dist. [Distant's handwriting]"; "NHMUK 010592349". Second to fifth right and left antennomeres, and right middle leg missing (Fig. 206).

Current status: *Supputius typicus* Distant, 1889.

Note: Thomas (1992: 113) explained: “The type of *Supputius typicus* Distant, a female, was located in the British Museum (Natural History). It is labeled: (a) “Type,” (b) “Supputius typicus Distant,” (c) “Bugaba 800-1500 ft, Champion.”” From Distant’s original description, we do not know whether Distant had one or more specimens, nor the sex. We have found only one specimen in the collection but cannot be sure it was the only one Distant had. By giving its labels data and calling the specimen “The type”, Thomas designated it as the lectotype by inference of “the type”.

***varipes* (*Gilva*)** Walker 1867a: 239.

Original data: Holotype and var. β. “a, b. Amazon Region. From Mr. Bates’ collection.”

HOLOTYPE f#: red-margined holotype disc; “Braz 62 57”; “Cazira Gilva varipes Walker’s catal.”; “NHMUK 010592169”. Specimen well reserved (Fig. 207).

NON TYPE m# ("Holotype" of the first description) : “Braz/ 62 57”; “Cazira Gilva varipes Walker's catal.”; “NHMUK 010592167”. Specimen well preserved (Fig. 208).

NON TYPE m# (var. β of the first description): “Santarem/ 53 72”; “Cazira Gilva varipes Walker's catal.”; “NHMUK 010592143”. Fourth and fifth right and left antennomeres missing, also right middle and left posterior legs missing (Fig. 209).

NON TYPE m# (var. β of the second description): green-margined type label; “Braz/ 62 57”; “1. Gilva varipes.”; “NHMUK 010592168”. Fourth and fifth left antennomeres missing (Fig. 210).

Current status: *Coryzorhaphis carneola* Erichson, 1848 (*Gilva varipes* was synonymised to *Coryzorhaphis spinolae* Signoret, 1862 by Stål 1870: 38 [see also Distant 1900a: 63; Schouteden 1907: 61]; *C. spinolae* Signoret was synonymised to *C. carneola* [as *C. carneolus*] by Thomas 1992: 36).

Notes: Austen (1907: 326) and others of Walker’s detractors have maintained that Walker was describing specimens and not species. On this occasion it is averred. Indeed, Walker proposed two descriptions for this species; it seems he did not understand what features were the most important ones to fix its concept (black spots on the hemelytra were counted as important in the first description and dropped in the second; the pale edged apex of the scutellum is counted as important in the second description but was also a feature in the specimens that we have determined as those of the first description). As the saying goes: “Every cloud has a silver lining”. Walker did indeed describe specimens and this proved pivotal to identify varieties of other species in this catalogue as well as to identify which, of four specimens, was the holotype of this species. Walker (1867a: 142) described the species from one specimen from the Amazon Region and one variety (“Var. β – Head wirth shorter stripes. Thorax with a black dot on each side in front. Scutellum testaceous. Fore wings with a black spot on the base of the costa.”) from Santarem. Later, in the same volume (1867a: 239), he redescribed the genus and species, explaining: “the description of this genus in page 141 is defective, and the following may be substituted.” As Walker published this correction in the same volume, it invalidates the first description and the second description only is valid. There, two specimens from the Amazon Region (a, b) are mentioned, with one of them being variety (“Var. β – Spots on the thorax and on the scutellum almost obsolete. Scutellum with a black point on each angle at the base, bordered with white at the tip.”). We have identified that:

1/ Walker had made the mistake in the Latin of the first description to mention “thorax” twice, first meaning “pronotum” and second, in its wider sense, including the scutellum.

2/ In the English description, he did use the word “scutellum” but counted the spots on the pronotal angles as part of it. So, he stated two and four.

3/ The second description is truer to the reality: “Thorax [pronotum] with two black spots near the hind border; hind angles black. Scutellum with two black spots near the fore border and with a short black streak on each side towards tip.”

4/ There is a discrepancy in the lengths given in both descriptions; all specimens are the same size. Walker may have measured the whole specimen from head to apex of hemelytra in the first description but only the body in the second.

5/ The specimen whose barcode number end in “168” matches var. β of the second description: its spots are almost invisible, it does have black points at the top angles of the scutellum and its scutellum is bordered with white at the tip (this latter feature appears in male specimen “143” and male specimen “167” but not in female specimen “169”; it may be a male characteristic).

5/ The variety from Santarem (“143”) can easily be determined not only thanks to its labels but also because it has a black spot on the costal margin whereas var. α (“Holotype”) of the first description has it in the discal cell. This is a feature of specimen “167” only. Specimen “169” does not present it. We have thus determined the latter as the holotype of *Gilva varipes* and considered the three other specimens as non-types.

6/ The “type” that Thomas (1992: 36) examined was, in fact, the variety of the second description (Specimen “168”), which had been erroneously marked as a type with the green –margined type label and the long label taken from the heading for the species in Walker’s catalogue: “1. Gilva varipes.”

***velata* (*Arma*)** Walker 1868: 532.

Original data: “Hindostan. In the National Museum at Melbourne.”

Current status: *Arma velata* Walker, 1868.

Notes: Walker (1868: 532) had separated *Arma velata* from *Arma turbida* thus: “Allied to *A. turbida*, but the spines of the thorax are longer and more acute.” Under the following heading “Species the types of which are not to be found in the British Museum.”, Distant (1900a: 64) placed *Arma velata* Walker, 1868, declaring that it should be treated as non existent. Walker (1985) does not list *Arma velata* in his “List of Hemiptera sent to the Museum of Victoria by F. Walker”. Even so, Distant’s remark should, obviously, not apply if the type(s) were to be found in Melbourne.

***ventralis* (*Arma*)** Dallas 1851: 100–101.

Original data: Syntype(s): ”f#”. “a. Venezuela. From Mr. Dyson’s Collection.”

SYNTYPE f#: blue-margined syntype disc; red-margined type label; “Venezuela / 47 26”; “21. Arma ventralis,”; “a”; “NHMUK 010592337”. Fourth and fifth right antennomeres, and second to fifth left antennomeres missing (Fig. 211).

Current status: *Podisus ventralis* (Dallas, 1851) (see Stål 1870: 51; Thomas 1992: 99).

Note: Walker (1867a: 137) listed only one specimen, but it does not mean that Dallas just had one (although it is likely). Thomas (1992: 100) mentioned: “A female specimen was located in the British Museum (Natural History). It is labeled: a) “Type,” b) “Venezuela,” c) “21. "Arma ventralis.””. He used the indefinite article and does not imply having seen “the” type. Taking the foregoing remarks into account, we consider the specimen a syntype.

***ventralis* (*Oplomus*)** Dallas 1851: 86.

Original data: Syntype(s): “f#”. “a. ———. From Mr. Children’s Collection.”

LECTOTYPE f# (designated by Thomas 1992: 62): purple-margined lectotype disc; “40 3 30 821.”; “21. Oplomus ventralis,”; “a”; “NHMUK 010592404”. Second to fifth right and left atennomeres, and right anterior and posterior legs missing (Fig. 212).

Current status: *Oplomus pulcher* Dallas, 1851 (synonymised by Thomas 1992: 62).

Note: Thomas (1992: 62) explained: “The type of *Oplomus ventralis* is a female and was located at the British Museum (Natural History). It is labeled: (a) “Type,” (b) “a,” (c) “Oplomus ventralis.” The specimen is metallic blue dorsally with a red abdomen.” From Dallas’s original description, we do not know whether Dallas had one or more specimens, only the sex: female. Walker (1867a: 122) listed only one specimen with corresponding data and we have found only one specimen in the collection but cannot be sure it was the only one Dallas had. By giving its labels data and calling the specimen “the type”, Thomas designated it as the lectotype by inference of “the type”.

***versicolor* (*Jalloides*)** Distant 1911b: 350.

Original data: Syntype(s). “*Hab*. Queensland; Kuranda (*F. P. Dodd,* Brit. Mus.).”

LECTOTYPE f# (designated by Thomas 1994: 166): purple-margined lectotype disc; red-margined type disc; “Queensland. F. P. Dodd. 1907–54.”; “Kuranda F. P. Dodd. Mch 04”; “Jalloides versicolor type Dist. [Distant’s handwriting]”; “NHMUK 010592292”. Doubled mounted specimen; second to fifth right antennomeres; and fourth and fifth left antennomeres missing (Fig. 213).

Current status: *Australojalla versicolor* (Distant, 1911) (see Thomas 1994: 166).

Note: From Distant’s original description, we do not know whether Distant had one or more specimens, nor the sex. We have found only one specimen in the collection but cannot be sure it was the only one Distant had. Thomas (1994: 166) stated: “Material examined: Holotype female BM(NH).”. We suspect he may have meant the specimen marked as type and this is the only specimen of the species in the collection (as Thomas noted: “Unfortunately, specimens seem quite rare.”), we therefore accept Thomas’s mention of the “Holotype female” as a valid lectotype designation.

***violaceus* (*Oplomus*)** Dallas 1851: 85–86.

Original data: Syntype(s): “f#”. “a. Columbia. From M. Goudot’s Collection.”

LECTOTYPE f# (designated by Thomas 1992: 59): purple-margined lectotype disc; red-margined type disc; “Columbia / 46 20”; “14. Oplomus violaceus,”; “a”; “NHMUK 010592402”. Fourth and fifth right antennomeres, second to fifth left antennomeres, and right posterior leg missing (Fig. 214).

Current status: *Oplomus salamandra* (Burmeister, 1835) (synonymised to *Oplomus tripustulatus* Fabricius by Stål 1870: 29, as Var. n; see Distant 1880: 31; Thomas 1992: 59, with valid current name as *O. salamandra* (Burmeister)).

Notes: Thomas (1992: 59) explained: “The female type of *Oplomus violaceus* Dallas was located in BMNH. It is labeled: (a) “Type,” (b) “Colombia,” (c) “Oplomus violaceus.” The specimen is metallic purplish in color.”. From Dallas’s original description, we do not know whether Dallas had one or more specimens, only the sex. Walker (1867a: 121) listed only one specimen with corresponding data and we have found only one specimen in the collection but cannot be sure it was the only one Dallas had. By giving its labels data, describing it and calling the specimen “The […] type”, Thomas designated it as the lectotype by inference of “the type”. As shown in Thomas (1992: 59), the name *tripustulatus* was preoccupied and so was that of *tibialis*, the next junior synonym, the name of the species therefore became *salamandra* Burmeister, 1835, the next non preoccupied junior synonym.

***virescens* (*Oechalia* (*Hawaiicola*))** Usinger 1941: 77–78.

Original data: “Holotype, male, Kokee, Kauai, August 21, 1921, O. H. Swezey. Allotype, female, Kaheluamanu, Kauai, April 22, 1920, J. A. Kusche, from the collection of W. M. Giffard. Eleven paratypes as follows: males, Kumuwela, Kauai, August 28, 1921, on *Straussia*; Halemanu, Kauai, August 18, 1921; and trail from Kokee to Kalalau, Kauai, August 5, 1925, on *Scaevola*, all collected by O. H. Swezey; Kokee, Kauai, February 1919, J. A, Kusche collector; and Alakai Swamp, Kauai, July 10, 1928, A. M. Adamson collector; females, two specimens, Kauaikinana, Kauai, August 2, 1925, O. H. Swezey collector; Kokee, Kauai, January, 1919, J. A. Kusche; Wahiawa, Kauai, June 1914, C. M. Cooke collector; Waialae River, Kauai, 4000 feet, April 14, 1920, J. A. Kusche collector, from the collection of W. M. Giffard; and

Makaweli, Kauai, 2000 ft., R. C. L. Perkins. Five additional specimens from the Kusche collection are labeled “Honolulu, Oahu, June 4, 1919”.”

PARATYPE f#: yellow-margined paratype disc; “Waialae River 4000 ft. Kauai”; “J. A. Kusche Coll 4-14-1920”; “W. M. Giffard”; “Brit. Mus. 1947-80”; “PARATYPE Oechalia virescens Usinger”; “NHMUK 010592457”. Specimen well preserved (Fig. 215).

PARATYPE m#: yellow-margined paratype disc; “Alakai Swamp VII-10-28 Kauai”; “A. M. Adamson Collector”; “Oechalia virescens Usinger Det. by R.L. Usinger”; “PARATYPE Oechalia virescens Usinger”; “Brit. Mus. 1947-80”; “NHMUK 010592458”. Specimen well preserved (Fig. 216).

Current status: *Oechalia virescens* Usinger, 1941.

***virgula* (*Oechalia*)** Van Duzee 1936: 220.

Original data: “Paratypes, 3 males taken with the holotype, six males taken at Kilauea, Hawaii, at 4,000 ft., Jan. 19, 1917 (W. M. Giffard), and one female taken at same place Aug. 5, 1919 (O. H. Swezey) ; two dark males taken in the Dry Forest, Hawaii, Jan. 1917 (Muir and Giffard) ; one female from Mt. Tantalus at 1,300 ft. (W. M. Giffard) ; one female from Alakai Swamp, Kauai, July 1917 (C. N. Forbes) ; one female from Kahuku, Kau, Hawaii, on "a-a" flows at 1,800 ft., May 29, 1918 (W. M. Giffard).”

PARATYPE m#: yellow-margined paratype disc; “Kilauea, Haw. 19-I-17 4000 ft.”; “W. M. Giffard Coll.”; “Coll. F. Muir”; “Oechalia virgula Van D. Det. by R.L. Usinger”; “PARATYPE virgula EP Van Duzee”; “Brit. Mus. 1947-80”; “NHMUK 010592459”. Right middle and posterior legs missing; abdomen partially disjointed from thorax (Fig. 217).

Current status: *Oechalia virgula* Van Duzee, 1936.

Note: Van Duzee had noted: “The types of the new species here described have been placed in the Bishop Museum.” Our paratype was presented to the Museum on 3/1/1947 by Dr. R. L. Usinger. It is one of the four male paratypes with similar data that Usinger (1941: 84) mentioned to be at hand (out of the six in the original description).

***viridicatus* (*Neoglypsus*)** Distant 1881: 27–28.

Original data: Syntype(s). “Tokei, Japan.”

SYNTYPE f#: blue-margined syntype disc; red-margined type [H. T.] disc; “Tokei Japan”; “ viridicatus Dist. [Distant’s handwriting]”; “Distant Coll. 1911–383.”; “NHMUK 010592300”. Fifth right antennomere, fourth and fifth left antennomere missing (Fig. 218).

SYNTYPE f#: blue-margined syntype disc; “Tokei Japan”; “Distant Coll. 1911–383”; “BRITISH MUSEUM”; “DYNORHYNCHUS DYBOWSKYI Jakov. Det. V. Gapud 1980”; “NHMUK 010592301”. Fourth and fifth right and left antennomeres, and right posterior leg missing (Fig. 219).

SYNTYPE f#: blue-margined syntype disc; “Japan (Lewis)”; “Distant Coll. 1911–383.”; “Chosenji”; “BRITISH MUSEUM”; “NHMUK 010592302”. Fourth and fifth right and left antennomeres missing (Fig. 220).

Current status: *Dinorhynchus dybowskyi* Jakovlev, 1876 (synonymised by Horváth 1889: 326).

Notes: Although Thomas (1994: 174) stated: “holotype female of *Neoglypsus viridicatus* was examined in BM(NH)”, we do not consider this a valid lectotype designation by inference of holotype as we have more than one female specimen in the collection and Thomas did not make an individual designation (see ICZN 1999: Art. 74.6.1.2.). I QUERY TYPE 302….

***volxemi* (*Podisus*)** Distant 1887b: Lviii–Lix.

Original data: Syntype(s). “Hab. Brazil. Therezopolis.” “Brussels’ Museum” “Van Volxem Collection”.

Current status: *Podisus volxemi* Distant, 1887.

Notes: Thomas (1992: 86) remarked: “Schouteden (1907b) provides a figure of this species (as *Apateticus volxemi*). I was unable to locate Distant's specimens of *Podisus volxemi* in the collection of the British Museum (Natural History).” If Schouteden could provide a figure of the species, it is because, as per Distant’s original description, a type is in Brussels. Synave (1969: 20) recorded the presence of the holotype in the Brussels Museum. As nothing in the original description indicates that there was only one specimen, we accept Synave’s mention of the holotype before 2000 as a lectotype designation by inference of holotype (ICZN 1999: Art. 74.6).

***williamsi* (*Afrius*)** Miller 1951: 183–184.

Original data: “MAURITIUS: 3 m# (including the type), 9 f#, 1948-49 (J. R. Williams). The type is deposited in the British Museum (Natural History).”

HOLOTYPE m#: red-margined holotype disc; “MAURITIUS. Coll. J.R. Williams 1.1949.”; “182”; “Pres by Com Inst Ent BM 1950 – 262”; “Afrius williamsi sp.n det. N.C.E. Miller. 1950.”; “COM INST ENT. COLL. NO. 11607”; “Predaceous on Schematiza cordiae, Barb”; “NHMUK 010592172”. Specimen carded; fifth right antennomere, and fourth and fifth left antennomeres missing (Fig. 221).

PARATYPE f#: yellow-margined paratype disc; “MAURITIUS Reduit. Xii.1948 Coll. J.R. Williams”; “182”; “Pres by Com Inst Ent BM 1950 – 262”; “Afrius williamsi sp.n det. N.C.E. Miller. 1950.”; “COM INST. ENT. COLL. NO. 11607”; “Predaceous on Schematiza cordiae, Barb”; “NHMUK 010592173 Specimen well preserved (Fig. 222).

PARATYPE f#: yellow-margined paratype disc; “MAURITIUS Reduit. Xii.1948 Coll. J.R. Williams”; “182”; “Pres by Com Inst Ent BM 1950 – 262”; “Afrius williamsi sp.n det. N.C.E. Miller. 1950.”; “COM INST. ENT. COLL. NO. 11607”; “Predaceous on Schematiza cordiae, Barb”; “NHMUK 010747732”. Specimen well preserved (Fig. 223).

PARATYPE f# yellow-margined paratype disc; “MAURITIUS Reduit. Xii.1949 Coll. J.R. Williams”; “182”; “Pres by Com Inst Ent BM 1950 – 262”; “Afrius williamsi sp.n det. N.C.E. Miller. 1950.”; “COM INST. ENT. COLL. NO. 11607”; “Predaceous on Schematiza cordiae, Barb”; “NHMUK 010747733”. Fourth and fifth left antennomeres missing (Fig. 224).

PARATYPE f#: yellow-margined paratype disc; “MAURITIUS Reduit. Xii.1949 Coll. J.R. Williams”; “182”; “Pres by Com Inst Ent BM 1950 – 262”; “Afrius williamsi sp.n det. N.C.E. Miller. 1950.”; “COM. INST. ENT. COLL. NO. 11607”; “Predaceous on Schematiza cordiae, Barb”; “NHMUK 010747734”. Specimen well preserved (Fig. 225).

PARATYPE f#: yellow-margined paratype disc; “Dept. of Agric. MAURITIUS”; “Pres by Com. Inst. Ent. B.M.1948-38”; “COM. INST. ENT. COLL. NO. 10958”; “182”; “NHMUK 010747735”. Specimen carded; fifth right antennomere, second to fifth left antennomere, and right middle and posterior legs missing (Fig. 226).

PARATYPE m#: yellow-margined paratype disc; “MAURITIUS Reduit. Xii.1949 Coll. J.R. Williams”; “182”; “Pres by Com Inst Ent BM 1950 – 262”; “Afrius williamsi sp.n det. N.C.E. Miller. 1950.”; “COM INST. ENT. COLL. NO. 11607”; “Predaceous on Schematiza cordiae, Barb”; “NHMUK 010747736”. Second to fifth right antennomeres, fifth left antennomere, and right posterior leg missing; wings opened (Fig. 227).

PARATYPE m#: yellow-margined paratype disc; “MAURITIUS Reduit A. Moutia II.v.1948”; “Pres by Com. Inst. Ent. B.M.1948-38”; “COM. INST. ENT. COLL. NO. 10958”; “Preying on Schematiza cordiae”; “182”; “NHMUK 010747737”. Specimen well preserved (Fig. 228).

PARATYPE f#: yellow-margined paratype disc; “MAURITIUS Reduit. i.1949 Coll. J.R. Williams”; “Afrius williamsi sp.n. det. N.C.E. Miller. 1950.”; “Press by Com Inst Ent B M 1950 - 262”; “COM INST. ENT. COLL. NO. 11607”; “182”; “Predaceous on Schematiza cordiae, Barb”; “NHMUK 010747738”. Specimen well preserved (Fig. 229).

PARATYPE f#: yellow-margined paratype disc; “MAURITIUS Reduit. i.1949 Coll. J.R. Williams”; “Afrius williamsi sp.n. det. N.C.E. Miller. 1950.”; “Press by Com Inst Ent B M 1950 - 262”; “182”; “Predaceous on Schematiza cordiae, Barb”; “NHMUK 010747739”. Specimen well preserved (Fig. 230).

PARATYPE f#: yellow-margined paratype disc; “Dept. of Agric. MAURITIUS Reduit 19.IV.1948”; “J.R. Williams”; “Pres by Com. Inst. Ent. B.M.1948-38”; “COM. INST. ENT. COLL. NO. 10958”; “182”; “NHMUK 010747740”. Specimen well preserved (Fig. 231).

Current status: *Afrius* (*Subafrius*) *flavirostrum* (Signoret, 1861) (synonymised by Roell *et al*. 2019: XXX).

Note: Apparently, one female paratype is missing.

***wollastoni* (*Megarhaphis*)** Buchanan-White 1878: 463–464.

Original data: Holotype [“exemplar unicum”]: male [“m#”]. “Santa Helena: “West Lodge””.

HOLOTYPE m#: red-margined holotype disc; red-margined type disc; “St Helena I; West Lodge I. St Helena Wollaston. 1875-76”; “1. Megarhaphis wollastoni BW.”; “MEGARHAPHIS WOLLASTONI g.n. sp.n F. Buchanan - White - 1878”;

“Macrorhaphis wollastoni (BUCH-WHITE) G. Schmitz det. 1972”; “Holotypus m#”; “Type I”; “BMNH(E) #1005995”; “NHMUK 010592178”. Specimen carded; fourth and fifth right antennomeres, fifth left antennomere, and left middle leg missing. Some parts are glued to the card in front and on the side of the specimen (Fig. 232).

Current status: *Macrorhaphis wollastoni* (Buchanan White, 1878) (see Schouteden 1905: 179; Schouteden 1907: 39).

Notes: Schouteden (1905: 181) observed: “Il se pourrait même que *M. Wollastoni* soit en réalité synonyme de *M. acuta*. Il serait intéressant de savoir ce que White entend par “*angulos posticos pronoti sat productos*”, ces angles n'étant que peu saillants chez *M. acuta*.”; this may need to be investigated. Strangely enough, Thomas (1994: 185) noted: “**Material examined:** Type specimen<u>s</u> in BM(NH).” [emphasis ours], yet Buchanan-White had stated that he had a unique example.

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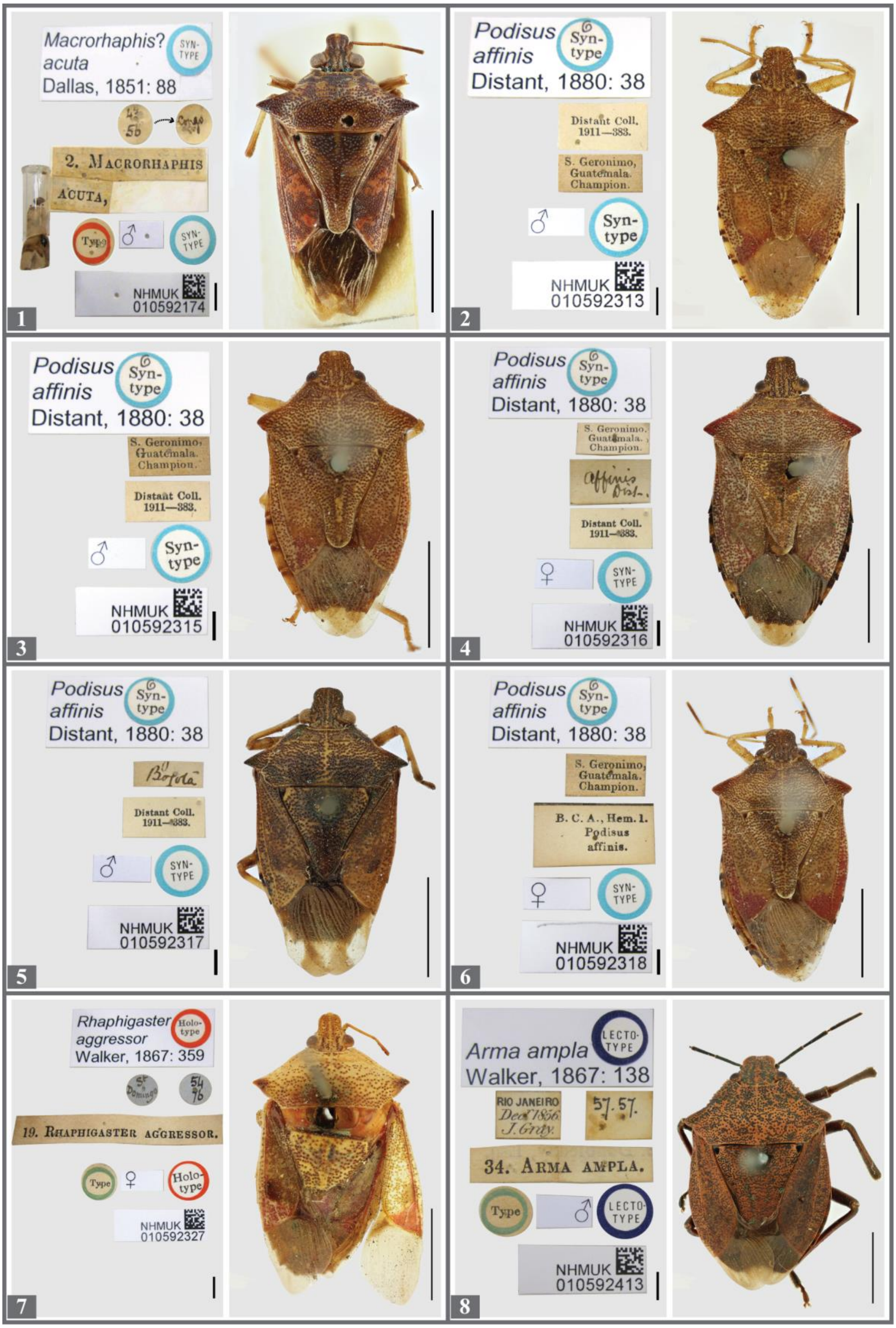
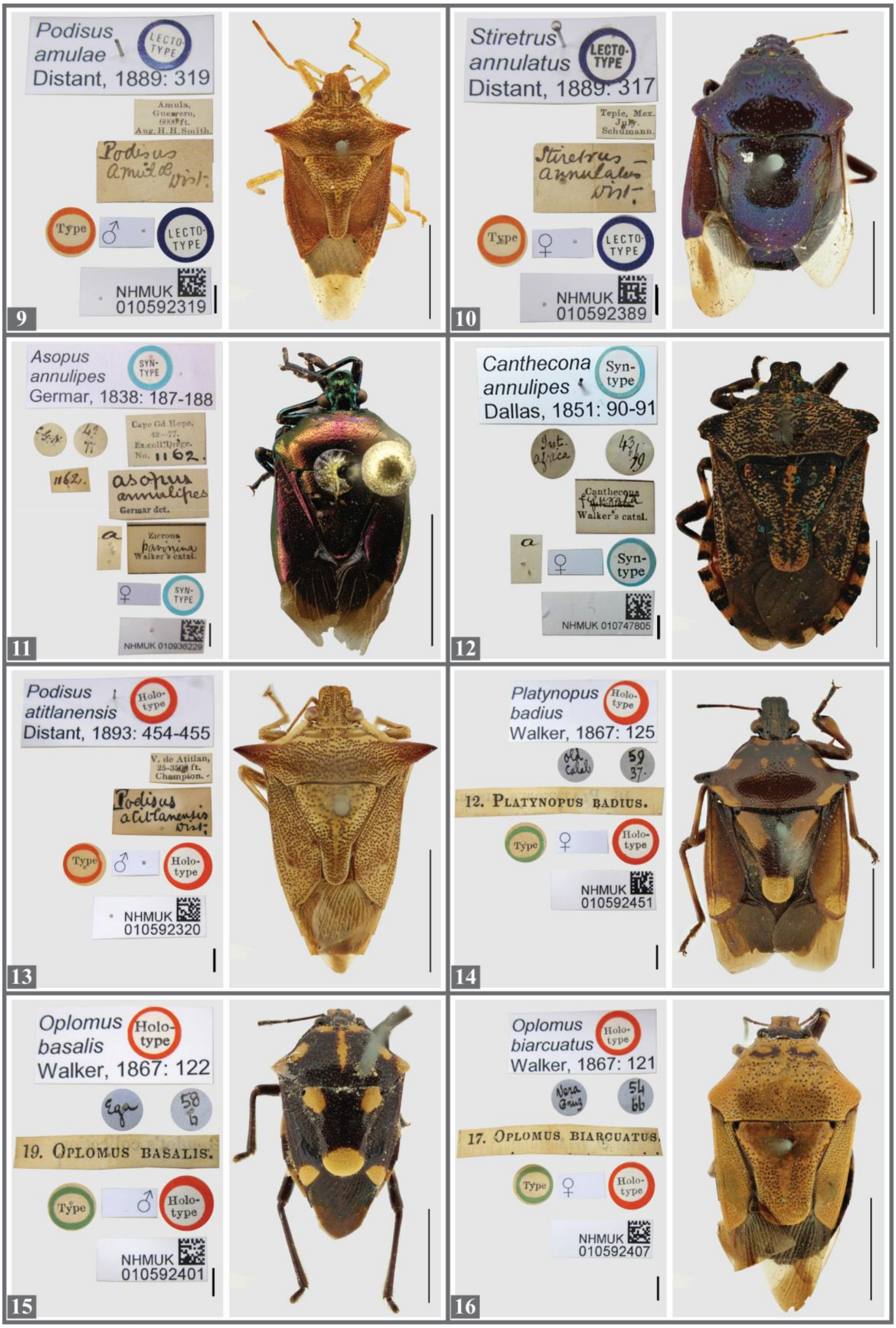
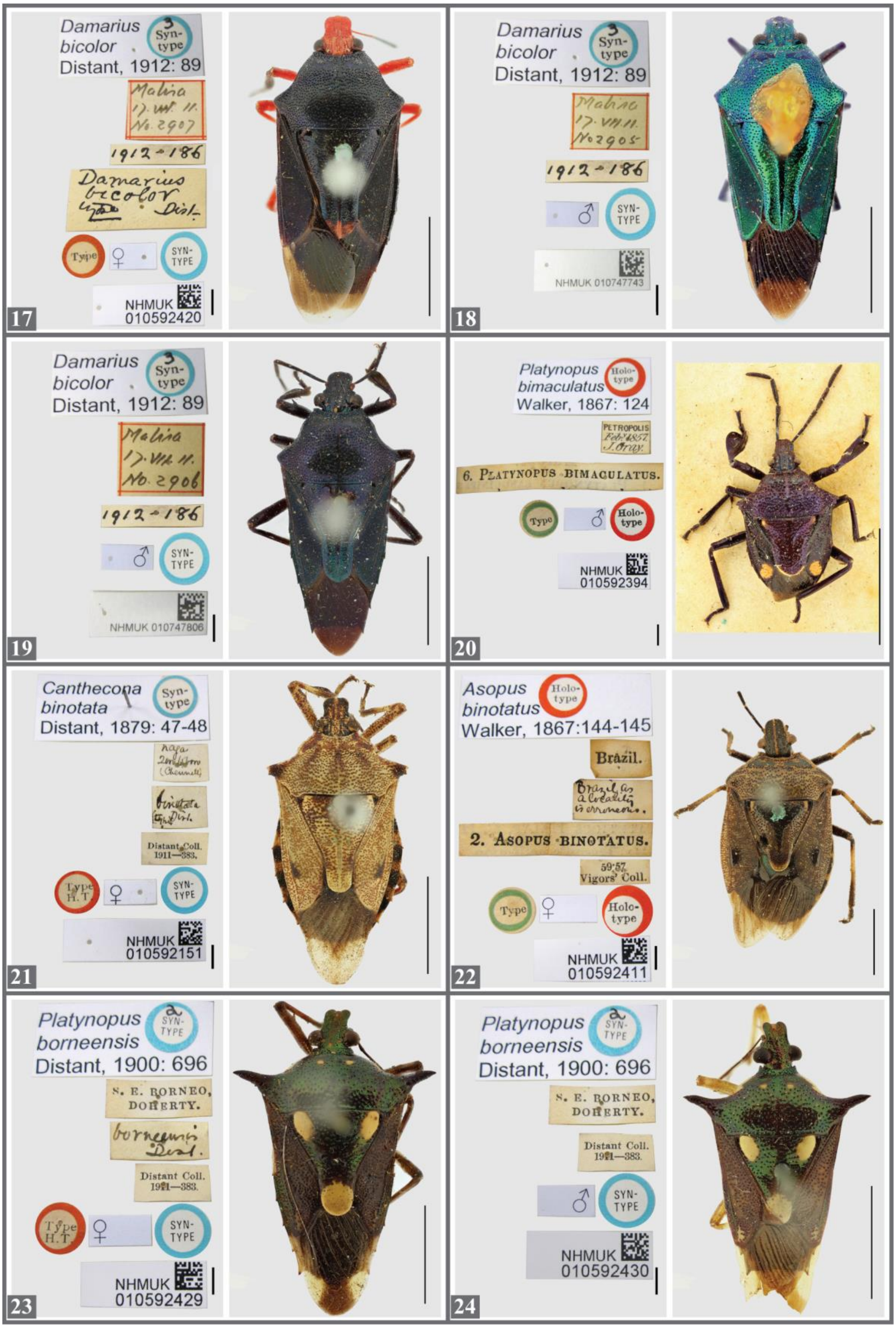
Figures



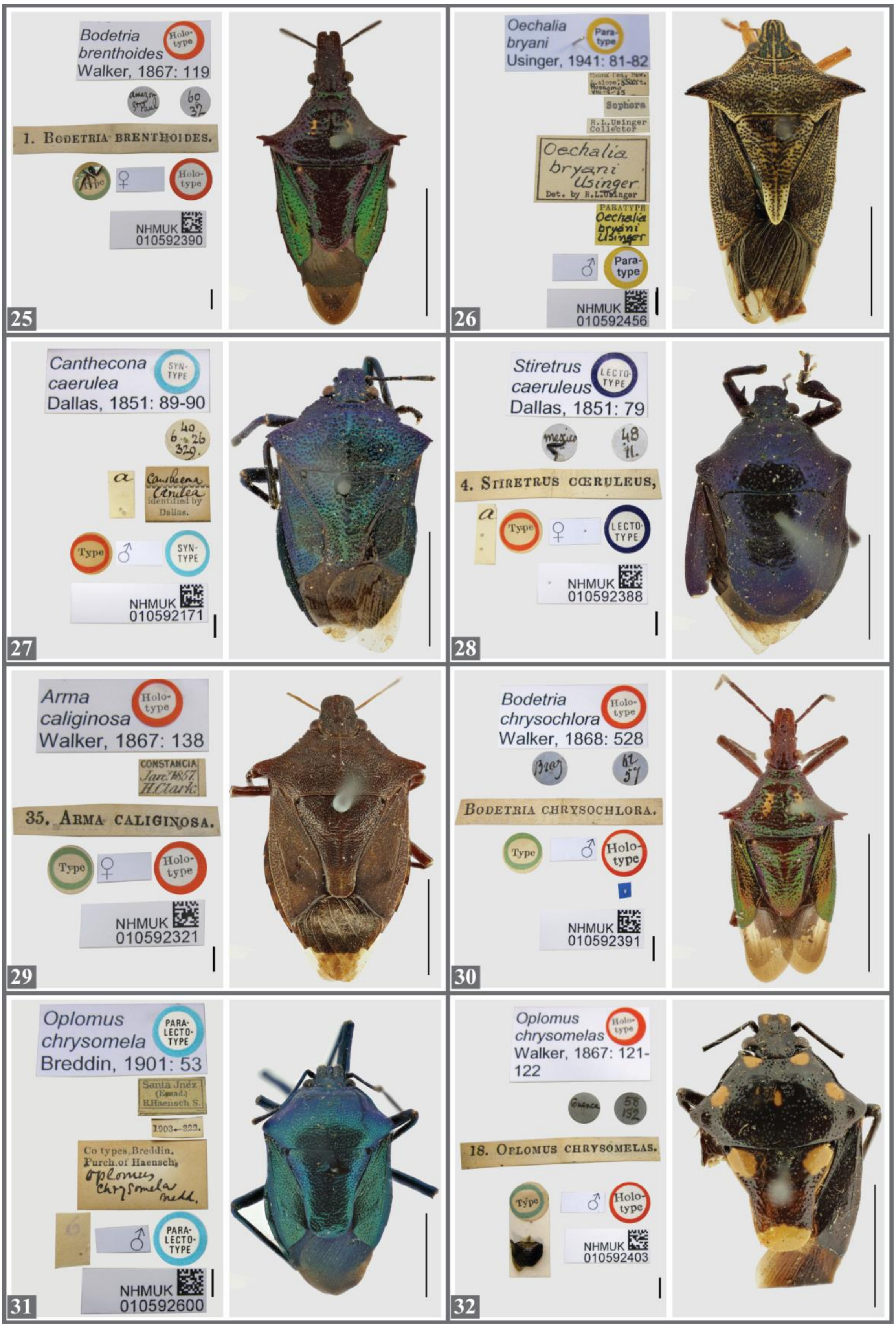
FIGURES 1–8. Type-specimens deposited in the NHMUK. 1, *Macrorhaphis acuta*; 2–6, *Podisus affinis*; 7, *Rhaphigaster aggressor*; 8, *Arma ampla*. Scale bars: 4 mm.



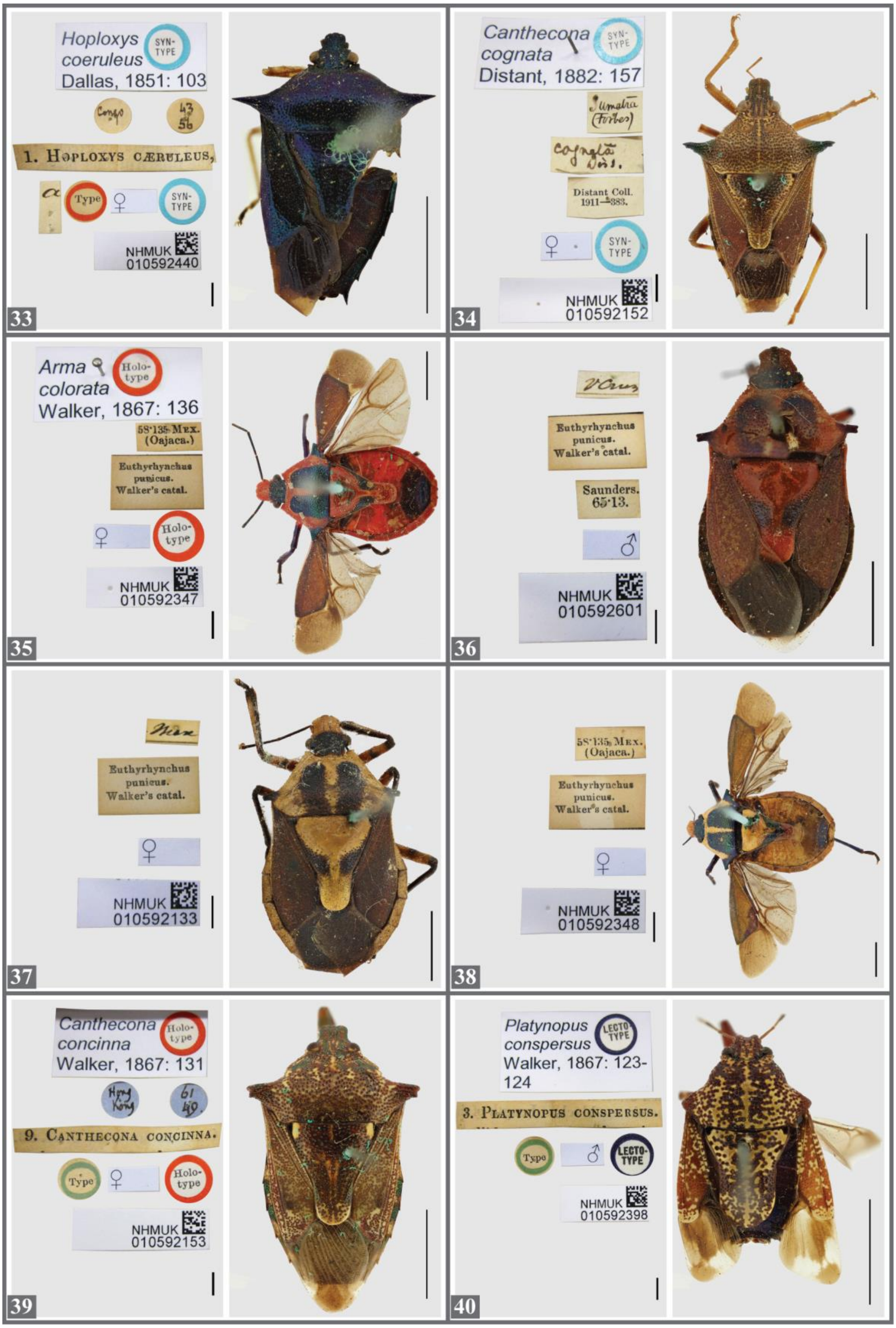
FIGURES 9–16. Type-specimens deposited in the NHMUK. 9, *Podisus amulae*; 10, *Stiretrus annulatus*; 11, *Asopus annulipes*; 12, *Canthecona annulipes*; 13, *Podisus atitlanensis*; 14, *Platynopus badius*; 15, *Oplomus basalis*; 16, *Oplomus biarcuatus*.Scale bars: 4 mm.



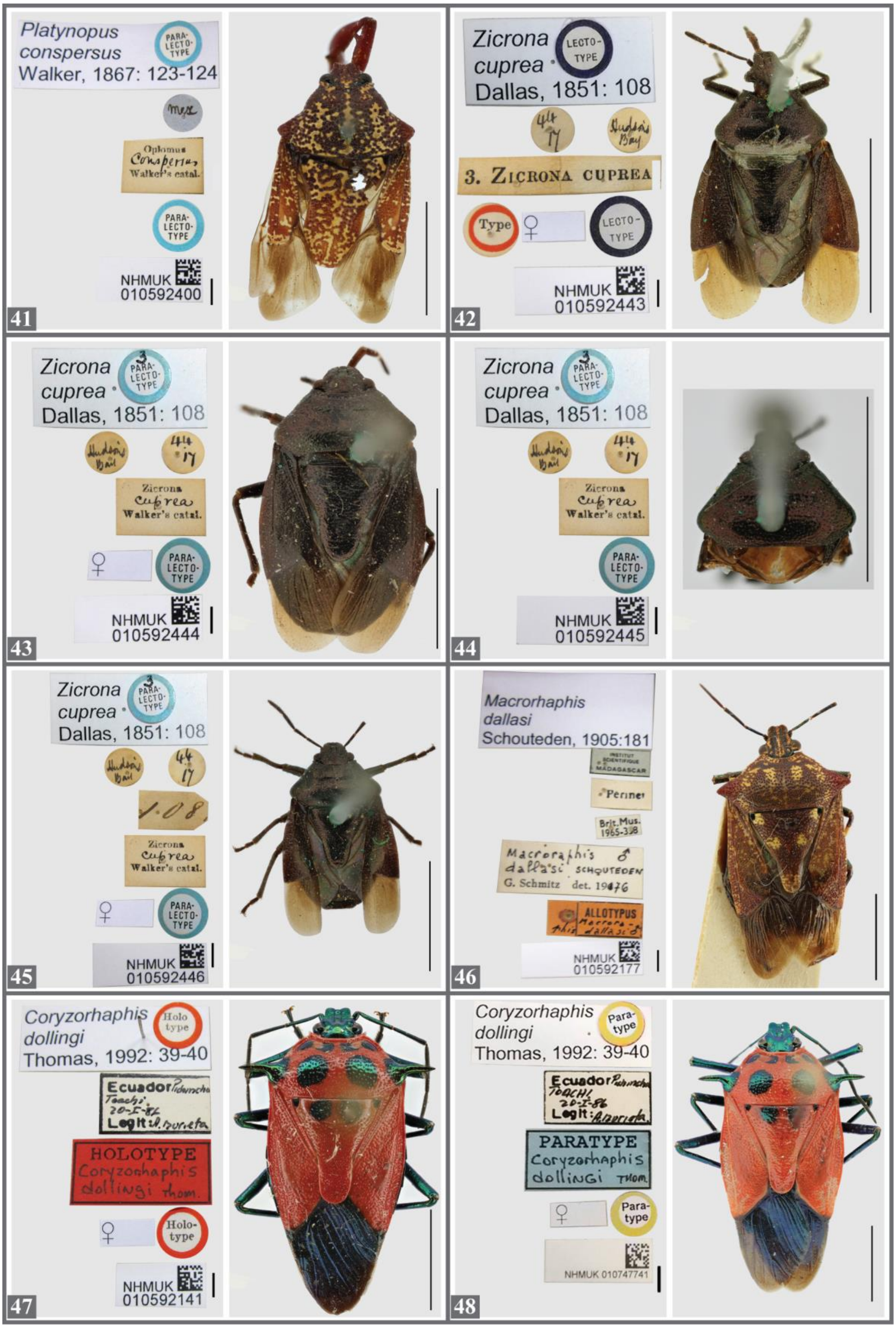
FIGURES 17–24. Type-specimens deposited in the NHMUK. 17–19, *Damarius bicolor*; 20, *Platynopus bimaculatus*; 21, *Canthecona binotata*; 22, *Asopus binotatus*; 23, 24 *Platynopus borneensis*. Scale bars: 4 mm.



FIGURES 25–32. Type-specimens deposited in the NHMUK. 25, *Bodetria brenthoides*; 26, *Oechalia bryani*; 27, *Canthecona caerulea*; 28, *Stiretrus caeruleus*; 29, *Arma caliginosa*; 30, *Bodetria chrysochlora*; 31, *Oplomus chrysomela*; 32, *Oplomus chrysomelas.*Scale bars: 4 mm.



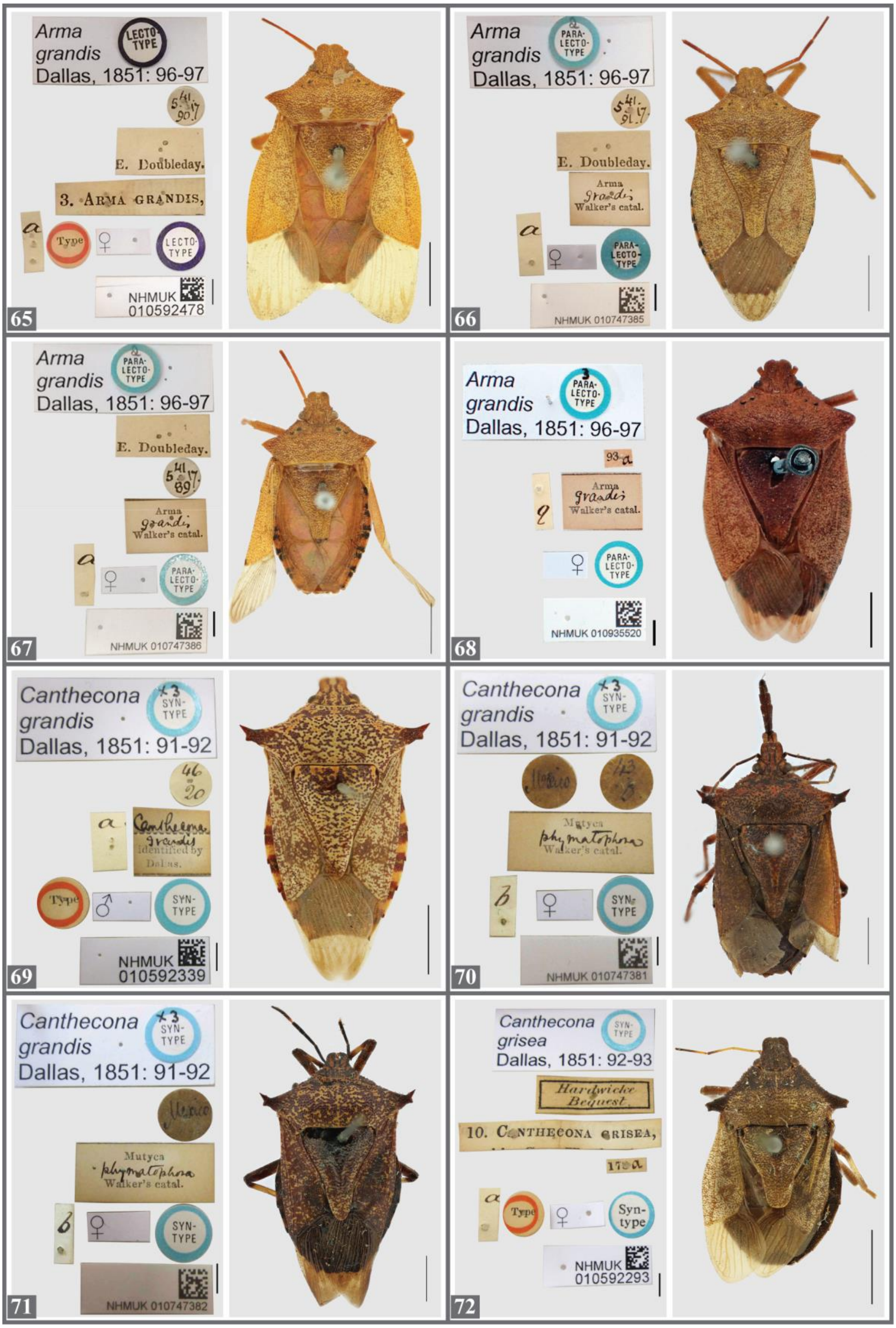
FIGURES 33–40. Type and historical specimens deposited in the NHMUK. 33, *Hoploxys coeruleus*; 34, *Canthecona cognata*; 35–38, *Arma colorata*; 39, *Canthecona concinna*; 40, *Platynopus conspersus*. Scale bars: 4 mm.



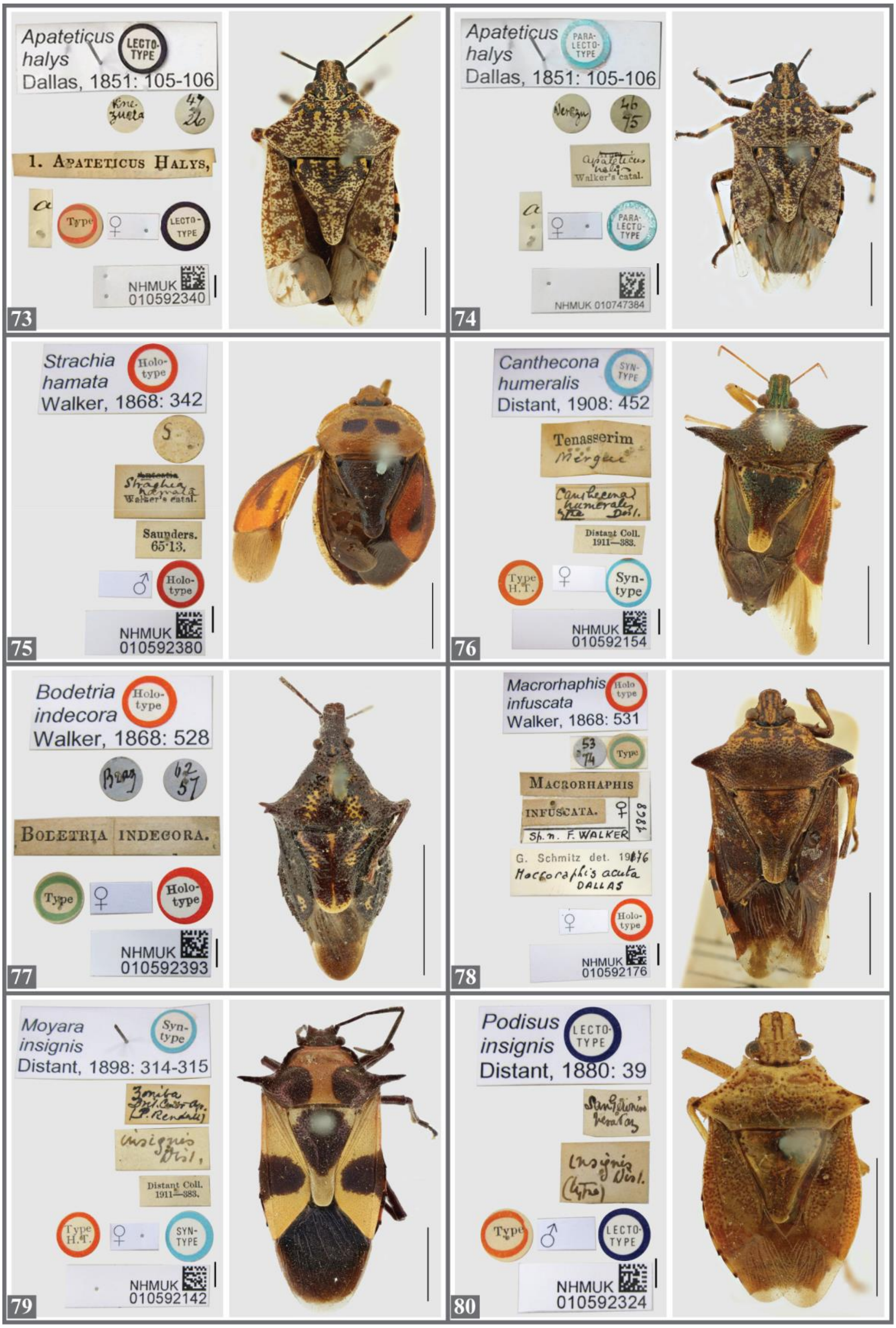
FIGURES 41–48. Type-specimens deposited in the NHMUK. 41, *Platynopus conspersus*; 42–45, *Zicrona cuprea*; 46, *Macrorhaphis dallasi*; 47, 48, *Coryzorhaphis dolligni* 13, *Podisus.* Scale bars: 4 mm.

FIGURES 49–66. Type and historical specimens deposited in the NHMUK. 49, 50, *Platynopus dotatus*; 51, *Blachia ducalis*; 52, *Coryzorhaphis egeri*; 53, *Oplomus equestris*; 54, 55, *Glypsus erubescens*; 56, *Strachia erythromela*.Scale bars: 4 mm.

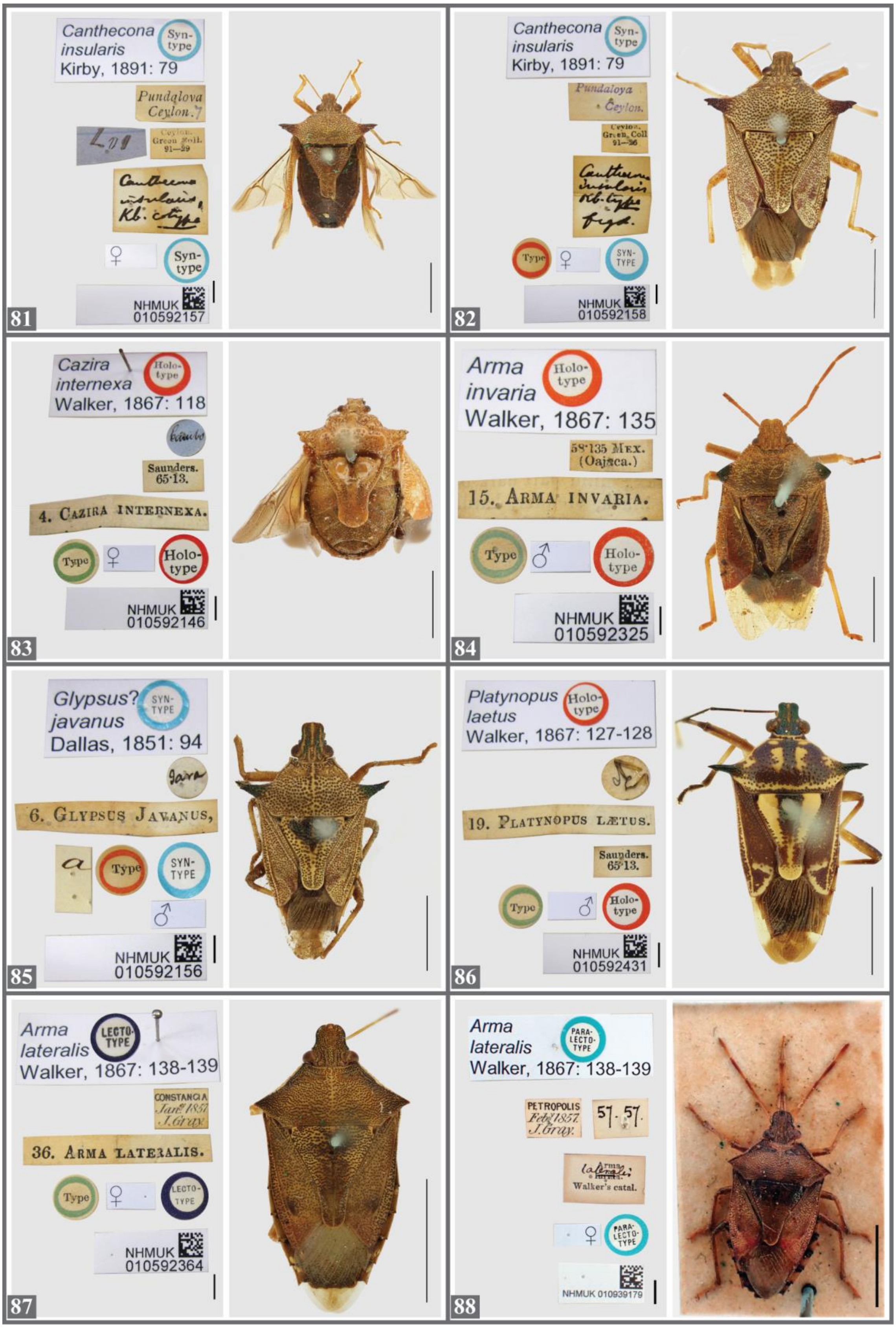
FIGURES 57–64. Type-specimens deposited in the NHMUK. 57, *Podisus falcatus*; 58, *Oplomus festivus*; 59 60, *Strachia frontalis*; 61, *Anasida funebris*; 62, *Arma fuscecens*; 63, *Glypsus erubescens*; 64, *Podisus gaumeri*. Scale bars: 4 mm.



FIGURES 65–72. Type-specimens deposited in the NHMUK. 65–68, *Arma grandis*; 69–71, *Canthecona grandis*; 72, *Cantecona grisea*.Scale bars: 4 mm.

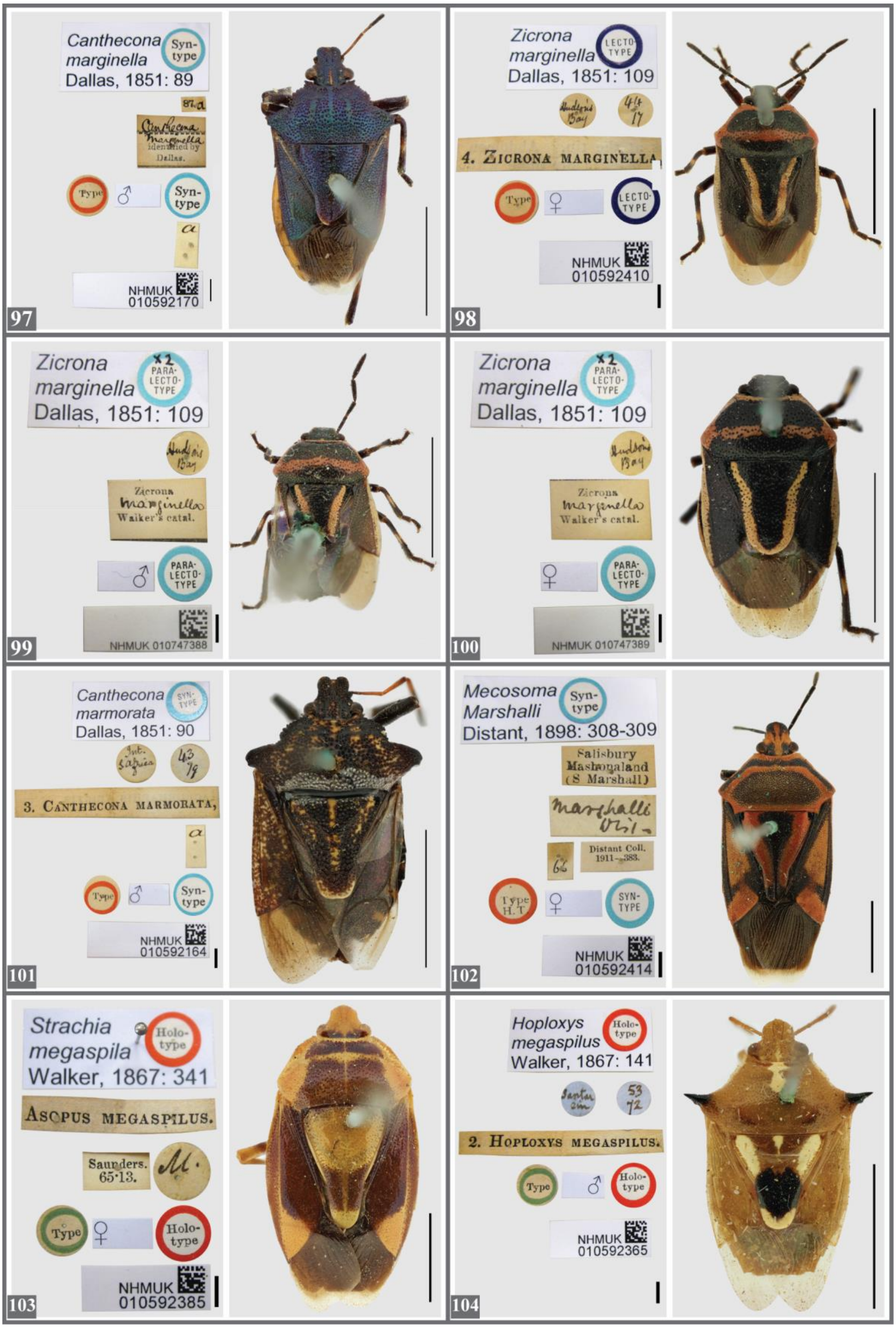


FIGURES 73–80. Type-specimens deposited in the NHMUK. 73, 74, *Apateticus halys*; 75, *Strachia hamata*; 76, *Canthecona humeralis*; 77, *Bodetria indecora*; 78, *Macrorhaphis infuscata*; 79, *Moyara insignis*; 80, *Podisus insignis*. Scale bars: 4 mm.

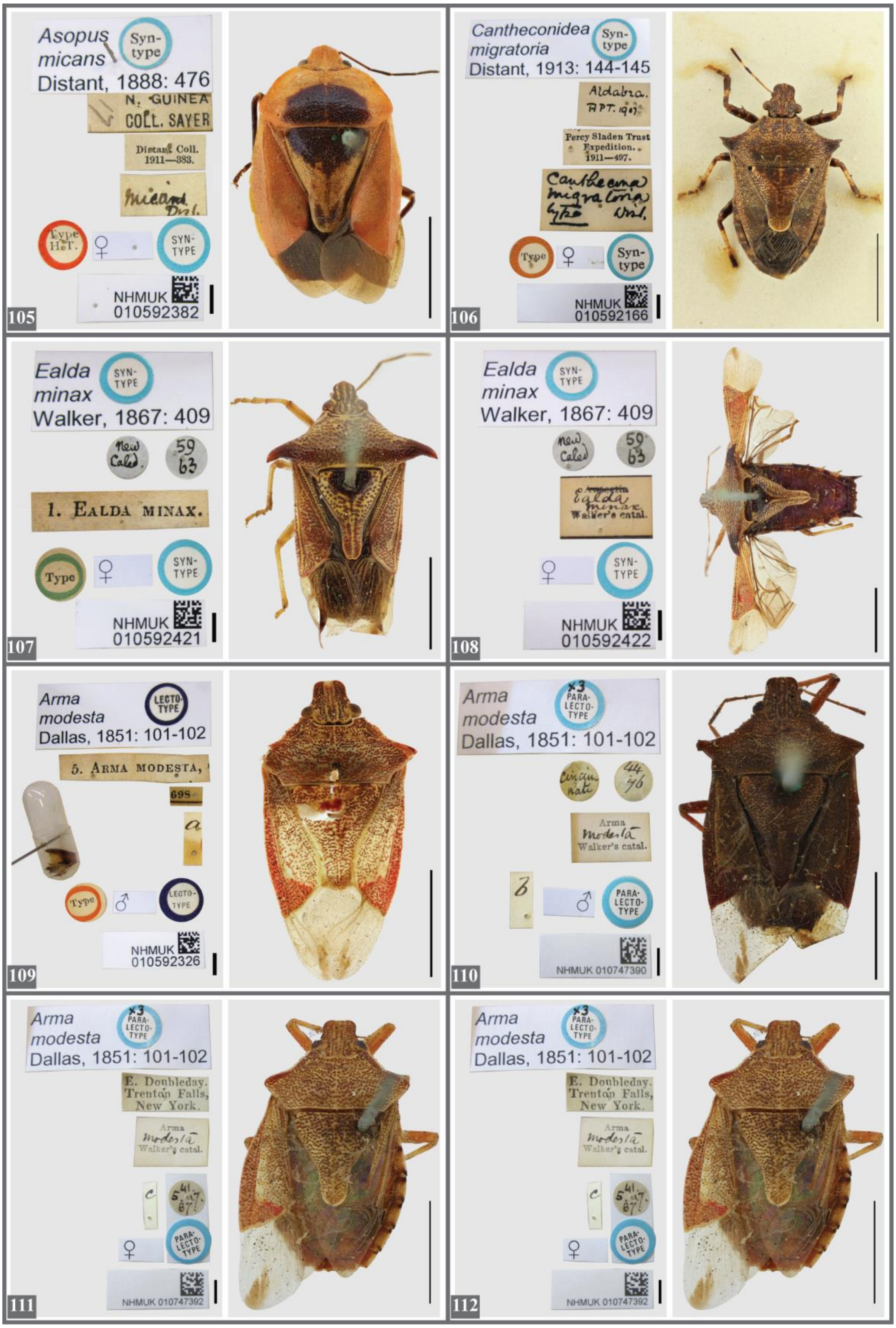


FIGURES 81–88. Type-specimens deposited in the NHMUK. 81, 82, *Canthecona insularis*; 83, *Cazira internexa*; 84, *Arma invaria*; 85, *Glypsus javanus*; 86, *Platynopus laetus*; 87, 88, *Arma lateralis.*Scale bars: 4 mm.

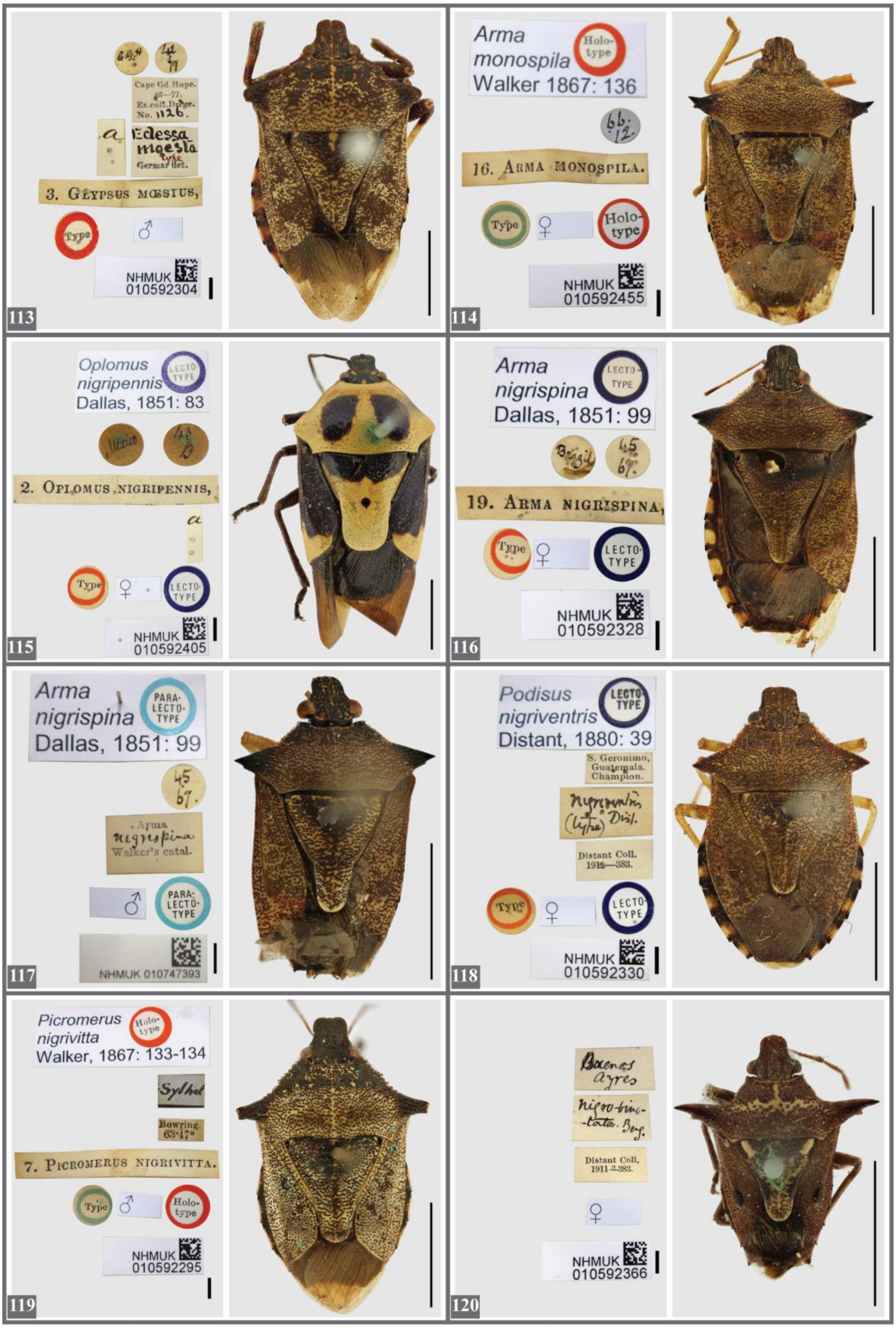
FIGURES 89–96. Type-specimens deposited in the NHMUK. 89, *Asopus leprosus*; 90, *Picromerus lewisi*; 91, *Oplomus lineatus*; 92, *Cimex luridus*; 93, *Glypsus luridus*; 94, 95, *Sesha manifesta*; 96, *Tynacantha marginata*. Scale bars: 4 mm.



FIGURES 97–104. Type-specimens deposited in the NHMUK. 97, *Canthecona marginella*; 98–100, *Zicrona marginella*; 101, *Canthecona marmorata*; 102, *Mecosoma marshalli*; 103, *Strachia megaspila*; 104, *Hoploxys megaspilus*.Scale bars: 4 mm.

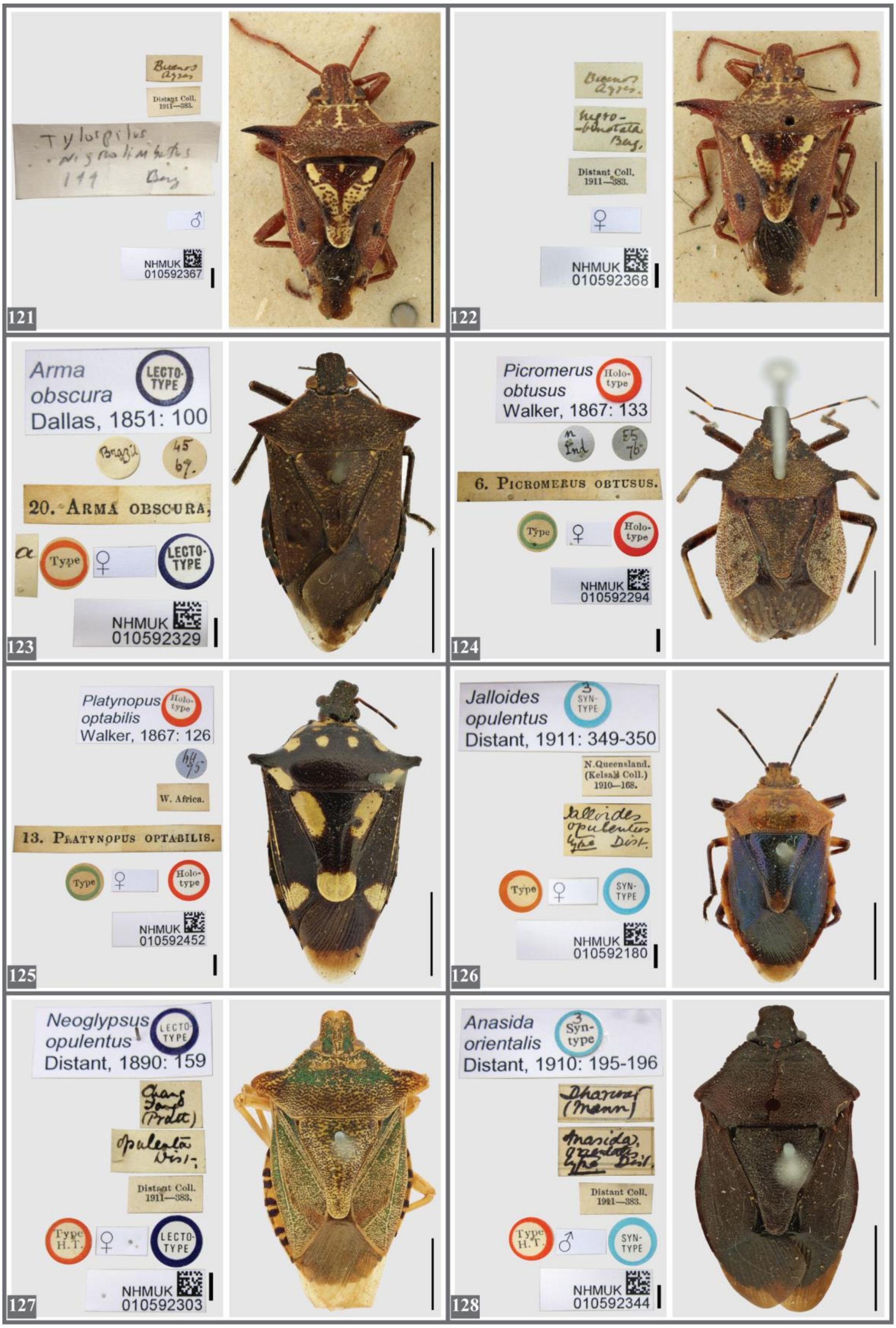


FIGURES 105–112. Type-specimens deposited in the NHMUK. 105, *Asopus micans*; 106, *Cantheconidea migratoria*; 107, 108 *Ealda minax*; 109–112, *Arma modesta*.Scale bars: 4 mm.

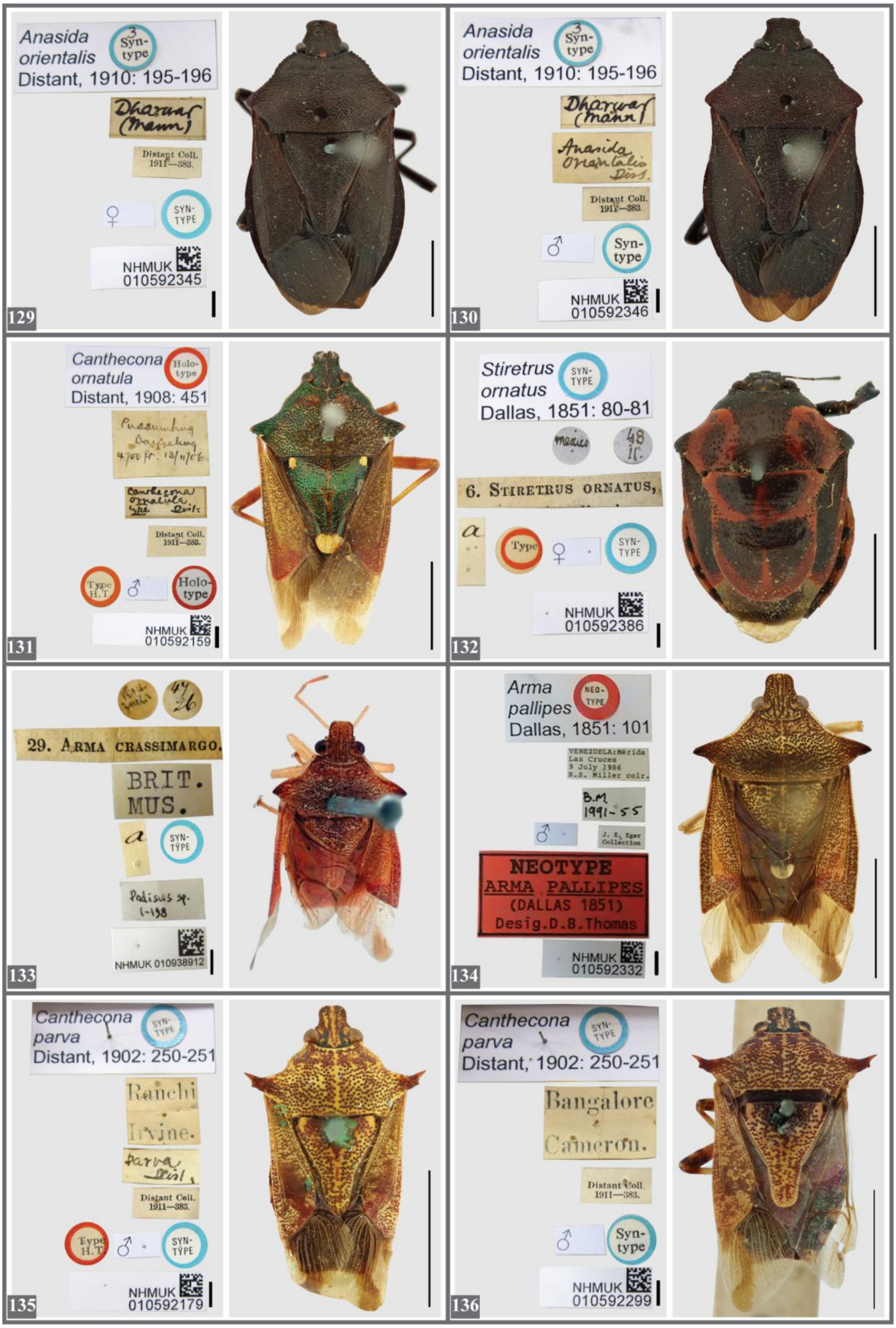


FIGURES 113–120. Type-specimens deposited in the NHMUK. 113, *Edessa moesta*;

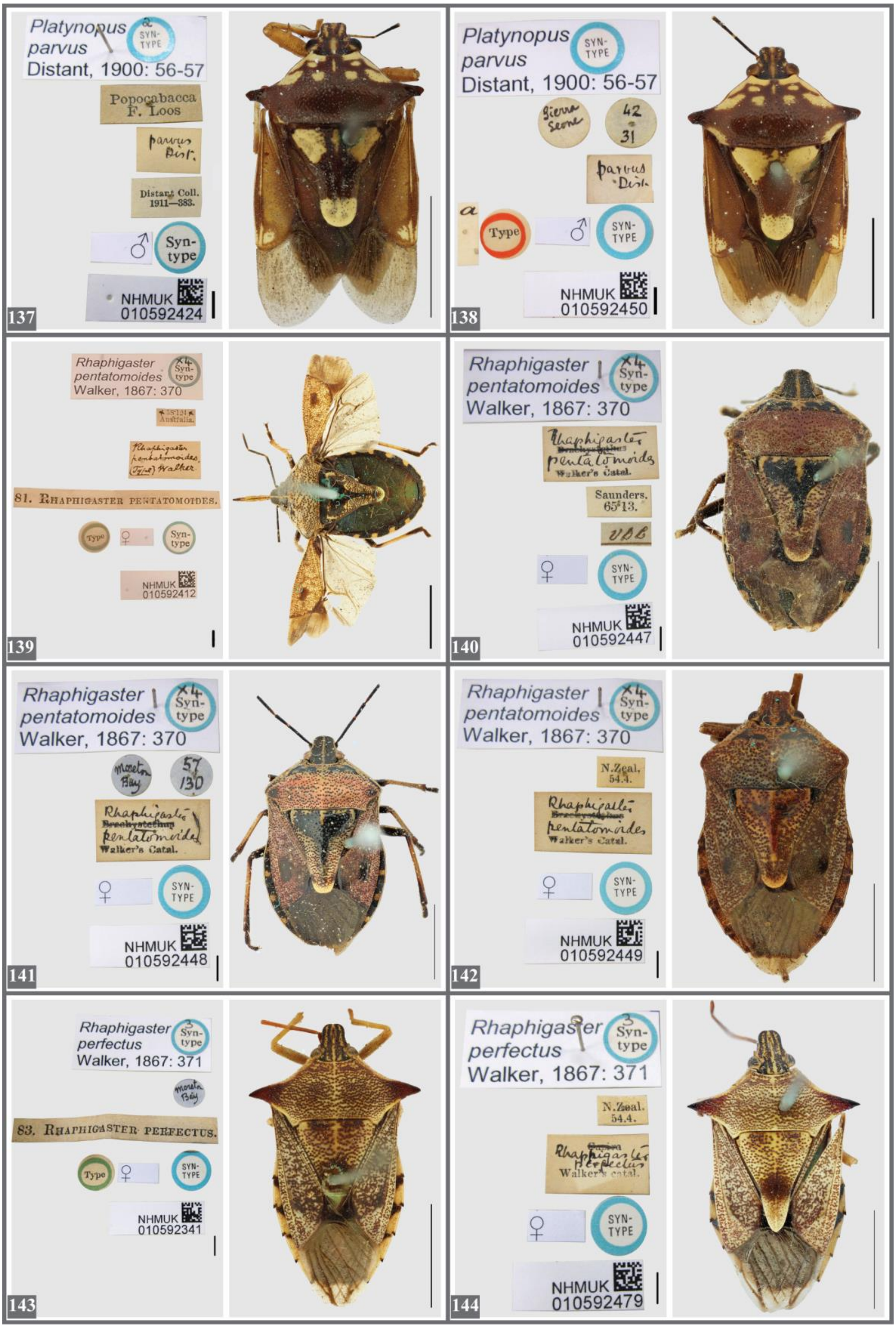
114, *Arma monospila*; 115, *Oplomus nigripennis*; 116, 117, *Arma nigrispina*; 118, *Podisus nigriventris*; 119, *Picromerus nigrivitta*; 120, *Mormidea nigro-binotata*. Scale bars: 4 mm.



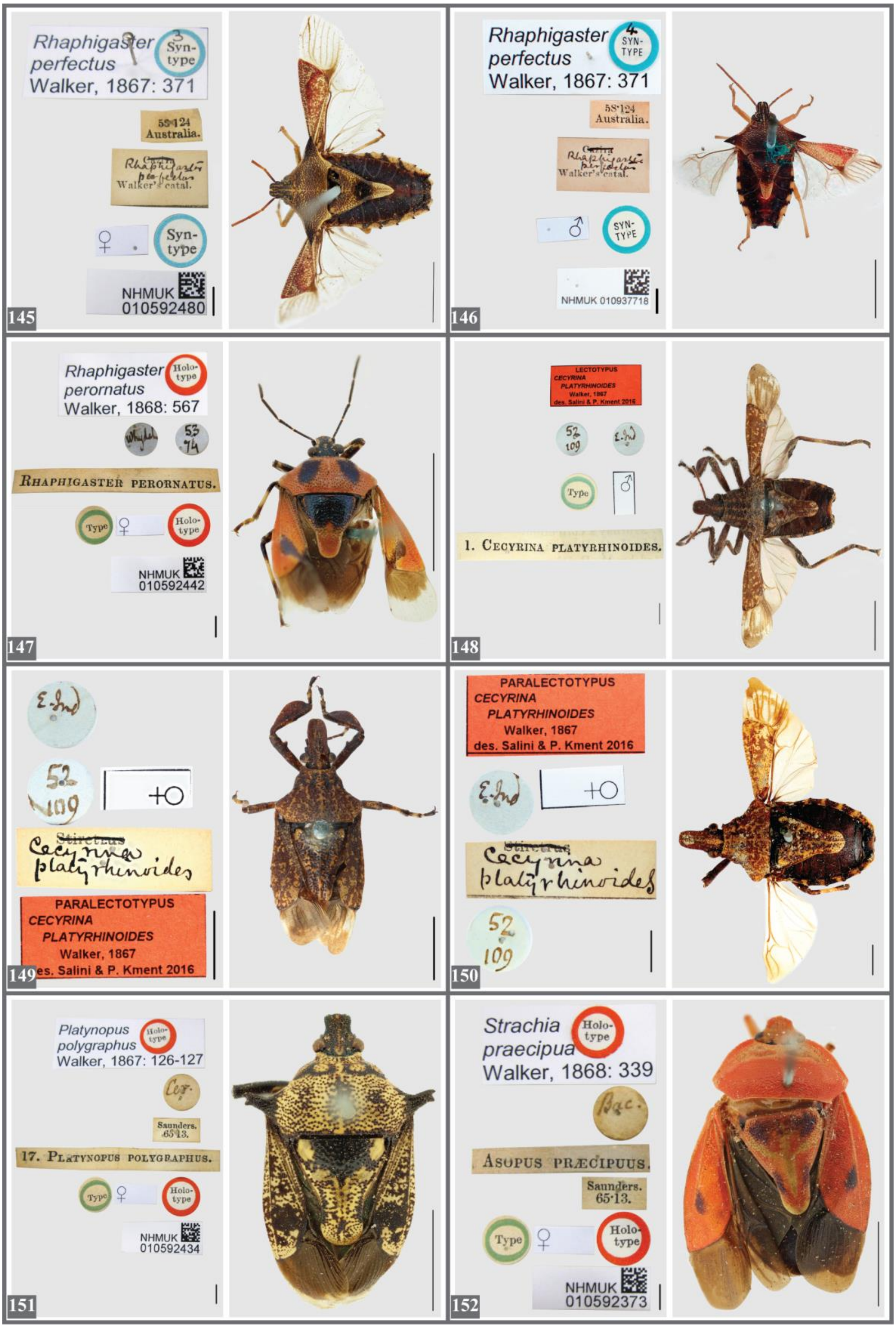
FIGURES 121–128. Type and historical specimens deposited in the NHMUK. 121, 122 *Mormidea nigro-binotata*; 123, *Arma obscura*; 124, *Picromerus obtusus*; 125, *Platynopus optabilis*; 126, *Jalloides opulentus*; 127, *Neoglypsus opulentus*; 128, *Anasida orientalis*. Scale bars: 4 mm.



FIGURES 129–136. Type-specimens deposited in the NHMUK. 129, 130, *Anasida orientalis*; 131, *Canthecona ornatula*; 132, *Stiretrus ornatus*; 133, 134, *Arma pallipes*; 135, 136, *Canthecona parva*.Scale bars: 4 mm.



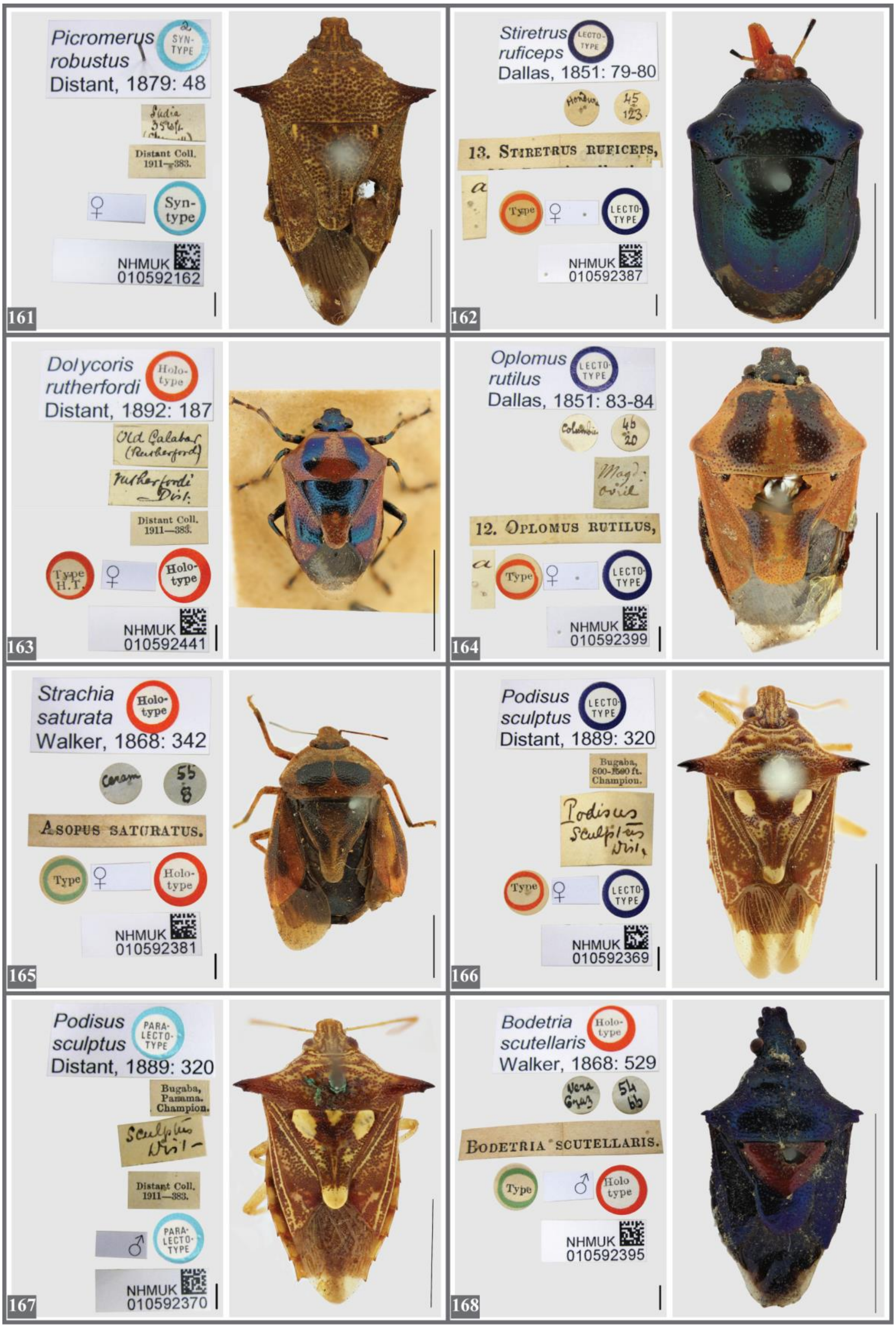
FIGURES 137–144. Type-specimens deposited in the NHMUK. 137, 138, *Platynopus parvus*; 139–142, *Raphigaster pentatomoides*; 143, 144, *Raphigaster perfectus*.Scale bars: 4 mm.



FIGURES 145–152. Type-specimens deposited in the NHMUK. 145, 146,

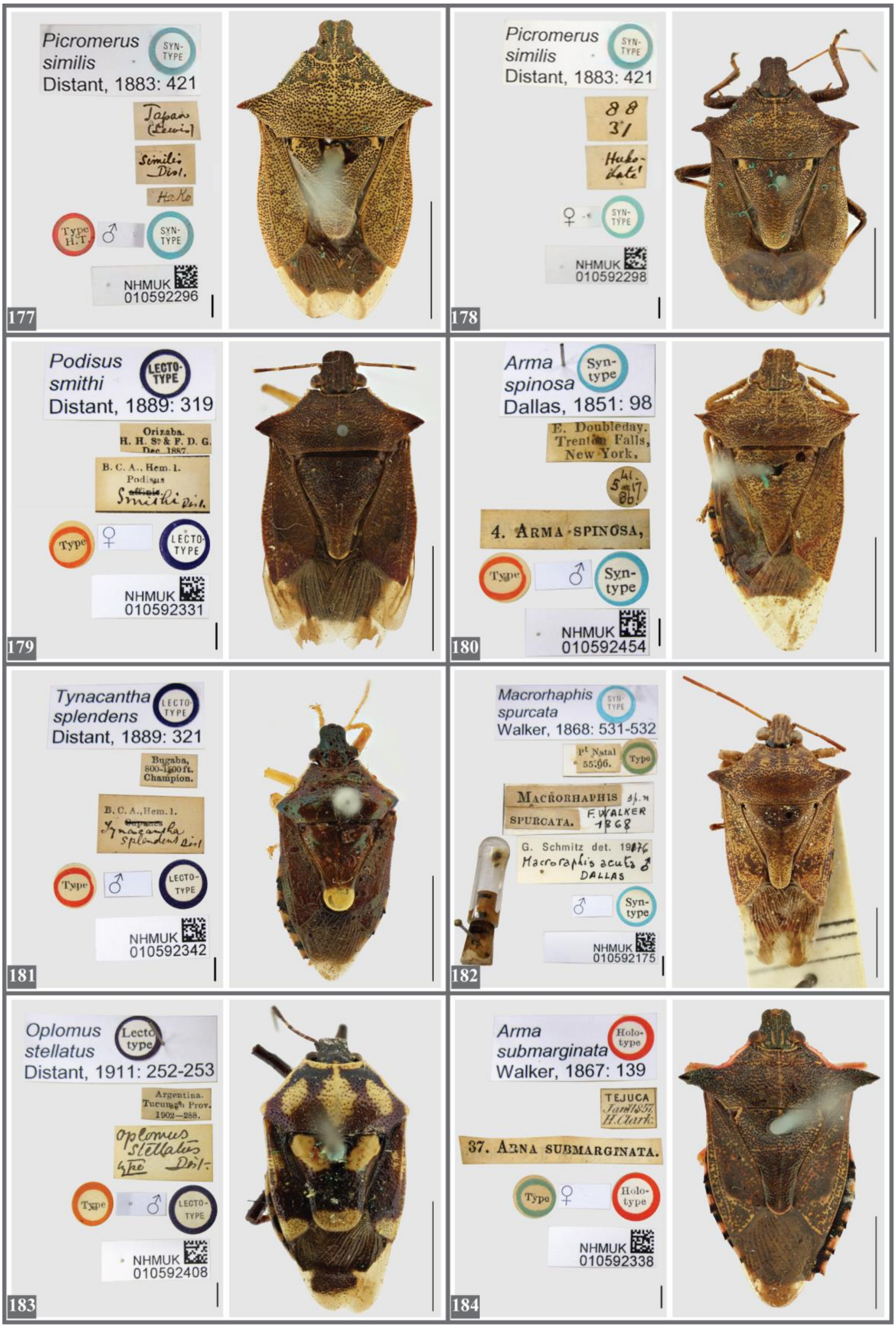
Rhaphigaster perfectus; 147, *Rhaphigaster perornatus*; 148–150, *Cecyrina platyrhynoides*; 151, *Platynopus polygraphus*; 152, *Strachia praecipua.*Scale bars: 4 mm.

FIGURES 135–160. Type-specimens deposited in the NHMUK. 153, *Incitatus primus*; 154, 155, *Oplomus pulcher*; 156, *Platynopus purparascens*; 157, *Strachia pyrophila*; 158, 159, *Strachia reciproca* ; 160, *Picromerus robustus.*Scale bars: 4 mm.

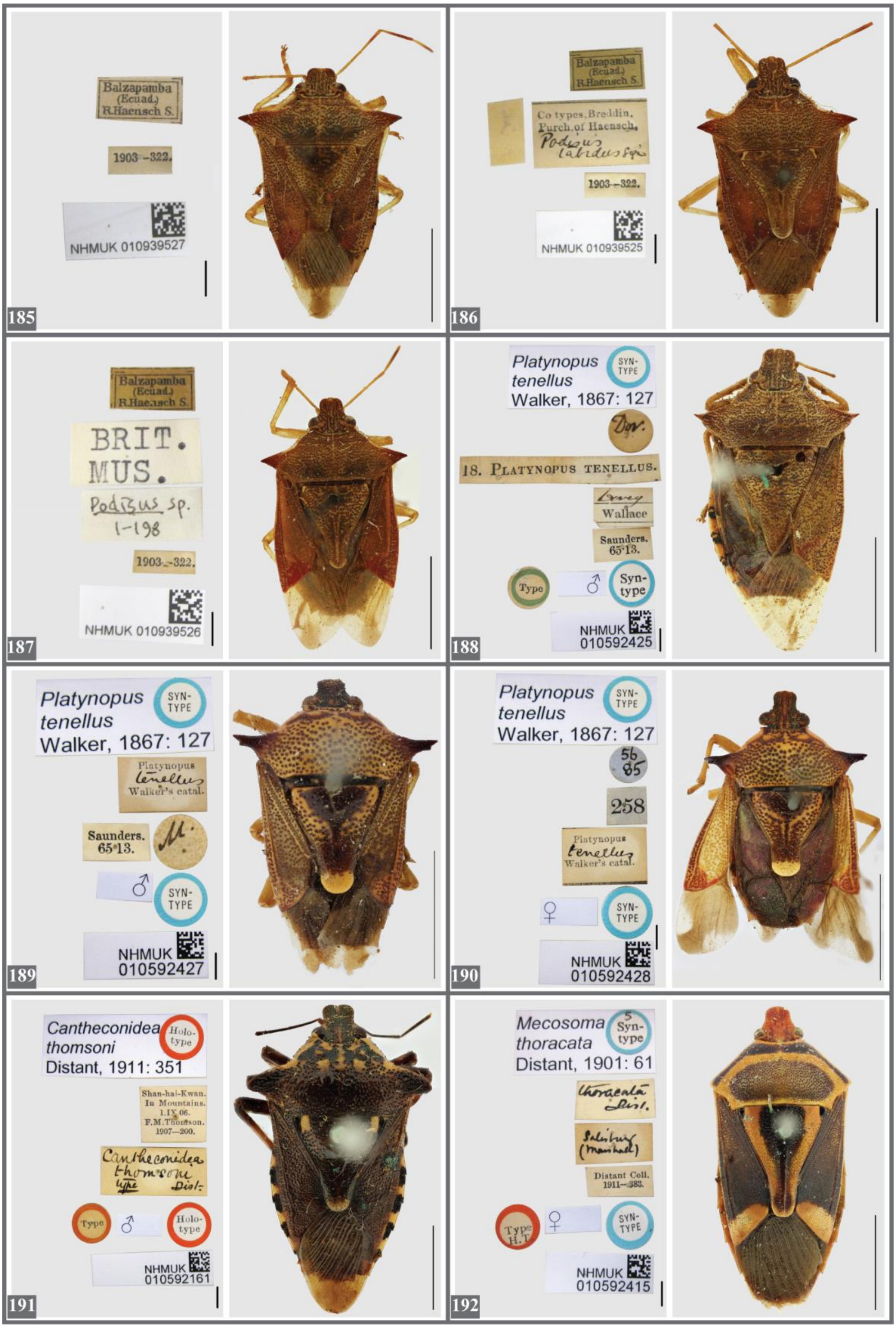


FIGURES 161–168. Type-specimens deposited in the NHMUK. 161, *Picromerus robustus*; 162, *Stiretrus ruficceps*; 163, *Dolycoris rutherfordi*; 164, *Oplomus rutilus*; 165, *Strachia saturata*; 166, 167 *Podisus sculptus*; 168, *Bodetria scutellaris.*Scale bars: 4 mm.

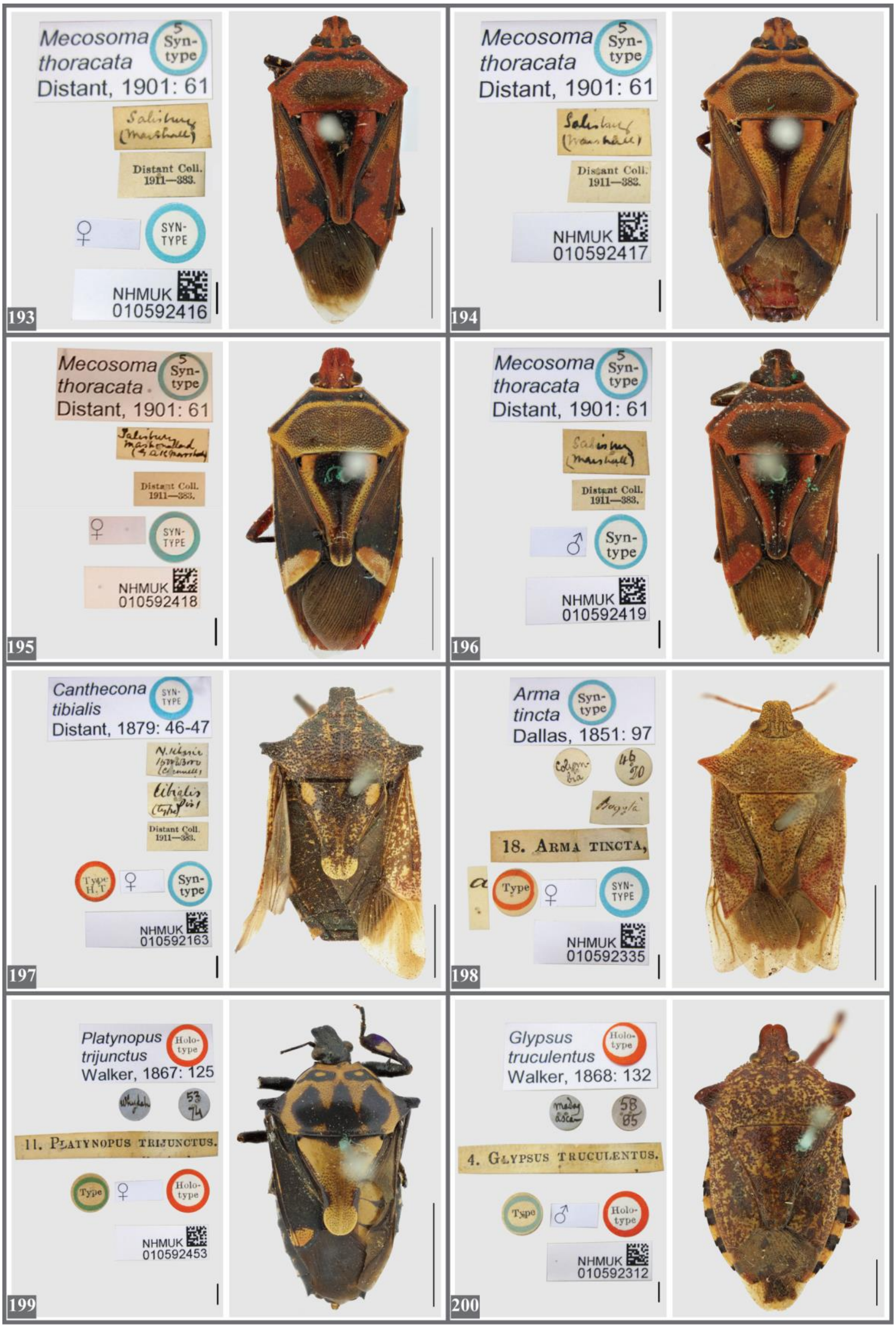
FIGURES 169–176. Type-specimens deposited in the NHMUK. 169, *Platynopus scutellatus*; 170, 171 *Arma semialba*; 172, *Platynopus semiscitus*; 173, *Platynopus silvaticus*; 174–176. Scale bars: 4 mm.



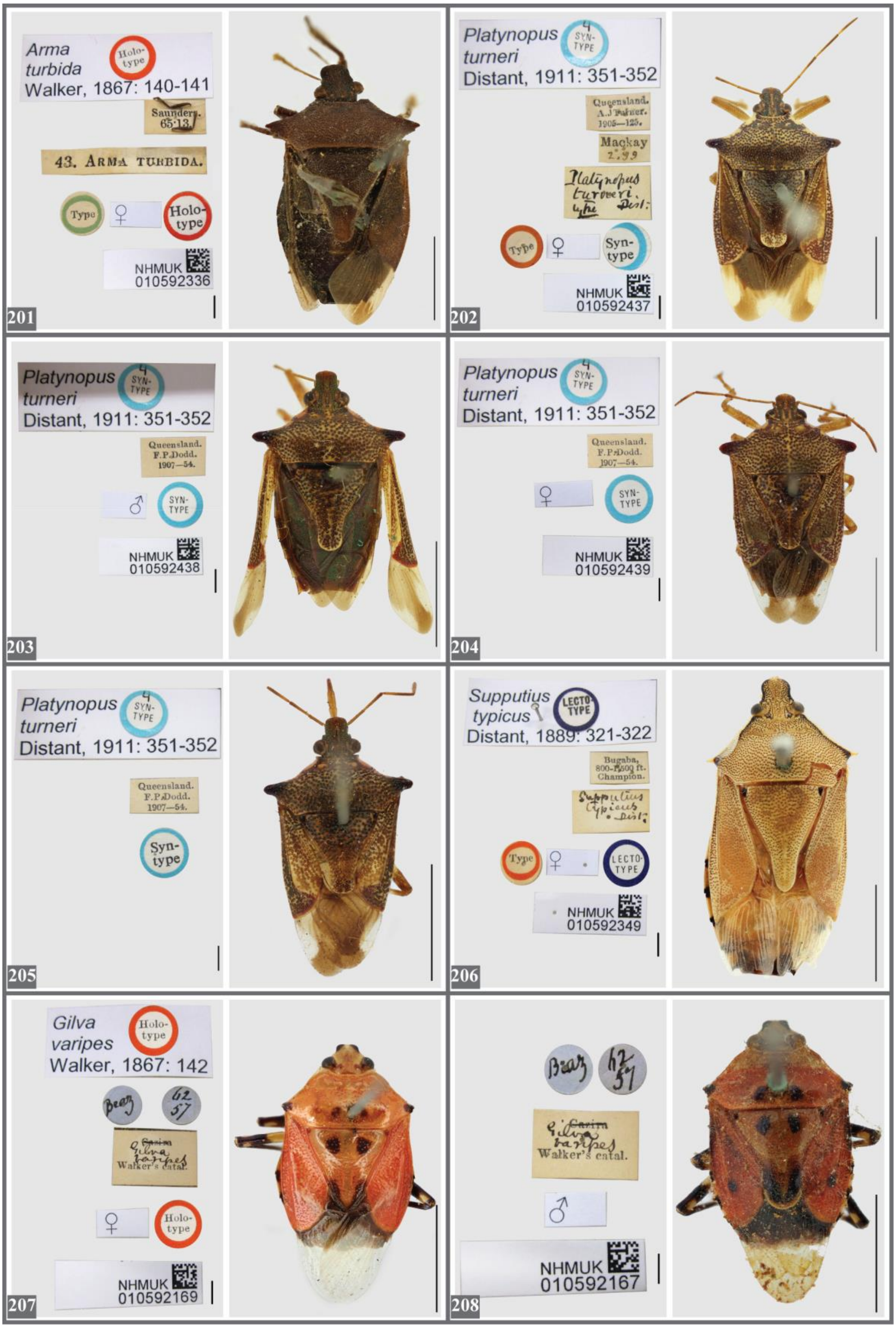
FIGURES 177–184. Type-specimens deposited in the NHMUK. 177, 178, *Picromerus similis*; 179, *Podisus smithi*; 180, *Arma spinosa*; 181, *Tynacantha splendens*; 182, *Macrorhaphis spurcata*; 183, *Oplomus stellatus*; 184, *Arma submarginata*.Scale bars: 4 mm.



FIGURES 185–192. Type and historical specimens deposited in the NHMUK. 185, *Podisus congrex*; 186, 187, *Podisus pallipes*; 188–190, *Platynopus tenellus*; 191, *Canthconidea thomsoni*; 192, *Mecosoma thoracata*.Scale bars: 4 mm.

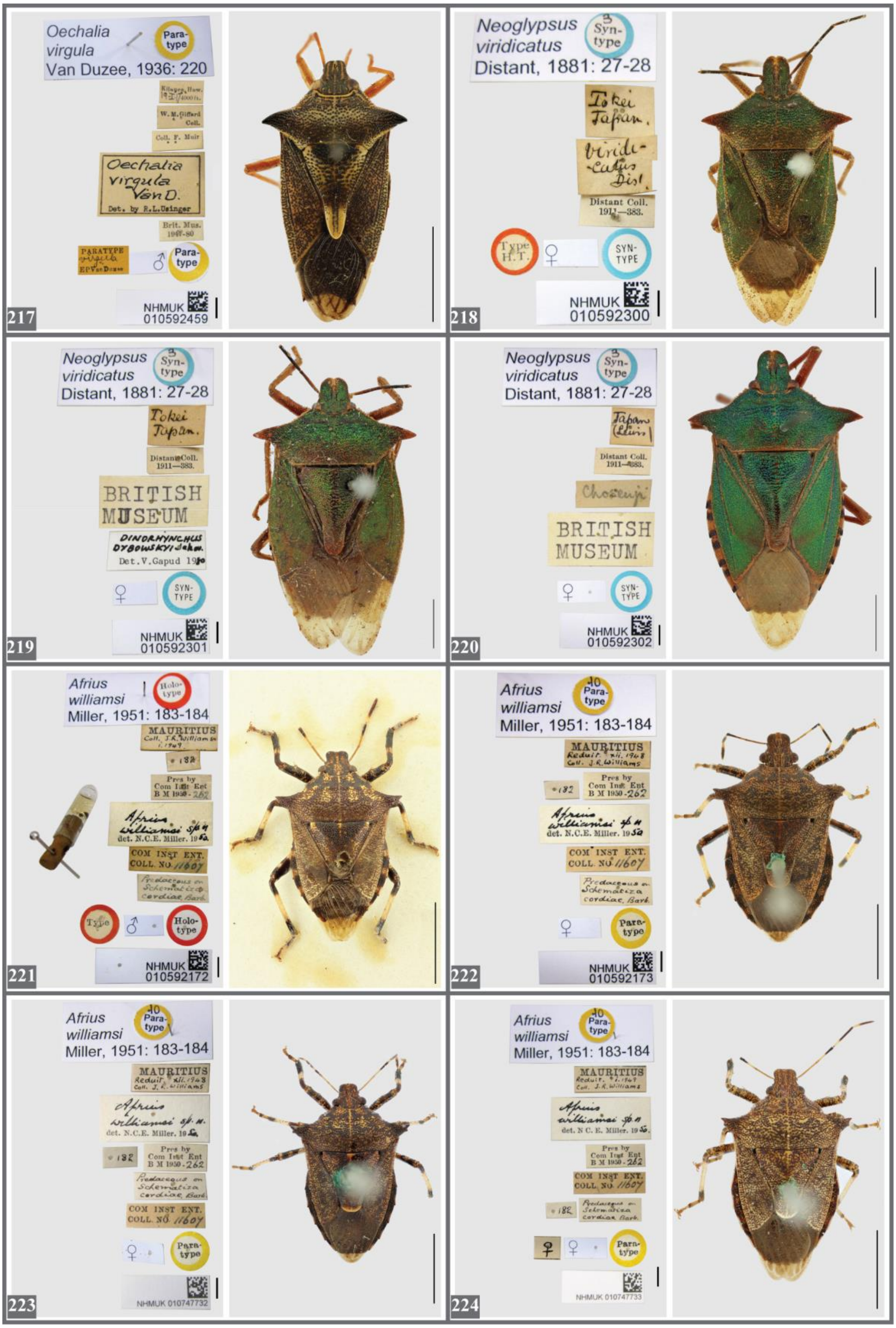


FIGURES 193–200. Type-specimens deposited in the NHMUK. 193–196, *Mecosoma thoracata*; 197, *Canthecona tibialis*; 198, *Arma tincta*; 199, *Platynopus trijunctus*; 200, *Glypsus truculentus.* Scale bars: 4 mm.

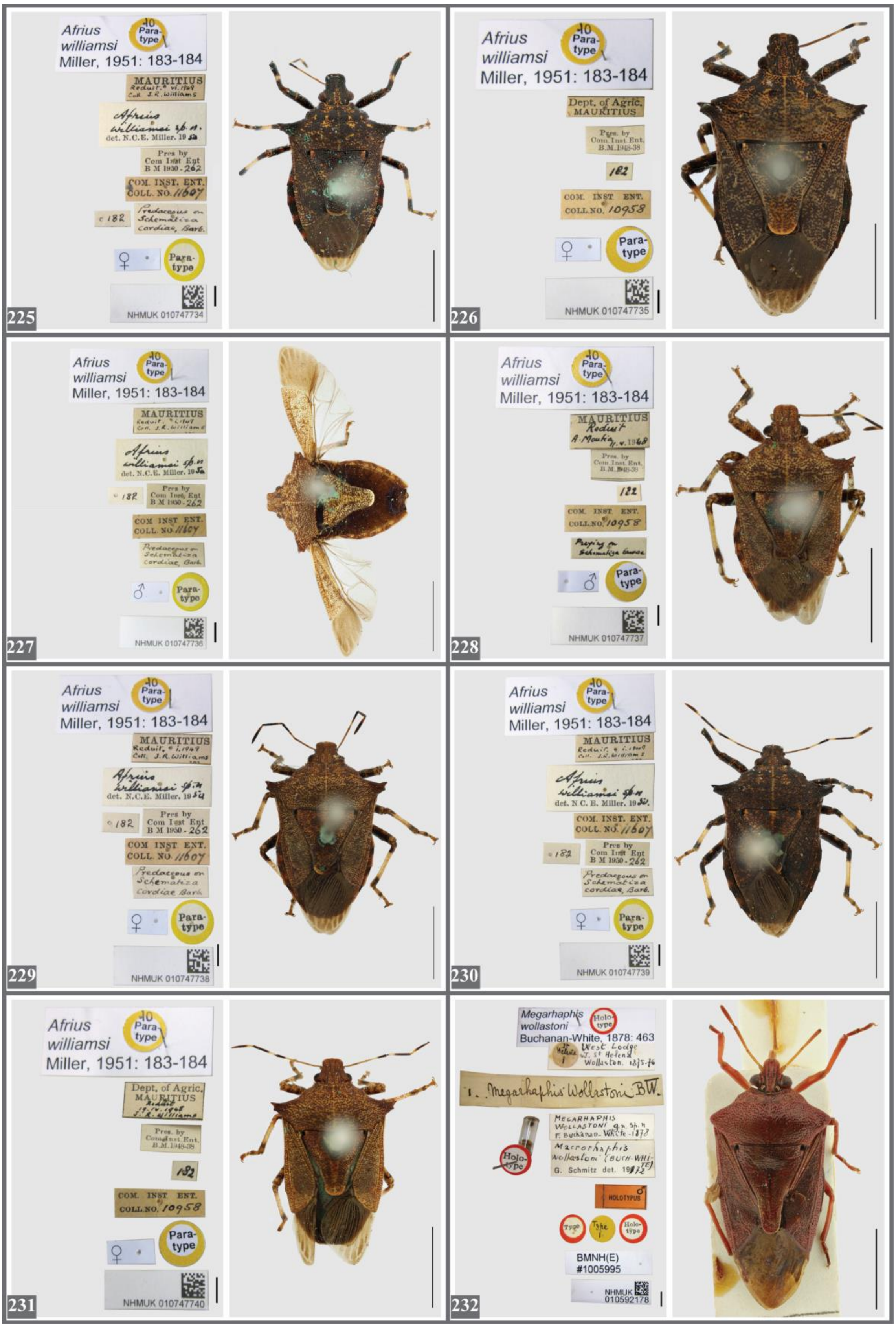


FIGURES 201–208. Type and historical specimens deposited in the NHMUK. 201, *Arma turbida*; 202–205, *Platynopus turneri*; 206, *Supputius typicus*; 207, 208, *Gilva varipes*.Scale bars: 4 mm.

FIGURES 209–216. Type and historical specimens deposited in the NHMUK. 209, 210, *Gilva varipes*; 211, *Arma ventralis*; 212, *Oplomus ventralis*; 213, *Jalloides versicolor*; 214, *Oplomus violaceus*; 215, 216, *Oechalia virescens*.Scale bars: 4 mm.



FIGURES 217–224. Type-specimens deposited in the NHMUK. 217, *Oechalia virgula*; 218– 220, *Neoglypsus viridicatus*; 221–224, *Afrius williamsi*.Scale bars: 4 mm.



FIGURES 225–132. Type-specimens deposited in the NHMUK. 225–231, *Afrius williamsi*; 232, *Megarhaphis wollastoni*.Scale bars: 4 mm.

Tables

Table 1. List of NHMUK (then BMNH) registration numbers on the labels of the specimens examined and the information they hold.

Registration numbers	Country/Locality	Additional information
40 30 3 821	Various localities	Specimen 821 identified as "Stiretrus?" was purchased at Mr. Children's sale on 30th March 1840
40 6 26 329	S. Africa (Natal)	Specimen 329 identified as "Asopus" was purchased from Dr Krauss on 26th June 1840.
41 5 17 86	Trenton Falls	Specimen 86 identified as "Pentatoma" was presented by Edward Doubleday on 17th May 1841.
41 5 17 87	United States	Specimen 87 identified as "Pentatoma" was presented by Edward Doubleday on 17th May 1841.
41 5 17 89	United States	Specimen 89 identified as "Pentatoma albipes" was presented by Edward Doubleday on 17th May 1841.
41 5 17 90	United States	Specimen 90 identified as "Pentatoma albipes" was presented by Edward Doubleday on 17th May 1841.
41 5 17 91	United States	Specimen 91 identified as "Pentatoma albipes" was presented by Edward Doubleday on 17th May 1841.
42 31	Sierra Leone	Collection containing 132 Hemiptera presented by Revd. D. F. Morgan.
42 77	South Africa, Cape of Good Hope	Purchased from Drégé of Hamburg (Bill 359). The register (pp. 107-112) contains a list of species with the number of specimens.
43 13	Mexico	Collection containing 46 Hemiptera presented by E. P. Coffin through J O Westwood.
43 19	South Africa (Interior)	Collection containing 129 Hemiptera presented by the Earl of Derby .They were collected by Burke one of Lord Derby's collectors in the Interior of S. Africa. Parallel of Delagoa.
43 56	Congo	Collection containing 96 Hemiptera and Homoptera. Collected by Andrew Curror, Royal Navy surgeon (HMS Waterwitch), and presented by Dr Richardson.
44 17	District of Hudson’s Bay (Albany River) (St Martin’s Falls)	Collection containing 106 Hemiptera presented by George Barnston. « These insects were collected by the donor, the numbers and MS names refer to a list not sent with the insects ; most of the names from the want of books are not to be depended upon, so far as the genera are concerned ».
44 76	U.S.A., Cincinnati	Collection containing 7 Hemiptera presented by T. G. Lea Esq. Through E Doubleday Esq.
45 67	Brazil	Collection containing 17 Hemiptera presented by Edw. Doubleday Esq.
45 123	Honduras	Collection containing 36 Hemiptera purchased from Dyson.

46 20	Columbia (N. Grenada)	Collection containing 118 Hemiptera purchased from M. Goudot.
46 75	Venezuela	Collection containing 9 Hemiptera purchased from Dyson.
47 1	Venezuela	Collection containing 16 Hemiptera purchased from Dyson (Bill 193).
47 21	Corea	Collection containing 22 Hemiptera and Homoptera presented by Capt. Sir E. Belcher and collected by Arthur Adams Esq. during the Voyage of HMS Samarang.
47 26	Venezuela	Collection containing 27 Rhynchota purchased from Dyson (Bill 193).
48 11	Mexico	Collection containing 35 Rhynchota purchased from Argent (Bill 198).
52 109	E. Indies	Collection containing 88 Rhynchota purchased from S. Stevens
53 72	Santarem on Amazon	Collection containing 40 Rhynchota purchased from Stevens and collected by Mr Bates.
53 74	Whydah	Collection containing 17 Rhynchota purchased from Stevens and collected by Mr Louis Fraser.
54 4	New Zealand (Auckland)	Collection containing 108 Rhynchota presented by Colonel Bolton.
54 66	Mexico, Vera Cruz	Collection containing 30 Rhynchota purchased from Cuming and collected by M. Sallé.
54 76	Various localities	Collection containing 100 Rhynchota purchased from Stevens. Formerly belonged to Zool. Soc. //S.R. belonged to Sir Stamford Raffles & are chiefly from Sumatra. //L.M. Dr Lyall Madagascar //J.H. St Domingo (Hearne) //F.C. Columbia Friend //T. Trebizond (Abbott)
55 8	Ceram & Amboina	Collection containing 31 Rhynchota purchased from S. Stevens for £30. They were collected by Madame Ida Pfeiffer during her recent travels. They are ticketed « Ceram ».
55 76	Northern India	Collection containing 18 Rhynchota purchased from Stevens and collected by Capt. Reid.
55 96	Port Natal	Collection containing 64 Rhynchota purchased from Stevens and collected by Gueinzius.
56 85	No localities on specimens, 213 to 239 « Isld. Of Moala. Sept. 1854 »	Collection containing 75 Rhynchota presented by Sir John Liddell MD. From Voyage of HMS Herald (Capt Denham RN) Solomon Islands, New Hebrides, Australia etc. S. America (see 55-69). N. Zealand etc.
56 143	Mexico	Collection containing 289 Rhynchota purchased from Cuming and collected by M. Salle on & around the volcano of Orizaba; two or three are from St Thomas in the W. Indies.
57 57	Brazil (Province of Rio)	Collection containing 229 Rhynchota presented on 8 June 1857 by Rev. Hamlet Clark & J. Gray Esq. Wheatfield House, Bolton le Moors, Lancashire. Harmston Vicarage, Lincoln. Collected at Petropolis, Constancia & other localities near Rio, indicated on each ticket. There are a few specimens collected at Bahia & St. Vincent.
57 130	Australia (Moreton Bay)	Collection containing 49 Rhynchota purchased from Stevens and collected by TR Diggles.

58 6	Amazon (Ega on the Riv.), Rio Javari (or Olivença)	Collection containing 40 Rhynchota purchased from Stevens.
58 13	Port Natal.	Collection containing 148 Rhynchota purchased from Stevens and collected by Gueinzius.
58 85	Madagascar	Collection containing 26 Rhynchota purchased from S. Stevens and collected by Madame Ida Pfeiffer.
58 124	Australia. Sydney & Moreton Bay ; The localities are Maitland « Partinston ». Moreton Bay, Wollanggong, Paramatta. Sydney.	Collection containing 131 Rhynchota collected by Edward Damel and bought of Samuel Stevens on Oct. 11 1858. *58-124* Insects so marked are Mr Marsdens 59.18. a few of the Celebes Insects 58.142* were marked 58.124* by transposition. The name of the country will indicate what the number should be. 58 142* : this collection containing 63 Rhynchota from Celebes (within 50 miles of Macassar) reached the Museum on 4 December 1858.
58 132	Cuenca (Province of Equador)	Collection containing 47 Rhynchota purchased from Cuming and collected by Fraser.
58 135	Mexico, Oajaca	In this collection, the specimens of Rhynchota were not counted. They were purchased from Sallé through Cuming.
59 37	Old Calabar, Brazil (chiefly), Ceylon etc.	Collection containing 83 Rhynchota purchased from Mr John Gray.
59 57	Various countries. British Islands	In this collection, the specimens of Rhynchota were not counted [Coleoptera, Orthoptera, Neuroptera, Hymenoptera and Lepidoptera were received in June 1859, Diptera and Rhynchota were not obtained until 27 September]. They were presented to the Museum by the Zoological Society of London. Originally part of Vigorsian Collection, including the types described by Mr Vigors in the Zoological Journal, Sumatra Insects collected by Sir Stamford Raffles. Barbary Insects collected by Capt. Lyon etc. They were selected on account of their scientific value. N. B. The British Insects originally belonged to Mr Wilkins of Costessey. There are many types of Kirby, Spencer & other entomologists of the time in Wilkins Coll.
59 63	New Caledonia	Collection containing 15 Rhynchota purchased from Cuming and collected by John Macgillwray FRGS.
60 32	Brazil, St. Paul	Collection containing 38 Rhynchota purchased from Stevens and collected by Bates.
60 76	Celebes (Manado)	Collection containing 12 Rhynchota purchased from Stevens and collected by A. Wallace.
61 9	Abyssinia	Collected on the mission of Sir W. C. Harris to Shoa in Abyssinia and presented by the Secretary for Indian Affairs.
61 49	Hong Kong	Collection containing 198 Rhynchota collected and presented by J. C. Bowring.
62 57	Brazil, on the banks of the Amazon	Collection containing 214 Hemiptera purchased from Stevens. These specimens were selected from Mr Bates' private collection.
62 58	Batchian	Collection containing 14 Hemiptera purchased from Stevens.

62 73	Siam (Camboya [Cambodia])	Collection of 14 Hemiptera purchased from Stevens and collected by Mouhot in the interior of Siam from the Laos Mountains - near Cochin China
62 91	Salwatty & New Guinea	Strangely neither the register nor, obviously, Baker (1995: 177) mention any Hemiptera for this date.
63 47* [This is different from 63 47, which are the insects presented by The Linnaean Society.]	Various countries	The Collection of Coleoptera presented to the British Museum by J. C. Bowring, including Chevrolat's collection of Longicornes [ca. 11 000 specimens]. The many cabinets, drawers and boxes presented by Bowring to the Museum contained a couple of collections with specimens from Sylhet but there are no mentions of Hemiptera, even in Bowring's letter to J.E. Gray where he detailed what he was donating. This letter is bound in the register as page 828.
64 75	Fernand Vaz River, West Africa	Collection containing 10 Hemiptera collected by Du Chaillu [Paul Belloni] and purchased of Stevens.
65 13	Various localities	Collection containing 3207 Hemiptera presented by William Wilson Saunders Esq. This constitutes the entire collection of Hemiptera from the saundersian cabinet containing the whole of the species collected by Mr. Wallace and Bates.
66 12	Cape Mexico Burmah Brazil	Collection containing 206 Hemiptera presented by William Wilson Saunders Esq.
88 11* [This is different from 88 11, which are the insects from the "Challenger Expedition"]	Various localities, chiefly British.	Collection containing 3600 Hemiptera. Purchased of Mrs Sarah Scott, being a selection from Mr John Scott's collection, containing 43 types of British species, 24 types of European species, 56 types of exotic species.
88 31	Kirkiang, Hakodate, Kashmir (Baltistan)	Collection containing 326 Hemiptera purchased from H. Leech Esq. [12, Princes St., Hanover Sq., W.]. Collected by Mr. Pratt. Collected by a native. Collected by J.H. Leech Esq. June 1887.
91 26	Ceylon, Pundaloya	Collection collected and presented by E. E. Green Esq. No Hemiptera are listed but a note refers to 90 115: a lot of insect from Ceylon presented by E. E. Green Esq. [10 Observatory Gardens Campden Hill, W (Till February 1892)] and containing a total of 600 Hemiptera. Another note reads : « The whole of the specimens were collected by the donor, and most of them bear labels with the locality [Rep. 13.XII.90] See also 91.26, which number is borne by several of the Hemiptera here registered. »
91 29	Cape Town, Port Elizabeth, Delagoa Bay, Durban	Collection containing 33 Rhynchota collected and presented by H. A. Spencer, Esq.
92 6	India	Collection containing 8000 Rhynchota purchased from Colonel C. Swinhoe. Selected from the collection of the late Mr E.T. Atkinson.
1902-288	Ecuador, Peru & Argentina (Tucuman Prov.)	Collection containing 242 Rhynchota purchased from W.F.H. Rosenberg.

1903-96	Brazil, Sta Anna de Chapada, Centr. Brazil	Collection containing 75 Hemiptera presented by Mrs Percy Sladen [Northbrook Park, Exeter]. Collected by Alphonse Robert. See "Insect Room Lists" p 19.
1903-322	Various Localities	Collection containing 220 Rhynchota purchased from R. Haensch.
1905-125	Queensland	Collection containing 92 Rhynchota presented by A. E. [A. J. is crossed out] Turner.
1907-54	Australia, Queensland	Collection containing 1050 Rhynchota purchased from F. P. Dodd.
1907-200	China, Tientsin and Shan-hai-Kwan, N. China	Collection containing 287 Rhynchota presented on 29/04/1907 by F. M. Thomson Esq.
1910-168	Australia (N. Queensland). Probably Tambourin Mountains.	Collection containing 200 Rhynchota presented by Mr Rosenberg.
1911-383	Various localities	Collection containing 5000 specimens (incl. 2260 Cicadidae) purchased from Mr W. L. Distant.
1911-497	Seychelles Islands	Collection presented by Professor J. Stanley Gardiner. No Hemiptera are mentioned in the register under this registration number, however, other orders are at other reg. numbers and some of the specimens bear the label 1911-497. For instance, Dragonflies are at 1912-295, other Diptera at 1911-43 & 99; 1912-299...
1912-186	Africa	Collection containing 11 Rhynchota presented by The African Entomological Research Committee.
1947-80	Hawaii & Central America	Collection containing 126 Hemiptera presented on 3/1/1947 by Dr. R. L. Usinger and collected by donor & HE Hinton
1948-38	Various localities	Collection containing 50 Rhynchota collected by various collectors and presented by the Commonwealth Institute of Entomology in 1948.
1950-262	Mauritius and Tanganyika	Collection containing 34 Hemiptera (including 1 type of n.sp.) presented by Com. Inst. Entom. on 15/05/1950 and collected by J.R. Williams, and Dr E. Burtt respectively.
1965-338:	Madagascar	Collection containing 489 Pentatomidae presented by Dr P. Malzy and collected by various collectors.
1983 478	Costa Rica, Panama	Collection of 962 Hemiptera collected by Jon H. Martin and donated by the same to the Museum in December 1983.
1991-55	Venezuela	Neotype of *Arma pallipes* Dallas, 1851; desig. D.B. Thomas and presented by the same on 20/03/1991.

CAPÍTULO 2

Revision of the African shieldbug genus *Afrius* Stål, 1870 (Hemiptera: Heteroptera: Pentatomidae: Asopinae)*

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Abstract

The African shieldbug genus *Afrius* Stål, 1870 is revised. *Afrius migratorius* Distant, 1913 and *A. williamsi* Miller, 1952 are proposed as junior synonyms of *A.* (*Subafrius*) *flavirostrum* (Signoret, 1861) and *Canthecona marmorata* Dallas, 1851, *Canthecona annulipes* Dallas, 1851 and *A. rubromarginatus* Bergroth, 1903 are proposed as junior synonyms of *A.* (*Afrius*) *purpureus* (Westwood, 1837) based on general morphology and genitalia of the species. The three valid species, *viz.* A. (*Subafrius*) *flavirostrum*, *A.* (*Afrius*) *kolleri* Schouteden, 1911 and *A.* (*Afrius*) *purpureus*, are redescribed with details of male and female genitalia morphology, and a lectotype is designated for *A.* (*Afrius*) *kolleri*. A key to identify the species and an update of the geographical distribution for each species are provided, including new records for *A.* (*Afrius*) *purpureus*.

Key words: stink bugs, predation, taxonomy, polymorphism, Ethiopian

Introduction

Subfamily Asopinae is the only predatory subfamily of Pentatomidae. It is an important economic group containing many species used as biological control agents for pest management (Grazia et al. 2015). The asopines have a worldwide distribution and are

* Trabalho aceito pelo *European Journal of Taxonomy*; em processo de publicação. [http://www.europeanjournaloftaxonomy.eu/]

recognized mainly by the robust labium and, in the male genitalia, by the presence of genital plates and a thecal shield (Thomas 1992, 1994). The asopine genus *Afrius* Stål, 1870 is distributed throughout Africa and its species have been considered potential biological control agents for insects injurious to plantations in different regions of Africa (Miller 1952, Sileshi *et al*. 2004). *Afrius* was created as a subgenus of *Cimex* Linnaeus, 1758 by Stål (1870) with three species, *Cimex* (*Afrius*) *figuratus* (Germar, 1838), *C*. (*Afrius*) *purpureus* (Westwood, 1837) and *C*. (*Afrius*) *flavirostris* Stål, 1864, characterized within the inclusive genus by abdominal lateral margins convex and anterior femora armed with spines. In his synopsis of the Old World asopine genera, Thomas (1994) presented a diagnosis of the genus and mentioned the lack of a species identification key and the necessity for revisionary studies on the genus. After examining type and other material of all species, we provide here a revision of the genus, with habitus and genitalia figures and descriptions of each species, new synonymies and new records

Material and methods

Type and other material were examined and photographed at The Natural History Museum, London, UK (NHMUK), the Musée Royal de l'Afrique Centrale, Belgium (RMCA), the Museum für Naturkunde Berlin, Germany (MFNB), the Muséum National d'Histoire Naturelle in Paris, France (MNHN), the University Museum of Natural History in Oxford, UK (OUMNH), and the Federal University of Rio Grande do Sul, Brazil (UFRG). Extra material was received from the American Museum of Natural History, USA (AMNH), David A. Rider Collection, USA (DARC), the Entomologisches Museum - Insekten Dauerausstellung Geyer, Germany, and the National Museum of Prague, Czech Republic (NMPC). Photographs were received from the Naturhistorisches Museum Wien, Austria (NHMW) and the Naturhistoriska Riksmuseet, Stockholm, Sweden (NHRS). The examined material is listed in Table 1, and the geographic coordinates in decimal degrees were taken from the software Google Earth (version 7: https://www.google.com/earth/) and from the "GeoNames" website (http://www.geonames.org) when the labels or literature information had sufficient data. The map for the distributional records of *Afrius* species (Fig. 1) was made using the software ArcGIS Desktop (version 10.4.1: http:// desktop.arcgis.com). To understand how the old regions of Africa overlapped with current countries, we consulted the "rare maps" website (https://www.raremaps.com).

Measurements in millimeters [mean ± standard deviation (minimum and maximum values found among all specimens measured)] are given for the total length; length and width of the head, pronotum, scutellum and abdomen; and length of the antennal and labial segments. Genitalia were prepared with heated 10% KOH aqueous solution. The terminology of Singh-Pruthi (1925), Baker (1931), Dupuis (1955, 1970), Konstantinov and Gapon (2005) and Gapon and Konstantinov (2006) was adopted for genitalic structures; a correspondence between different terms used for the male genitalia by these authors is given in Table 2. We follow the terminology of Kment & Vilímová (2010) for the external scent efferent system of the metathoracic gland. Drawings were carried out under a stereomicroscope coupled with a camera lucida and edited with a vectorial image processor.

Results

Order Hemiptera Linnaeus, 1758

Suborder Heteroptera Latreille, 1810

Family Pentatomidae Leach, 1815

Subfamily Asopinae Spinola, 1850

Afrius **Stål, 1870**

Cimex (*Afrius*) Stål, 1870: 44. Type species by subsequent designation (Schouteden 1907: 51): *Asopus figuratus* Germar, 1838 (= *Afrius purpureus* (Westwood, 1837)).

Afrius – Lethierry & Severin 1893: 214. – Schouteden 1907: 50–52. – Kirkaldy 1909: 10. – Schouteden 1909: 64. – Cachan 1952: 305. – Villiers 1952b: 81. – Mamet 1957: 34. – Gillon 1972: 351–352. – Schouteden 1972: 106. – Thomas 1994: 150–152. – Maldès & Pluot-Sigwalt 2004: 20. – Rider 2006: 234. – Robertson 2009: 20–23.

Diagnosis. Lateral pronotal margins sinuous and crenulated on anterior half; frenal margin of scutellum longer than postfrenal part; abdominal basal tubercle short, not extending beyond metacoxae; profemur with a preapical spine; protibia very slightly expanded; male abdomen with or without ventral setose patches on segments V and VI; posterior angles of the seventh abdominal segment obtuse (Fig. 8C, paVII); metapleural evaporatorium thinly surrounding peritreme.

Redescription. Body length: 8.70–13.22 mm (females) and 9.00–11.00 (males). Body oval or pentagonal, with variable colour patterns. Head uniformly punctured, mandibular plates varying from equal to a little shorter or little longer than clypeus, with margins straight to slightly sinuous; ocelli placed close to an imaginary line connecting posterior margin of eyes; antenna with five antennomeres bearing thin setae, denser on fourth and fifth antennomeres; antennal tubercles partially visible from above, acute apically; bucculae rounded; labium robust, extending to posterior margin of metasternum.

Pronotum hexagonal, uniformly punctured except on cicatrices; anterior margin concave; lateral margins sinuous, crenulated on anterior half; posterior angles with a prominent small spine; a thin central line without punctures forms a weak longitudinal medial carina that extends from anterior to posterior margin. Scutellum reaching an imaginary line connecting middle of each connexival segment V; a thin central line without punctures also forms a weak longitudinal medial carina, connected with a similar line on pronotum from anterior to posterior margins. Frenal margins longer than postfrenal margins. Corium longer than scutellum, uniformly punctured, membrane surpassing apex of abdomen. Pro- meso- and metasterna covered by small thin setae; prosternum lighter, with a weak median carina; mesosternum black between pro- and mesocoxae, slightly punctured, with central parallel horizontal stripes, and with a median light wide, rectangular and elevated carina, wider anteriorly; metasternum flat or slightly elevated. Metapleural evaporatorium narrowly surrounding peritreme, narrowly extending on posterior meso- and anterior metapleural margins, also extending to anterior angle of mesopleura. Peritreme groove; ostiolar opening laterally directed. Profemur with anteapical spine, protibia slightly expanded, meso- and metatibiae prismatic.

Abdomen sparsely punctured, punctures less dense on disc, short basal tubercle anteriorly directed. Trichobothria aligned to an imaginary line connecting middle of spiracles. Posterolateral angles of abdominal sternites rounded.

Male. Abdomen with or without ventral setose patches on segments V and VI. Pygophore bowl-shaped, with setae on all surface, denser between ventral border and inferior layer of ventral border, and on apex of posterolateral angles (Figs 3, 6, 10 A–F); dorsal border concave, weakly medially elevated (Figs 3, 6, 10 A, D, db); ventral border slightly concave (Figs 3, 6, 10, B, E, vb), medially emarginated in posterior view (Figs 3, 6, 10, C, F, vb), inferior layer slightly excavated (Figs 3, 6, 10, B, C, E, F, il). Posterolateral angles rounded, setose on apex (Figs 3, 6, 10, A–F, pa). Segment X tubular, ventrally directed, dorsally sclerotized, medially carinated, setose, setae denser on apex (Figs 3, 6, 10, A, C, D, F, X). Genital plates between the lateral walls of capsule and parameres (Figs 3, 6, 10, A, C, D, F, I, gp). Phallus. Phallotheca divided in a globose basal theca and a cup-like thecal shield (Figs 3 J–Q, 6 J–R, 10 J–R, ph, bt, ts). Ejaculatory reservoir contained inside basal theca (Figs 3 J–N, 6 J–O, 10 J–O, er). Basal foramen circular, reinforced by the basal plates (Figs 3 L, N, 6 L, O, 10 L, O, bf, bp). Vesica partially inserted in phallotheca, golf club-shaped in lateral view, bearing two elongated filaments and a central elevated portion with microsculptures (Figs 3 J–Q, 6 J–R, 10 J–R, v); ductus seminis running between the filaments of vesica, ending on a secondary gonopore, dorsally directed (Figs 3 J–Q, 6 J–R, 10 J–R, ds, sg). Conjunctival lobes paired, posteriorly directed, globose, with apices endowed with a set of small sculptured processes (Figs 3 J–P, 6 J–P, 10 J–Q, cl, sp).

Female. Gonocoxites VIII subtriangular, posterior margins sinuous, sutural margins straight, juxtaposed, setae on posterior and sutural margins (Figs 4, 7, 11, A, B, gcVIII). Laterotergites VIII triangular, longer than wide, with spiracles on basal angle (Figs 4, 7, 11, A, B, laVIII). Exposed portion of gonocoxites IX rectangular, wider than long, slightly covering the proximal lateral margins of laterotergites IX (Figs 4, 7, 11, A, B, gcIX). Exposed portion of laterotergites IX digitiform, setose on apex, not attaining band uniting laterotergites VIII, separated from each other by gonocoxites IX and segment X (Figs 4, 7, 11, A, B, laIX). Segment X trapezoidal (Figs 4, 7, 11, A, B, X). Inner portion of gonocoxites IX projected in 1+1 straight elongated arms, variable in extension, and with apices rounded or acute (Figs 4, 7, 11, C, D, gcIX). Gonapophyses IX with 1+1 variable secondary thickenings (Figs 4, 7, 11, C, D, gpIX). Ring sclerites absent. Thickening of vaginal intima elongated (Figs 4, 7, 11, C, D, vi). Pars intermedialis small (Figs 4, 7, 11, C, D, pi), narrower than the median duct of vesicular area. Capsula seminalis oval, longer and wider than pars intermedialis (Figs 4, 7, 11, C, D, cs).

Distribution. Throughout Africa and adjacent islands (Fig. 1).

Remarks: *Afrius* was created as a subgenus of *Cimex* Linnaeus, 1758 by Stål (1870) but not within the present sense of *Cimex*, since *Cimex* currently corresponds to a genus of Cimicidae. At the time of the description, three species of *Afrius* were recognized, *viz*. *Cimex (Afrius) figuratus* (Germar, 1838), *C. (Afrius) purpureus* (Westwood, 1837) and *C. (Afrius) flavirostris* Stål, 1864, while two others (*Canthecona marmorata* Dallas, 1851 and *C. annulipes* Dallas) were mentioned as species *incertae sedis*. Lethierry & Severin (1893) included all the above five species in *Afrius*. Schouteden (1907) divided the genus into two subgenera (*Afrius* s. str. and *Subafrius* Schouteden, 1907), separating them by the size of the scutellum and by the presence of abdominal silky patches in the male of the subgenus *Afrius.*

Afrius can be differentiated from most African genera of Asopinae by the following combined characteristics: lateral pronotal margins crenulated on anterior half, presence of a well developed spine on profemora, and abdominal basal tubercle short, not extending beyond metacoxae. The genus shares these features only with *Canthecona* Amyot & Serville, 1843, *Glypsus* Dallas, 1851, and *Picromerus* Amyot & Serville, 1843, however, the posterior abdominal segment of *Canthecona* is acuminate, not obtuse as in *Afrius*; the abdominal tubercle is bifid in *Glypsus*, not single as in *Afrius*; and the metapleural evaporatorium is more developed in *Picromerus* in comparison with *Afrius.*

We consider *Afrius* divided in two subgenera by the presence or absence of abdominal glandular patches (Thomas 1994) and by morphological differences of the male genitalia, described below. We do not consider, however, the subgenera as two distinct genera because the presence or absence of abdominal glandular patches can be interspecifically variable in other genera of Asopinae, as in *Macrorhaphis* Dallas, 1851 (Thomas 1994). Besides, the species of *Afrius* present many similarities of general morphology, of female genitalia, and of pygophore, mainly the genital plates. Perhaps a phylogenetic study can better elucidate the *Afrius* classification in future.

Key to the species of *Afrius* Stål, 1870

1. Scutellum wider than long, humeral pronotal angles laterally well projected to an acute angle (Fig. 2 B, D, F, H, J). Male abdomen without setose patches on segments V and VI (Fig. 2 C, L), parameres with two evident rami (Fig. 3 G, H) … *A.* (*Subafrius*) *flavirostrum* (Signoret, 1861)

1'. Scutellum longer than wide (Figs 5 B, D; 8 B, D, F, H, J, L, N, P), humeral pronotal angles slightly projected to an acute (Figs 5 B; 9 B), rounded (Fig. 9 A, C), or triangular angle (Fig. 9D). Male abdomen with setose patches on segments V and VI (Fig. 8C), parameres without two evident rami, triangular (Figs 6 G, H; 10 G, H) … 2

2. Postfrenal lobe of scutellum enlarged, constriction line (sc) broader than adjacent region (ac) of corium until radial vein (Fig. 8H). Humeral angles little emarginated (Fig. 9) … *A.* (*Afrius*) *purpureus* (Westwood, 1837)

2'. Postfrenal lobe narrow, constriction line (sc) equal or shorter than adjacent region (ac) of corium until radial vein (Fig. 5D). Humeral angles not emarginated (Fig. 5 B, D) … *A.* (*Afrius*) *kolleri* Schouteden, 1911

***Afrius* (*Subafrius*) Schouteden, 1907**

Afrius (*Subafrius*) Schouteden, 1907: 51. Type species by original monotypy: *Picromerus flavirostrum* Signoret, 1861.

Afrius (*Subafrius*) – Kirkaldy 1909: 10. – Cachan 1952: 306. – Thomas 1994: 152. – Maldès & Pluot-Sigwalt 2004: 20. – Rider 2006: 234.

Diagnosis. Males without abdominal glandular patches; parameres divided in two lobes; dorsal disc of vesica covered by fine and inconspicuous microsculptures.

Afrius (*Subafrius*) *flavirostrum* (Signoret, 1861)
(Figs 2–4)

Picromerus flavirostrum Signoret, 1861: 921.
Cantheconidea migratoria Distant, 1913: 144–145. NEW SYNONYM.

Afrius williamsi Miller, 1952: 183–184. NEW SYNONYM.

Canthecona flavirostris (incorrect subsequent spelling) – Stål 1864: 68.
Cimex (Afrius) flavirostris (incorrect subsequent spelling) – Stål 1870: 44.
Afrius flavirostris (incorrect subsequent spelling) – Lethierry & Severin 1893: 214 [with "Stål 1864" for authority]. – Schouteden 1905a: 151–153.
Afrius (Subafrius) flavirostrum – Schouteden 1907: 51. – Kirkaldy 1909: 10. – Cachan 1952: 306. – Thomas, 1994: 152. – Maldès & Pluot-Sigwalt 2004: 20. – Gapon & Konstantinov 2006: 809.
Afrius williamsi – Williams 1951: 461. – Jolivet & Théodoridès 1953: 5. – Orian 1956: 642. – Mamet 1957: 35. – Cox 1996: 38.
Subafrius flavirostrum – Orian 1965: 116.
Afrius (Subafrius) migratorius – Thomas 1994: 152.
Afrius (Subafrius) williamsi – Thomas 1994: 152.
Afrius flavirostrum – Kuklinski & Borgemeister 2002: 59.

Types examined. *Picromerus flavirostrum* Signoret, 1861. Syntype male, labels: "Madagasc Coll. Signoret."; "flavirostr det. Signoret."; "flavirostrum d. Schouteden." (Fig. 2 A–C) (deposited at NHMW). Syntype female, labels: "Madagascar. Coll. Signoret."; "flavirostrum"; "flavirostrum d. Schouteden."; "flavirostr. det. Signoret."; "Afrius flavirostrum Type Sign." (Fig. 2 E–F) (deposited at NHMW). Syntype female, labels: "Madag."; "Stål"; "Type"; "Typus"; "NHRS-GULI 000057896" (Fig. 2D) (deposited at NHRS). These three syntypes were examined by photos.
Cantheconidea migratoria Distant, 1913. Syntype female, labels: blue-margined syntype disc label; red-margined type disc label "Aldabra. APT. 1907"; "Percy Sladen Trust Expedition. 1911-497."; "Canthecona migratoria type Dist."; "NHMUK 010592166" (Fig. 2 G–H) (deposited at NHMUK).
Afrius williamsi Miller, 1952. Holotype male, labels: red-margined holotype disc label; "MAURITIUS. Coll. J.R. Williams i.1949."; "182"; "Pres by Com Inst Ent BM 1950 – 262"; "Afrius williamsi sp.n det. N.C.E. Miller. 1950."; "COM INST ENT. COLL. NO. 11607"; "Predaceous on Schematiza cordiae, Barb"; "NHMUK 010592172" (Fig. 2 I–J) (deposited at NHMUK).

Paratype female, labels: yellow-margined paratype disc label; “MAURITIUS Reduit. xii.1948 Coll. J.R. Williams”; “182”; “Pres by Com Inst Ent BM 1950 – 262”; “Afrius williamsi sp.n det. N.C.E. Miller. 1950.”; “COM INST. ENT. COLL. NO. 11607”; “Predaceous on Schematiza cordiae, Barb”; “NHMUK 010592173 (Fig. 2 K–L) (deposited at NHMUK).

Paratype female, labels: yellow-margined paratype disc label; “MAURITIUS Reduit. xii.1948 Coll. J.R. Williams”; “182”; “Pres by Com Inst Ent BM 1950 – 262”; “Afrius williamsi sp.n det. N.C.E. Miller. 1950.”; “COM INST. ENT. COLL. NO. 11607”; “Predaceous on Schematiza cordiae, Barb”; “NHMUK 010747732” (deposited at NHMUK).

Paratype female, labels: yellow-margined paratype disc label; “MAURITIUS Reduit. I.1949 Coll. J.R. Williams”; “182”; “Pres by Com Inst Ent BM 1950 – 262”; “Afrius williamsi sp.n det. N.C.E. Miller. 1950.”; “COM INST. ENT. COLL. NO. 11607”; “Predaceous on Schematiza cordiae, Barb”; “NHMUK 010747733” (deposited at NHMUK).

Paratype female, labels: yellow-margined paratype disc label; “MAURITIUS Reduit. vi.1949 Coll. J.R. Williams”; “182”; “Pres by Com Inst Ent BM 1950 – 262”; “Afrius williamsi sp.n det. N.C.E. Miller. 1950.”; “COM. INST. ENT. COLL. NO. 11607”; “Predaceous on Schematiza cordiae, Barb”; “NHMUK 010747734” (deposited at NHMUK).

Paratype female, labels: yellow-margined paratype disc label; “Dept. of Agric. MAURITIUS”; “Pres by Com. Inst. Ent. B.M.1948-38”; “COM. INST. ENT. COLL. NO. 10958”; “182”; “NHMUK 010747735” (deposited at NHMUK).

Paratype male, labels: yellow-margined paratype disc label; “MAURITIUS Reduit. i.1949 Coll. J.R. Williams”; “182”; “Pres by Com Inst Ent BM 1950 – 262”; “Afrius williamsi sp.n det. N.C.E. Miller. 1950.”; “COM INST. ENT. COLL. NO. 11607”; “Predaceous on Schematiza cordiae, Barb”; “NHMUK 010747736” (deposited at NHMUK).

Paratype male, labels: yellow-margined paratype disc label; “MAURITIUS Reduit A. Moutia II.v.1948”; “Pres by Com. Inst. Ent. B.M.1948-38”; “COM. INST. ENT. COLL. NO. 10958”; “Preying on Schematiza cordiae”; “182”; “NHMUK 010747737” (deposited at NHMUK).

Paratype female, labels: yellow-margined paratype disc label; “MAURITIUS Reduit. i.1949 Coll. J.R. Williams”; “Afrius williamsi sp.n. det. N.C.E. Miller. 1950.”; “Press by Com Inst Ent B M 1950 - 262”; “COM INST. ENT. COLL. NO. 11607”; “182”; “Predaceous on Schematiza cordiae, Barb”; “NHMUK 010747738” (deposited at NHMUK).
Paratype female, labels: yellow-margined paratype disc label; “MAURITIUS Reduit. i.1949 Coll. J.R. Williams”; “Afrius williamsi sp.n. det. N.C.E. Miller. 1950.”; “Press by Com Inst Ent B M 1950 - 262”; “182”; “Predaceous on Schematiza cordiae, Barb”; “NHMUK 010747739” (deposited at NHMUK).
Paratype female, labels: yellow-margined paratype disc label; “Dept. of Agric. MAURITIUS Reduit 19.IV.1948”; “J.R. Williams”; “Pres by Com. Inst. Ent. B.M.1948-38”; “COM. INST. ENT. COLL. NO. 10958”; “182”; “NHMUK 010747740” (deposited at NHMUK).

Diagnosis. Scutellum wider than long, humeral pronotal angles laterally well projected to an acute angle; male abdomen without setose patches; parameres with two distinct lobes.
Redescription. Body elongate oval, yellowish to brown, usually with a pale posterior margin of the scutellum. Head subrectangular, wider than long, uniformly punctured; mandibular plates equal or little shorter than and two times wider than clypeus, anteriorly rounded, with margin straight to slightly sinuous; antennomeres yellow to brownish, black coloured on apical halves of third to fifth antennomeres, bearing thin setae, denser on third to fifth antennomeres; proportion of lengths of antennomeres: II≥IV>V>III>I; labium robust, reaching metasternum, last segment darker than precedent; proportion of lengths of labiomeres: II>I≥III>IV. Pronotum hexagonal, uniformly punctured except on cicatrices, twice or more wider than long, cicatrices flat. Anterior margin concave. Lateral margins sinuous, slightly crenulated on anterior half, humeral angle laterally projected, emarginated, apices acute. Scutellum wider than long. Corium longer than scutellum, reaching connexival segment VI, uniformly punctured, membrane surpassing apex of abdomen (Fig. 2).

Male abdomen without setose patches, parameres biramous (Fig. 3 F–H, par).

Male. Measurements (n=5): head length 1.82 ± 0.18 (1.68–2.10); width 1.93 ± 0.15 (1.87–2.13); pronotum length 2.52 ± 0.48 (1.85–3.22); width 6.44 ± 0.64 (5.64–

7.25); scutellum length 3.02 ± 0.32 (2.66–3.48); width 3.22 ± 0.34 (2.88–3.75); lengths of antennomeres: I 0.32 ± 0.05 (0.27–0.37), II 1.26 ± 0.11 (1.2–1.39), III 1.12 ± 0.23 (0.97–1.37), IV 1.32 ± 0.21 (1.12–1.54); V 1.16 ± 0.13 (1.05–1.31); lengths of labiomeres: I 0.94 ± 0.02 (0.93–0.97), II 1.13 ± 0.09 (1.05–1.23), III 0.97 ± 0.10 (0.90–1.90), IV 0.81 ± 0.02 (0.78–0.82); length of abdomen 4.50 ± 0.70 (4.00–5.00); width 4.82 ± 0.25 (4.65–5.00); total length 9.87 ± 0.71 (9.19–11.00).

Genitalia. Genital plates elongated and cylindrical (Fig. 3 A, C, D, F, I, gp). Parameres long, biramous, head V-shaped divided in one process long and acute and another shorter and rounded, dorsally directed, extended beyond pygophore (Fig. 3 A–H, par). Phallus. Thecal shield about two times longer than basal theca, widely opened posteriorly (Fig. 3 J–Q, ts). Vesica subrectangular in dorsal view (Fig. 3 O–Q, v), golf club-shaped in lateral view, with apex subtriangular and a central slightly elevated rounded portion covered by fine and inconspicuous microsculptures (Fig. 3 L–N, v, m); ductus seminis enlarged near apex (Fig. 3 K–Q, ds). Apices of conjunctival lobes globose, endowed with a set of sculptured processes, forming a subrectangular projection in lateral view (Fig. 3 K–P, cl, sp).

Female. Measurements (n=5): head length 1.87 ± 0.10 (1.80–1.95); width 1.78 ± 0.18 (1.65–1.91); pronotum length 2.62 ± 0.17 (2.5–2.74); width 3.48 ± 0.07 (3.43–3.53); scutellum length 3.01 ± 0.07 (2.96–3.07); width 3.24 ± 0.18 (3.11–3.37); length of antennomeres: I 0.30 ± 0.0 (0.30–0.30), II 1.29 ± 0.03 (1.27–1.31), III 1.08 ± 0.0 (1.08–1.08), IV 1.28 ± 0.05 (1.24–1.31); V 1.16 ± 0.06 (1.12–1.20); length of labiomeres: I 0.97 ± 0.06 (0.93–1.01), II 1.14 ± 0.03 (1.12–1.16), III 0.94 ± 0.0 (0.94–0.94), IV 0.86 ± 0.06 (0.82–0.90); length of abdomen 5.12 ± 0.05 (5.08–5.16); width 5.24 ± 0.0 (5.24–5.24); total length 9.51 ± 1.14 (8.70–10.32).

Genitalia. Gonocoxites VIII little longer than wide, mesial portions of posterior margins slightly constricted (Fig. 4 A, B, gcVIII). Median and inner ducts of vesicular area with uniform diameter (Fig. 4 C, D, md, id).

Distribution. Madagascar (Signoret 1861), Seychelles Islands (Distant 1913), Mauritius (Miller 1952) (Table 1, Fig. 1).

Remarks. Although this species seems similar to *A.* (*Afrius*) *purpureus* (Westwood, 1837) in general aspect, this is the most distinct species of the genus: the scutellum is wider than long, the males do not have abdominal glandular patches, the parameres are divideded in two arms, and the vesica is shorter and less microsculptured in comparison

with *A.* (*Afrius*) *purpureus* and *A.* (*Afrius*) *kolleri* Schouteden, 1911. Because of the aforementioned, we have kept the subgeneric classification, grouping *A. kolleri* and *A. purpureus* in the subgenus *Afrius*, and *A. flavirostrum* in the subgenus *Subafrius*.
When describing *A. williamsi*, Miller (1952) compared his new species with *A. marmoratus* (Dallas, 1851), but did not mention *A.* (*Subafrius*) *flavirostrum*.
The two new synonymies herein proposed have already been pointed out by Orian in his unpublished thesis (Orian 1965).

***Afrius* (*Afrius*) Stål, 1870**

Cimex (*Afrius*) Stål, 1870: 44.

Afrius (*Afrius*) – Schouteden 1907: 51–52. – Kirkaldy 1909: 10. – Thomas 1994: 151–152. – Maldès & Pluot-Sigwalt 2004: 20.

Diagnosis. Males with abdominal glandular patches; parameres not divided in two lobes; dorsal disc of vesica covered by dense and demarcated microsculptures.

Afrius (*Afrius*) *kolleri* Schouteden, 1911
(Figs 5–7)

Afrius kolleri Schouteden, 1911: 180; lectotype herein designated.

Afrius kolleri – Schouteden 1963: 399. – Gillon 1972: 352. – Schouteden 1972: 106. – Gillon 1974: 219. – Thomas, 1994: 151. – Maldès & Pluot-Sigwalt 2004: 20. – Robertson 2009: 22–23.

Types examined. *Afrius kolleri* Schouteden, 1911. Lectotype male, here designated, labels: “Holotypus”; “MUSÉE DU CONGO Galli-Koko Kasai R. CARLIER”; Afrius Stål kolleri Schout.”; “Afrius kolleri n?” (Fig. 5 A, B). Paralectotype female, labels: “Paratypus”; “MUSÉE DU CONGO LUKOMBE. 6.X.08 A. Koller” (deposited at RMCA) (Fig. 5 C, D).

Diagnosis. Scutellum longer than wide, postfrenal lobe narrow; humeral pronotal angles not emarginated; male abdomen with setose patches on segments V and VI, parameres triangular, without two distinct lobes.

Redescription. Body pentagonal elongated, reddish to brown, usually with black stripes on head, pronotum, scutellum, and corium. Head quadrate, as long as wide or slightly wider than long, uniformly punctured; mandibular plates equal or little longer than clypeus, and little wider than clypeus, with margins straight to slightly sinuous; clypeus black; occeli surrounded by subquadrate black spots; antennomeres usually black, proportion of lengths of antennomeres: V>IV>III=II>I; labium robust, reaching metasternum; proportion of lengths of labiomeres: II>I>III>IV.

Pronotum hexagonal, uniformly punctured, wider than long, with 1+1 black transversal stripes on cicatrices, 1+1 black vertical spots on humeral angles, and 3 longitudinal stripes on disc; cicatrices flat, black, sometimes with a central red spot, demarcated by punctures; anterior margin concave; lateral margins sinuous, crenulated on anterior half; humeri triangular, not emarginated. Scutellum longer than wide, uniformly punctured, reaching an imaginary line connecting middle of connexival segments V, partially or entirely emarginated in black and with one triangular black central spot along frenal lobe; postfrenal lobe narrow, narrower than corium at same region. Corium longer than scutellum, reaching connexival segment VI. Protibiae slightly expanded (Fig. 5).

Male abdomen with setose patches on segments V and VI, parameres uniramous, triangular.

Male. Measurements (n=3): head length 1.95 ± 0.20 (1.72–2.07); width 2.07 ± 0.06 (2.02–2.15); pronotum length 2.76 ± 0.23 (2.52–2.98); width 4.86 ± 0.40 (4.53–5.32); scutellum length 3.23 ± 0.13 (3.08–3.33); width 2.90 ± 0.09 (2.80–2.96); length of antennomeres: I 0.31 ± 0.05 (0.27–0.37), II 1.05 ± 0.07 (0.97–1.12), III 1.08 ± 0.04 (1.05–1.12), IV 1.34 ± 0.06 (1.30–1.38); V 1.50 ± 0.00 (1.50–1.50); length of labiomeres: I 0.86 ± 0.03 (0.84–0.90), II 1.16 ± 0.03 (1.12–1.18), III 0.92 ± 0.02 (0.90–0.93), IV 0.92 ± 0.02 (0.90–0.93); length of abdomen 5.12 ± 0.17 (5.00–5.24); width 4.56 ± 0.15 (4.45–4.67); total length 10.11 ± 1.00 (9.00–10.97).

Genitalia. Genital plates cylindrical (Fig. 6 A, D, I, gp). Parameres long, uniramous, head triangularly elongated, dorsally directed, extended beyond pygophore

(Fig. 6 A–H, par). Phallus. Thecal shield and basal theca subequal in length (Fig. 6 L, N, O, ts, bt). Vesica shield-shaped in dorsal view (Fig. 6 P, Q, R), golf club-shaped in lateral view (Fig. 6 L–O, v), with apex rounded and a central elevated microsculptured portion (Fig. 6 L–O, m), this central portion is rounded in lateral view, subtriangular in dorsal view; ductus seminis with uniform diameter (Fig. 6 L–R, ds). Apices of conjunctival lobes with inconspicuous sculptured process (Fig. 6 L, O, P, sp).

Female. Measurements (n=5): head length 2.20 ± 0.09 (2.06–2.30); width 2.20 ± 0.12 (2.05–2.35); pronotum length 3.33 ± 0.24 (3.06–3.63); width 5.81 ± 0.31 (5.56–6.03); scutellum length 3.94 ± 0.27 (3.71–4.30); width 3.34 ± 0.26 (3.07–3.75); length of antennomeres: I 0.35 ± 0.01 (0.33–0.37), II 1.18 ± 0.07 (1.12–1.25), III 1.18 ± 0.08 (1.12–1.27), IV 1.47 ± 0.13 (1.31–1.62); V 1.42 ± 0.0 (1.42–1.42); length of labiomeres: I 1.04 ± 0.13 (0.90–1.23), II 1.27 ± 0.07 (1.20–1.35), III 1.00 ± 0.08 (0.93–1.12), IV 0.98 ± 0.10 (0.83–1.08); length of abdomen 6.40 ± 0.45 (6.03–7.09); width 5.59 ± 0.34 (5.40–6.20); total length 11.98 ± 0.86 (11.12–13.22).

Genitalia. Gonocoxites VIII little longer than wide, posterior margins sinuous (Fig. 7 A, B, gcVIII). Median and inner ducts of vesicular area little widening to apex (Fig. 7 C, D, md, id).

Distribution. Democratic Republic of the Congo (Schouteden 1911), Ivory Coast (Gillon, 1972), Ethiopia, Uganda (Thomas, 1994), Cameroon (Maldès and Pluot-Sigwalt, 2004) (Table 1, Fig. 1).

Remarks. This species is apparently more similar with *A.* (*Afrius*) *purpureus* because they both present glandular patches on abdominal venter of males, parameres not divided in two rami, and presence of vesica microsculptures.

Afrius kolleri was based on an unspecified number of specimens of both sexes (Schouteden 1911). We examined two specimens in the RMCA, a male labelled as holotype and a female labelled as paratype. Since no holotype was designated in the original description, both of them must be considered as syntypes; accordingly, we hereby designate the male specimen as lectotype.

Afrius purpureus (Westwood, 1837)
(Figs 8–11)

Pentatoma yolofa Guérin-Méneville, 1831: 55, fig. 2 and legend (syn. Stål, 1870: 44).

Pentatoma purpurea Westwood, 1837: 43.

Asopus figuratus Germar, 1838: 185–186 (syn. Schouteden, 1905: 147, as a var. of *Canthecona purpurea*).

Canthecona caerulea Dallas, 1851: 89 (syn. Stål, 1862: 496, to *Canthecona Yolofa* Guérin, as var.; syn. Stål, 1870: 44).

Canthecona marginella Dallas, 1851: 89 (syn. Stål, 1862: 496, to *Canthecona Yolofa* Guérin, as var.; syn. Stål, 1870: 44).

Canthecona marmorata Dallas, 1851: 90 (synonymy to *Canthecona purpurea* suspected by Schouteden 1905a: 150). NEW SYNONYM.

Canthecona annulipes Dallas, 1851: 90–91 (syn. Schouteden 1905a: 149–150, to *Canthecona marmorata*; synonymy to *Canthecona purpurea* suspected by Schouteden 1905a: 150). NEW SYNONYM.

Canthecona miniatescens Stål, 1853: 213 (syn. Stål, 1864: 66–67, with *Canthecona figurata*, as var. b.; syn. Kirkaldy 1909: 10, to *Afrius purpureus*, as a var.).

Afrius rubromarginatus Bergroth, 1903: 289. NEW SYNONYM.

Pentatoma (*Eurydema*) *yolofa* – Laporte 1832: 61.

Canthecona Yolofa – Amyot & Serville 1843: 82. – Dallas 1851: 89. – Stål 1864: 67–68. – Larousse 1890: 724 [without any capital letters].

Cimex (*Pentatoma*) *yolofa* – Guérin-Méneville 1844: 344 [description]

Asopus figuratus – Herrich-Schaffer 1844: 113 (and fig. 710).

Canthecona figurata – Stål 1864: 66–67. – Gerstaecker 1892: 345.

Cimex (*Afrius*) *figuratus* – Stål 1870: 44.

Cimex (Afrius) purpureus – Stål 1870: 44. – Distant 1884: 459.

Cimex marmoratus – Stål 1870: 46.

Cimex annulipes – Stål 1870: 46.

Canthecona Ylofa (incorrect subsequent spelling) – Wallengren 1875: 133.

Afrius purpureus – Reuter 1882: 9. – Lethierry & Severin 1893: 214. – Schouteden 1907: 51–52.– Kirkaldy 1909: 10. – Schouteden 1909: 64. – Schouteden 1910: 91. – Vuillet & Vuillet 1911: 277. – Vuillet & Vuillet 1912: 445. – Hollrung 1912: 280. – Jeannel 1913: 97. – Schouteden 1913a: 190. – Schouteden 1913b: 324. – Zacher 1921: 139. – Lehmann 1922: 129. – Hesse 1925: 39. – Carpenter 1926: Liii. – Golding 1931: 222. – Van Heerden 1931: 131 (and fig. Cvii). – Hargreaves 1937: 518. – Villiers

1949: 88. – Risbec 1950: 126, 397, 447. 457. – Cachan 1952: 305. – Leston 1952: 895. – Villiers 1952a: 1211. – Villiers 1952b: 82. – Mancini 1953: 202. – Villiers 1954: 230. – Villiers 1956: 213. – Lindberg 1958: 31. – Le Pelley 1959: 166. – Caswell 1962: 26. – Schouteden 1963: 399. – Schouteden 1964: 95. – Cachan 1965: 5–32. – Girard 1969: 7, 52. – Herting 1971: 80. – Gillon 1972: 351–352. – Schouteden 1972: 106. – Gillon 1974: 219, 241, 246, 251, 266, 270, 285, 287. – Linnavuori 1975: 124. – Herting 1976: 71. – Linnavuori 1976: 129. – Medler 1980: 123. – Bourdouxhe & Jolivet 1981: 46–48. – Linnavuori 1982: 164. – Nuamah 1982: 11. – Nonveiller 1984: 54, 142. – Balsbaugh 1988: 276. – Couilloud 1989: 207–208. – Quicke et al. 1992: 1024. – Van Harten 1993: 247. – Bijlmakers & Verhoek 1995: 147, 317. – Schaefer 1996: 41. – Jolivet 1997: 153. – Boulard 1998: 41. – Dolling et al. 1999: 73. – Beenen & Hawkeswood 2004: 473. – Tchibozo & Braet 2004: 161. – Arechavaleta et al. 2005: 76. – Renou 2007: 30. – Poutouli et al. 2011: 9, 54–56, 58, 76. – Agboton et al. 2014: 9. – Crétenet & Gourlot 2015: 138.

Afrius purpureus var. *marginella* – Reuter 1882: 9. – Kirkaldy 1909: 10.

Cimex (*Afrius*) *purpureus* var. *marginella* – Distant 1884: 459.

Cimex purpureus – Distant 1890: LIII [with Hope for author, not Westwood].

Cimex figuratus – Distant 1892: 248 [description and illustration of unnamed variety].

Afrius ? *annulipes* – Lethierry & Severin 1893: 214.

Afrius figuratus – Lethierry & Severin 1893: 214. – Distant 1898: 308. – Distant 1901: 27. – Howard 1906: 731. – Leston 1954: 680 (and in title). – Maitai 1958: 291. – Le Pelley 1959: 257. – McDonald 1966: 44. – Cobben 1968: 116. – Le Pelley 1968: 195, 501. – Herting 1973: 84, 85, 87. – Medler 1980: 123. – Smith & Barfield 1982: 263. – Scholtz & Holm 1985: 147. – Merrett 1986: 549. – Matanmi & Hassan 1987: 376. – Fry 1989: 108. – Schaefer 1996: 44. – Sileshi et al. 2000: 41, 48.

Afrius ? *marmoratus* – Lethierry & Severin 1893: 214.

Canthecona purpurea – Schouteden 1905a: 146. – Schouteden 1905b: 15.

Canthecona purpurea var. *figuratus* – Schouteden 1905a: 147.

Canthecona marmorata – Schouteden 1905a: 149–150.

Canthecona rubromarginata – Schouteden 1905a: 150–151.

Afrius marmoratus – Schouteden 1907: 51. – Kirkaldy 1909: 10. – Thomas, 1994: 151. – Robertson 2009: 22.

Afrius rubromarginatus – Schouteden 1907: 52. – Bergroth 1908: 182. – Kirkaldy 1909: 10. – Thomas 1994: 151. – Maldès & Pluot-Sigwalt 2004: 20. – Robertson 2009: 22. – Krüger & Deckert 2016: 46.

Afrius purpureus var. *caerulea* – Kirkaldy 1909: 10.

Afrius purpureus var. *figurata* – Kirkaldy 1909: 10.

Afrius purpureus var. *miniatescens* – Kirkaldy 1909: 10.

Afrius purpureus var. *figuratus* – Schouteden 1907: 51–52. – Schouteden 1909: 64. – Mancini 1937: 43. – Le Pelley 1959: 54.

Afrius yolofus – Dupuis 1952: 454. – Leston 1954: 680 (in a note). – Thomas 1994: 151. – Maldès & Pluot-Sigwalt 2004: 20. – Rebagliati et al. 2005: 201. – Kerisew 2011: 91.

Afrius purpureus purpureus – Linnavuori 1989: 13.

Afrius purpureus figuratus – Linnavuori 1989: 12–13 [with unnamed variety].

Afrius yolofa – Sileshi et al. 2001: 289. – Sileshi et al. 2004: 6, 18. – Kerzhner et al. 2004: 18. – Rider 2006: 234. – Robertson 2009: 21–22. – Matesco et al. 2014: 352.

Types examined: *Pentatoma purpurea* Westwood, 1837: 43. Syntype female. Labels: “Type Hem: 242 PENTATOMA PURPUREA WESTWOOD HOPE DEPT. OXFORD”; “TYPE = WEST. (HOPE) C. Hemipt. 1837 Part. I. page 43 Distant, P.Z.S., 1900, p. 807-825.”; “Type”; “Africa”; “Afrius purpureus Westw.” (deposited at OUMNH) (Fig. 8 E–F).

Asopus figuratus Germar, 1838. Syntype female. Labels: “figuratus Germ. Promont. b. sp. Collect. Germ.”; “Afrius figuratus (Germ)”; “7968”; “Typus”. (deposited at MFNB) (Fig. 8 G–H).

Canthecona caerulea Dallas, 1851:89. Syntype male. Labels: blue-margined syntype disc label; red-margined type disc label; “40 6 26 329”; “Canthecona caerulea identified by Dallas”; “a”; “NHMUK 010592171”. (deposited at NHMUK) (Fig. 8 A–C).

Canthecona marginella Dallas, 1851:89. Syntype male. Labels: blue-margined syntype disc label; red-margined type disc label; “87a”; “Canthecona marginella identified by Dallas”; “a”; “NHMUK 010592170”. (deposited at NHMUK) (Fig. 8 I–J).

Canthecona marmorata Dallas, 1851: 90. Syntype male. Labels: blue-margined syntype disc label; red-margined type disc label; “Int. S. Africa / 4319”; “3. Canthecona marmorata,”; “a”; “NHMUK 010592164”. (deposited at NHMUK) (Fig. 8 K–L).

Canthecona annulipes Dallas, 1851: 90-91. Syntype female. Labels: blue-margined syntype disc label; “Int. Africa”; “Canthecona figurata Walker’s catal.”; “a”. (deposited at NHMUK) (Fig. 8 M–N).
Canthecona miniatescens Stål, 1853:213. Syntype female. Labels: “Caffraria”; “I. Vahlb”; “miniatescens Stål type.”; “Typus”; “NHRS-GULI 000027293” (deposited at NHRS) (examined by photo) (Fig. 8D).
Afrius rubromarginatus Bergroth, 1903: 289. Syntype female. Labels: “Type Hem: 704 AFRIUS RUBROMARGINATUS BERGROTH. HOPE DEPT. OXFORD”; “Afrius rubro=marginatus Bergr.”; “Probably TANGANYIKA”; “Ann. Soc. Ent. Belg. 47: 289”; “Afriq Or”; “3/”; “TYPE”. (deposited at OUMNH) (Fig. 8 O–P).

Diagnosis. Scutellum longer than wide, postfrenal lobe enlarged; humeral pronotal angles little emarginated; male abdomen with setose patches on segments V and VI, parameres triangular, without two distinct lobes.
Redescription. Body elongate oval, with variable colour patterns from yellowish and brownish with yellow or red stripes (Fig. 8 D, H, L, N) to purple, green and blue metallic uniform colours (Fig. 8 B, C, F, J, P) or with yellow, red and orange stripes. Head subrectangular, wider than long, punctured; mandibular plates equal or little longer than clypeus, with margin varying from straight to sinuous; antenna bearing thin setae, denser on third, fourth and fifth antennomeres, proportion of lengths of antennomeres: IV>V>II>III>I; labium robust, reaching metasternum; proportion of lengths of labiomeres: II>I>IV>III.

Pronotum hexagonal, densely punctured, twice or more wider than long, cicatrices flat; anterior margin concave; lateral margins strongly sinuous, crenulated on anterior half (Fig. 9), humeral angle slightly emarginated, anterior humeral portion varying from convex (Fig. 9 A, C) to acute or spinose (Fig. 9 B, D). Scutellum longer than wide, densely punctured. Corium longer than scutellum, usually not surpassing connexival segment V, densely punctured.

Setose patches present on male abdominal segments V and VI (Fig. 8C). Parameres uniramous, triangular.

Male. Measurements (n=5): head length 1.69 ± 0.08 (1.61–1.76); width 1.90 ± 0.12 (1.76–2.10); pronotum length 5.70 ± 0.46 (5.32–6.45); width 2.83 ± 0.46 (5.32–6.45); scutellum length 3.51 ± 0.29 (3.14–3.95); width 3.33 ± 0.28 (3.06–3.79); length of antennomeres: I 0.30 ± 0.04 (0.26–0.34), II 1.08 ± 0.11 (0.93–1.24), III 1.06 ± 0.10 (0.93–1.16), IV 1.26 ± 0.11 (1.12–1.39); V 1.22 ± 0.09 (1.12–1.31); length of labiomeres: I 0.93 ± 0.12 (0.79–1.12), II 1.06 ± 0.09 (0.94–1.09), III 0.80 ± 0.09 (0.67–0.94), IV 0.83 ± 0.08 (0.71–0.94); length of abdomen 4.67 ± 0.46 (4.03–5.24); width 4.83 ± 0.40 (4.43–5.48); total length 10.03 ± 0.52 (9.35–10.64).

Genitalia. Genital plates cylindrical (Fig. 10 A, C, D, F, I, gp). Parameres long, uniramous, head elongately triangular, dorsally directed, extended beyond pygophore (Fig. 10 A–H, par). Phallus. Basal theca and thecal shield subequal in length (Fig. 10, L–R, bt, ts). Vesica subtriangular in dorsal view (Fig. 10 P–R, v), golf club-shaped in lateral view, with apex obtuse and a central strongly elevated portion covered by microsculptures (Fig. 10 L–O, v, m), this central portion is broad, rectangular in lateral view, cylindrical in dorsal view; ductus seminis uniform (Fig. 10 L–R, ds), dorsally directed. Apices of conjunctival lobes globose endowed with a set of small sculptured processes (Fig. 10, L, N, O, cl, sp).

Female. Measurements (n=5): head length 2.12 ± 0.19 (1.83–2.28); width 2.12 ± 0.12 (1.91–2.21); pronotum length 6.94 ± 0.31 (6.45–7.25); width 3.17 ± 0.20 (2.82–3.30); scutellum length 4.43 ± 0.39 (3.79–4.75); width 4.06 ± 0.34 (3.46–4.35); lengths of antennomeres: I 0.38 ± 0.04 (0.34–0.45), II 1.30 ± 0.15 (1.12–1.42), III 1.17 ± 0.14 (0.93–1.31), IV 1.50 ± 0.19 (1.16–1.61), V 1.37 ± 0.15 (1.12–1.50); lengths of labiomeres: I 1.04 ± 0.07 (0.94–1.12), II 1.27 ± 0.15 (1.01–1.38), III 0.93 ± 0.09 (0.78–1.01), IV 0.94 ± 0.11 (0.75–1.05); length of abdomen 6.17 ± 0.34 (5.64–6.45); width 6.27 ± 0.42 (5.64–6.61); total length 11.96 ± 0.83 (10.80–13.06).

Genitalia. Gonocoxites VIII little wider than long, posterior margins sinuous (Fig. 11 A, B, gcVIII). Median and inner duct of vesicular area of uniform diameter (Fig. 11 C, D, md, id).

Distribution. Senegal (Guérin-Méneville 1844), South Africa (Dallas, 1851), Guinea (Stål 1864), Zimbabwe [as Mashonaland] (Distant, 1898), Democratic Republic of the Congo (Distant, 1901), Benin, Cameroon, Central African Republic [as Haute-Sangha], Equatorial Guinea [as Fernando Po], Eritrea, Ethiopia [as Abyssinia], Gabon, Mozambique, Nigeria [as Benue Niger], Sierra Leone, Sudan, Tanzania [as Usambara and Kilimanjaro] (Schouteden 1905a), South Sudan (Schouteden, 1909), Kenya [as Leito-kitok] (Schouteden 1910), Guinea-Bissau (Schouteden, 1913b), Namibia [as Damaraland, Otjiwarongo, and Tsumeb] (Hesse, 1925), Mali [as French Soudan]

(Risbec 1950), Cape Verde Islands (Lindberg 1958), Ivory Coast [as Lamto (Toumodi)] (Schouteden 1963), Yemen (Linnavuori 1989), Angola, Gambia, Ghana, Liberia, Somalia (Thomas, 1994), Malawi (Sileshi *et al*. 2000), Botswana, Chad, Republic of Djibouti, Uganda, Togo (Maldès and Pluot-Sigwalt, 2004), Niger, Republic of the Congo [as Congo Brazz.], Zanzibar (Robertson, 2009), Canary Islands (new record) (Table 1, Fig. 1).

Remarks. Intraspecific variability in the colour and general morphology has been demonstrated for *A. (Afrius) purpureus* (e.g., Linnavuori 1989, Schouteden 1905a, Van Heerden 1931, Villiers 1952b) as well as for other pentatomids, such as *Nezara viridula* (Linnaeus, 1758) (e.g., Freeman 1940; Kiritani 1970; Ohno & Alam 1992; Vivan & Panizzi 2002; More *et al.* 2017) and *Stiretrus decemguttatus* (Lepeletier & Serville, 1828) (Paleari 2013) for colour pattern, and *Pinthaeus sanguinipes* (Fabricius, 1781) for variation in the pronotum, reported by Zhao *et al*. (2013). Besides, we could not find any correspondence between the polymorphism and the geographic distribution of *A.* (*Afrius*) *purpureus*, i.e. specimens that we have examined, despite different colour patterns and pronotum shapes, are sympatric. The localities where they were collected are denoted by green dots on Fig. 1.

There has been considerable difference of opinion regarding the name used for this species, i.e. either *yolofa*/*-us*, *purpurea*/*-us* or *figurata*/*-us* and, sometimes, the latter used as a variety or subspecies of the second one (see review of the taxonomic history of the species above). Dallas (1851) was the first to synonymize *figuratus* and *yolofa*; he stated the date of publication of *Pentatoma yolofa* as 1830, while Stål (1864) stated it as 1829. Subsequent authors (including Stål 1870) accepted 1838 as the year of publication for *yolofa* and therefore they recognized either *figuratus* or *purpureus* as the valid name. Wallengren (1875) may have been the last author to use *yolofa* (misspelled as *Ylofa*) as a valid name while Larousse (1890) gave a brief description of it under the genus *Canthecona* (Strangely, the entry first mentions that the type species of *Canthecona* is from Senegal and thereafter describes *C. yolofa*, as though implying it were the type species; the type species of *Canthecona* Amyot & Serville, 1843 is, however, *C. discolor* (Palisot de Beauvois, 1811), described from the Kingdom of Oware, now Southwest Nigeria.). Dupuis (1952) demonstrated the priority of *Pentatoma yolofa* Guérin-Méneville, 1831 over *Pentatoma purpurea* Westwood, 1837 and *Asopus figuratus* Germar, 1838. Thomas (1994) adopted the combination suggested by Dupuis

(1952), *Afrius yolofus*. This was, as well, used by subsequent authors (Maldès & Pluot Sigwalt 2004, Rebagliati *et al*. 2005, Kerisew 2011). Some others (Sileshi *et al*. 2001, Sileshi *et al*. 2004, Kerzhner *et al*. 2004, Rider 2006, Robertson 2009, Matesco *et al*. 2014), however, chose the combination *Afrius yolofa*, while some others still used *purpureus* and/or *figuratus* after 1952 (e.g. Mancini 1953, Villiers 1954, 1956, Leston 1954, Lindberg 1958, Schouteden 1963, 1964, Gillon 1972, Linnavuori 1975, 1976, 1982, Bourdouxhe & Jolivet 1981, Nuamah 1982, Matanmi & Hassan 1987, Balsbaugh 1988, Couilloud 1989, Quicke *et al*. 1992, Schaefer 1996, Tchibozo & Braet 2004, Poutouli *et al*. 2011, Agboton *et al*. 2014, Crétenet & Gourlot 2015) and others treated *figuratus* as a variety or a subspecies of *purpureus* (Schouteden 1905a, Schouteden 1907a, Kirkaldy 1909, Schouteden 1909, Mancini 1937, Le Pelley 1959, Linnavuori 1989). Others still have used two or three combinations in the same work, possibly because they were reporting facts from primary sources, using the names as they were in the sources and were not aware that the species were the same (Le Pelley 1959 and Schaefer 1996).

The different combinations used for one and the same species clearly are the results of a few misconceptions: when and how *yolofa*, *figuratus* and *purpureus* were synonymized, the problematic dating of *yolofa* and *figuratus* and the status of *yolofa* as an adjective or a noun in apposition.

<u>Synonymies of *yolofa*, *figuratus* and *purpureus*.</u> Earlier we noted that Dallas (1851) first stated the synonymy of *figuratus* with *yolofa*. Clearly, Stål (1870) and Schouteden (1905a) believed *yolofa* sensu Dallas (1851) was a misidentification, pertaining to *figuratus*. *Pentatoma yolofa* was synonymized to *Cimex* (*Afrius*) *purpureus* by Stål (1870). *A. figuratus* was considered as a variety of *Canthecona purpurea* by Schouteden (1905a). It appeared as a junior synonym of *Afrius yolofus* together with *Pentatoma purpurea* in Dupuis (1952). Later, Leston (1954) made use of it as the valid name of the species yet, in a footnote, corrected that the valid name should be *Afrius yolofus*. Additionally, the confusion between the use of *figuratus* and *purpureus* has been so great that some authors have even attributed the authorship of *purpureus* to Germar (e.g. Risbec 1950, Herting 1971, 1976). Considering the above, it is no surprise that *figuratus* appeared as a variety or subspecies of *purpureus*, even relatively recently. It is no surprise either that it still appeared as a valid name as late as

2000 (Sileshi *et al*. 2000) and possibly later, concurrently with the other names (*yolofa*, *yolofus* and *purpureus*).

Problematic dating of *yolofa* and *figuratus*. As stated above, until Dupuis (1952), *yolofa* had been considered a junior synonym of *purpureus* as its date of publication was thought to be 1838. This actually is that of *figuratus*. For a long time there was considerable confusion about the priority of the works of Westwood (1837) and Germar (1838); the title pages of both works indicated 1837 as the date of publication. Schouteden (1907b) demonstrated that Westwood's work had priority. Sherborn (1922–1932) attributed the date "1840" to all taxa published by Germar in the fifth volume of the *Revue Entomologique* (pp. 121–192); most modern catalogues of Heteroptera list Germar's work with the date 1838 (e.g. Rolston *et al*. 1993, Schuh 1995, Aukema & Rieger (eds) 1995–2013, Rolston *et al*. 1996, Cassis & Gross 2002, CoreoideaSF Team 2018, Dellapé & Henry 2018). Recently, Nagel & Schmidlin (2014: 97) stated a precise date (21 November 1838) for taxa newly described between pages 1 to 224 of the fifth volume. As a consequence, *Pentatoma purpurea* Westwood, 1837 definitely has priority over *Asopus figuratus* Germar, 1838 [not 1837 as earlier authors had assumed], and *Pentatoma yolofa* Guérin-Méneville, 1831, over them both.

Should we use *yolofa*, a noun in apposition or *yolofus*, an adjective?

The original description indubitably shows that Guérin-Méneville chose an adjective and not a noun in apposition as may have thought recent authors who made use of the combination *Afrius yolofa*, possibly influenced by earlier authors (Amyot & Serville 1843, Dallas 1851).

Guérin-Méneville (1831: plate 55, 1844: 344) used the binomen *Pentatoma yolofa* with a lower case "y", implying that the name was treated as an adjective (a capital "D" was used for *Scutellera Dives* and a capital "S" for *Tesseratoma* [sic] *Sonneratii* on the same plate, as one would expect in those days for a noun in apposition or a genitive based on the name of a person); the same author (Guérin-Méneville 1844: 344) also used the French vernacular name P[entatome] yolofe. Amyot & Serville (1843) cited this species as *Canthecona Yolofa* (with vernacular French as Canthécone Yolofa), using a capital "Y" in the Latin binomen (also followed by Dallas 1851), and a final "a" in the French name. Their use of a capital "Y" and of a final "a" in the French name indicates that these subsequent authors treated the species name as a noun in apposition.

The *Grand Dictionnaire Universel du XIX siècle* (Larousse 1876: 1423) has an entry for the adjective "YOLOF ou YOLOFF, OVE", meaning "relative to the native language of the Wolof people (Senegal, Gambia, Mauritania)". Although the adjective is there restricted to the field of linguistics and despite the fact that the proper feminine form of the adjective in French is "yolove", it is clear that Guérin-Méneville (1831) meant to indicate that his *Pentatoma*, collected in Senegal, the land of the wolof/yolof people, was "yolove" (expressed with an adjective), so he called it Pentatome yolofe/*Pentatoma yolofa*. Admitedly, this adjective has not much been used in zoology; Sherborn (1932: 7031) only lists another species having *yolofus* for epithet, *Prionus yolofus* (Dalman, 1817) (Coleoptera: Cerambycidae: Prioninae: Acanthophorini). The latter species is now placed in genus *Tithoes* Thomson, 1864 which contains two other species whose epithets equally express their rather precise African provenance: *Tithoes congolanus* (Lameere, 1903) and *T. somalius* (Lameere, 1903).

The precedence of *A. yolofa* over its synonyms, pointed out by Dupuis (1952) and echoed by Leston (1954), was greatly ignored until Thomas (1994). Even now, few are those who apply it. In almost two centuries, a substantial number of papers on the species, which happens to be a predacious bug and natural enemy of agricultural pests, have been published using either *purpureus* or *figuratus*. Since *purpureus* has been the most used overall, since it was used continually to refer to this species since its publication and since *Afrius purpureus* is the name used in the latest publication on the species that we are aware of, we have used the name *Afrius purpureus* in this revision as the valid name. In addition, we intend to apply to the International Commission on Zoological Nomenclature, under Article 23.9.3 of the Code (ICZN 1999), so that the prevailing usage for the specific name *Pentatoma purpurea* Westwood, 1837 (currently *Afrius purpureus*) be conserved and ensured in future.

Concluding remarks.

We cannot hypothesize the relationship of the *Afrius* species without a phylogenetic study, and at present we do not know if the genus is monophyletic. *A.* (*Afrius*) *kolleri* and *A.* (*Afrius*) *purpureus* seems to be more related to each other than to *A.* (*Subafrius*) *flavirostrum* based on similar male genitalia, i.e., presence of vesica microsculptures and the presence of male abdominal glandular patches.

Afrius (*Afrius*) *purpureus* is a species with broad geographical distribution and a great intraspecific variability in respect of size, morphology of the head and pronotum, and colour pattern (Figs 8 and 9). Because of the observed differences we consider the morphology of the genitalia crucial to delimit the species of *Afrius*.

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Captions of tables

Table 1. Geographic distribution and material examined of the *Afrius* Stål, 1870 species. The data are from literature and labels of the examined material. New collection sites located in previously registered countries are referred to as “new locality”, whereas new collection sites located in also new registered countries are referred to as “new record”.

Locality	**latitude**	**longitude**	**material examined**	**collection**	**observations**
<u>*A.* (*Subafrius*) *flavirostrum*</u>					
MADAGASCAR			1 female, 1 male	NHMW	syntypes of *Picromerus flavirostrum*
MADAGASCAR: Ambanja					data from Cachan 1952
MADAGASCAR: Amber Forest Reserve	-12.45	49.19			data from Maldès and Pluot-Sigwalt 2004
MADAGASCAR: Ankarafantsika	-15.72	46.45	3 males	NHMUK	non type - **New locality**
MADAGASCAR: Diego-Suarez	-12.32	49.30			data from Maldès and Pluot-Sigwalt 2004
MADAGASCAR: Fenoarivo Atsinanana	-17.38	49.40			data from Maldès and Pluot-Sigwalt 2004
MADAGASCAR: Helodranon' Antongila, Antanambe	-16.44	49.84			data from Maldès and Pluot-Sigwalt 2004
MADAGASCAR: Ivondro, between Tamatave and Andevorante	-18.23	49.36			data from Maldès and Pluot-Sigwalt 2004
MADAGASCAR: Maevatanana	-13.88	48.53			data from Maldès and Pluot-Sigwalt 2004
MADAGASCAR: Morondava	-20.29	44.29	1 male	NHMUK	non type - **New locality**
MADAGASCAR: Mt. d'Ambre					data from Cachan 1952
MADAGASCAR: Nosy Mitsio	-12.88	48.60	1 male	NHMUK	non type - **New locality**
MADAGASCAR: Périnet, Analamazoatra	-18.93	48.43			data from Cachan 1952
MAURITIUS: Reduit	-20.23	57.49	8 females, 3 males	NHMUK	holotype and paratypes of *Afrius williamsi*
MAURITIUS: Rose Hill	-20.24	57.47			data from Mamet 1957
MAURITIUS: Royal Botanical gardens					data from Mamet 1957
MADAGASCAR: Tulear, Zombitse Forest	-22.78	44.67	2 females	NHMUK	non type - **New locality**
MADAGASCAR: Vohemar	-13.37	50.00	3 females, 1 male	UFRG	non type - **New locality**
SEICHELLES ISLANDS: Aldabra	-9.23	46.39			data from Distant 1913

SEICHELLES ISLANDS: Aldabra	-9.23	46.39	1 female	NHMUK	syntype of *Cantheconidea migratoria*

<u>*A.*(*Afrius*) *kolleri*</u>

DEMOCRATIC REPUBLIC OF THE CONGO			2 females	NHMUK	non type
DEMOCRATIC REPUBLIC OF THE CONGO: Elizabethville (Lubumbashi)	-11.68	27.49	1 male	NHMUK	non type - **New locality**
DEMOCRATIC REPUBLIC OF THE CONGO: Galikoko	-4.96	21.25	1 male	RMCA	lectotype of *Afrius kolleri*
DEMOCRATIC REPUBLIC OF THE CONGO: Gorges de la Pelenge					data from Schouteden 1972
DEMOCRATIC REPUBLIC OF THE CONGO: Ituri	1.87	29.26	1 female, 1 male	RMCA	non type - **New locality**
DEMOCRATIC REPUBLIC OF THE CONGO: Kabwekanono	-5.81	28.56			data from Schouteden 1972
DEMOCRATIC REPUBLIC OF THE CONGO: Keniati river					data from Schouteden 1972
DEMOCRATIC REPUBLIC OF THE CONGO: Lukombe	-4.37	22.17	1 female	RMCA	paralectotype of *Afrius kolleri*
DEMOCRATIC REPUBLIC OF THE CONGO: Lulua, Kananga	-7.96	22.43	1 female	RMCA	non type - **New locality**
DEMOCRATIC REPUBLIC OF THE CONGO: Lusinga	-8.92	27.20			data from Schouteden 1972
DEMOCRATIC REPUBLIC OF THE CONGO: Lusinga	-8.92	27.20	1 female	RMCA	non type
DEMOCRATIC REPUBLIC OF THE CONGO: Mubale river					data from Schouteden 1972
DEMOCRATIC REPUBLIC OF THE CONGO: Munoi					data from Schouteden 1972
DEMOCRATIC REPUBLIC OF THE CONGO: Ngowa	-5.74	16.59	1 female, 1 male	RBINS	non type
UGANDA: Mpumu	0.35	32.83	1 female	NHMUK	non type - **New locality**
UGANDA: Bukalasa	0.70	32.51			data from Maldès and Pluot-Sigwalt 2004

<u>*A.*(*Afrius*) *purpureus*</u>

Africa			1 female	OUMNH	syntype of *Pentatoma purpurea*
BENIN: Agoué					data from Maldès and Pluot-Sigwalt 2004
BENIN: Bassila	9.00	1.66			data from Villiers 1952a
BENIN: in between Djougou and Kouandé					data from Maldès and Pluot-Sigwalt 2004
BENIN: Ouidah	6.45	02.06	1 female	NHMUK	non type - **New locality**
BENIN: Tchaourou	8.88	2.59			data from Linnavuori 1982, 1989
CAMEROON: Baïgom	5.57	10.68			data from Maldès and Pluot-Sigwalt 2004
CAMEROON: Dschang	5.44	10.05			data from Maldès and Pluot-Sigwalt 2004
CANARY ISLANDS			2 males	NHMUK	non type - **New record**
CAPE VERDE: Maio	15.21	-23.16			data from Arechavaleta *et al*. 2005
CAPE VERDE: Santo Antão					data from Arechavaleta *et al*. 2005
CAPE VERDE: Santo Antão, Porto Novo	17.03	-25.06			data from Lindberg 1958
CAPE VERDE: São Nicolau					data from Arechavaleta *et al*. 2005
CAPE VERDE: São Nicolau, Chã da Preguisa					data from Lindberg 1958
CAPE VERDE: São Nicolau, Ribeira Brava	16.61	-24.29			data from Lindberg 1958
CAPE VERDE: São Nicolau, Ribeira do Recanto					data from Lindberg 1958
CAPE VERDE: São Vicente					data from Arechavaleta *et al*. 2005
CAPE VERDE: São Vicente, Monte Verde	16.86	-24.93			data from Lindberg 1958
CAPE VERDE: Santiago	15.12	-23.62			data from Lindberg 1958 and Arechavaleta *et al*. 2005
CAPE VERDE: Maio, Monte Penoso	15.22	-23.13			data from Lindberg 1958
CAPE VERDE: Maio, Porto Ingles	15.14	-23.23			data from Lindberg 1958

CAPE VERDE: Maio, Porto Ingles	15.14	-23.23	1 female	NHMUK	non type
CAPE VERDE: Maio, Ribeira da Lagoa					data from Lindberg 1958
CAPE VERDE: São Vicente, Monte Verde	16.87	-24.93	1 male	NHMUK	non type
CENTRAL AFRICAN REPUBLIC: Bouar	5.93	15.59	1 male	NHMUK	non type
CENTRAL AFRICAN REPUBLIC: Mambéré-Kadéï	4.50	16.00			
CENTRAL AFRICAN REPUBLIC: Sibut [as Haute-Sangha]	5.73	19.08			data from Schouteden 1905a
CENTRAL AFRICA: Haut Oubangui					data from Maldès and Pluot-Sigwalt 2004
CHAD: Bébédjia	8.67	16.57			data from Maldès and Pluot-Sigwalt 2004
CHAD: Dar Banda					data from Maldès and Pluot-Sigwalt 2004
CHAD: "Est des Niellims"					data from Maldès and Pluot-Sigwalt 2004
CHAD: Goundi	9.36	17.37			data from Maldès and Pluot-Sigwalt 2004
CHAD: Kaga Batolo					data from Maldès and Pluot-Sigwalt 2004
DEMOCRATIC REPUBLIC OF THE CONGO: Duma	2.57	30.57			data from Lehmann 1922
DEMOCRATIC REPUBLIC OF THE CONGO: Faradje	3.74	29.71	1 female, 1 male	AMNH	non type - **New locality**
DEMOCRATIC REPUBLIC OF THE CONGO: Kananga	-7.96	22.43			data from Distant 1901 and Schouteden 1905, 1909
DEMOCRATIC REPUBLIC OF THE CONGO: Kavala Bland			1 female	NHMUK	non type
DEMOCRATIC REPUBLIC OF THE CONGO: Kivu, Kadjdju					data from Maldès and Pluot-Sigwalt 2004
DEMOCRATIC REPUBLIC OF THE CONGO: Tanganika, Mpala	-6.73	29.52			data from Schouteden 1909
DJIBOUTI: "Désert des Somalis"					data from Maldès and Pluot-Sigwalt 2004
ETHIOPIA: Maraquo (Marek'o Bota?)			1 female	NHMUK	non type
ETHIOPIA: Ziway Hãyk	08.06	38.83	1 female	NHMUK	non type - **New locality**
GHANA: Ashanti					data from Reuter 1882

GHANA: Ashanti, Tafo	6.74	-1.61	1 male	DARC	non type
GHANA: Tafo	6.74	-1.61	2 males	NHMUK	non type
GUINEA: Damaskanya					data from Villiers 1956
GUINEA: Kindia	10.4	18.86			data from Maldès and Pluot-Sigwalt 2004
GUINEA-BISSAU: Bolama	11.57	-15.47			data from Schouteden 1913b
IVORY COAST: Adiopodoumé	5.43	-4.13			data from Gillon 1972 and Linnavuori, 1982, 1989
IVORY COAST: Bingerville	5.35	-3.88			data from Schouteden 1964, and Gillon 1972
IVORY COAST: Bouaflé	6.99	-5.74			data from Gillon 1972
IVORY COAST: Bouaké	7.69	-5.03			data from Gillon 1972
IVORY COAST: Foro-Foro	7.94	-5.00			data from Linnavuori 1982
IVORY COAST: Grand-Bassam	5.22	-3.75			data from Schouteden 1905a, and Maldès and Pluot-Sigwalt 2005
IVORY COAST: Lamto	6.22	-5.03			data from Schouteden 1963, and Maldès and Pluot-Sigwalt 2004
KENYA: Kibwezi	-2.41	37.96	1 female	NHMUK	non type - **New locality**
KENYA: Loitokitok	-2.92	37.51			data from Schouteden 1910
KENYA: Mombasa	-4.07	39.66			data from Maldès and Pluot-Sigwalt 2004
KENYA: Mumias. 4,500 ft	0.33	34.49	1 female	NHMUK	non type - **New locality**
KENYA: Nairobi	-1.30	36.84	1 male	NHMUK	non type - **New locality**
KENYA: Nakuru			1 female, 1 male	NHMUK	non type
KENYA: Nakuru, Ilala, Maramas Dist., 14m E of Mumias	-0.31	36.11	1 female, 1 male	NHMUK	non type - **New locality**
KENYA: Taita Taveta	-3.40	38.44	1 male	NHMUK	non type - **New locality**
KENYA: Upper Kuja Valley, S. Kavironado, 4,200 ft			3 females, 4 males	NHMUK	non type

MALI: Dogo, Macina	13.99	-5.73			data from Villiers 1954, and Maldès and Pluot-Sigwalt 2004
MALI: Niono	15.19	-5.95			data from Maldès and Pluot-Sigwalt 2004
MOZAMBIQUE: Zambezia, Port. E. Africa, Valley of Kola R., nr. E. Mt. Chiperone			2 females	NHMUK	non type
NAMIBIA: Damaraland	-21.00	17.50			data from Hesse 1925
NAMIBIA: Oshikoto, Tsumeb	-19.23	17.71			data from Hesse 1925
NAMIBIA: Otjozondjupa, Otjiwarongo	-20.46	16.64			data from Hesse 1925
NIGERIA: Azara	8.45	9.50	6 females,14 males	NHMUK	non type - **New locality**
NIGERIA: Enugu	6.73	7.50	1 female	NHMUK	non type - **New locality**
NIGERIA: Geriki					data from Linnavuori 1982
NIGERIA: Ibadan	7.37	3.90			data from Linnavuori 1982
NIGERIA: Igbetti-Igbobo					data from Linnavuori 1982
NIGERIA: Ile-Ife	7.48	4.56			data from Linnavuori 1982
NIGERIA: Ilorin	8.49	4.54			data from Goldin 1931
NIGERIA: Kagoro forest	9.58	8.47			data from Linnavuori 1982
NIGERIA: Kano	12.32	8.61	1 female	NHMUK	non type - **New locality**
NIGERIA: Kauka Namoda	12.56	6.57			data from Linnavuori 1982
NIGERIA: Mokwa	9.20	5.33			data from Linnavuori 1982
NIGERIA: Zaria, Samaru	11.16	7.63	1 male	NHMUK	non type - **New locality**
SENEGAL: Bambey	14.78	-16.47	4 females	NHMUK	non type - N**ew locality**
SENEGAL: Cambérène	14.77	-17.42			data from Maldès and Pluot-Sigwalt 2004
SENEGAL: Dakar (Dakkar, VIII, Senegal 27, Baum)	14.68	-17.45	1 female	NMPC	non type

SENEGAL: Dakar, Gorée	14.66	-17.39			data from Villiers 1949
SENEGAL: Dakar, Sébikotane	14.74	-17.13			data from Villiers 1949
SENEGAL: Dakar, Thiaroye	14.75	-17.35			data from Villiers 1949
SENEGAL: Mboro	15.13	-16.88			data from Maldès and Pluot-Sigwalt 2004
SENEGAL: Pout	14.77	-17.06			data from Villiers 1949
SENEGAL: Richard-Toll	16.46	-15.69			data from Maldès and Pluot-Sigwalt 2004
SIERRA LEONE			1 male	NHMUK	syntype of *Canthecona marginella*
SOMALIA: Afgooye	2.13	45.12			data from Linnavuori 1976
SOMALIA: Jowhar	2.99	45.56			data from Mancini 1937
SOUTH AFRICA			1 female	NHMUK	non type
SOUTH AFRICA: Barberton, Mpumalanga	-25.77	31.04	1 female	NHMUK	non type - **New locality**
SOUTH AFRICA: Cape of Good Hope	-34.35	18.47			data from Maldès and Pluot-Sigwalt 2004
SOUTH AFRICA: Cape of Good Hope	-34.27	18.42	1 female	ZMHN	syntype of *Asopus figuratus*; image examined
SOUTH AFRICA: Delagoa, Limpopo	-23.97	28.75	1 male	NHMUK	non type
SOUTH AFRICA: Eastern Cape, Matatiele	-30.36	28.80	1 male	NHMUK	non type - **New locality**
SOUTH AFRICA, Free State, Toowoomba	-30.25	25.40	1 female	DARC	non type - **New locality**
SOUTH AFRICA, Gauteng, Johannesburg, Bedford Ridge			1 female, 1 male	AMNH	non type
SOUTH AFRICA: Interior (Parallel of Delagoa [Bay])			1 male	NHMUK	syntype of *Canthecona marmorata*
SOUTH AFRICA: Interior (Parallel of Delagoa [Bay])			1 female	NHMUK	syntype of *Canthecona annulipes*
SOUTH AFRICA: Johannesburg 6,000ft	-26.20	28.04	2 females	NHMUK	non type - **New locality**
SOUTH AFRICA: KwaZulu-Natal					syntype of *Canthecona miniatescens*. See Ruta & Libonatti (2016: 205-206) for an explanation on the boundaries of Caffraria

					before the second half of the 19th century and their mentioning of detailed data on Wahlberg's excursions in Brinck (1955)
SOUTH AFRICA: KwaZulu-Natal	-29.30	30.00	1 male	NHMUK	syntype of *Canthecona caerulea*
SOUTH AFRICA: KwaZulu-Natal, Weenen	-28.84	30.08	1 male	NHMUK	non type
SOUTH AFRICA: Little falls	-26.12	27.89	1 female	NHMUK	non type - **New locality**
SOUTH AFRICA: Northern Cape, Hester Malan N.R., E. Springbok	-29.60	17.90	1 female	NHMUK	non type - **New locality**
SOUTH AFRICA, Pietermaritzburg	-29.60	30.38	3 females, 1 male	Geyer mus.	non type - **New locality**
SOUTH AFRICA: Pretoria	-25.73	28.24			data from Distant 1892
SOUTH AFRICA: Pretoria	-25.73	28.24	12 females, 5 males	NHMUK	non type
SOUTH SUDAN: Latuka	4.64	32.55			data from Schouteden 1905a, 1909
SUDAN: Kita					data from Maldès and Pluot-Sigwalt 2004
TANZANIA: Arusha, Oldean Rd, 3,800 ft	-3.34	35.54	1 female	NHMUK	non type
TANZANIA: Bububu	-5.92	39.22			data from Jeannel 1914. Bububu is a village 10 Km north of the City of Zanzibar
TANZANIA: Kagera	-1.91	31.25	1 female	NHMUK	non type
TANZANIA: Kilimanjaro	-3.07	37.35			data from Schouteden 1905a, 1910, and Maldès and Pluot-Sigwalt 2004
TANZANIA: Musoma, Banagi Hill	-2.30	34.83			data from Leston 1952
TANZANIA: Old Shinyanga, Boma	-3.56	33.41	2 females	NHMUK	non type - **New locality**
TANZANIA: Usambara	-4.75	38.50			data from Schouteden 1905a
TOGO: Atakpamé	7.53	01.13			data from Maldès and Pluot-Sigwalt 2004
UGANDA: Between Jinja & Busia or Mbwago's, E. Busoga (Some Forest), 3,800-4,000 ft			1 female	NHMUK	non type

UGANDA: Eastern Mbale Dist., S. of Mt. Elgon	01.08	34.18	1 female	NHMUK	non type - **New locality**
UGANDA: Entebe	0.05	32.46	6 females, 3 males	NHMUK	non type - **New locality**
UGANDA: Kadungulu, Eastern Province	1.51	33.20	1 female	NHMUK	non type - **New locality**
UGANDA: Kampala	0.34	32.58	1 male	NHMUK	non type - **New locality**
UGANDA: Kigezi Dist . Afr. Exp., Mabungo Camp. 6,000 ft J. Ford	0.46	31.63	1 female	NHMUK	non type - **New locality**
UGANDA: Mabungo camp.	0.46	31.63	2 females, 1 male	NHMUK	non type
UGANDA: Mbale,Kumi Rd. 3,700 ft S. of L. Salisbury	1.96	34.18	2 females, 3 males	NHMUK	non type - **New locality**
UGANDA: "Región Nord du Victoria Nyanza"					data from Maldès and Pluot-Sigwalt 2004
UGANDA: S.E. Ankole., 4,400- 4,800 ft			2 females, 1 male	NHMUK	non type
UGANDA: Semliki Plains, near Sishore of L.A. Albert			1 male	NHMUK	non type
YEMEN: Wādī Risyān	13.56	43.28			data from Linnavuori 1989
ZIMBABWE: Mashonaland					data from Distant 1898
- Places not identified:					
Cap. Congo					data from Schouteden 1905a
Insaba (Congo)					data from Schouteden 1905a
Fernando Po					data from Schouteden 1905a
El Banno					data from Mancini 1953
Koridjalu					data from Schouteden 1905b
Lambarem (Congo)					data from Schouteden 1905a
Mpala (Congo, Tanganyika)					data from Schouteden 1905a
Musoma					data from Leston 1952. Probably in Tanzania

Niam-Niam (Congo)			data from Schouteden 1905a
Oriental Africa			data from Schouteden 1905a
Quilimane			data from Gerstaecker 1892. Probably Quelimane, in Mozambique
TANGANYIKA or Oriental Africa?	1 female	OUMNH	syntype of *Afrius rubromarginatus.* "A handwritten label reads "Probably TANGANYIKA" and it could be so, but we can't help notice that the green disc label reads "Afriq Or", clearly an abbreviation of the French "Afrique orientale". It could be because the specimen was labelled and/or examined in Belgium (Bergroth published the original description of *A. rubromarginatus* in the Annales de la Société entomologique de Belgique) but it could also mean that the specimen was collected in French East Africa, the only mainland country of which was what is now the Republic of Djibouti, a record for this species newly reported by Maldès and Pluot-Sigwalt in 2004)
Vieux-Kassongo			data from Schouteden 1913a

Table 2. Terminology of male genitalia from Singh-Pruthi 1925, Baker 1931, Dupuis 1955, 1970, Konstantinov & Gapon 2005, and Gapon & Konstantivov 2006.

	Singh-Pruthi, 1925	Baker 1931	Dupuis, 1955, 1970	Konstantinov & Gapon, 2004; Gapon & Konstantivov, 2006
External genitalia	IXth segment	genital segment	pygophore or genital capsule	pygophore
	-	ventral and dorsal borders	-	-
	-	genital plates	processus supérieurs	genital plates or parandria
	segment X	proctiger	anal tube or proctiger	-
	parameres	claspers	parameres	parameres
Internal genitalia	aedeagus	-	phallus	aedeagus
	-	-	phalloteca	theca
	-	-	-	basal theca
	-	-	-	thecal shield
	basal foramen	-	-	-
	basal plates	-	-	-
	vesica	-	vesica	apical outgrowths of median plates of the penis + pons transversus + longitudinal filaments of median plates of the penis
	ejaculatory duct		ductus seminis	seminal duct + vesica
	gonophore	-	secondary gonopore	secondary gonopore
	conjunctiva	-	conjunctiva	conjunctiva
	Ejaculatory reservoir	-	ejaculatory reservoir	ejaculatory reservoir

Figures

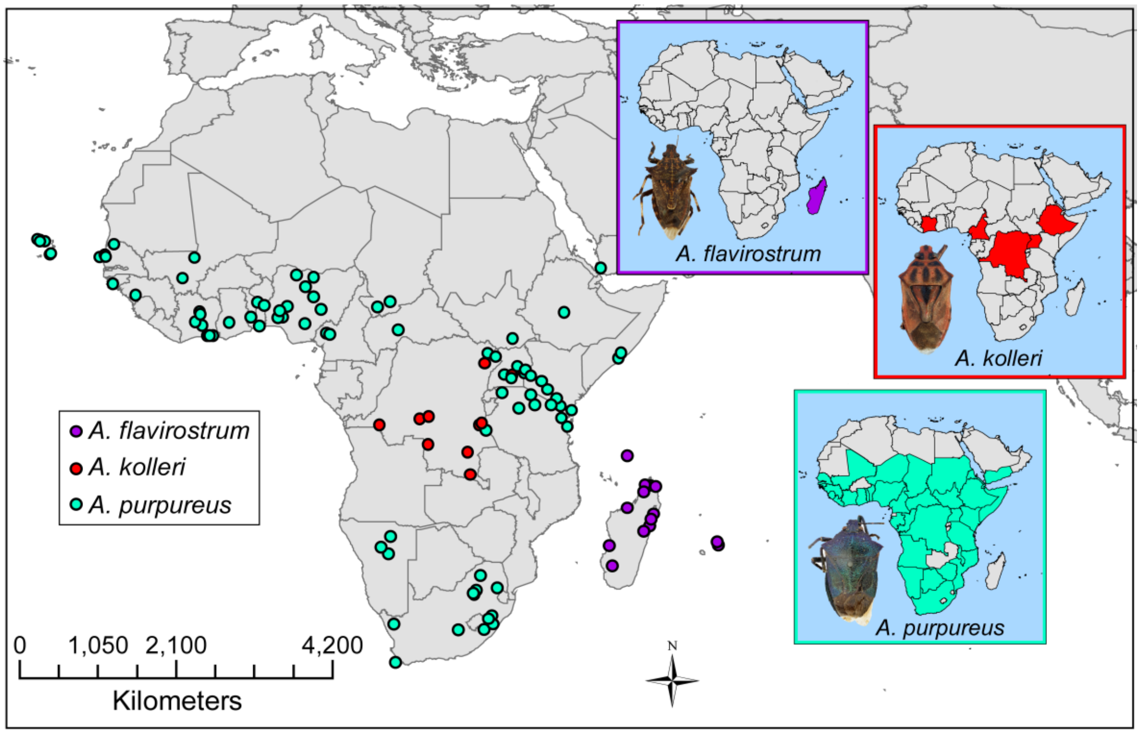

Fig. 1. Geographic distribution of the genus *Afrius* Stål, 1870 through Africa. The species points of occurrence and their dispersion in different countries are represented in purple (*A.* (*Subafrius*) *flavirostrum* (Signoret, 1861)), red (*A.* (*Afrius*) *kolleri* Schouteden, 1911), and green (*A.* (*Afrius*) *purpureus* (Westwood, 1837)). The countries highlighted for each species on the right part of the map are from literature information. The points marked for each species are from literature and labels information.

Fig. 2. *Afrius* (*Subafrius*) *flavirostrum* (Signoret, 1861), type specimens. A–C, *Picromerus flavirostrum* Signoret, 1861 syntype male, labels, dorsal and ventral habitus respectively (Images received from Herbert Zettel and Harald Bruckner, NHMW); D, *Picromerus flavirostrum*, syntype female, labels and dorsal habitus (Image received from Gunvi Lindberg, NHRS); E–F, *Picromerus flavirostrum*, syntype female, labels and dorsal habitus (Images received from Herbert Zettel and Harald Bruckner, NHMW); G–H, *Cantheconidea migratoria* Distant, 1913, syntype female, labels and dorsal habitus (NHMUK); I–J, *Afrius williamsi* Miller, 1951, holotype male, labels and dorsal habitus (NHMUK); K–L, *Afrius williamsi*, paratype female, labels and ventral habitus (NHMUK). Scale bars = 4 mm.

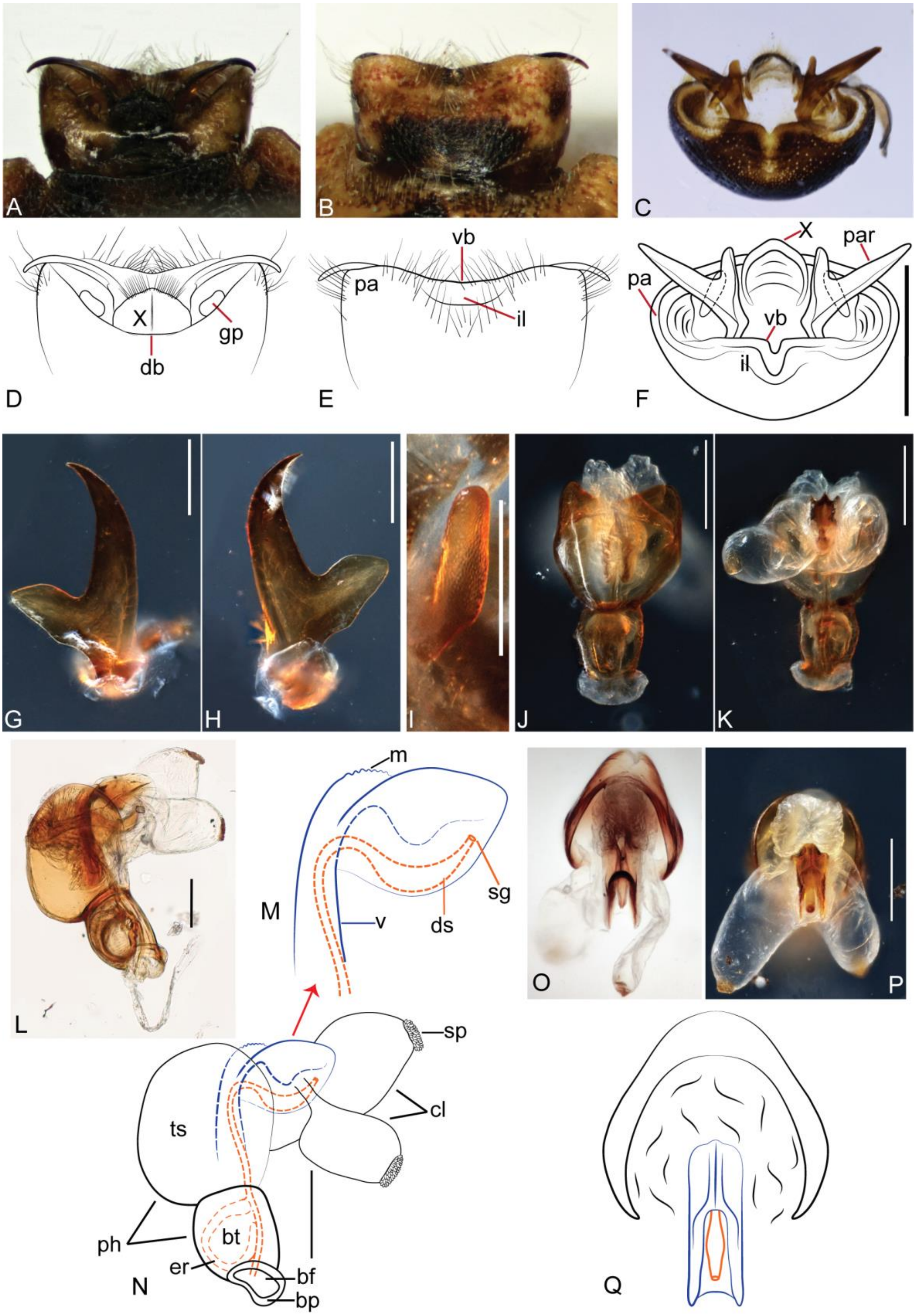

Fig. 3. *Afrius* (*Subafrius*) *flavirostrum* (Signoret, 1861), male genitalia. A–F pygophore in dorsal (A, D), ventral (B, E) and posterior (C, F) views; G, H, right paramere in lateral views, internal and external respectively; I, right genital plate, dorso-posterior

view; J, K, L, phallus in anterior, posterior and lateral views respectively; M, a detail of the vesica in lateral view, also represented in the drawing of the phallus in the figure N; O–Q, phallus in dorsal view. Abbreviations: bf, basal foramen; bp, basal plates; bt, basal theca; cl, conjunctival lobes; db, dorsal border; ds, ductus seminis; er, ejaculatory reservoir; il, inferior layer; gp, genital plates; m, microsculptures; pa, posterolateral angles; par, parameres; ph, phallotheca; sg, secondary gonophore; sp, conjunctival process; ts, thecal shield; v, vesica; vb, ventral border; X, segment X. Scale bars: F= 0.5 mm; G–Q = 0.25mm.

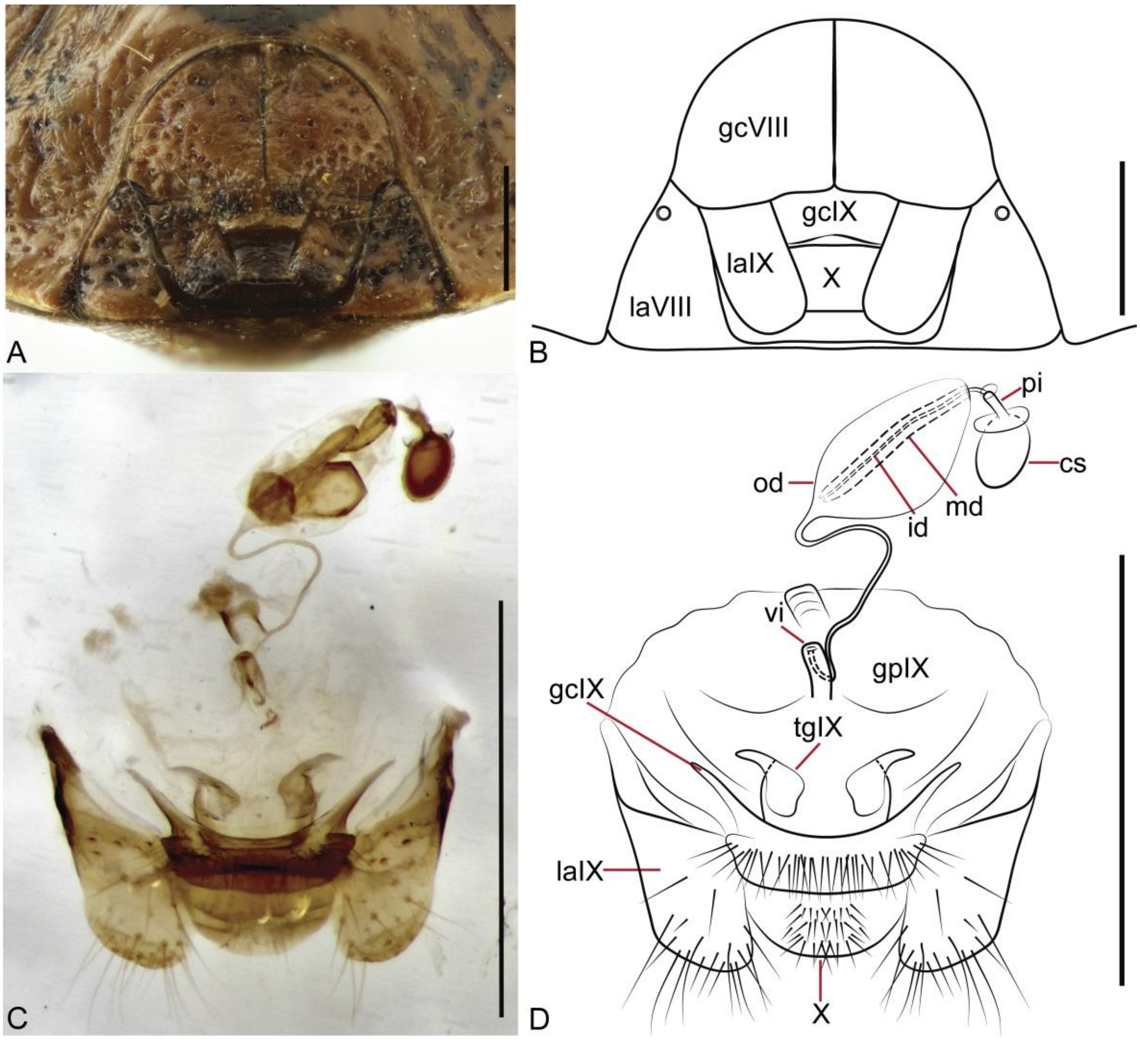

Fig. 4. *Afrius* (*Subafrius*) *flavirostrum* (Signoret, 1861), female genitalia. A, B genital plates, ventroposterior view; C, D inner genitalia, ventral view. Abbreviations: id, inner duct; cs, capsula seminalis; gcVIII, gonocoxites VIII; gcIX gonocoxites IX; gpIX gonapophyses IX; laVIII, laterotergites VIII; laIX, laterotergites IX; md, median duct of vesicular area; od, outer duct of vesicular area; pi, pars intermedialis; tgIX, secondary thickening of gonapophyses IX; vi, thickening of vaginal intima; X, segment X. Scale bars: A, B = 1 mm; C, D = 0.5 mm.

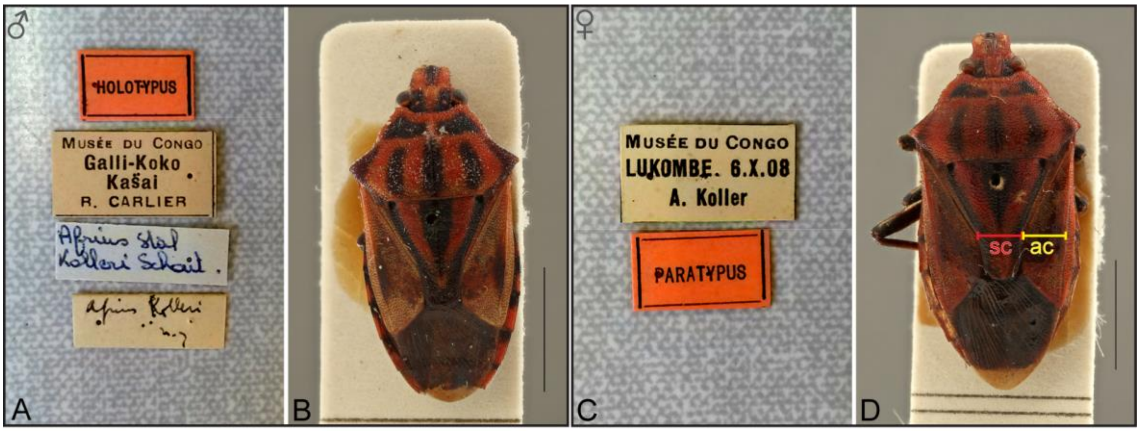

Fig. 5. *Afrius* (*Afrius*) *kolleri* Schouteden, 1911 types. A–B, lectotype male, labels and dorsal habitus (RMCA); C–D, paralectotype female, labels and dorsal habitus (RMCA). Abbreviations: ac, corium adjacent to the scutellum constriction; sc, scutellum constriction. Scale bars = 4 mm.

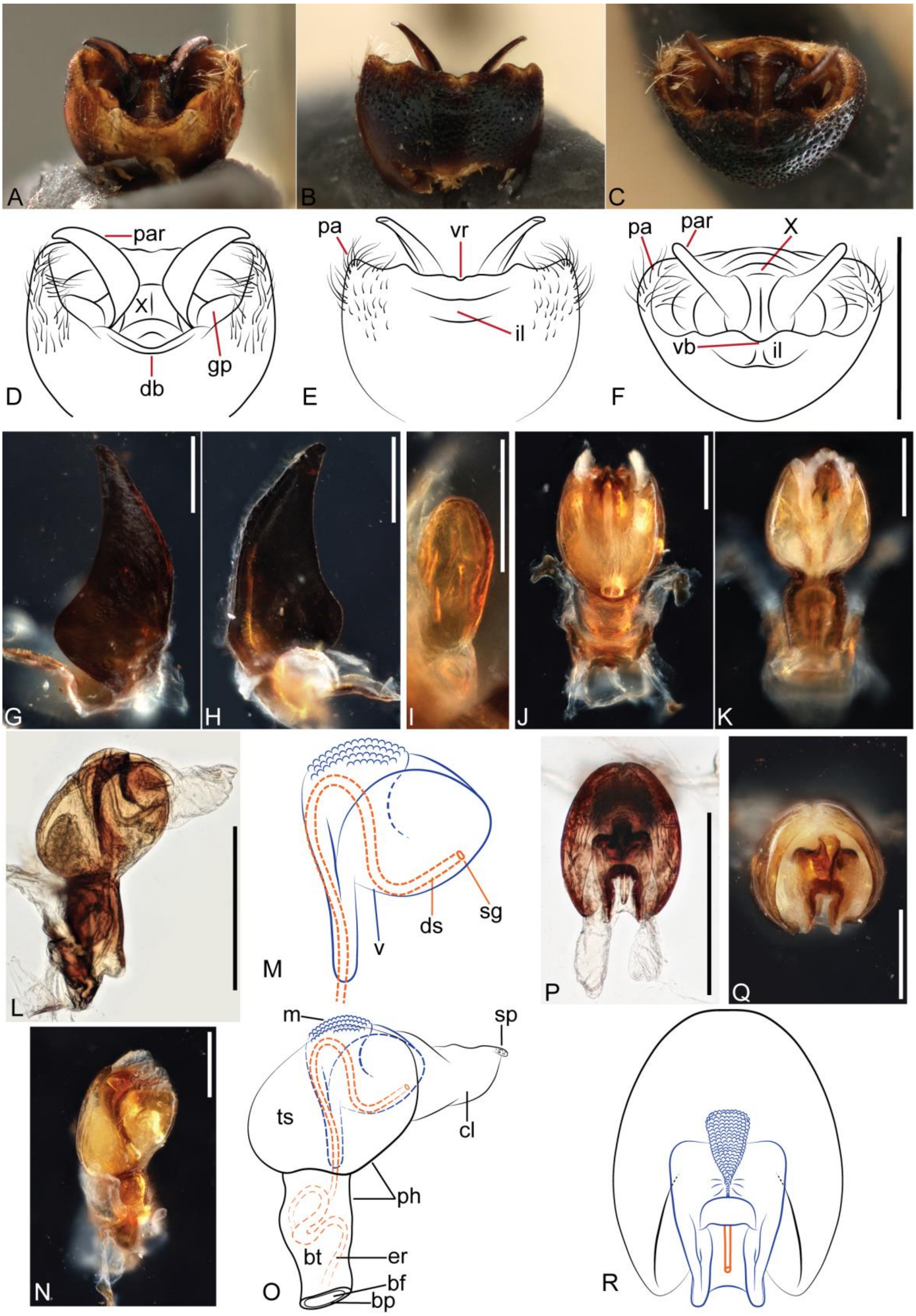

Fig. 6. *Afrius* (*Afrius*) *kolleri* Schouteden, 1911, male genitalia. A–F pygophore in dorsal (A, D), ventral (B, E) and posterior (C, F) views; G, H, right paramere in lateral views, internal and external respectively; I, right genital plate, dorso-posterior view; J,

K, L, phallus in anterior, posterior and lateral views respectively; M, a detail of the vesica in lateral view, also represented in the drawing of the phallus in the figure O; N, phallus in dorso-lateral view; P–R, phallus in dorsal view. Abbreviations: bf, basal foramen; bp, basal plates; bt, basal theca; cl, conjunctival lobes; db, dorsal border; ds, ductus seminis; er, ejaculatory reservoir; il, inferior layer; gp, genital plates; m, microsculptures; pa, posterolateral angles; par, parameres; ph, phallotheca; sg, secondary gonophore; sp, conjunctival process; ts, thecal shield; v, vesica; vb, ventral border; X, segment X. Scale bars: C, F, L, O, P = 0.5 mm; G–K, M, N, Q, R = 0.25 mm.

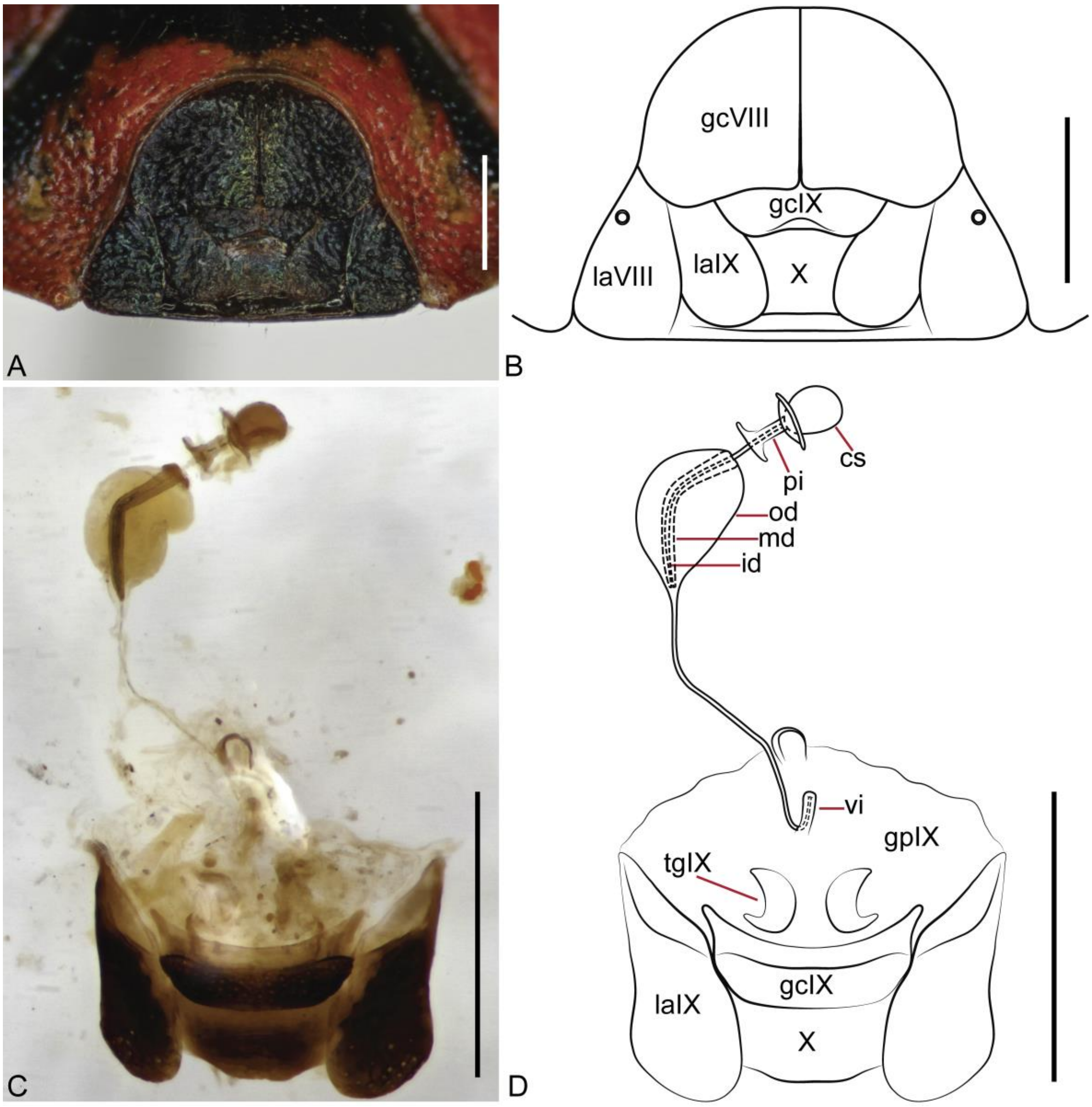

Fig. 7. *Afrius* (*Afrius*) *kolleri* Schouteden, 1911, female genitalia. A, B genital plates, ventroposterior view; C, D inner genitalia, ventral view. Abbreviations: id, inner duct; cs, capsula seminalis; gcVIII, gonocoxites VIII; gcIX gonocoxites IX; gpIX gonapophyses IX; laVIII, laterotergites VIII; laIX, laterotergites IX; md, median duct of vesicular area; od, outer duct of vesicular area; pi, pars intermedialis; tgIX, secondary thickening of gonapophyses IX; vi, thickening of vaginal intima; X, segment X. Scale bars: A, B = 1 mm; C, D = 0.5 mm.


Canthecona caerulea Dallas, 1851: 89-90
SYN-TYPE
Canthecona caerulea identified by Dallas.
Type
NHMUK 010592171
paVII
NHRS-GULI 000027293
Typus
TYPE HEM: 242 PENTATOMA PURPUREA WESTWOOD HOPE DEPT. OXFORD
TYPE. WESTW. (HOPE) C.Hemipt.1837 Part I. page 43 Distant, P.Z.S., 1900, p.807-825.
Africa
Afrius purpureus
Typus
7968
sc
ac
Canthecona marginella Dallas, 1851: 89
Syn-type
Canthecona marginella identified by Dallas.
NHMUK 010592170
Canthecona marmorata Dallas, 1851: 90
3. CANTHECONA MARMORATA,
NHMUK 010592164
Canthecona annulipes Dallas, 1851: 90-91
Walker's catal.
NHMUK 010747805
TYPE HEM: 704 AFRIUS RUBROMARGINATUS BERGROTH HOPE DEPT. OXFORD
Afrius rubromarginatus Berg.
TYPE
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P

Fig. 8. *Afrius* (*Afrius*) *purpureus* (Westwood, 1837), type specimens. A–C, *Canthecona caerulea* Dallas, 1851 syntype male, labels, dorsal and ventral habitus respectively (NHMUK); D, *Canthecona miniatescens* Stål, 1853, syntype female, labels and dorsal view (Image received from Gunvi Lindberg, NHRS); E–F, *Pentatoma purpurea* Westwood, 1837, syntype female, labels and dorsal habitus (OUMNH); G–H, *Asopus figuratus* Germar, 1838, syntype female, labels and dorsal habitus (MFNB); I–J, *Canthecona marginella* Dallas, 1851, syntype male, labels and dorsal habitus (NHMUK); K–L, *Canthecona marmorata* Dallas, 1851, syntype male, labels and dorsal habitus (NHMUK); M–N, *Canthecona annulipes* Dallas, 1851, syntype female, labels and dorsal habitus (NHMUK); O–P, *Afrius rubromarginatus* Bergroth, 1903, syntype female, labels and dorsal habitus (OUMNH). Abbreviations: ac, corium adjacent to the scutellum constriction; sc, scutellum constriction. Scale bars = 4 mm.

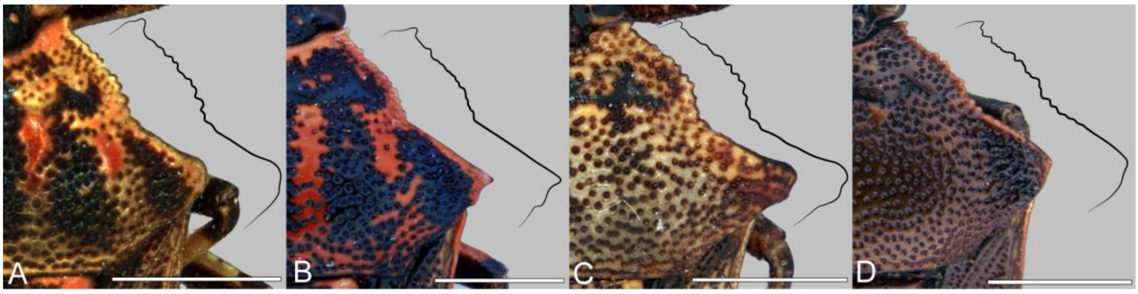

Fig. 9. *Afrius* (*Afrius*) *purpureus* (Westwood, 1837), variation of the pronotum shape. Scale bars = 2 mm.

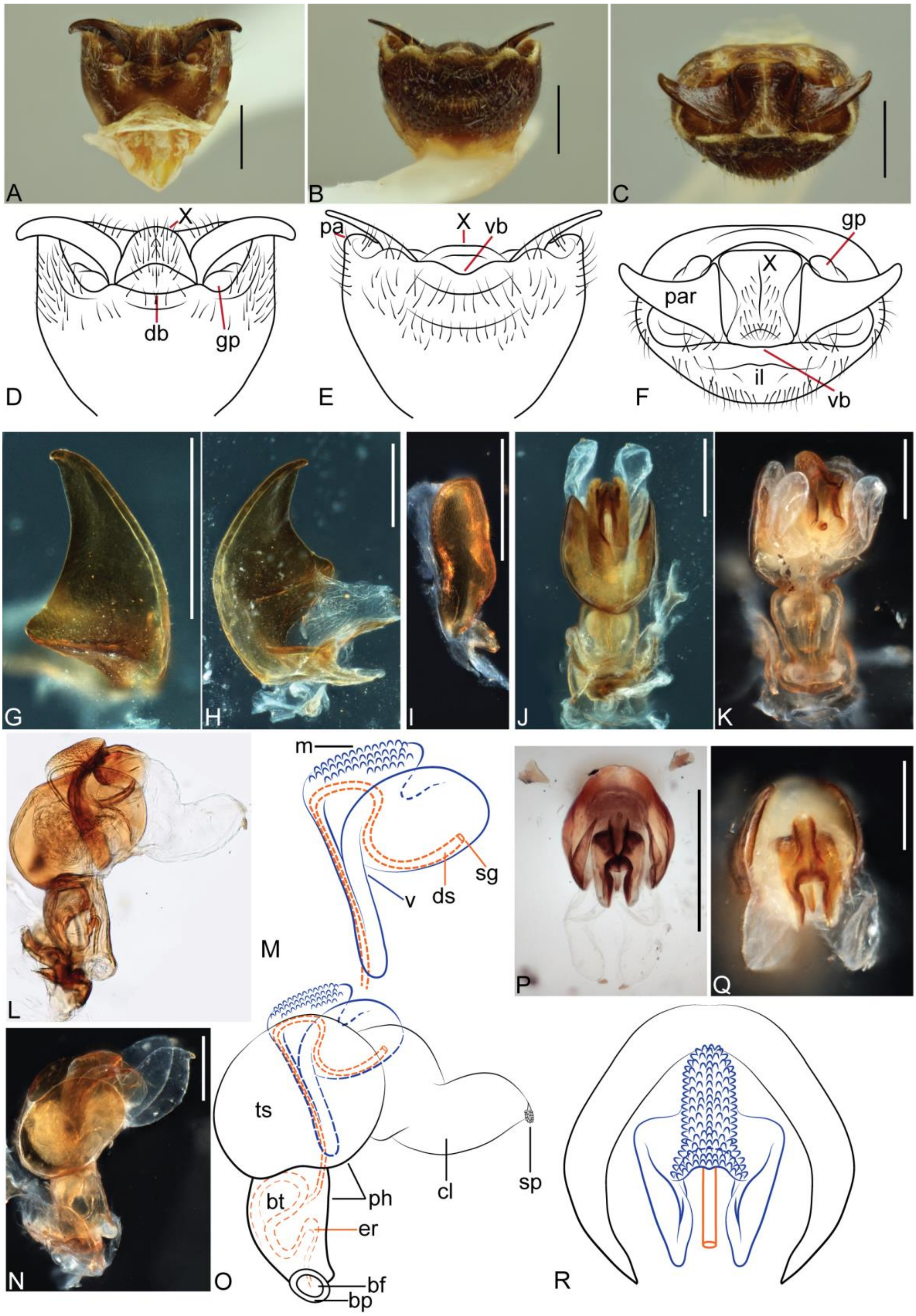

Fig. 10. *Afrius* (*Afrius*) *purpureus* (Westwood, 1837), male genitalia. A–F pygophore in dorsal (A, D), ventral (B, E) and posterior (C, F) views; G, H, right paramere in lateral views, internal and external respectively; I, right genital plate, dorso-posterior view; J, K, L, phallus in anterior, posterior and lateral views respectively; M, a detail of the

vesica in lateral view, also represented in the drawing of the phallus in the figure O; N, phallus in lateral view; P–R, phallus in dorsal view. Abbreviations: bf, basal foramen; bp, basal plates; bt, basal theca; cl, conjunctival lobes; db, dorsal border; ds, ductus seminis; er, ejaculatory reservoir; il, inferior layer; gp, genital plates; m, microsculptures; pa, posterolateral angles; par, parameres; ph, phallotheca; sg, secondary gonophore; sp, conjunctival process; ts, thecal shield; v, vesica; vb, ventral border; X, segment X. Scale bars: A–F= 0.5 mm; G–R = 0.25mm.

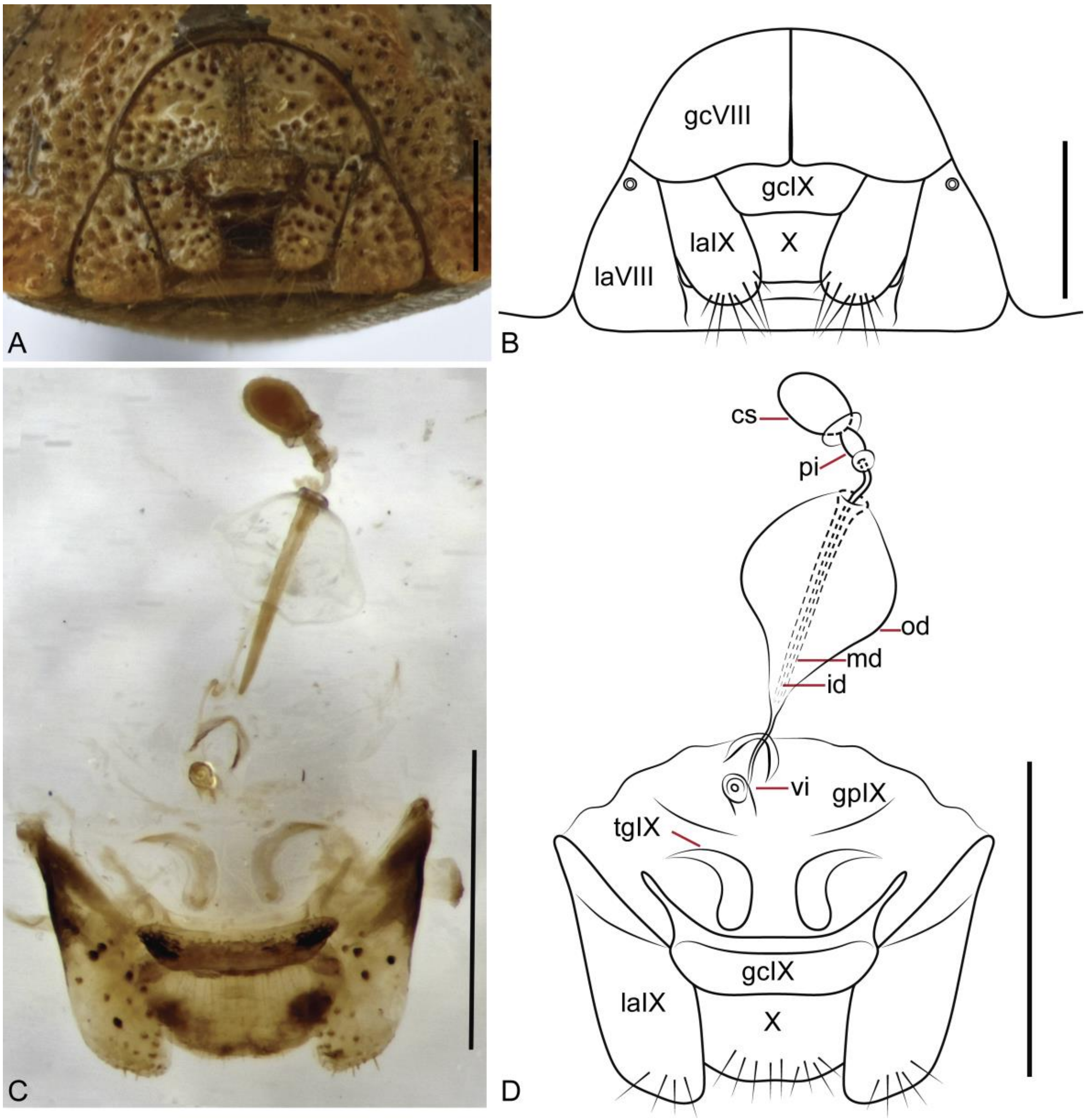

Fig. 11. *Afrius* (*Afrius*) *purpureus* (Westwood, 1837), female genitalia. A, B genital plates, ventroposterior view; C, D inner genitalia, ventral view. Abbreviations: id, inner duct; cs, capsula seminalis; gcVIII, gonocoxites VIII; gcIX gonocoxites IX; gpIX gonapophyses IX; laVIII, laterotergites VIII; laIX, laterotergites IX; md, median duct of vesicular area; od, outer duct of vesicular area; pi, pars intermedialis; tgIX, secondary thickening of gonapophyses IX; vi, thickening of vaginal intima; X, segment X. Scale bars: A, B = 1 mm; C, D = 0.5 mm.

CAPÍTULO 3

Compared morphology of male genitalia traits in Asopinae (Hemiptera: Pentatomidae) with a terminology proposal*

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Abstract

The superior processes of dorsal rim are structures of the pygophore that have already been called with many different terms in the literature. In Asopinae, these structures are well developed, visible posteriorly, and have different shapes and sizes. They are placed behind of parameres, on dorsal base of posterolateral angles. There is no comparative study describing these structures and evaluating the placement of them inside the pygophore in different taxa. Considering that compared studies may be important for define structures terminologies, we describe here the superior processes of dorsal rim and the parameres in most genera of Asopinae in comparison with genera of other Pentatomidae subfamilies. The structures were studied in scanning electron microscopy. We described the shape and size of the structures, propose nine morphological characters for use in phylogenies, and propose the use of the term "superior process of dorsal rim"

Introduction

The genital structures of insects have a great value for the identification of their species since they present a great diversity of details (Snodgrass 1957; Song & Bucheli 2010). In particular, the male genitalia is recognized as the most variable and divergent

* Este trabalho será submetido à *Zoologischer anzeiger* [https://www.journals.elsevier.com/zoologischer-anzeiger]

body structure, whose traits are valuable for insect systematics, inclusive in phylogenetic studies (e.g. Eyer 1924; Singh-Pruthi 1925; Dirsh 1956; Tuxen 1970; Song & Bucheli 2010; Simmons 2014). However, the great morphological diversity can be an obstacle in the understanding of the homology of the genital structures which often causes the use of several different terms for the same structure (Marks 1951; Snodgrass 1957).

As the most insects, the abdominal segments VIII to X are modified in genital structures in Heteroptera. The genital cup (pygophore) usually does not vary intraspecifically, but presents a considerable interspecific variability, being able to have different processes of different sizes and forms that can serve as taxonomic and phylogenetic information for the group (e.g. Singh-Pruthi 1925; Dupuis 1955; Schaefer 1977; Genevcius & Schwertner 2017). Many of the structures that make up a genital cup may be related to the male-female coupling (Schaefer 1977).

The pygophore is a small tube strongly sclerotized derived from the ninth abdominal segment which opens internally and externally and is delimited by dorsal, ventral and lateral rims (Dupuis 1970; Schaefer 1977). The eighth segment is a less sclerotized structure which surrounds and moves the ninth segment (Schaefer 1977). The pygophore contains the phallus (aedeagus), the anal tube, one pair of parameres, and an intersegmental membrane known as diaphragm (Sharp 1890) or segmental membrane (Singh-Pruthi 1925). The diaphragm supports the phallus and parameres, and separates the anterior part of the segment (which belongs to the body cavity and includes the ductus ejaculatorius, the distal portion of alimentary duct, and the muscles of phallus and parameres) from the posterior part (which opens externally and supports the anal tube, the phallus and parameres) (Sharp 1890; Dupuis 1970). In some species, the diaphragm may contain 1 + 1 distinct symmetric areas differentiated in lobes or processes on each side of the anal tube and above the parameres, called *processus supérieurs* by Dupuis (1955).

We have observed that, even with the proposed standardization of terminology of genital structures by Tuxen 1970, several terms have been used for same male genital structures in works about Pentatomidae, in particular when it comes to the *processus supérieurs*. In Asopinae, these processes are generally quite developed and are considered one of the main morphological characteristics of the group (Thomas 1994). They have already been described for a small variety of species, having been called as "genital plates" (Baker 1931; Thomas 1994; Roell et al. in press), "basal plates" (Singh-Pruthi 1925), "dorsal plates" (Gapon & Konstantinov 2006), "dorsal sclerites" (Zhao, Rédei & Bu 2013; Srikumar et al. 2018; Zhao et al. 2018), pseudoclasper (Zou et al. 2012) and even "parandria" (Thomas 1994, Gapon & Konstantinov 2006; Gapon 2009; Zhao, Liu & Bu 2013; Zhao, Bu & Liu 2016). Dupuis (1970) stressed that "(…) these processes must not be confused with the parandria; they denote externally the insertion point of the superior abductor muscles of the parameres; in accordance with their phragmal nature, they lack bristles".

In other subfamilies of Pentatomidae these processes have already been treated as "superior process" (Dursun & Fent 2013), "superior process of diaphragm" (e.g. Grazia & Teradaira 1980; Grazia & Fortes 1995; Barcellos & Grazia 1998), "process of diaphragm" (e.g. Grazia, Becker & Thomas 1994); "genital cup process" (e.g. Barcellos & Grazia 2003; Matesco, Grazia & Campos 2007), "superior process of genital cup" (e.g. Bernardes, Schwertner & Grazia 2011), "genital cup superior process" (Correia & Fernandes 2016), "processo da taça genital" (e.g. Silva, Fernandes & Grazia 2004; Silva, Fernandes & Grazia 2006). "superior process of dorsal rim" (e.g. Weiler, Ferrari & Grazia 2011; Schwertner & Grazia 2012; Poock-da-Silva, Barão & Grazia 2013; Grazia, Bolze & Barão 2016; Bianchi, Barão & Grazia 2017), and "dorsal plate of pygophore" (Kment 2013).

Up to date, these structures have never been studied in a context of comparative morphology, which possibly may justify the big number of terms for them. Furthermore, because they are highly developed in Asopinae, often having the size equivalent to the parameres, and being generally posteriorly visible, these structures have been cited with differentiated terminologies in comparison to the other subfamilies, and no hypothesis of homology was until the moment proposed. In this work, we evaluate the superior processes and parameres in Asopinae, comparing with species of Cyrtocorinae, Discocephalinae, Edessinae, Pentatominae, Phyllocephalinae, and Podopinae, seeking to: a) evaluate and describe the shape and the cuticular surface of the structures; b) propose morphological characters for use in phylogenies of the group; c) compare the shape and position of the process among several subfamilies of Pentatomidae, focusing on Asopinae; d) propose a standardization of terminology for these structures in Pentatomidae.

Material and methods

The right paramere and the right superior process of dorsal rim of 76 species of Asopinae were examined by optical (OM) and electron scanning microscopy (SEM), comprising 52 genera (Tables 1 and 2). Furthermore, we studied the right paramere of one species of Cyrtocorinae, four species of Discocephalinae, one species of Edessinae, four species of Pentatominae, one species of Phyllocephalinae, and two species of Podopinae; of these, only *Dinocoris gibbus* (Dallas, 1852) (Discocephalinae), *Edessa rufomarginata* (DeGeer, 1773) (Edessinae), *Nezara viridula* (Linnaeus, 1758) (Pentatomidae), and *Tantia albopunctulata* (Bergroth, 1894) (Phyllocephalinae) have superior process of dorsal rim, which were also examined (Tables 1 and 2). The studied specimens were obtained from the following institutions (acronyms according to Evenhuis, 2018): American Museum of Natural History, United States of America (AMNH); Australian Museum, Australia (AMS); Florida State Collection of Arthropods, United States of America (FSCA); Illinois Natural History Survey, United States of America (INHS); Instituto Nacional de Pesquisas da Amazônia, Brazil (INPA); Musee Royal de l'Afrique Centrale, Belgium (RMCA); Museu Nacional, Universidade do Rio de Janeiro, Brazil (MNRJ); Muséum National d'Histoire Naturelle, France (MNHN); National Museum, Czech Republic (NMPC); Naturhistoriska riksmuseet, Sweden (NHRS); Royal Belgian Institute of Natural Sciences, Belgium (RBINS); Science Museum of Minnesota, United States of America (SMPM); Staten Island Museum, United States of America (SIM); The Natural History Museum, United Kingdom (NHMUK); Universidade Federal do Rio Grande do Sul, Brazil (UFRG); University of Copenhagen, Zoological Museum, Denmark (ZMUC); Virginia Museum of Natural History, United States of America (VMNH).

The parameres and the superior process of dorsal rim were removed from dry specimens, kept submerged in contact lens solution Renu® for 48 h, agitated in an ultrasonic bath (5.400 kHz) with water and detergent solution for six minutes, and then dehydrated via an ethanolic series (80% alcohol for 5 minutes and and 90% alcohol for 5 minutes). The pieces were then glued to metal supports with carbon tape and coated with gold before observation, and microphotography using the scanning electron microscope JEOL JSM 6060 at the Center of Microscopy and Microanalysis at UFRGS, Porto Alegre, Brazil.

Results

Superior process of dorsal rim (spd)

The 1+1 studied processes are placed lateral to the anal tube and above the bases of parameres, and they are derived from infoldings of the dorsal rim both in Asopinae and in the non-asopine taxa (Fig. 1B, d; Fig. 2, d). The position of these structures in the Asopinae species and in the species of other subfamilies of Asopinae is much similar. Hence, we are treating these structures as “superior process of dorsal rim (spd)” in this study, and we suggest that this terminology is adopted in future works.

The superior processes of dorsal rim (spd) in Asopinae are always positioned dorsolateral to the head of parameres, at the base of postero-lateral angles, parallel to dorsal border, often surpassing the dorsal border (Figs. 1B, 2A), and they are connected to the lateral wall of pygophore (i.e. on infoldings of the dorsal rim) by a fine membrane (Fig. 2A). In the non-asopine taxa, the position of the spd is almost similar to Asopinae, but they are mostly perpendicular to dorsal border (Fig. 2B). *Dinocoris gibbus* (Discocephalinae) presents the processes slightly displaced to the mesial region of the lateral wall of pygophore (Supplementary material 2, Figs. 4 and 5) Besides that, the spd in the non-asopines arise connected to dorsal rim by a sclerotized area (Fig. 2B) (Table 1).

Only two species of Asopinae do not have spd (*Leptolobus eburneatus* Karsch, 1892 and *Leptolobus murrayi* Signoret, 1855) (Table 1), the lateral wall of pygophore is internally projected and strongly sclerotized in these two species (Supplementary material, Figs. 214, 215).

The spd are generally well developed in Asopinae, and it presents a large variety of shapes: round (*Anasida tenebrio* Karsch, 1892; *Apateticus lineolatus* (Herrich-Schäffer, 1840); *Cecyrina platyrhinoides* Walker, 1867; *Coryzorhaphis leucocephala* Spinola, 1837; *Discocera cayennensis* Laporte, 1833; *Eocanthecona furcellata* (Wolff, 1801); *Jalla dumosa* (Linnaeus, 1758); *Montrouzieriellus falleni* (Guérin-Méneville, 1831); *Perillus exaptus* (Say, 1825); *Stiretrus decastigmus* (Herrich-Shäffer, 1838); *Stiretrus decemguttatus* (Lepeletier & Serville, 1828); *Stiretrus erytrocephalus* (Lepeletier & Serville, 1828); *Tylospilus chilensis* (Spinola, 1852); *Tynacantha marginata* Dallas, 1851; *Tyrannocoris rex* Thomas, 1992; *Tyrannocoris nigriceps*

Thomas, 1992), oval (*Afrius flavirostrum* (Signoret, 1861); *Afrius purpureus* (Westwood, 1837); *Amyotea hamata* (Walker, 1868); *Arma custos* (Fabricius, 1794); *Blachia ducalis* Walker, 1867; *Canthecona discolor* (Palisot de Beauvois, 1811); *Comperocoris roehneri* (Philipi, 1862); *Coryzorhaphis carneolus* Erichson, 1848; *Damarius splendidulus* (Fabricius, 1803); *Dinorhynchus dybowskyi* Jakovlev, 1876; *Dorycoris pavoninus* (Westwood, 1837); *Ealda minax* Walker, 1867; *Friarius alluaudi* (Schouteden, 1905); *Glypsus conspicuus* (Westwood, 1837); *Hemallia signitenens* (Schouteden, 1905); *Hoploxys coeruleus* Dallas, 1851; *Jalloides opulentus* Distant, 1911; *Jalloides rubricosa* (Stål, 1870); *Mecosoma mensor* Germar, 1837; *Oechalia schellembergi* (Guérin-Méneville, 1831); *Oplomus catena* (Drury, 1782); *Oplomus cruentus* (Burmeister, 1835); *Parajalla sanguineosignata* (Spinola, 1852); *Perillus bioculatus* (Fabricius, 1775); *Perillus circumcinctus* Stål, 1862; *Picromerus bidens* (Linnaeus, 1758); *Pinthaeus sanguinipes* (Fabricius, 1781); *Planopsis silvatica* (Distant, 1890); *Platynopus melanoleucus* (Westwood, 1837); *Platynopiellus septendecimaculatus* (Palisot de Beavois, 1811); *Podisus maculiventris* (Say, 1831); *Rhacognathus americanus* Stäl, 1870; *Rhacognathus punctatus* Linnaeus, 1878; *Supputius typicus* (Distant, 1889)); subquadrate (*Alcaeorrhynchus grandis* (Dallas, 1851); *Conquistator mucronatus* (Uhler, 1897); *Troilus luridus* (Fabricius, 1775)), subrectangular (*Cazira chiroptera* (Herrich-Schäffer, 1840); *Cazira insignis* (Schouteden, 1907); *Cazira verrucosa* (Westwood, 1834); *Brontocoris tabidus* (Signoret, 1863); *Supputius cincticeps* (Stål, 1858)), falciform (*Amyotea malabarica* (Fabricius, 1775); *Andrallus spinidens* (Fabricius, 1787); *Cantheconidea variabilis* (Vollenhoven, 1868); *Cermatulus nasalis* (Westwood, 1837); *Heteroscelis robustus* Thomas, 1992; *Heteroscelis servillei* Laporte, 1833; *Marmessulus nigricornis* (Stål, 1865); *Podisus nigrispinus* (Dallas, 1851); *Zicrona caerulea* (Linnaeus, 1758)), guttiform (*Apoecilus bracteatus* (Fitch, 1856)), subtriangular (*Apoecilus cynicus* (Say, 1831); *Discocera coccinea* (Fabricius, 1798); *Tylospilus cloelia* (Stäl, 1862)), narrow and elongated (*Euthyrrhychus floridanus* (Linnaeus, 1767)), trapezoidal (*Glypsus kuhlgatzi* Schouteden, 1904), and sinuous (*Macrorhaphis acuta* Dallas, 1851).

The spd in Asopinae may be longer than half the length of paramere head, or even have a size similar to that of the head of the paramere (Table 1). But some species have small process in comparison to the length of the paramere head, as in *Canthecona discolor* (Palisot de Beauvois, 1811) (Table 1). In the other subfamilies, the spd is shorter than half the length of paramere head. Almost all spd have microsculptures on their surface (Figs. 1A, 3B–L), which can range from an imbricated pattern (Fig. 3J, L) to almost parallel lines (Fig. 3 E, F). The surfaces of the spd of *Hemallia signitenens* (Schouteden, 1905) (Fig. 3A) and *Platynopiellus septendecimaculatus* (Palisot de Beavois, 1811) are smooth (Supplementary Material, Figs. 179, 180, 294, 295). The surface of spd can also be uniform (Fig. 3B) or presents longitudinal elevations (Fig. 3D, I, J). Some species have yet globose projections on disc and on margins of the spd (Fig. 3G, H) (Table 1). Below are described more details about the spd for groups of Asopinae species.

Afrius flavirostrum (Signoret, 1861); *A. purpureus* (Westwood, 1837); *Dorycoris pavoninus* (Westwood, 1837); *Friarius alluaudi* (Schouteden, 1905); *Jalla dumosa* (Linnaeus, 1758) ; *Jalloides opulentus* Distant, 1911; *J. rubricosa* (Stål, 1870) and *Picromerus bidens* (Linnaeus, 1758) (Supplementary material 1, Figs. 4, 5, 9, 10, 164, 165, 199, 200, 204, 205, 209, 210, 279, 280)

Oval elongated, microsculptures imbricated, without globose projections and without elevations.

Alcaeorrhynchus grandis (Dallas, 1851) (Supplementary material 1, Figs. 14, 15)

Subquadrate, lateral internal margin concave, margins slightly elevated, microsculptures imbricated, few globose projections on disc.

Amyotea hamata (Walker, 1868) (Supplementary material 1, Figs. 19, 20)

Oval with globose projections on dorsal margin and disc, microsculptures imbricated, ventral margin less sclerotized than disc.

Amyotea malabarica (Fabricius, 1775) (Supplementary material 1, Figs. 24, 25)

Falciform, pleated with many longitudinal elevations. Microsculptures imbricated.

Anasida tenebrio Karsch, 1892; *Eocanthecona furcellata* (Wolff, 1801); *Marmessulus nigricornis* (Stål, 1865); *Montrouzieriellus falleni* (Guérin-Ménéville, 1831); *Pinthaeus sanguinipes* (Fabricius, 1781); *Platynopus melanoleucus* (Westwood, 1837); *Podisus* *maculiventris* (Say, 1831), *Rhacognathus* americanus Stål, 1870; *R. puncatatus* Linnaeus, 1878 (Supplementary material 1, Figs. 29, 30, 154, 155, 229, 230, 239, 240, 284, 285, 299, 300, 304, 305, 314, 315, 319, 320)

Almost round, with longitudinal or transversal elevations. Microsculptures imbricated to parallel lines.

Andrallus spinidens (Fabricius, 1787) (Supplementary material 1, Figs. 34, 35)

Falciform, lateral internal margin concave, with longitudinal elevations near ventral margin, and globose projections near the external and ventral margins. Microsculptures forming parallel lines.

Apateticus lineolatus (Herrich-Schäffer, 1840) (Supplementary material 1, Figs. 39, 40)

Oval, but with the dorso-lateral angle projected. Globose projections on dorsal and lateral internal margins. Microsculptures forming parallel lines, sometimes combined in a polygonal pattern.

Apoecilus bracteatus (Fitch, 1856); *Apoecilus cynicus* (Say, 1831) (Supplementary material 1, Figs. 44, 45, 49, 50)

Subtriangular, lateral internal margin jagged. Globose projections on lateral internal margin and on disc. Microsculptures forming parallel lines.

Arma custos (Fabricius, 1794) (Supplementary material 1, Figs. 54, 55)

Lateral internal margin strongly convex with globose projections, lateral external margin concave. Microsculptures forming parallel lines.

Blachia ducalis Walker, 1867 (Supplementary material 1, Figs. 59, 60)

Falciform with sinuous microsculptures. Without elevations or globose projections.

*Brontocoris tabidus (*Signoret, 1863); *Supputius cincticeps* (Stål, 1858) (Supplementary material 1, Figs. 64, 65, 139, 140)

Subrectangular with some longitudinal elevations and some globose projections. Ventral margin concave. Microsculptures forming parallel lines.

Canthecona discolor (Palisot de Beauvois, 1811); *Damarius splendidulus* (Fabricius, 1803); *Glypsus conspicuus* (Westwood, 1837); *Hoploxys coeruleus* Dallas, 1851 (Supplementary material 1, Figs. 69, 70, 124, 125, 169, 170, 194, 195)

Oval elongated with strong longitudinal elevations which form a longitudinal sulcus on disc. Microsculptures imbricated or parallel lines.

Cantheconidea variabilis (Vollenhoven, 1868) (Supplementary material 1, Figs. 74, 75)

Suboval with a secondary lobe from lateral external margin. Microsculptures imbricated

Cazira chiroptera (Herrich-Schäffer, 1840); *Cazira verrucosa* (Westwood, 1834); *Discocera cayennensis* Laporte, 1833; *Discocera coccinea* (Fabricius, 1798) (Supplementary material 1, Figs. 79, 80, 89, 90, 134, 135, 139, 140)

C-shaped with light longitudinal elevations. Microsculptures imbricated.

Cazira insignis (Schouteden, 1907) (Supplementary material 1, Figs. 84, 85)

Inverted C-shape (Ɔ) with longitudinal elevations and imbricated microsculptures.

Cecyrina platyrhinoides Walker, 1867; *Tynacantha marginata* Dallas, 1851; *Tyrannocoris nigriceps* Thomas, 1992; *T. rex* Thomas, 1992 (Supplementary material 1, Figs. 94, 95, 364, 365; 369, 370, 374, 375)

Round, covered by globose microsculptures that sometimes form longitudinal elevations. Microsculptures forming parallel lines. *T. marginata* and *Ty. rex* have the ventral margin of spd projected, while in *T. nigriceps* the dorsal margin is projected.

Cermatulus nasalis (Westwood, 1837) (Supplementary material 1, Figs. 99, 100)

C-shaped with well pronounced elevations. Microsculptures imbricated.

Comperocoris roehneri (Philipi, 1862) (Supplementary material 1, Figs. 104, 105)

Oval excavated near dorsal margin. Covered by light elevations and imbricated microsculptures.

Conquistator mucronatus (Uhler, 1897) (Supplementary material 1, Figs. 109, 110)

Subquadrate, with latero-ventral angle projected, and covered by globose projections. Microsculptures forming parallel lines.

Coryzorhaphis carneolus Erichson, 1848; *C. leucocephala* Spinola, 1837 (Supplementary material 1, Figs. 114, 115, 119, 120)

Subtriangular with the lateral external margin concave, and the latero-ventral angle projected. Microsculptures forming parallel lines.

Dinorhynchus dybowskyi Jakovlev, 1876 (Supplementary material 1, Figs. 129, 130)

Suboval with the lateral external margin strongly concave. Microsculptures imbricated

Ealda minax Walker, 1867 (Supplementary material 1, Figs. 149, 150)

Subrectangular elongated, with a central elevation that joins to the inner lateral margin. Microsculptures imbricated.

Euthyrhynchus floridanus (Linnaeus, 1767) (Supplementary material 1, Figs. 159, 160)

Narrow and elongated, surface irregular with sinuosities and elevations. Microsculptures imbricated to parallel lines.

Glypsus kuhlgatzi Schouteden, 1904 (Supplementary material 1, Figs. 174, 175)

Trapezoidal, dorsal margins elevated. Microsculptures imbricated.

Hemallia signitenens (Schouteden, 1905) (Supplementary material 1, Figs. 179, 180)

Oval elongated with smooth surface. Without projections.

Heteroscelis robustus Thomas,1992; *H. servillei* Laporte, 1833 (Supplementary material 1, Figs. 184, 185, 189, 190)

Falciform strongly curved and excavated. Microsculptures parallel lines to imbricate.

Macrorhaphis acuta Dallas, 1851 (Supplementary material 1, Figs. 224, 225)

Sinuous, with longitudinal elevations and imbricated microsculptures.

Mecosoma mensor Germar, 1837 (Supplementary material 1, Figs. 234, 235)

Suboval, with longitudinal elevations and light parallel microsculptures.

Oechalia schellembergi (Guérin-Ménéville, 1831)

Parameres

The parameres of Asopinae have a well-developed head, generally posteriorly visible. In some species, the parameres are much long, projecting beyond the lateral margins of pygophore (Fig. 4A). The internal lateral surface (Fig. 1C) can present microsculptures or wrinkles (e.g. Supplementary material 1, Figs. 56, 66, 81), or can be totally smooth (e.g. Supplementary material 1, Figs. 61, 106, 111), but in both cases the dorsal and ventral angles are generally smooth (Fig. 1C). The external lateral surface (Fig. 1D) can be smooth (e.g. Supplementary material, Figs. 03, 33, 68) or microsculptured (e.g. Supplementary material, Figs. 13, 18, 23), mainly on distal region (Fig. 1D). The microsculptures can be imbricated (e.g. Supplementary material 1, Fig. 133) or almost parallel (e.g. Supplementary material 1, Fig. 178) (Table 2).

Morphological characters

Based on the morphological diversity observed we propose the following characters. The characteristics of each studied species are listed on tables 1 and 2.

1) Superior process of dorsal rim: (a) absent; (b) present.
2) Superior process of dorsal rim, size: (a) up to half of paramere head; (b) more than half of paramere head.
3) Superior process of dorsal rim, microsculptures: (a) absent; (b) present.
4) Superior process of dorsal rim, globose projections: (a) absent; (b) present.
5) Superior process of dorsal rim, longitudinal elevations: (a) absent; (b) present.
6) Superior process of dorsal rim, connection with diaphragm: (a) membranous; (b) sclerotized

7) Head of paramere, position: (a) totally inside the pygophore; (b) projected beyond the lateral margins of pygophore.
8) Head of paramere, internal surface: (a) totally smooth; (b) with wrinkles or microsculptures.
9) Head of paramere, external surface: (a) smooth; (b) microsculptured.

Discussion

In this work, we present for the first time the description of the superior processes of dorsal rim (spd) for Asopinae in a comparative study including other subfamilies of Pentatomidae. We showed the great diversity of spd shapes and we observed that they are present in almost all genera of Asopinae (except in *Leptolobus* Signoret, 1855), and the connection of these structures to the dorsal rim is quite membranous (facilitating their removal even during dissection), unlike the majority of the other Pentatomidae species where the spd is a continuation of the sclerotized part of dorsal rim (except in *Tantia albopunctulata* (Bergroth, 1894)). The lack of a phylogenetic hypothesis for the subfamilies of Pentatomidae hinders our understanding on the evolution of spd, however, the presence of spd has already been indicated in several other taxa not studied here (e.g. Grazia & Teradaira 1980; Becker & Thomas 1994; Grazia & Fortes 1995; Barcellos & Grazia 1998; Barcellos & Grazia 2003; Matesco, Grazia & Campos 2007; Bernardes, Schwertner & Grazia 2011; Weiler, Ferrari & Grazia 2011; Poock-da-Silva, Barão & Grazia 2013; Dursun & Fent 2013; Kment 2013; Grazia, Bolze & Barão 2016; Correia & Fernandes 2016; Bianchi, Barão & Grazia 2017) which indicates that the spd can be quite common, opening doors for two scenarios: a) the processes may be homologous to Pentatomidae, and were lost secondarily in certain groups; or b) the spd may have arisen many times by parallelism.

Proposing terminologies for morphological structures is not simple. Treating structures of the same ontogenetic origin with different names may generate errors of interpretation, and of hypotheses of primary homology, just as dealing with structures of different origins with the same name can generate similar errors. As mentioned in the previous paragraph, we cannot assume a common origin for the spd in Pentatomidae, but because of the position in which the psd are present and because they extend from the dorsal rim, we consider the use of the same term among the different taxa of

Pentatomidae, so we propose the term superior processes of dorsal rim, which was already used previously (e.g. Weiler, Ferrari & Grazia 2011; Schwertner & Grazia 2012; Poock-da-Silva, Barão & Grazia 2013; Grazia, Bolze & Barão 2016; Bianchi, Barão & Grazia 2017), even though “genital cup process”, “dorsal plate of pygophore”, ‘genital plates”, “dorsal sclerites” (e.g Baker 1931; Thomas 1994; Roell et al. in press, Gapon & Konstantinov 2006, Zhao, Rédei & Bu 2013; Srikumar et al. 2018; Zhao et al. 2018, Barcellos & Grazia 2003; Matesco, Grazia & Campos 2007) are not incorrect terms, because all of them refer to the position of the process.

The various components of genital insect structures are related to anchoring during coupling, and the coupling mechanism is variable among different taxa (Genevcius & Schwertner 2017). The superior processes of dorsal rim probably act on anchoring during the coupling of asopines, as demonstrated for *Podisus nigrispinus* (Dallas, 1851) by Genevcius & Schwertner 2017, which differs from other pentatomids where the ventral rim of pygophore is useful on hold of the female genital plates. In this sense, the term “pseudoclasper” suggested for the spd by Zou et al. 2012 is not totally ruled out. However, it is not known whether other asopines as well as other Pentatomidae groups possessing spd may exhibit this same coupling pattern.

Most of the spd have their surfaces microsculptured, and this can vary from an imbricated pattern to almost parallel lines. Microsculptures have been reported in other arthropods (e.g. Lindroth 1974; Fusco et al. 2000; Beutel & Gorb 2001; Arismendi & Thomas 2003; Doberski & Walmesley 2007; Roell & Campos 2018), but little is known about the possible function of these structures. Interestingly, the distal external surface of parameres which is towards to the spd (Figs 1, 4B) is generally covered by microsculptures. It seems that the paramere and the spd act in the adhesion of structures, probably of the gonocoxites VIII. However, broad parameres (longer than the twice spd) do not have the distal region towards the spd (the spd are small, and towards the proximal region of parameres) (Figs 2A, 4A), these parameres have, mostly, the external surface smooth (*Afrius* Stål, 1870; *Andrallus* Bergroth,1862; *Canthecona* Amyot & Serville, 1843; *Cantheconidea* Schouteden, 1907; *Damarius* Schouteden, 1907; *Dorycoris* Mayr, 1864; *Ealda* Walker, 1867; *Eocanthecona* Bergroth, 1915; *Friarius* Schouteden, 1907; *Hoploxys* Dallas, 1851; *Jalla* Hahn, 1832; *Jalloides rubricosa* (Stål, 1870); *Macrorhaphis* Dallas, 1851; *Mecosoma* Dallas, 1851; *Picromerus* Amyot & Serville, 1843; *Pinthaeus* Stål, 1867; *Platynopiellus* Thomas, 1994; *Platynopus* Amyot & Serville, 1843) (Tables 1 and 2). In the latter case, adherence may be facilitated in some other way. Perhaps the study of the morphology of female genitalia could better clarify this scenario.

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Figures

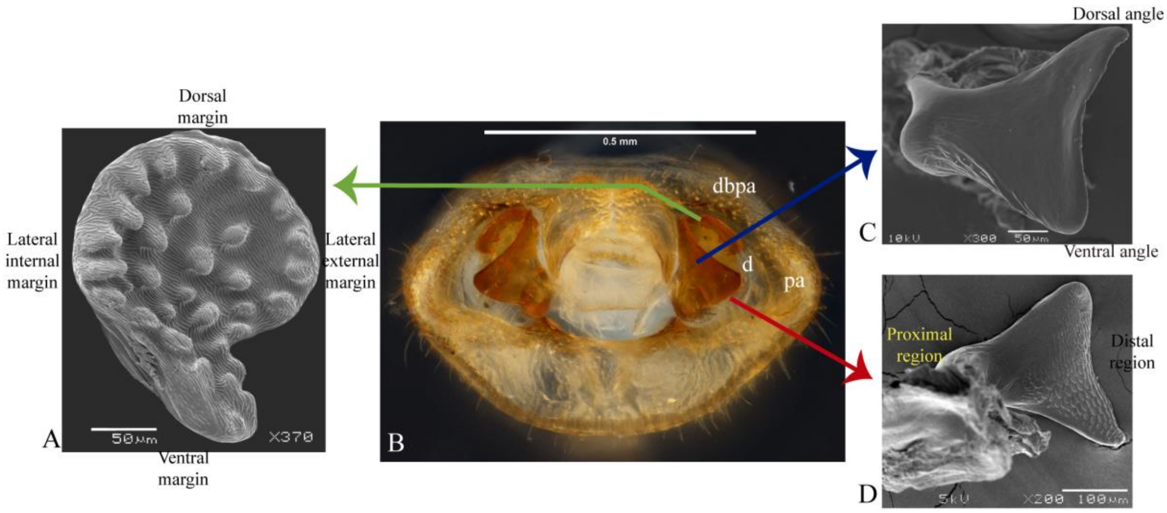


Fig. 1. Pygophore in posterior view, with detailed images of the superior processes of dorsal rim and parameres of *Tynacantha marginata*. A, right superior process of diaphragm; B, pygophore; C, ineer view of the right parâmero; D, outer view of the right paramere.

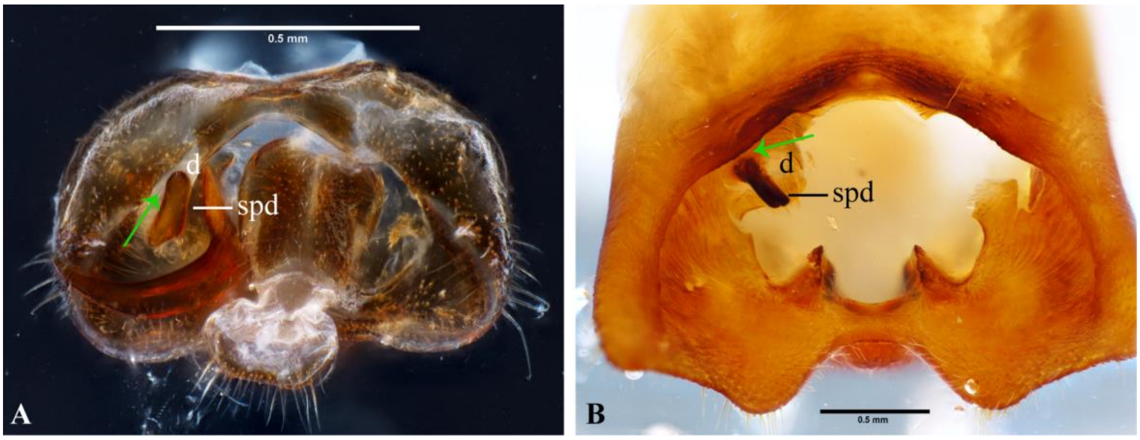


Fig. 2. Dorso-posterior view of the pygophore of *Afrius flavirostrum* (A) and *Edessa rufomarginata* (B) showing the dorsal rim (d), and the connection between the superior process of dorsal rim (spd) and the dorsal rim indicated with a green arrow.

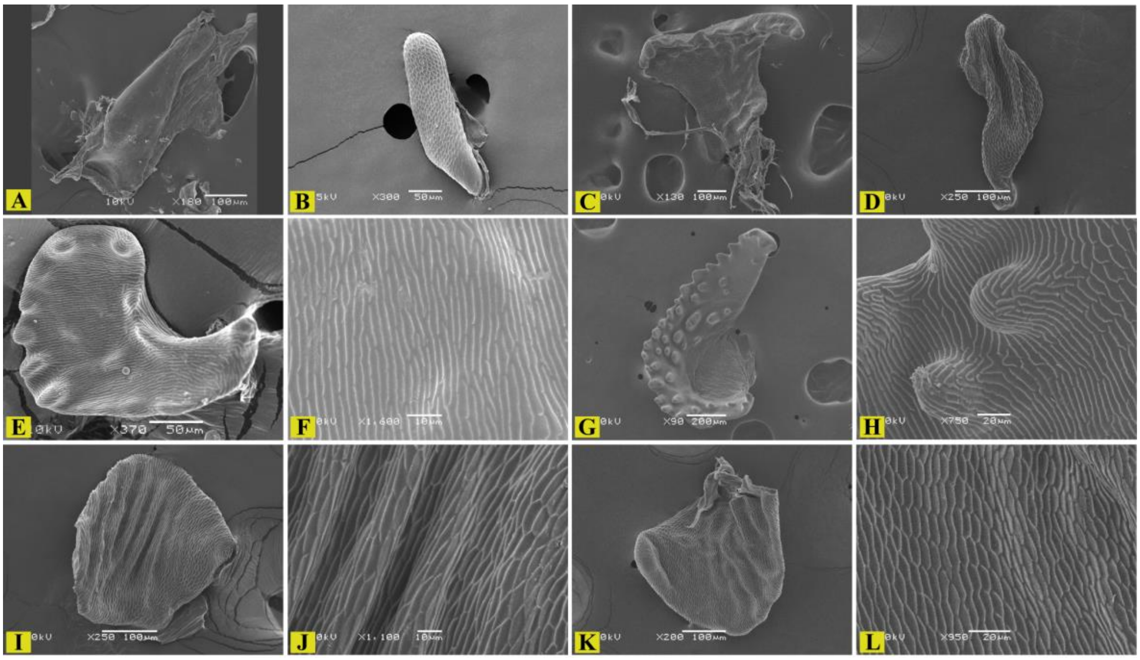


Fig. 3. Morphological variations on surface of the Asopinae superior processes of dorsal rim. A, *Hemallia signitenens*; B, *Afrius flavirostrum*; C, *Glypsus kuhlgatzi*; D, *Macrorhaphis acuta*; E, F *Podisus nigrispinus*; G, H, *Apoecilus bracteatus*; I, J, *Anasida tenebrio*; K, L, *Montrouzieriellus falleni*.

Tables

Table 1. Characteristics of the superior processes of dorsal rim

		Superior process of diaphragm								
		Presence	Proportion	Microsculptures	Globose projections	Elevations	Connection with diaphragm			
Genus		Absent	Present	Up to half of paramere head	More than half of paramere head	Absent	Present	Absent	Present	Absen
Asopinae										
Afrius Stål, 1870	*A. flavirostrum* (Signoret, 1861)		X	X			X	X		X
	A. purpureus (Westwood, 1837)		X	X			X	X		X
Alcaeorrhynchus Bergroth, 1891	*A. grandis* (Dallas, 1851)		X		X		X		X	X
Amyotea Ellenreider, 1862	*A. hamata* (Walker, 1868)		X		X		X		X	X
	*A. malabarica (*Fabricius, 1775)		X		X		X	X		
Anasida Karsch, 1892	*A. tenebrio* Karsch, 1892		X		X		X	X		
Andrallus Bergroth,1862	*A. spinidens* (Fabricius, 1787)		X	X			X		X	
Apateticus Dallas, 1851	*A. lineolatus* (Herrich-Schäffer, 1840)		X		X		X		X	X
Apoecilus Stål, 1870	*A. bracteatus* (Fitch, 1856)		X		X		X		X	X
	A. cynicus (Say, 1831)		X		X		X		X	X
Arma Hahn, 1832	*A. custos* (Fabricius, 1794)		X		X		X		X	
Blachia Walker, 1867	*B. ducalis* Walker, 1867		X		X		X	X		X
Brontocoris Thomas, 1992	*B. tabidus* (Signoret, 1863)		X		X		X		X	
Canthecona Amyot & Serville, 1843	*C. discolor* (Palisot de Beauvois, 1811)		X	X			X	X		
Catheconidea Schouteden, 1907	*C. variabilis* (Vollenhoven, 1868)		X	X			X	X		
Cazira Amyot & Serville, 1843	*C. chiroptera* (Herrich-Schäffer, 1840)		X		X		X	X		

	C. insignis (Schouteden, 1907)	X		X		X	X		
	C. verrucosa (Westwood, 1834)	X		X		X	X		
Cecyrina Walker, 1867	*C. platyrhinoides* Walker, 1867	X		X		X		X	
Cermatulus Dallas, 1851	*C. nasalis* (Westwood, 1837)	X		X		X	X		
Comperocoris Stål, 1867	*C. roehneri* (Philipi, 1862)	X		X		X	X		
Conquistator Gapon, 2009	*C. mucronatus* (Uhler, 1897)	X		X		X		X	
Coryzorhaphis Spinola, 1837	*C. carneolus* Erichson, 1848	X		X		X	X		X
	C. leucocephala Spinola, 1837	X		X		X	X		X
Damarius Schouteden, 1907	*D. splendidulus* (Fabricius, 1803)	X	X			X	X		
Dinorhynchus Jakovlev, 1876	*D. dybowskyi* Jakovlev, 1876	X		X		X	X		X
Discocera Laporte, 1833	*D. cayennensis* Laporte, 1833	X		X		X	X		
	D. coccinea (Fabricius, 1798)	X		X		X	X		
Dorycoris Mayr, 1864	*D. pavoninus* (Westwood, 1837)	X	X			X	X		X
Ealda Walker, 1867	*E. minax* Walker, 1867	X	X			X	X		
Eocanthecona Bergroth, 1915	*E. furcellata* (Wolff, 1801)	X	X			X	X		
Euthyrhynchus Dallas,1851	*E. floridanus* (Linnaeus, 1767)	X		X		X	X		
Friarius Schouteden, 1907	*F. alluaudi* (Schouteden, 1905)	X	X			X	X		X
Glypsus Dallas, 1851	*G. conspicuus* (Westwood, 1837)	X		X		X	X		
	G. kuhlgatzi Schouteden, 1904	X		X		X	X		X
Hemallia Bergroth, 1908	*H. signitenens* (Schouteden, 1905)	X		X	X		X		X
Heteroscelis Latreille, 1829	*H. robustus* Thomas,1992	X		X		X	X		
	H. servillei Laporte, 1833	X		X		X	X		
Hoploxys Dallas, 1851	*H. coeruleus* Dallas, 1851	X	X			X	X		
Jalla Hahn, 1832	*J. dumosa* (Linnaeus, 1758)	X	X			X	X		
Jalloides Shoutden, 1907	*J. opulentus* Distant, 1911	X	X			X	X		X
	J. rubricosa (Stål, 1870)	X	X			X	X		X
Leptolobus Signoret, 1855	*L. eburneatus* Karsch, 1892	X	_		_	_	_		_

Leptolobus Signoret, 1855	*L. murrayi* Signoret, 1855	X	_		_	_	_		_
Macrorhaphis Dallas, 1851	*M. acuta* Dallas, 1851	X	X			X	X		
Marmessulus Bergroth, 1891	*M. nigricornis* (Stål, 1865)	X		X		X	X		
Mecosoma Dallas, 1851	*M. mensor* Germar, 1837	X	X			X	X		
Montrouzieriellus Kirkaldy, 1908	*M. falleni* (Guérin-Méneville, 1831)	X		X		X	X		
Oechalia Stål, 1862	*O. schellembergi* (Guérin-Méneville, 1831)	X		X		X		X	X
Oplomus Spinola, 1837	*O. catena* (Drury, 1782)	X		X		X		X	X
	O. cruentus (Burmeister, 1835)	X		X		X		X	X
Parajalla Distant, 1911	*P. sanguineosignata* (Spinola, 1852)	X		X		X	X		
Perillus Stål, 1862	*P. bioculatus* (Fabricius, 1775)	X		X		X		X	X
	P. circumcinctus Stål, 1862	X		X		X		X	X
	P. exaptus (Say, 1825)	X		X		X		X	
Picromerus Amyot & Serville, 1843	*P. bidens* (Linnaeus, 1758)	X	X			X	X		X
Pinthaeus Stål, 1867	*P. sanguinipes* (Fabricius, 1781)	X	X			X	X		
Planopsis Schouteden, 1907	*P. silvatica* (Distant, 1890)	X		X		X	X		
Platynopiellus Thomas, 1994	*P. septendecimaculatus* (Palisot de Beavois, 1811)	X	X		X		X		X
Platynopus Amyot & Serville, 1843	*P. melanoleucus* (Westwood, 1837)	X	X			X	X		
Podisus Herrich-Shäffer, 1851	*P. maculiventris* (Say, 1831)	X		X		X		X	
	P. nigrispinus (Dallas, 1851)	X		X		X		X	X
Rhacognathus Fieber, 1860	*R. americanus* Stäl, 1870	X		X		X	X		
	R. puncatatus (Linnaeus, 1878)	X		X		X	X		
Stiretrus Laporte, 1833	*S. decastigmus* (Herrich-Shäffer, 1838)	X		X		X		X	X

	*S. decemguttatus (*Lepeletier & Serville, 1828)	X	X	X	X	X	
	*S. erythrocephalus (*Lepeletier & Serville, 1828)	X	X	X	X	X	
Supputius Distant, 1889	*S. cincticeps* (Stål, 1858)	X	X	X	X		
	S. typicus (Distant, 1889)	X	X	X	X		
Troilus Stål, 1867	*T. luridus* (Fabricius, 1775)	X	X	X	X	X	
Tylospilus Stål, 1870	*T. chilensis* (Spinola, 1852)	X	X	X	X	X	
	T. cloelia (Stäl, 1862)	X	X	X	X	X	
Tynacantha Dallas, 1851	*T. marginata* Dallas, 1851	X	X	X	X	X	
Tyrannocoris Thomas, 1992	*T. nigriceps* Thomas, 1992	X	X	X	X	X	
	T. rex Thomas, 1992	X	X	X	X	X	
Zicrona Amyot & Serville, 1843	*Z. caerulea* (Linnaeus, 1758)	X	X	X	X		
Cyrtocorinae							
Cyrtocoris *White, 1842*	*Cyrtocoris egeris* Packauskas & Schaefer, 1998	X	–	–	–	–	–
Discocephalinae							
Antiteuchus Dallas, 1851	*Antiteuchus mixtus* (Fabricius, 1787)	X	–	–	–	–	–
Dinocoris Burmeister, 1835	*Dinocoris gibbus* (Dallas, 1852)	X	X	X	X	X	
Lincus Stål, 1867	*Lincus spurcus* Rolston, 1983	X	–	–	–	–	–
Ochlerus Spinola, 1837	*Ochlerus rusticus* Breddin, 1910	X	–	–	–	–	–
Edessinae							
Edessa Fabricius, 1803	*Edessa rufomarginata* (DeGeer, 1773)	X	X	X	X	X	
Pentatominae							
Arvelius Spinola, 1837	*Arvelius albopunctatus* (DeGeer, 1773)	X	–	–	–	–	–

Murgantia Stål, 1862	*Murgantia varicolor* (Westwood, 1837)	X	–	–	–	–	–
Nezara Amyot & Serville, 1843	*Nezara viridula* (Linnaeus, 1758)	X	X	X		X	X
Proxys Spinola, 1837	*Proxys albopunctulatus* (Palisot de Beauvois, 1805)	X	–	–	–	–	–
Phyllocephalinae							
Tantia Distant, 1910	*Tantia albopunctulata* (Bergroth, 1894)	X	X		X	X	X
Podopinae							
Graphosoma Laporte, 1833	*Graphosoma lineatum* (Linnaeus, 1758)	X	–	–	–	–	–
Podops Laporte, 1833	*Podops inunctus* (Fabricius, 1775)	X	–	–	–	–	–

Table 2. Characteristics of parameres.

		Head of paramere					
		Position		Internal surface		External surface	
Genus	Species	Completely inside the pygophore	Projected beyond the lateral margins of pygophore	Smooth	With wrinkles or microsculptures	Smooth	Microsculptured
Asopinae							
Afrius Stål, 1870	*A. flavirostrum* (Signoret, 1861)		X		X	X	
	A. purpureus (Westwood, 1837)		X		X	X	
Alcaeorrhynchus Bergroth, 1891	*A. grandis* (Dallas, 1851)	X			X		X
Amyotea Ellenreider, 1862	*A. hamata* (Walker, 1868)	X			X		X
	*A. malabarica (*Fabricius, 1775)	X			X		X
Anasida Karsch, 1892	*A. tenebrio* Karsch, 1892	X			X		X
Andrallus Bergroth,1862	*A. spinidens* (Fabricius, 1787)		X	X		X	
Apateticus Dallas, 1851	*A. lineolatus* (Herrich-Schäffer, 1840)	X			X		X
Apoecilus Stål, 1870	*A. bracteatus* (Fitch, 1856)	X			X		X
	A. cynicus (Say, 1831)	X			X		X
Arma Hahn, 1832	*A. custos* (Fabricius, 1794)	X			X		X
Blachia Walker, 1867	*B. ducalis* Walker, 1867	X			X		X
Brontocoris Thomas, 1992	*B. tabidus* (Signoret, 1863)	X		X			X
Canthecona Amyot & Serville, 1843	*C. discolor* (Palisot de Beauvois, 1811)	X			X	X	
Catheconidea Schouteden, 1907	*C. variabilis* (Vollenhoven, 1868)	X			X	X	
Cazira Amyot & Serville, 1843	*C. chiroptera* (Herrich-Schäffer, 1840)	X			X		X
	C. insignis (Schouteden, 1907)	X			X		X
	C. verrucosa (Westwood, 1834)	X			X		X
Cecyrina Walker, 1867	*C. platyrhinoides* Walker, 1867	X			X		X
Cermatulus Dallas, 1851	*C. nasalis* (Westwood, 1837)	X			X		X

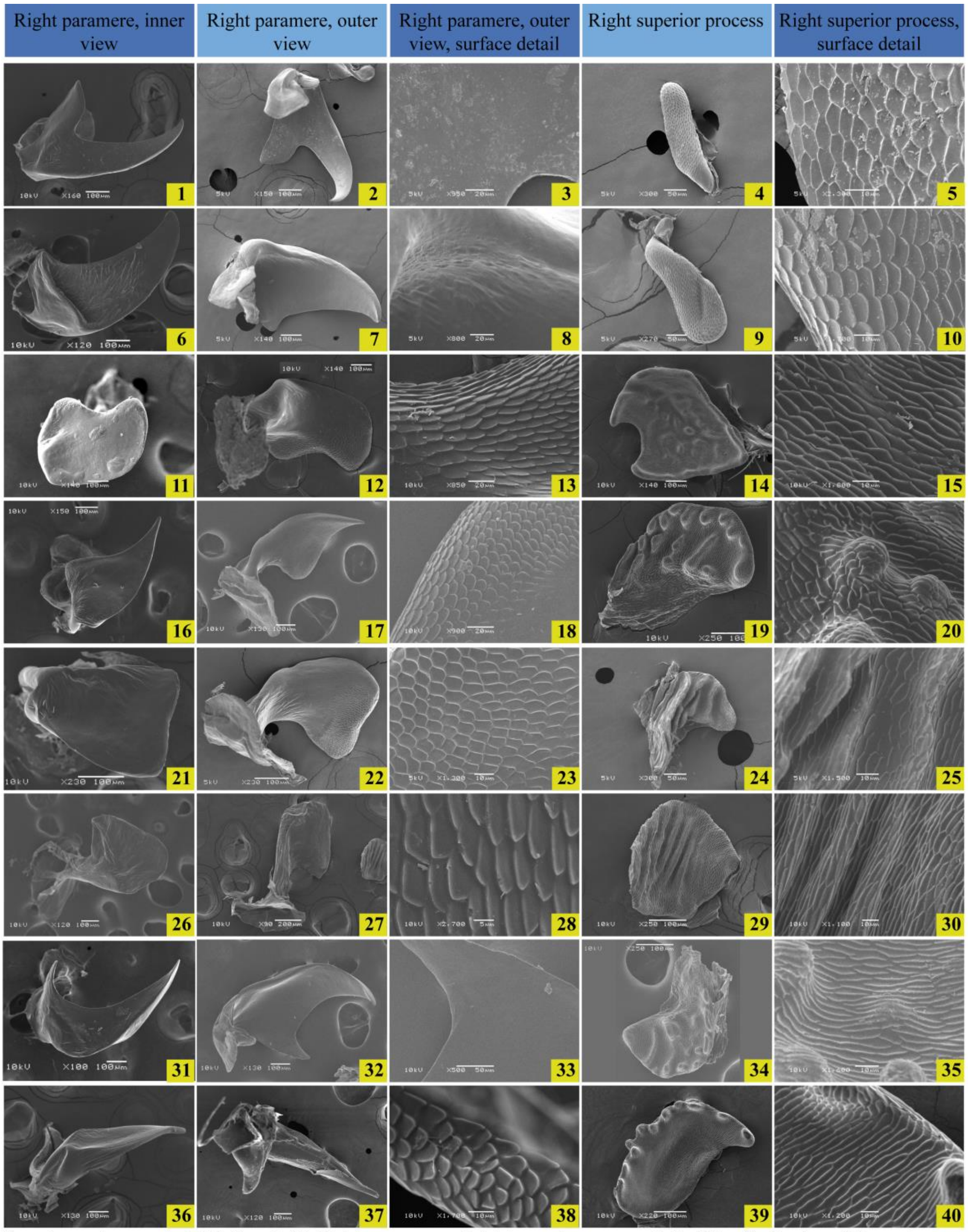
Comperocoris Stål, 1867	*C. roehneri* (Philipi, 1862)	X			X		X
Conquistator Gapon, 2009	*C. mucronatus* (Uhler, 1897)	X		X			X
Coryzorhaphis Spinola, 1837	*C. carneolus* Erichson, 1848	X		X			X
	C. leucocephala Spinola, 1837	X			X		X
Damarius Schouteden, 1907	*D. splendidulus* (Fabricius, 1803)		X		X	X	
Dinorhynchus Jakovlev, 1876	*D. dybowskyi* Jakovlev, 1876	X			X		X
Discocera Laporte, 1833	*D. cayennensis* Laporte, 1833	X			X		X
	D. coccinea (Fabricius, 1798)	X			X		X
Dorycoris Mayr, 1864	*D. pavoninus* (Westwood, 1837)		X		X	X	
Ealda Walker, 1867	*E. minax* Walker, 1867		X	X		X	
Eocanthecona Bergroth, 1915	*E. furcellata* (Wolff, 1801)		X		X	X	
Euthyrhynchus Dallas,1851	*E. floridanus* (Linnaeus, 1767)	X		X			X
Friarius Schouteden, 1907	*F. alluaudi* (Schouteden, 1905)		X		X	X	
Glypsus Dallas, 1851	*G. conspicuus* (Westwood, 1837)	X			X		X
	G. kuhlgatzi Schouteden, 1904	X			X		X
Hemallia Bergroth, 1908	*H. signitenens* (Schouteden, 1905)	X		X			X
Heteroscelis Latreille, 1829	*H. robustus* Thomas,1992	X			X		X
	H. servillei Laporte, 1833	X			X		X
Hoploxys Dallas, 1851	*H. coeruleus* Dallas, 1851		X		X	X	
Jalla Hahn, 1832	*J. dumosa* (Linnaeus, 1758)	X		X		X	
Jalloides Shoutden, 1907	*J. opulentus* Distant, 1911		X		X		X
	J. rubricosa (Stål, 1870)		X		X	X	
Leptolobus Signoret, 1855	*L. eburneatus* Karsch, 1892		X		X	X	
Leptolobus Signoret, 1855	*L. murrayi* Signoret, 1855		X		X	X	
Macrorhaphis Dallas, 1851	*M. acuta* Dallas, 1851		X		X	X	
Marmessulus Bergroth, 1891	*M. nigricornis* (Stål, 1865)	X			X		X
Mecosoma Dallas, 1851	*M. mensor* Germar, 1837		X		X	X	
Montrouzieriellus Kirkaldy, 1908	*M. falleni* (Guérin-Méneville, 1831)		X		X	X	

Oechalia Stål, 1862	*O. schellembergi* (Guérin-Ménéville, 1831)	X			X		X
Oplomus Spinola, 1837	*O. catena* (Drury, 1782)	X			X		X
	O. cruentus (Burmeister, 1835)	X			X		X
Parajalla Distant, 1911	*P. sanguineosignata* (Spinola, 1852)	X		X			X
Perillus Stål, 1862	*P. bioculatus* (Fabricius, 1775)	X			X		X
	P. circumcinctus Stål, 1862	X			X		X
	P. exaptus (Say, 1825)	X			X		X
Picromerus Amyot & Serville, 1843	*P. bidens* (Linnaeus, 1758)		X		X	X	
Pinthaeus Stål, 1867	*P. sanguinipes* (Fabricius, 1781)		X		X	X	
Planopsis Schouteden, 1907	*P. silvatica* (Distant, 1890)		X		X	X	
Platynopiellus Thomas, 1994	*P. septendecimaculatus* (Palisot de Beavois, 1811)		X		X	X	
Platynopus Amyot & Serville, 1843	*P. melanoleucus* (Westwood, 1837)	X			X	X	
Podisus Herrich-Shäffer, 1851	*P. maculiventris* (Say, 1831)	X			X		X
	P. nigrispinus (Dallas, 1851)	X		X			X
Rhacognathus Fieber, 1860	*R. americanus* Stäl, 1870	X			X		X
	R. puncatatus Linnaeus, 1878	X			X		X
Stiretrus Laporte, 1833	*S. decastigmus* (Herrich-Shäffer, 1838)	X			X		X
	S. decemguttatus (Lepeletier & Serville, 1828)	X			X		X
	S. erythrocephalus (Lepeletier & Serville, 1828)	X			X		X
Supputius Distant, 1889	*S. cincticeps* (Stål, 1858)	X		X			X
	S. typicus (Distant, 1889)	X		X			X
Troilus Stål, 1867	*T. luridus* (Fabricius, 1775)	X			X		X
Tylospilus Stål, 1870	*T. chilensis* (Spinola, 1852)	X			X		X
	T. cloelia (Stäl, 1862)	X		X			X

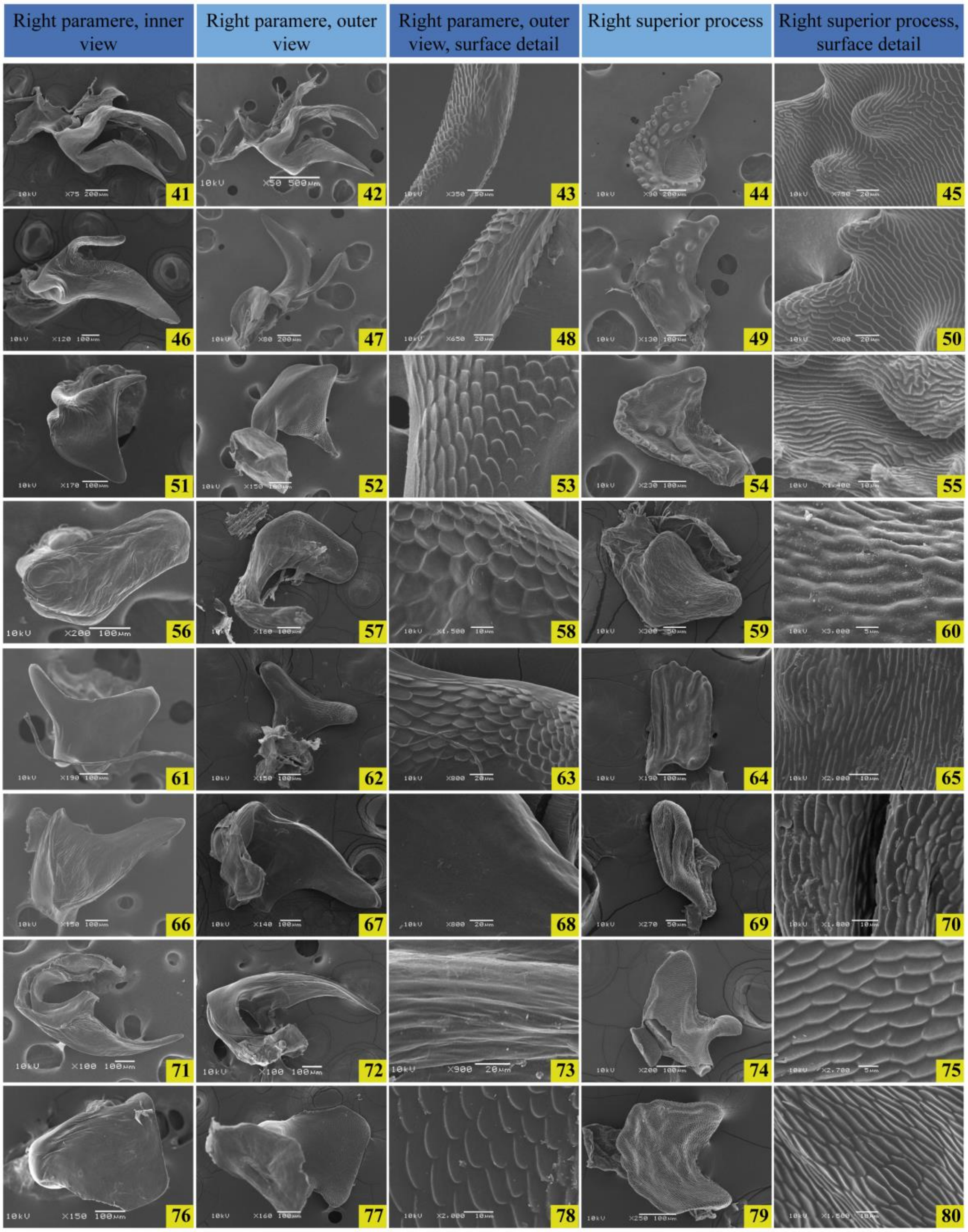
Tynacantha Dallas, 1851	*T. marginata* Dallas, 1851	X		X		X
Tyrannocoris Thomas, 1992	*T. nigriceps* Thomas, 1992	X	X			X
	T. rex Thomas, 1992	X		X		X
Zicrona Amyot & Serville, 1843	*Z. caerulea* (Linnaeus, 1758)	X		X		X
Cyrtocorinae						
Cyrtocoris *White, 1842*	*Cyrtocoris egeris* Packauskas & Schaefer, 1998	X	X			X
Discocephalinae						
Antiteuchus Dallas, 1851	*Antiteuchus mixtus* (Fabricius, 1787)	X		X	X	
Dinocoris Burmeister, 1835	*Dinocoris gibbus* (Dallas, 1852)	X		X	X	
Lincus Stål, 1867	*Lincus spurcus* Rolston, 1983	X		X	X	
Ochlerus Spinola, 1837	*Ochlerus rusticus* Breddin, 1910	X		X		X
Edessinae						
Edessa Fabricius, 1803	*Edessa rufomarginata* (DeGeer, 1773)	X		X		X
Pentatominae						
Arvelius Spinola, 1837	*Arvelius albopunctatus* (DeGeer, 1773)	X		X		X
Murgantia Stål, 1862	*Murgantia varicolor* (Westwood, 1837)	X		X		X
Nezara Amyot & Serville, 1843	*Nezara viridula* (Linnaeus, 1758)	X		X		X
Proxys Spinola, 1837	*Proxys albopunctulatus* (Palisot de Beauvois, 1805)	X		X		X
Phyllocephalinae						
Tantia Distant, 1910	*Tantia albopunctulata* (Bergroth, 1894)	X		X		X
Podopinae						
Graphosoma Laporte, 1833	*Graphosoma lineatum* (Linnaeus, 1758)	X		X	X	
Podops Laporte, 1833	*Podops inunctus* (Fabricius, 1775)	X		X		X

Supplementary material

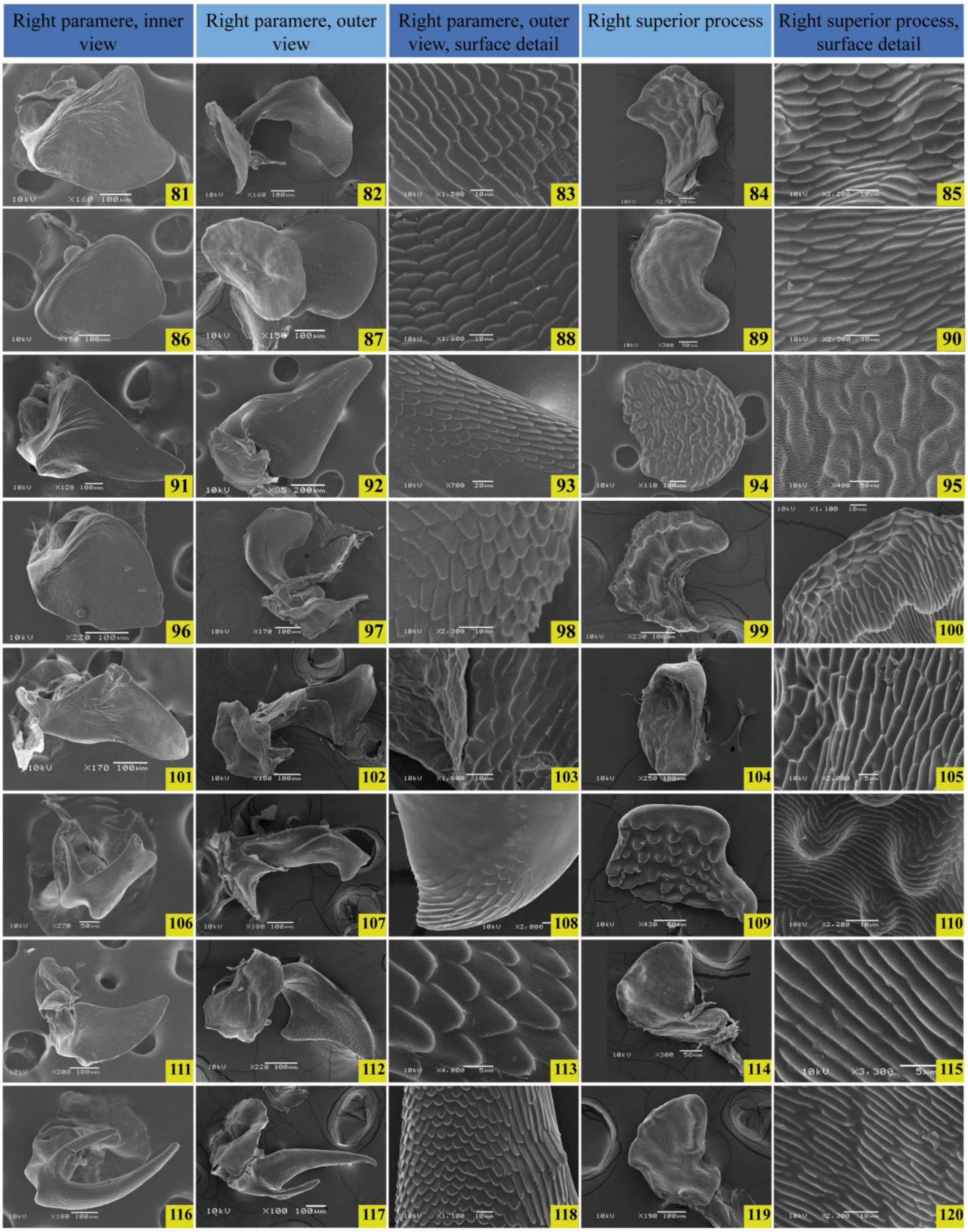
Supplementary material 1.



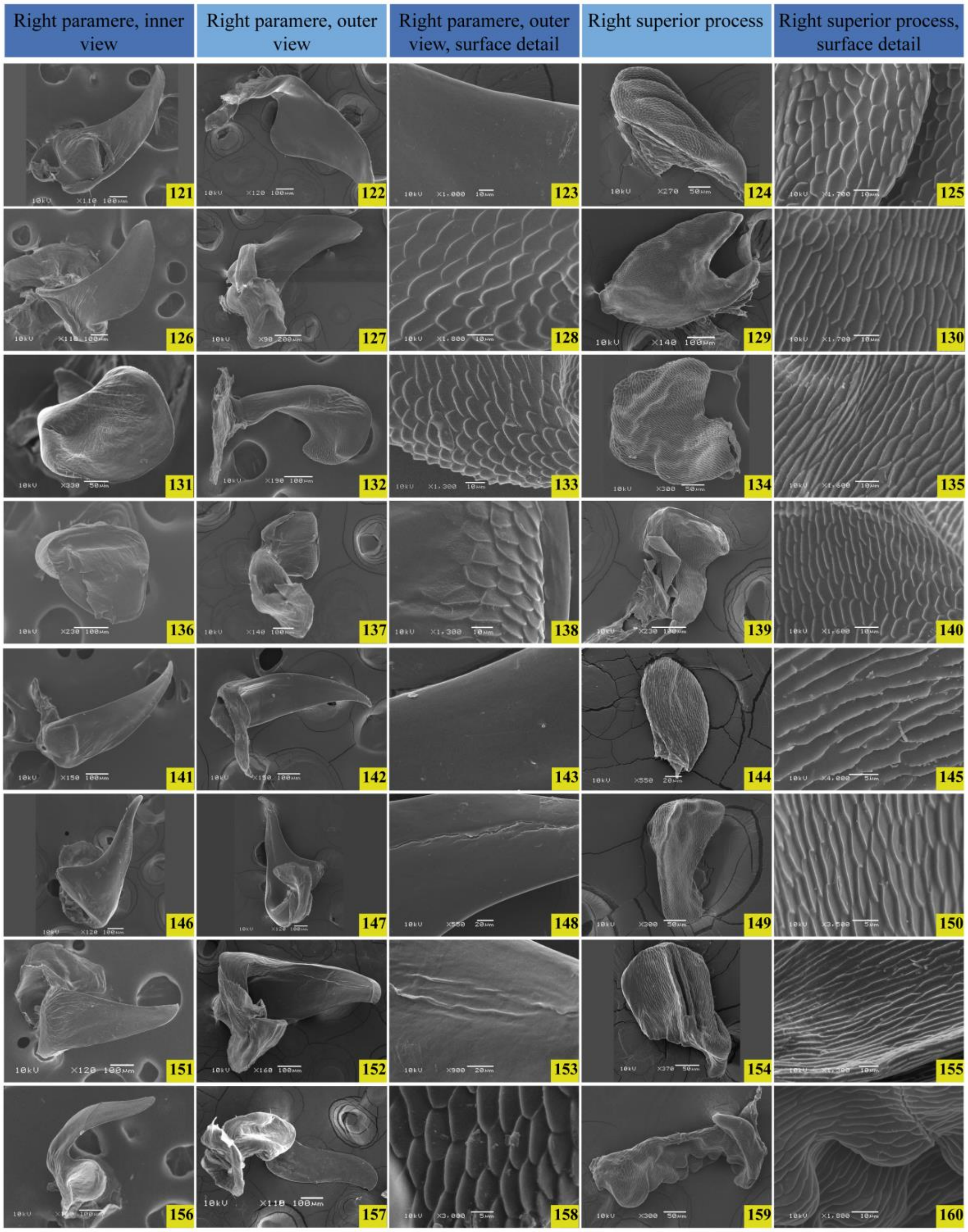
Supplementary material 1, figs. 1-40. Right paramere and right superior process. 1-5, *Afrius flavirostrum* (Signoret, 1861). 6-10, *Afrius purpureus* (Westwood, 1837). 11-15, *Alcaeorrhynchus grandis* (Dallas, 1851). 16-20, *Amyotea hamata* (Walker, 1868). 21-25, *Amyotea malabarica* (Fabricius, 1775). 26-30, *Anasida tenebrio* Karsch, 1892. 31-35, *Andrallus spinidens* (Fabricius, 1787). 36-40, *Apateticus lineolatus* (Herrich-Schäfer, 1840).



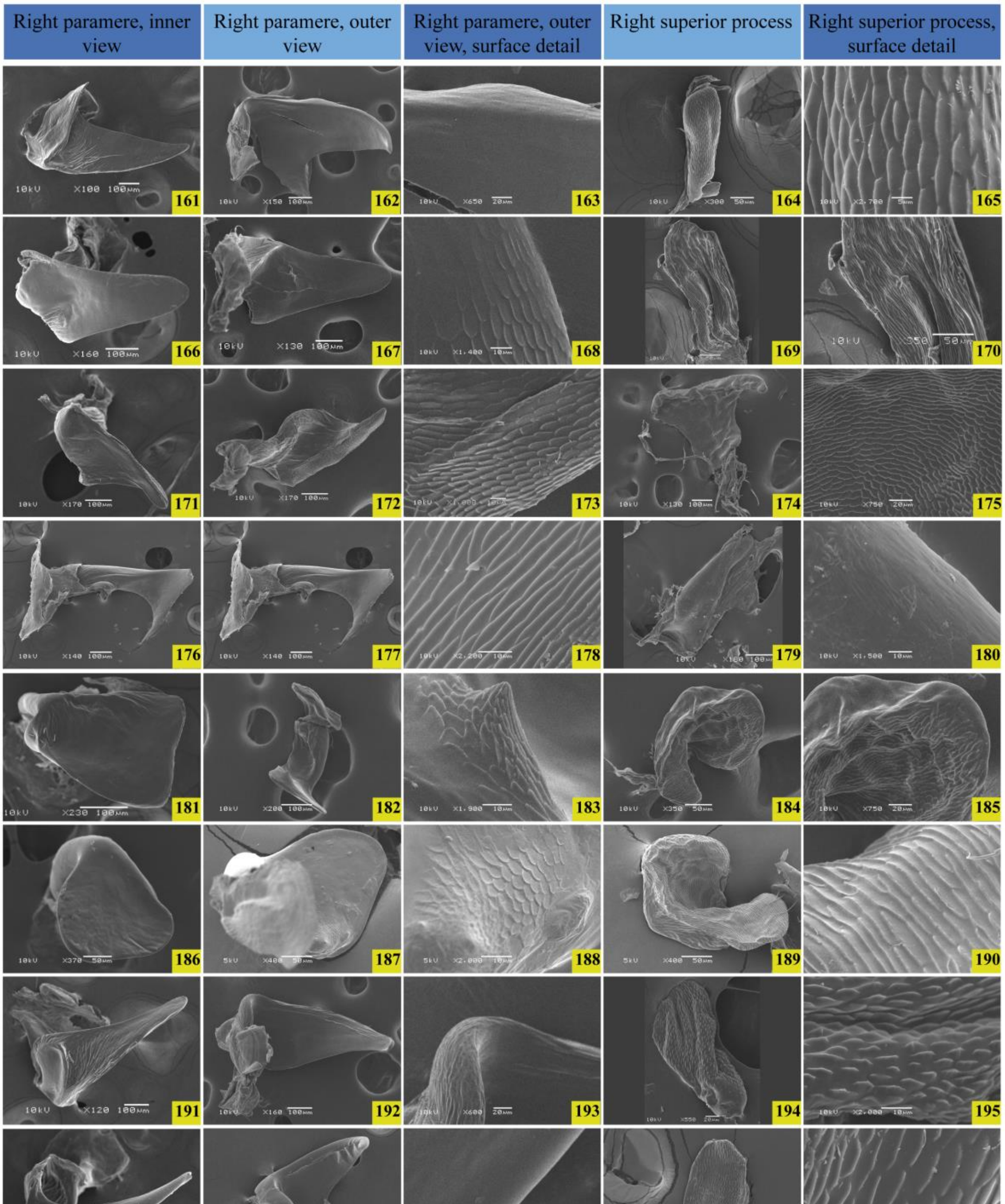
Supplementary material 1, figs. 41-80. Right paramere and right superior process of dorsal border. 41-45, *Apoecilus bracteatus* (Fitch, 1856) (Signoret, 1861). 46-50, *Apoecilus cynicus* (Say, 1831). 51-55, *Arma custos* (Fabricius, 1794). 56-60, *Blachia ducalis* Walker, 1867. 61-65, *Brontocoris tabidus* (Signoret, 1863). 66-70, *Canthecona discolor* (Palisot de Beauvois, 1811). 71-75, *Cantheconidea variabilis* (Vollenhoven, 1868). 76-80, *Cazira chiroptera* (Herrich-Schäffer,



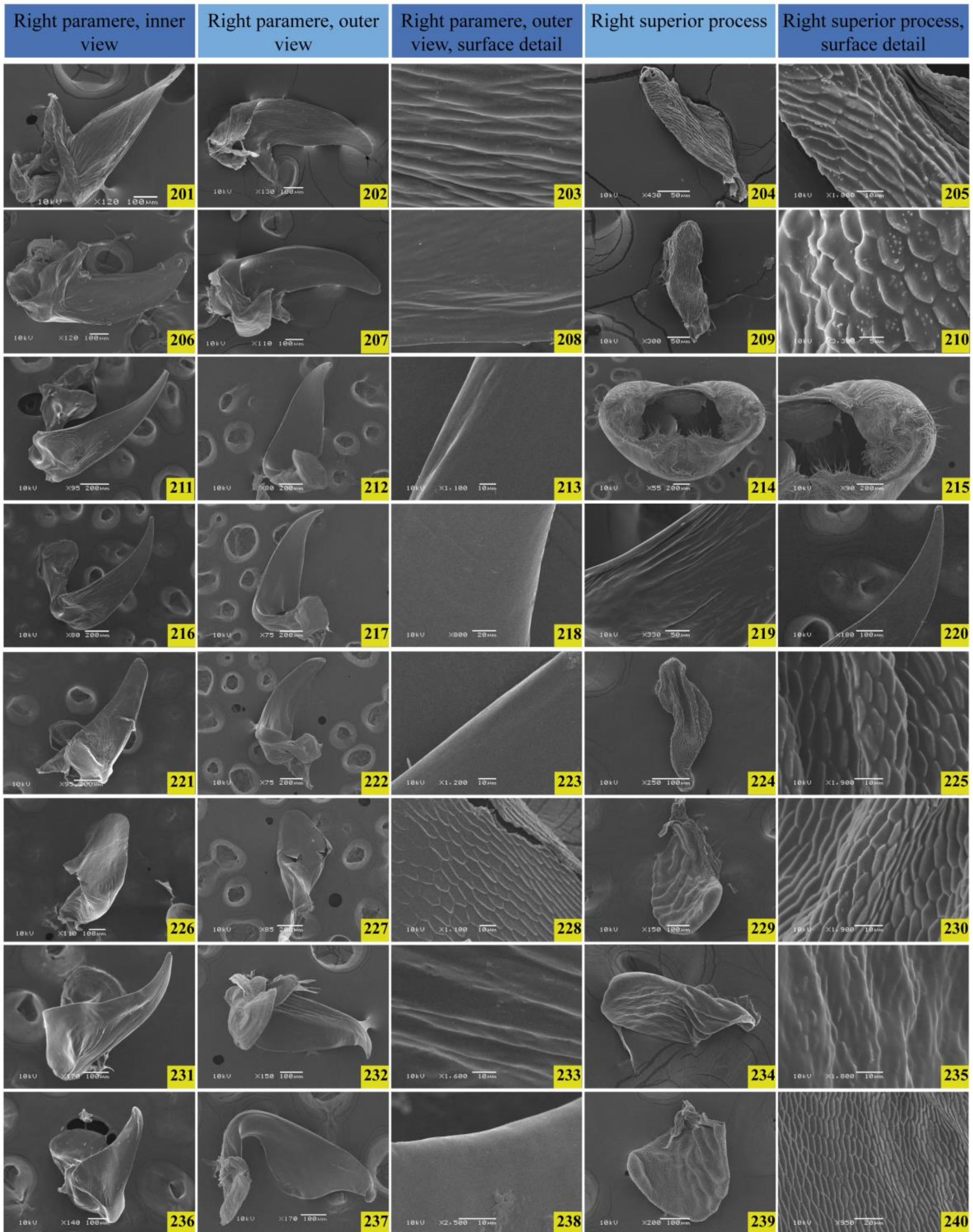
Supplementary material 1, figs. 81-120. Right paramere and right superior process of dorsal border. 81-85, *Cazira insignis* (Schouteden, 1907). 86-90, *Cazira verrucosa* (Westwood, 1834). 91-95, *Cecyrina platyrhinoides* Walker, 1867. 96-100, *Cermatulus nasalis* (Westwood, 1837). 101-105, *Comperocoris roehneri* (Philipi, 1862). 106-110, *Conquistator mucronatus* (Uhler, 1897). 111-115, *Coryzorhaphis carneolus* Erichson, 1848. 116-120, *Coryzorhaphis leucocephala*



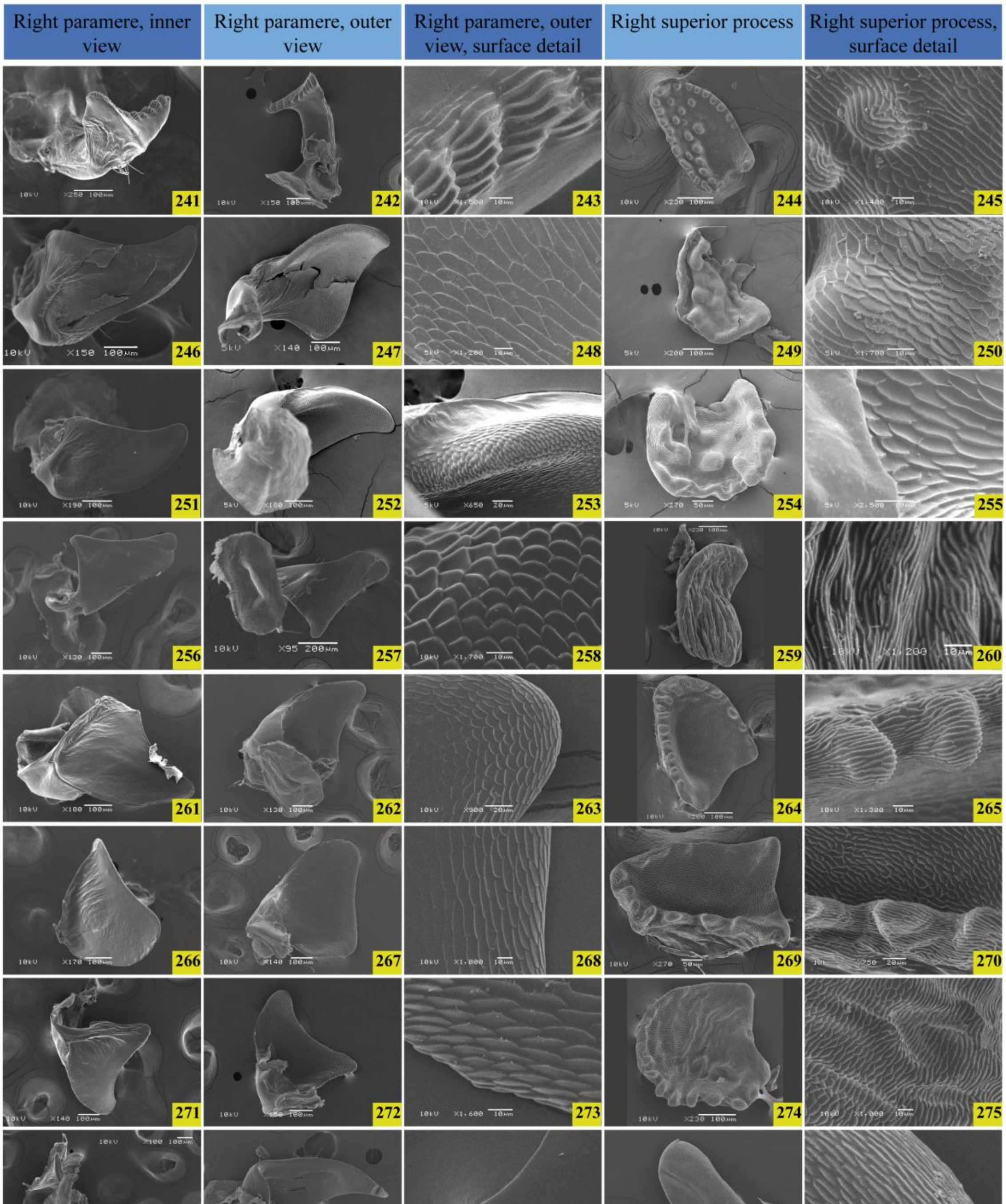
Supplementary material 1, figs. 121-160. Right paramere and right superior process of dorsal border. 121-125, *Damarius splendidulus* (Fabricius, 1803). 126-130, *Dinorhynchus dybowskyi* Jakovlev, 1876. 131-135, *Discocera cayennensis* Laporte, 1833. 136-140, *Discocera coccinea* (Fabricius, 1798). 141-145, *Dorycoris pavoninus* (Westwood, 1837). 146-150, *Ealda minax* Walker, 1867. 151-155, *Eocanthecona furcellata* (Wolff, 1801). 156-160, *Euthyrhynchus floridanus*



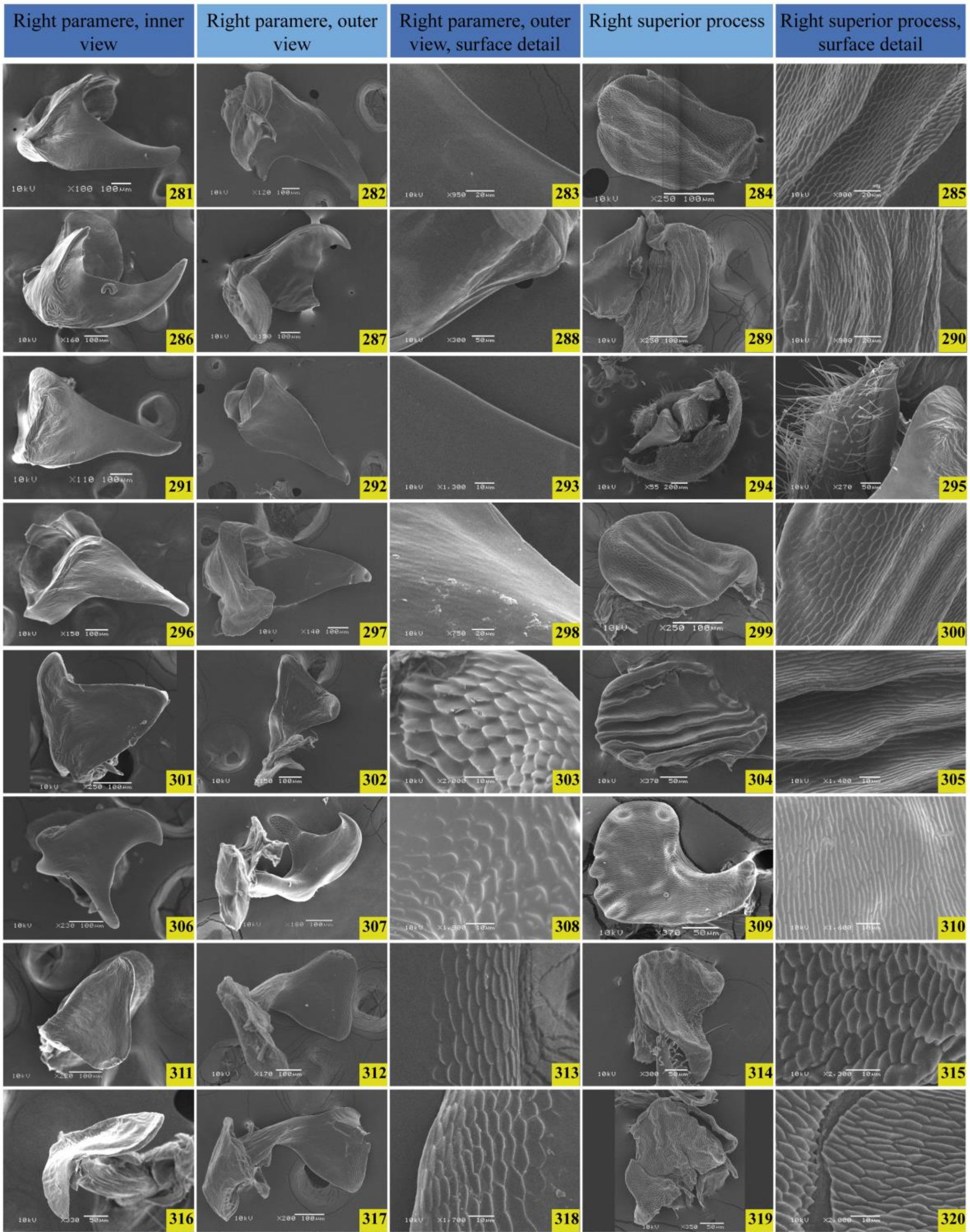
Supplementary material 1, figs. 161-200. Right paramere and right superior process of dorsal border. 161-165, *Friarius alluaudi* (Schouteden, 1905). 166-170, *Glypsus conspicuus* (Westwood, 1837). 171-175, *Glypsus kuhlgatzi* Schouteden, 1904. 176-180, *Hemallia signitenens* (Schouteden, 1905). 181-185, *Heteroscelis robustus* Thomas,1992. 186-190, *Heteroscelis servillei* Laporte, 1833. 191-195, *Hoploxys coeruleus* Dallas, 1851. 196-200, *Jalla dumosa* (Linnaeus, 1758).



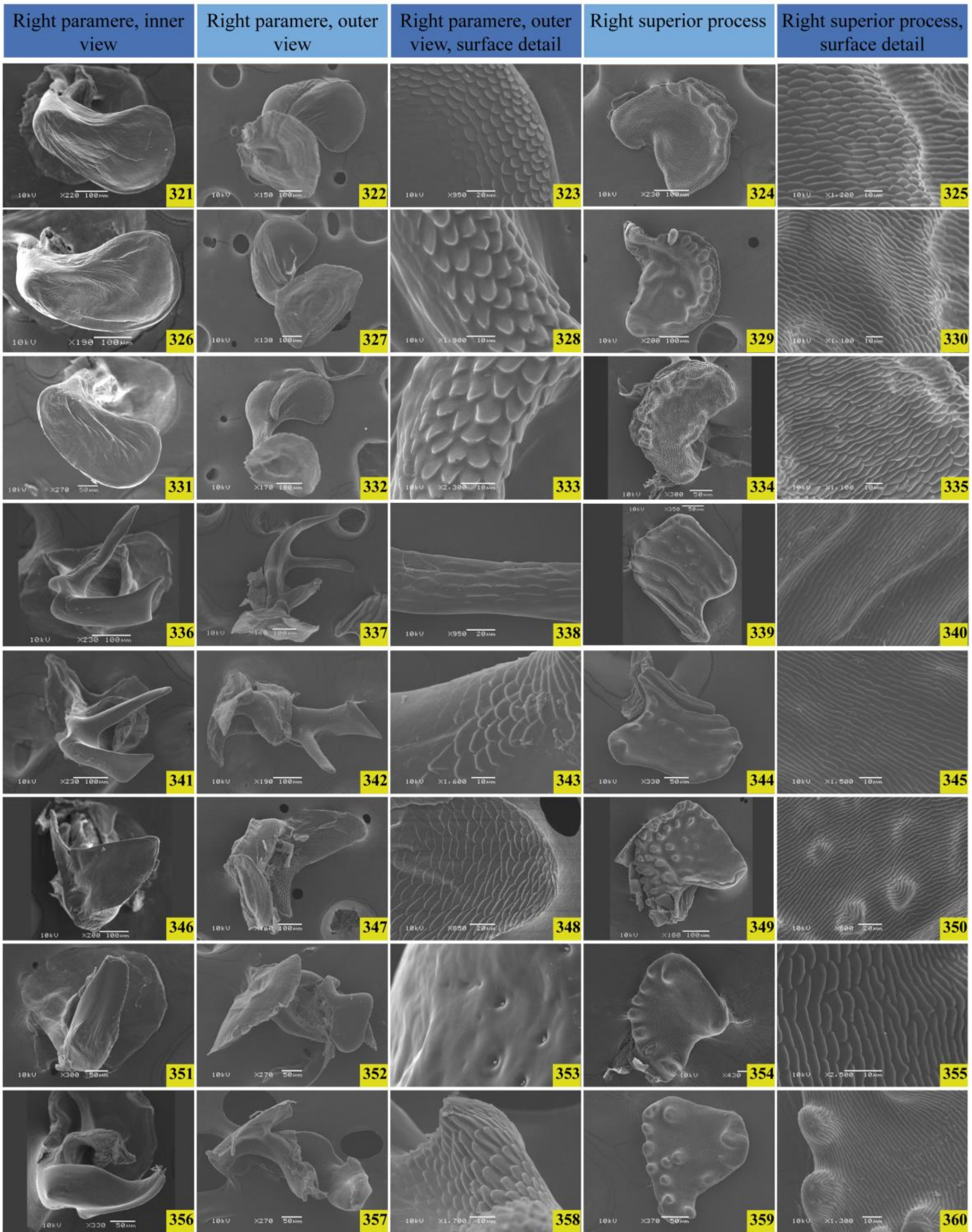
Supplementary material 1, figs. 201-240. Right paramere and right superior process of dorsal border. 201-205, *Jalloides opulentus* Distant, 1911. 206-210, *Jalloides rubricosa* (Stål, 1870). 211-215, *Leptolobus eburneatus* Karsch, 1892 (214, 215 - pygophore) . 216-220, *Leptolobus murrayi* Signoret, 1855 (219, 220 - details of paramere). 221-225, *Macrorhaphis acuta* Dallas, 1851. 226-230, *Marmessulus nigricornis* (Stål, 1865). 231-235, *Mecosoma mensor* Germar, 1837. 236-240, *Montrouzieriellus falleni* (Guérin-Méneville, 1831).



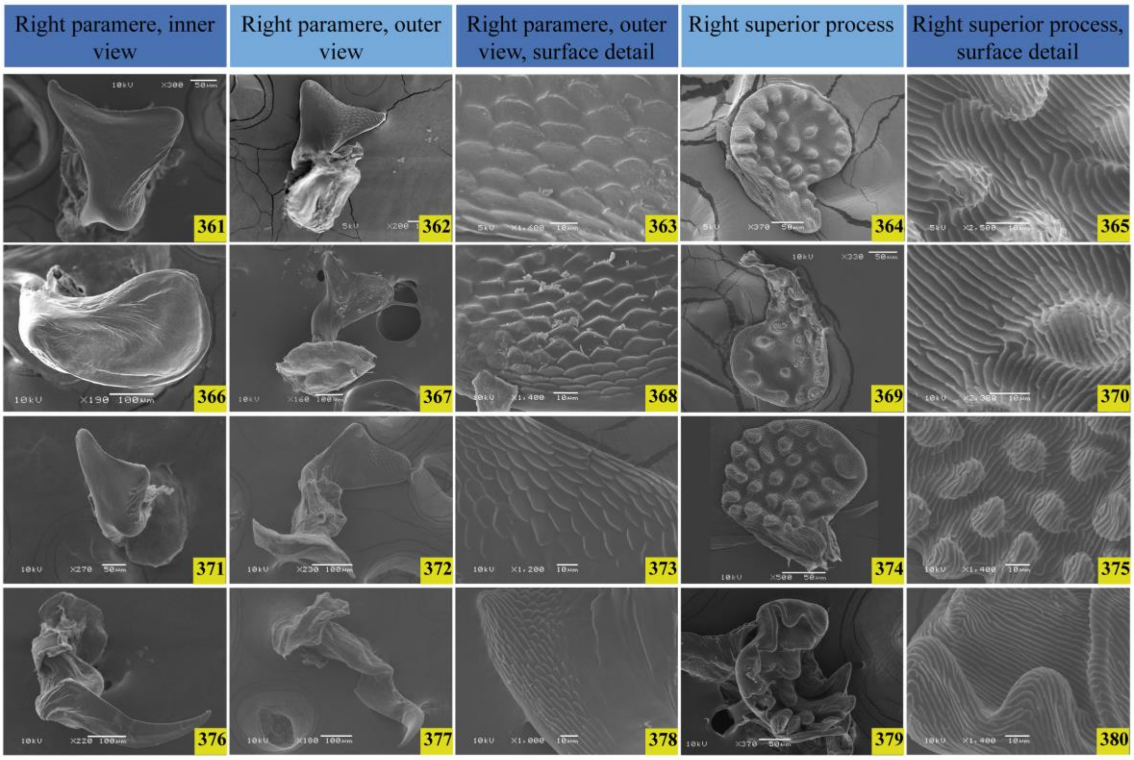
Supplementary material 1, figs. 241-280. Right paramere and right superior process. 241-245, *Oechalia schellembergi* (Guérin-Ménéville, 1831). 246-250, *Oplomus catena* (Drury, 1782). 251-255, *Oplomus cruentus* (Burmeister, 1835). 256-260, *Parajalla sanguineosignata* (Spinola, 1852). 261-265, *Perillus bioculatus* (Fabricius, 1775). 266-270, *Perillus circumcinctus* Stål, 1862. 271-275, *Perillus exaptus* (Say, 1825). 276-280, *Picromerus bidens* (Linnaeus, 1758).



Supplementary material 1, figs. 281-320. Right paramere and right superior process of dorsal border. 281-285, *Pinthaeus sanguinipes* (Fabricius, 1781). 286-290, *Planopsis silvatica* (Distant, 1890). 291-295, *Platynopiellus septendecimaculatus* (Palisot de Beavois, 1811) (294-295, Pygophore and detail of the superior process). 296-300, *Platynopus melanoleucus* (Westwood, 1837). 301-305, *Podisus maculiventris* (Say, 1831). 306-310, *Podisus nigrispinus* (Dallas, 1851). 311-315, *Rhacognathus americanus* Stål, 1870. 316-320, *Rhacognathus puncatatus* Linnaeus, 1878.

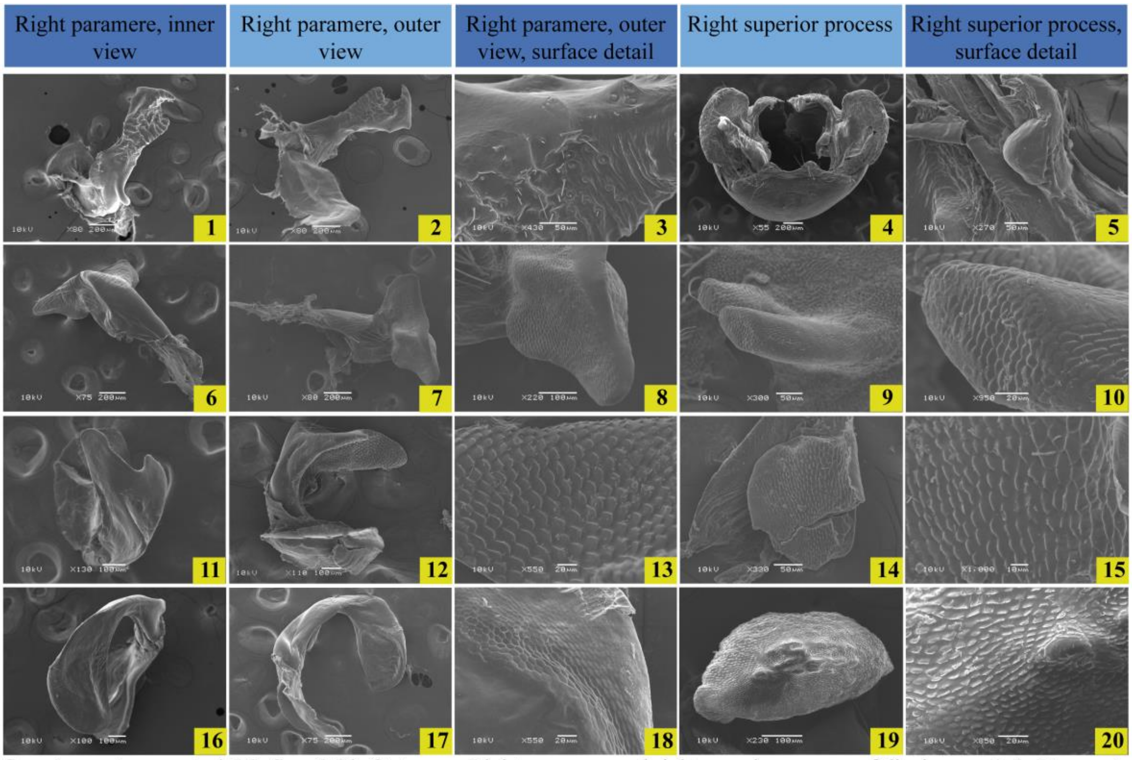


Supplementary material 1, figs. 321-360. Right paramere and right superior process of dorsal border. 321-325, *Stiretrus decastigmus* (Herrich-Shäffer, 1838). 326-330, *Stiretrus decemguttatus* (Lepeletier & Serville, 1828). 331-335, *Stiretrus erythrocephalus* (Lepeletier & Serville, 1828). 336-340, *Supputius cincticeps* (Stål, 1858). 341-345, *Supputius typicus* (Distant, 1889). 346-350, *Troilus luridus* (Fabricius, 1775). 351-355, *Tylospilus chilensis* (Spinola, 1852). 356-360, *Tylospilus cloelia* (Stål, 1862).

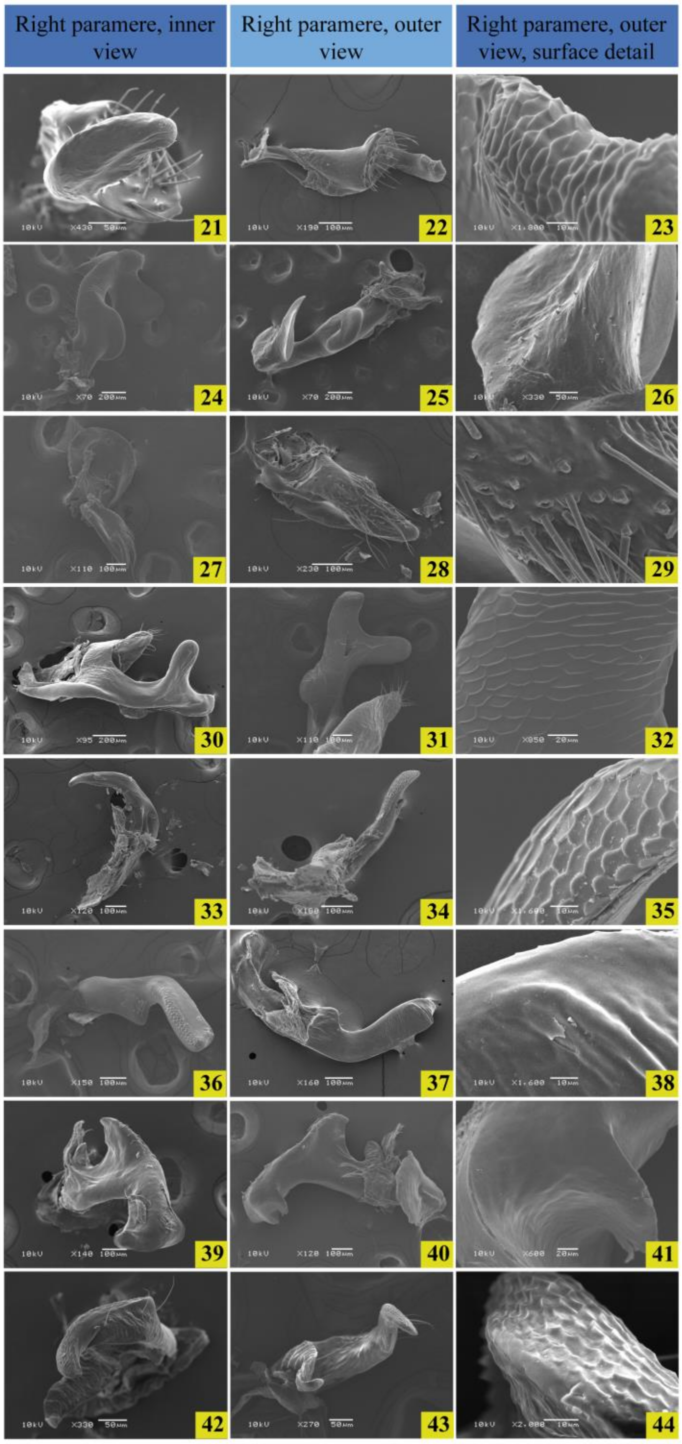


Supplementary material 1, figs. 361-380. Right paramere and right superior process of dorsal border. 361-365, *Tynacantha marginata* Dallas, 1851. 366-370, *Tyrannocoris nigriceps* Thomas, 1992. 371-375, *Tyrannocoris rex* Thomas, 1992. 376-380, *Zicrona caerulea* (Linnaeus, 1758).

Supplementary material 2.



Supplementary material 2, figs. 1-20. Outgroup. Right paramere and right superior process of diaphragm. 1-5, *Dinocoris gibbus* (Dallas, 1852) (4, pygophore). 6-10, *Edessa rufomarginata* (DeGeer, 1773). 11-15, *Nezara viridula* (Linnaeus, 1758). 16-20, *Tantia albopunctulata* (Bergroth, 1894).



Supplementary material 2, figs. 1-20. Outgroup. Right paramere. 21-23,*Cyrtocoris egeris* Packauskas & Schaefer, 1998. 24-26, *Antiteuchus mixtus* (Fabricius, 1787). 27-29, *Lincus spurcus* Rolston, 1983. 30-32, *Arvelius albopunctatus* (DeGeer, 1773). 33-35, *Murgantia varicolor* (Westwood, 1837). 36-38, *Proxys albopunctulatus* (Palisot de Beauvois, 1805). 39-41, *Graphosoma lineatum* (Linnaeus, 1758). 42-44, *Podops inunctus* (Fabricius, 1775).

CAPÍTULO 4

Phylogeny of the predatory stink bugs and the evolution of abdominal glandular patches (Hemiptera: Pentatomidae: Asopinae)*

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Abstract

Asopinae is a group of predatory stink bugs worldwide distributed, and currently classified in 64 genera and 295 species. Its species are characterized, mainly, by the robust labium modified for predation. Its monophyly was many times speculated but never tested with a cladistics methodology. We present the first phylogenetic hypothesis of monophyly of Asopinae, as well as the internal relationships among its genera. We do not consider classifying the subfamily in tribes because we did not find sufficiently distinctive and exclusive features for the groups of genera recovered monophyletic by the cladistics analysis. Moreover, we present an ancestral state reconstruction study which indicates that the presence of male abdominal glandular patches is homologous for one group of species inside Asopinae.

Introduction

Asopinae is the only subfamily of Pentatomidae presenting predatory habits, and this secondary condition within the family is the most famous feature of the group (Gapud, 1991; Thomas, 1992, 1994; De Clercq, 2008; Grazia *et al*., 2015), which makes them potential controllers of diverse agricultural pests, mainly of defoliation caterpillars attacking crops worldwide (e.g. Zanuncio *et al*., 1994, 2011; De Clercq *et al*., 1998;

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Malaguido & Panizzi, 1998; Cavalcanti *et al*., 2000; Oliveira *et al*., 2002; Vivan *et al*., 2002; Angelini & Boiça Jr., 2009; Ribeiro *et al*., 2010; Zibaee *et al*., 2012; Claver & Jaiswal, 2013; Vacari, 2013; Magistrali *et al*., 2014). The biological control allows the reduction of chemical compounds in agricultural production systems. The asopines are mostly generalists, and many species suck plant fluids and water probably as a complementary diet, or when prey are scarce (De Clercq, 2000, 2008).

Allied to the predatory habit, the asopines have a robust labium, with the first segment articulated with full forward extension capability (Gapud, 1991; Thomas, 1992). Besides that, they have an apparently rectangular head, with labium inserted right below labrum, profemora frequently endowed with thorn, very numerous tibial bristles, superior process of dorsal rim in the pygophore, and phallus divided in basal and apical theca (Gapud, 1991; Thomas, 1992, 1994; Gapon & Konstantinov, 2006; Barão *et al*., 2013; Brugnera *et al*., 2019; Roell *et al*., in press; Roell *et al*. in prep.). Furthermore, they are very variable in color (Thomas, 1992, 1994), and 26 genera have male pheromone abdominal glandular patches (Thomas, 1992; Kochenborger, 2018). The glandular patches were studied in a comparative morphology perspective, and fifteen morphological characters were proposed by Kochenborger (2018), but nothing is known about the evolution of these structures in Asopinae.

Asopinae is classified in 64 genera and 295 species (Table 1), distributed worldwide. Africa is home to 15 genera of Asopinae, America is to 28, Asia is to 18, Europe is to 7, and Oceania is to 11 (Thomas, 1992, 1994) (Table 1). Thomas (1992, 1994) made available identifications keys for the genera of Asopinae, and also for the species of the western hemisphere. There is no identification key for the species of eastern hemisphere.

The monophyly of Asopinae has been speculated (Schouteden, 1907; McDonald, 1966; Thomas, 1992; Gapon & Konstantinov, 2006), and Pendergrast (1957) suggested that Asopinae, Discocephalinae, Podopinae (Graphosomatini) and Phyllocephalinae should form a natural group based on their very similar structure of male genitalia. McDonald (1966) indicated that Asopinae has a similar structure of the male genitalia with Podopinae and Pentatomini. Years later, Gapud (1991) proposed that Asopinae is sister of a Pentatominae group ("Penta 10") formed by some species of the Strachiini tribe: *Eurydema* Laporte, 1833, *Murgantia* Stål, 1862, *Stenozygum* Fieber, 1860, and *Strachia* Hahn, 1833 (Rider, 2019).

Based on morphological characteristics, four tribes have already been proposed for Asopinae: Discoceraria Schouteden, 1907 (= Stiretrides Amyot & Serville, 1843), Asoparia Schoudeten, 1907 (= Asopides Amyot & Serville, 1843), Jallini Dupuis, 1949, and Stilbotini Gapud, 2015. Furthermore, Gapon (2008) proposed, in his doctoral thesis, the division of the subfamily in five tribes: Amyoteini Schouteden, 1907, Glypsini Gapon, 2008 *nomen nudum*, Jallini Dupuis, 1949, Platynopini Gapon, 2008 *nomen nudum*, and Stiretrini Amyot & Serville, 1843, but this study has not yet been published.

In this work we present the first phylogenetic analysis for Asopinae seeking to evaluate: a) its monophyly and its relationships with other subfamilies of Pentatomidae; b) intergeneric relationships; and c) the validity of tribes and groups of genera already proposed to the subfamily. We also provide an ancestral state reconstruction study for the characters of male abdominal glandular patches evaluating the distribution of these characters along the phylogeny, and the evolution of these structures in Asopinae.

Material and methods

Taxon sampling and material preparation

A total of 101 taxa were included in the cladistic analysis, comprising 87 species in the ingroup, which includes at least one species of each known genera of Asopinae. The outgroup includes most subfamilies of Pentatomidae (Grazia *et al*., 2008), which is formed by one species of Cyrtocorinae (*Cyrtocoris egeris* Packauskas & Schaefer, 1998), four Discocephalinae (*Antiteuchus mixtus* (Fabricius, 1787); *Dinocoris gibbus* (Dallas, 1852); *Lincus spurcus* Rolston, 1983; *Ochlerus rusticus* Breddin, 1910), one Edessinae (*Edessa rufomarginata* (De Geer, 1773)), four Pentatominae (*Arvelius albopunctatus* (DeGeer, 1773); *Murgantia varicolor* (Westwood, 1837); *Nezara viridula* (Linnaeus, 1758); *Proxys albopunctulatus* (Palisot, 1811)), one Phyllocephalinae (*Tantia albopunctulata* (Bergroth, 1894)), two Podopinae (*Graphosoma lineata* (Linnaeus, 1758); *Podops inunctus* (Fabricius, 1775)), and *Galgupha schulzii* (Fabricius, 1781) as the root (Thyreocoridae Amyot & Serville, 1843). The species of Asopinae included in the analysis are listed in the table 1, as well as where are deposited the type-specimens of most of them. Specific identifications were confirmed through of the exam of type-specimens (Table 1), of the identifications keys from Thomas (1992, 1994), and through the original descriptions of the studied taxa.

The analyzed specimens pertain to the following institutions (acronyms according Evenhuis, 2019):

AMNH - American Museum of Natural History (New York, United States of America).

AMS - Australian Museum (Sydney, Australia).

BHMH - Universidade Federal de Minas Gerais, Museu de Historia Natural (Belo Horizonte, Brazil).

CLEV - Cleveland Museum of Natural History (Cleveland, United States of America).

DARC - David A. Rider Collection (Fargo, United States of America).

DZUP - Museu de Entomologia Padre Jesus Santiago Moure, Universidade Federal do Paraná (Curitiba, Brazil).

EMG - Entomologisches Museum Geyer, Insekten Dauerausstellung (Geyer, Germany).

FSCA - Florida State Collection of Arthropods (Gainesville, United States of America).

INHS - Illinois Natural History Survey (Champaign, United States of America).

INPA - Instituto Nacional de Pesquisas da Amazônia, Coleção Sistemática da Entomologia (Amazonas, Brazil).

MACN - Museo Argentina de Ciencias Naturales "Bernardino Rivadavia" (Buenos Aires, Argentina).

MLPA - Universidad Nacional de La Plata, Museo de la Plata (La Plata, Argentina).

MCPM - Milwaukee City Public Museum (Milwaukee, United States of America).

MNHN - Muséum National d'Histoire Naturelle (Paris, France).

MNRJ - Universidade do Rio Janeiro, Museu Nacional (Rio de Janeiro, Brazil).

MZLS - Museé Zoologique (Lausanne, Switzerland).

MZUSP - Museu de Zoologia da Universidade Federal de São Paulo (São Paulo, Brazil).

NHMUK - The Natural History Museum (London, United Kingdom).

NHMW - Naturhistorisches Museum Wien (Wien, Austria).

NHRS - Naturhistoriska riksmuseet (Stockholm, Sweden).

NMPC - National Museum (Prague, Czech Republic).

OUMNH - Oxford University Museum of Natural History (Oxford, United Kingdom).

RBINS - Royal Belgian Institute of Natural Sciences (Brussels, Belgium).

RMCA - Musee Royal de l'Afrique Centrale (Tervurem, Belgium).

SIM - Staten Island Museum (Staten Island, United States of America).
UFRG - Universidade Federal do Rio Grande do Sul, Instituto de Biologia (Porto Alegre, Brazil).
UFRJ - Universidade Federal do Rio de Janeiro (Rio de Janeiro, Brazil).
UMSP - University of Minnesota (St. Paul, United States of America).
VMNH - Virginia Museum of Natural History (Martinsville, United States of America).
ZFMK - Zoologisches Forschungsmuseum "Alexander Koenig" (Bonn, Germany).
ZMHB - Museum für Naturkunde der Humboldt-Universität (Berlin, Germany).
ZMUC - University of Copenhagen, Zoological Museum (Copenhagen, Denmark).

Phallus and female ectodermal ductus were studied after boiling in 10% KOH aqueous solution. The terminology of Baker (1931), Dupuis (1970), Gapon & Konstantinov (2006) & Roell *et al*., in press was adopted for genital structures. The terminology of Kment & Vilímová (2010) and Barão *et al*. (2017) was adopted for cuticular structures of the external scent efferent system.

Cladistic analysis

We present two hypothesis for the Asopinae phylogeny, the first (A) including all taxa examined, even though by photos or descriptions (Figs. 1–5), and the second (B) excluding the taxa examined only by photos or bibliography (*Australojalla versicolor* (Distant, 1911), *Bulbostethus transversalis* Ruckes, 1963, *Martinina inexpectata* Schouteden, 1907, *Martinina prima* (Distant, 1908), *Ornithosoma rivierei* Kormilev, 1957, *Parealda bouvieri* Schouteden, 1907, *Ponapea arachnoides* Ruckes, 1963, and *Pseudanasida fallax* Schouteden, 1907) (Table 1) (Figs. 1, 6, supplementary material 1) because we could not code most of characters for these specimens, generating block bias, which could impair the accuracy of the results (Prevosti & Chemisquy, 2010). The purpose of including these taxa in the analysis is to have at least one species of each known genus of Asopinae. The data for *Ornithosoma rivierei* and *Ponapea arachnoides* were based only on bibliography (Kormilev, 1957; Ruckes, 1963; Thomas, 1992, 1994) because their type specimens were not found (on Argentinian museums for the first and on north-american museums for the second). Thomas (1992) said he has not seen the type of *O. rivierei*, but he examined the holotype of *P.*

arachnoides on AMNH (Thomas, 1994). Ruth Salas (AMNH) and Jim Boone (BPBM, Bernice P. Bishop Museum, Hawaii) could not locate *P. arachnoides*.

A data matrix with 191 morphological characters were constructed in the software Mesquite v. 3.10 (Maddison & Maddison, 2017) based on a comparative study of the adult external morphology (characters 1 to 130), female external and internal genitalia (characters 131 to 164), and male external and internal genitalia (characters 165 to 191) (Supplementary material 2). Nonapplicable data were recorded as '–' and missing data as '?'. All characters were coded non-additively (Fitch, 1971). Character polarization followed the outgroup method (Nixon & Carpenter, 1993), and the most parsimonious trees where searched in TNT (Goloboff *et al*., 2008) by heuristic searches (random Wagner tree, 999 replications, tree bisection reconnection saving 99 trees per replication) under equal (EW) and implied weighting (IW). The IW analyses were performed according Mirande (2009), with 11 K-values calculated with a fit range of 50 to 90% of a perfectly hierarchical character. Strict consensus trees were calculated for each K-value. A similarity matrix of Subtree Pruning Regrafting (SPR) distances was constructed to compare the 11 strict consensus K-value. The presented classifications under implied weighting are based on the trees with higher sums of similarity of SPR distances, indicating more stable K-values (Mirande, 2009; Garbelotto *et al*., 2014). Relative Bremer support (subtrees up to ten extra steps; relative fit difference of 0.9) (Bremer 1994) was calculated. Visualization of cladograms was performed in WinClada 1.00.08 (Nixon 2002).

Ancestral reconstruction

Ancestral state reconstruction was provided for ten significant traits about the external structure of the male abdominal glandular patches. The characters 114 to 120 about the distribution of glandular patches were united only in one character regarding the presence and absence of glandular patches in order to know in which node the GPs have probably emerged (Fig. 5). Characters and codes are from Kochenborger (2018). We also sampled taxa not analyzed by Kochenborger (2018), but for these cases scanning electron microscopy were not made. Using Mesquite's ASR package (v3.10; Maddison & Maddison, 2017), likelihood criterion and the Markov k-state one parameter model (Mk1) we traced the characters over the tree generated by a data matrix that includes all taxa and all characters evaluated (hypothesis A, Fig. 5) seeking to produce results on the most reliable and accurate phylogeny (Deleporte, 1993; De Queiroz, 1996; Miller, 2003). Likelihood scores were used to evaluate results and the potential evolutionary explanations for the emergence of glandular patches and its transformations.

A correlation test likelihood-based was provided to test the independent evolution of the following features: a) presence or absence of male abdominal glandular patches (GPs) with presence or absence of pores; b) setae parallel or angled to abdomen with setae sparse or densely grouped. The analysis was performed through Pagel’s test in Mesquite v.3.10 (Pagel, 1994; Maddison & Maddison, 2017) with 1000 simulations. Owing to a limitation of Pagel’s test, taxa with missing data were excluded while performing the test.

Results and discussion

Morphological characters
(See the supplementary materials SM3, SM4 for illustrations)

Head:

1. Head, region before the anterior line of eyes, shape: (0) subtriangular (SM3, Fig. 1 A, D); (1) subquadrate (SM3, Fig. 1 B, E); (2) subrectangular (wider than long) (SM3, Fig. 1 C, F); (3) subrectangular (longer than wide) (SM3, Fig. 1G, I); (4) tongue-like (SM3, Fig. 1 H, J).

Barreiro (2015) commented that the head of the asopines is rectangular, apparently unique for the group. Once the base of head can be more or less long (Grazia *et al*., 2008), and the size of eyes can be variable (Barreiro, 2015), we observed the morphology of the head before the anterior line of eyes, and this region is generally subquadrate in Asopinae.

2. Base of head, shape: (0) not forming a neck; anterior margin of pronotum near eyes; (1) forming a neck; anterior margin of pronotum distant from eyes (SM3, Fig. 1I) (Grazia *et al*., 2008).

3. Head, lateral view, shape: (0) flat (SM3, Fig. 1K); (1) convex (SM3, Fig. 1L).

4. Head, size: (0) wider than long (SM3, Fig. 1B); (1) longer than wide (SM3, Fig. 1I); (2) as long as wide (Hasan & Kitching, 1993; Barreiro, 2015).

Here we measured the width of the head including eyes, and the length until the end of mandibular plates.

5. Interocular distance, size: (0) longer than the head length; (1) longer than 3\4 of the head length; (2) subequal to the head length; (3) up to 3\4 of the head length (SM3, Fig. 1A) (Hasan & Kitching 1993, Campos & Grazia 2006, Barreiro, 2015).

We measured the head length from the posterior line of eyes to the apex of mandibular plates

6. Eyes, size: (0) as long as wide; (1) longer than wide; (2) wider than long (SM3, Fig. 1J) (Barreiro, 2015).

7. Eyes, size: (0) less than half of interocular distance; (1) half the interocular distance or more (SM3, Fig. 1O) (Campos & Grazia, 2006).

8. Eyes, posterior margin, carina: (0) absent; (1) present (SM3, Fig. 1I) (Campos & Grazia, 2006).

9. Occeli, width related to the eye width: (0) less than 1\3 of the eye width (SM3, Fig. 1C); (1) 1\3 of the eye width or more (Barreiro, 2015).

10. Head, distance between the inner limit of eye and the external limit of occelli: (0) equal the occelli width; (1) practically inexistent; (2) twice the occelli width; (3) half the occelli width; (4) 1.5 times the ocelli width (SM3, Fig. 1P) (5) 3 times the ocelli with or more (Campos & Grazia, 2006).

11. Mandibular plates, punctuation: (0) conspicuous (SM3, Fig. 1B); (1) inconspicuous (SM3, Fig. 1M).

The punctuations are absent or almost invisible in some species (inconspicuous).

12. Mandibular plates, punctuation, distribution: (0) regular (SM3, Fig. 1J); (1) irregular (SM3, Fig. 1N).

The punctuations are regularly distributed when the whole surface of mandibular plates is covered by them, and the space among them is similar. Irregular punctuations can be observed when they are distributed generally only on disc of mandibular plates, and the distance among them is variable. Non-comparable to taxa with inconspicuous punctuations (character 11).

13. Mandibular plates, lateral margins, position: (0) plane, at the same level of the disc of mandibular plates and clypeus (SM3, Fig. 1K); (1) elevated in relation to the disc of mandibular plates and clypeus (SM3, Fig. 1L).

The mandibular plates of *Leptolobus* Signoret, 1855 are dorsally directed, so its lateral margins are elevated in relation to its disc.

14. Mandibular plates, lateral margins: (0) not contiguous with antenniferous tubercles (SM3, Fig. 1A); (1) contiguous with antenniferous tubercles (SM3, Fig. 1N).

15. Mandibular plates, position: (0) parallel (SM3, Fig. 1B); (1) convergent (SM3, Fig. 1J) (Roell & Campos, 2015).

16. Mandibular plates, length: (0) in line with clypeus; (1) longer than clypeus (SM3, Fig. 1O); (2) shorter than clypeus (Gapud, 1991; Barreiro, 2015).

Some species of Asopinae (e.g. *Afrius purpureus* (Westwood, 1837)) present intraspecific variation to this character, which were coded as multistate.

17. Mandibular plates, inner margins, shape: (0) convex or sinuous (SM3, Fig. 1I); (1) straight (SM3, Fig. 1M) (Bianchi *et al*., 2017)

Multistate for *Afrius flavirostrum* (Signoret, 1861).

18. Clypeus, apex, shape: (0) plane in relation to base (SM3, Fig. 1P); (1) depressed in relation to base (SM3, Fig. 1O).

Multistate for *Eocanthecona furcellata* (Wolff, 1801), *Mecosoma mensor* Germar, 1837, and *Platynopiellus septendecimaculatus* (Palisot de Beavois, 1811).

19. Antennal tubercle, head in dorsal view: (0) invisible; (1) visible (SM3, Fig. 1O) (Gapud, 1991; Grazia *et al*., 2008; Barreiro, 2015)

20. Antennal tubercle, lateral distal margin, shape: (0) straight; (1) convex (SM3, Fig. 1K).

21. Antennal tubercle, ventral distal margin, shape: (0) straight; (1) convex.

22. Antennae, longer antennomere: (0) V; (1) IV; (2) III; (3) II; (4) IV e V.

Gapud (1991) pointed a difference in the lengths of the antennomeres II and III, and said that the character regarding the size of antennal segments could be useful together with other characters.

Marmessulus nigricornis (Stål, 1865) and *Montrouzieriellus falleni* (Guérin-Méneville, 1831) have the antennomeres IV and V equally long, and these are longer than precedent antennomeres (state 4).

23. Antennomere IV: (0) cylindrical; (1) enlarged.

The IV antennomere dorso-ventrally flattened and dilated is one diagnostic characteristic of *Discocera*, *Cecyrina* Walker, 1867 and *Colpothyreus* Stål, 1867 (Thomas, 1992, 1994). In our analysis, this is one evidence that corroborates the monophyphy of *Discocera*, and the sister relation of *Cecyrina* with *Colpothyreus*.

24. Distance between labium and labrum: (0) up to half of the first labium segment length (SM3, Fig. 2C); (1) more than half of the first labium segment length (SM3, Fig. 2B); (2) almost nonexistent, labium inserted right below labrum (SM3, Fig. 2A) .

Gapud (1991) defined Asopinae as the most clearly defined group in comparison with other Pentatomidae based in several characteristics, including the “labral-labial-buccular arrangement”, i.e the labium is juxtaposed to labrum and bucculae (state 2). Besides that, he said that this arrangement can be found in Phyllocephalinae. Barreiro (2015) pointed this condition either to some species of Edessinae. This is a synapomorphic condition for Asopinae, but present also in *Tantia albopunctulata* (Phyllocephalinae), and *Cyrtocoris egeris* (Cyrtocorinae).

25. Labium, first segment, insertion: (0) before the middle of bucculae (SM3, Fig. 2A); (1) after the middle of bucculae (SM3, Fig. 2B) (Roell & Campos, 2015).

26. Labium, first segment, position: (0) not surpassing the posterior margin of bucculae (SM3, Fig. 2C); (1) surpassing the posterior margin of bucculae (SM3, Fig. 2B) (Campos & Grazia, 2006; Barreiro, 2015).

27. Labium, length related to the length of ventral thorax: (0) 1/5 longer (SM3, Fig. 2D); (1) subequal; (2) 1/3 longer; (3) twice longer; (4) shorter; (5) 2/5 longer.

The size of labium has been evaluated according to its reach (Gapud, 1991; Campos & Grazia, 2006; Barreiro, 2015). Once some species have long heads (e.g. *Heteroscelis servillei* Laporte, 1833), with the labium arising further on in comparison with other species, we choose to evaluate the length of labium in comparison with the length of ventral thorax (from anterior limit of prothorax to posterior limit of metathorax). For the sampled taxa we found six variables, expressed in the states 0 to 5.

28. Labium, segment I, size: (0) about twice longer than wide (SM3, Fig. 2E); (1) 3,5 times longer than wide; (2) 2,5 times longer than wide; (3) 3 times longer than wide (4) 5 times longer than wide.

The most famous characteristic defining Asopinae is the large labium (Thomas, 1992, 1994; Grazia *et al*., 2015, Barreiro, 2015), however, some species have a narrower labium (e.g. *Heteroscelis servillei*, *Stilbotes semperi*) in comparison with other asopines, as well as the segments I to IV oftentimes have different widths to each other. Therefore, we evaluate the proportion of the first segment. In Asopinae the first segment is generally wide, about twice longer than wide.

29. Labium, segment II, shape: (0) anterior and posterior margins almost equal in width (SM3, Fig. 2C); (1) narrower on the anterior margin, apparently triangular (SM3, Fig. 2A).

30. Labium, segment II, length: (0) shorter than the combined segments III and IV (SM3, Fig. 2A); (1) longer than the combined segments III and IV.

This characteristic is used on identification keys and descriptions by Thomas (1992, 1994). The state 1 is one of the evidences that corroborate the monophyly of *Supputius* Distant, 1889.

31. Shorter labium segment: (0) IV; (1) I; (2) III; (3) III and IV (4) I and IV.

32. Bucculae, posterior margins: (0) contiguous (SM3, Fig. 2F); (1) evanescent (SM3, Fig. 2G) (Gapud, 1991; Barreiro, 2015).

33. Bucculae, ventral view, position: (0) lateral to the base of the lip, rectilinear (SM3, Fig. 2H); (1) facing the base of lip (SM3, Fig. 2L) (Gapud, 1991)

34. Bucculae, anterior region, shape: (0) not developed (SM3, Fig. 2H); (1) developed and rounded (2) developed and spined (SM3, Fig. 2L) (Barreiro, 2015; Roell & Campos, 2015)

Thorax:

35. Pronotum, lateral margin, anterior half, shape: (0) smooth (SM3, Fig. 2I); (1) crenulated (SM3, Fig. 2J); (2) serrated (SM3, Fig. 2K) (Garbelotto *et al*., 2013).

36. Pronotum, lateral smooth margin, anterior half, shape: (0) carinated (SM3, Fig. 2I); (1) not carinated.

Not comparable in species with crenulated or serrated pronotum.

37. Pronotum, lateral margin, shape: (0) convex (SM3, Fig. 3B); (1) sinuous (SM3, Fig. 2I); (2) rectilinear (SM3, Fig. 3A).

38. Pronotum, anterolateral margin, projection: (0) absent; (1) present (SM3, Fig. 2J).

39. Pronotum, anterolateral margin, projection, extension: (0) in line with the lateral margin of eyes; (1) surpassing the lateral margin of eyes for half an eye width or more; (2) surpassing the lateral margin of eyes for less than half an eye width; (3) not reaching the lateral margin of eyes.

40. Pronotum, humeral angles, shape: (0) not emarginated (SM3, Fig. 3A); (1) emarginated (SM3, Fig. 3C) (Gapud, 1991).

41. Pronotum, humeral angles, position in frontal view: (0) plane in relation to the disc (SM3, Fig. 3D); (1) dorsally directed (SM3, Fig. 3E); (2) depressed (SM3, Fig. 3F).

42. Pronotum, posterior angles, shape: (0) rounded (SM3, Fig. 2J); (1) triangular (SM3, Fig. 3A).

43. Pronotum, posterior angles, shape: (0) in line with posterior margin (SM3, Fig. 3B); (1) projected beyond posterior margin (SM3, Fig. 3G).

44. Pronotum, posterior angles, acute projection: (0) absent; (1) present (SM3, Fig. 2K).

45. Pronotum, anterior region between the anterior margin and cicatrices: (0) flat (SM3, Fig. 3A); (1) sulcated (SM3, Fig. 3B).

46. Pronotum, medial longitudinal line, shape: (0) flat; (1) elevated (SM3, Fig. 3H).

47. Pronotum, disc, transversal constriction: (0) absent; (1) present (SM3, Fig. 3I).

The pronotum medially constricted is one of the diagnostic characteristics for *Leptolobus* and *Stilbotes* Stål, 1867 (Thomas, 1994), which corroborates their sister-relationship in our analysis.

48. Pronotum, posterior margin, middle tubercle: (0) absent; (1) present (SM3, Fig. 3J).

The body surfaces of the *Cazira* Amyot & Serville, 1843 species are generally covered by many tubercles. The tubercle on middle of posterior margin of pronotum is common to the three species studied.

49. Pronotum, postero-lateral margin, carina: (0) absent; (1) present (SM3, Fig. 3K).

50. Scutellum, shape: (0) triangular, base larger than apex (SM3, Fig. 3M); (1) U-shaped, base and apex almost similar in width (SM3, Fig. 3L) (Hasan & Kitching, 1993).

Schouteden (1907) proposed the tribe Discoceraria for the group called Stiretrides by Amyot & Serville (1843) (*Discocera* Laporte, 1833 + *Stiretrus* Laporte, 1833). Both authors considered the large scutellum (state 1) unique for this group. Thomas (1992) suggested suspending the tribal classifications because of the lack of characters supporting them. About scutellum Thomas states that, even though different from *Discocera*, the species of *Oplomus* Spinola, 1837, *Perillus* Stål, 1862, *Heteroscelis* Latreille, 1829, *Coryzorhaphis* Spinola, 1837, and *Blachia* Walker, 1867 have also a certain degree of enlargement. We coded the U-shaped scutellum (state 1) for *Blachia*, *Discocera* and *Stiretrus*, and it appears synapomorphic for clade 34 (*Discocera* + *Stiretrus*). Furthermore, the taxa cited by Thomas form a clade supported by several features, including the size of post-frenal margins of scutellum (characters 52 and 55) (clade 28).

51. Scutellum, lateral view, shape: (0) plane, less high than pronotum (SM3, Fig. 3N); (1) convex, higher than pronotum (SM3, Fig. 3O); (2) convex, but not surpassing the pronotum (SM3, Fig. 3P).

52. Scutellum, post-frenal margins, size: (0) shorter than frenal margins (SM3, Fig. 3M); (1) longer than frenal margins (SM3, Fig. 3L); (2) subequal the frenal margins (Gapud, 1991; Grazia, 2008).

53. Scutellum, posterior margin, shape: (0) not emarginated; (1) emarginated.

The emarginated posterior margin of scutellum is one of the diagnostic characteristics for *Colpothyreus*, but it is also present in *Cazira verrucosa* (Westwood, 1834).

54. Scutellum, posterior margin, dorsal view, range: (0) sternite V (SM3, Fig. 4B); (1) sternite VI; (2) sternite VII; (3) end of abdomen (Gapud, 1991; Campos & Grazia, 2006).

55. Scutellum post frenal part, width: (0) equal or larger than adjacent corium (SM3, Fig. 4A); (1) narrower than adjacent corium.

56. Scutellum, range: (0) surpassing the corium apex; (1) not surpassing the corium apex (Campos & Grazia, 2006).

57. Scutellum, longitudinal median line: (0) flat; (1) elevated (SM3, Fig. 4B).

58. Scutellum, longitudinal median line, elevation, distribution: (0) 1/3 apical; (1) apical half; (2) 3/4 apical; (3) 1/5 apical.

59. Scutellum, anterior surface, tubercle: (0) absent; (1) present (SM3, Fig. 4C) (Gapud, 1991).

60. Scutellum, anterior surface, tubercle, shape: (0) unilobed; (1) bilobed (SM3, Fig. 4C).

61. Profemur, projection: (0) absent; (1) present (SM3, Fig. 2D; SM3, Fig. 4B) (Campos & Grazia, 2006).

62. Profemur, projection, shape: (0) thorn (SM3, Fig. 4B); (1) tubercle (SM3, Fig. 2D).

63. Mesofemur, projection: (0) absent; (1) present.

64. Mesofemur, projection, shape: (0) tubercle; (1) thorn.

65. Meso- and metatibiae, dorsal inner and outer margins, longitudinal carina: (0) absent; (1) present (SM3, Fig. 4D).

66. Meso- and metatibiae, dorsal sulcus: (0) absent; (1) present (SM3, Fig. 4D).

67. Meso- and metatibiae, lateral sulcus: (0) absent; (1) present (SM3, Fig. 4E).

68. Foretibia, dorsal external margin, foretibial expansion: (0) absent; (1) present (Brugnera *et al*., 2018).

The characters 68 to 75 were proposed and illustrated by Brugnera *et al*. (2019).

69. Foretibia, inner view, dorsal external margin, foretibial expansion, maximal width related to width of tibial axis: (0) less than double; (1) more than double (Brugnera *et al*., 2019).

70. Foretibia, inner view, dorsal external margin, foretibial expansion reaching base of tibia: (0) absent; (1) present (Brugnera *et al*., 2019).

71. Foretibia, inner view, ventral surface, foretibial expansion: (0) absent; (1) present (Brugnera *et al*., 2019).

72. Foretibia, ventral surface, foretibial expansion reaching base of tibia: (0) absent; (1) present (Brugnera *et al*., 2019).

73. Foretibia, ventral surface, foretibial apparatus, shape of setae: (0) curvilinear; (1) rectilinear (Brugnera *et al*., 2019).

74. Foretibia, ventral surface, proximal setae: (0) absent; (1) present (Brugnera *et al*., 2019).

75. Foretibia, peripheral area, shape: (0) flat; (1) elevated (Brugnera *et al*., 2019).

76. Corium, posterolateral angle, shape: (0) truncate (SM3, Fig. 4A); (1) rounded (SM3, Fig. 4B).

77. Hemelytral membrane, range: (0) not or very lightly surpassing the end of abdomen; (1) surpassing the end of abdomen (longer than female genital plates in ventral view) (SM3, Fig. 4C).

78. Prosternum, mesial longitudinal region, shape: (0) excavated; (1) slightly elevated (SM3, Fig. 4G); (2) flat (SM3, Fig. 4F).

79. Mesosternum, longitudinal gutter: (0) absent (SM3, Fig. 4G); (1) present (SM3, Fig. 4H).

80. Mesosternum, shape: (0) carinated (SM3, Fig. 4G); (1) not carinated (Hasan & Kitching, 1993).

Not comparable to species that have longitudinal gutter.

81. Mesosternum, carina, extension: (0) on entire mesosternum (SM3, Fig. 4G); (1) only on anterior half of mesosternum; (2) only on posterior half of mesosternum.

82. Mesosternum, carina, base, width: (0) uniform with the rest of carina (SM3, Fig. 4I); (1) wider than the rest of carina (SM3, Fig. 4G).

83. Mesosternum, carina, sulcus: (0) absent (SM3, Fig. 4G); (1) present (SM3, Fig. 4J).

84. Metasternum, shape: (0) not carinated (SM3, Fig. 4G); (1) carinated (SM3, Fig. 4I) (Campos & Grazia, 2006).

85. Metasternum, shape: (0) plane to metapleurae (SM3, Fig. 4I); (1) raised in relation to metapleurae (SM3, Fig. 4K); (2) sulcated (SM3, Fig. 4L) (Campos & Grazia, 2006).

86. Ostiole, ventro-lateral view, shape: (0) guttiform; (1) circular; (2) elliptic; (3) narrow fissure (Barão *et al*., 2017)

87. Ostiole, opening orientation: (0) laterally; (1) latero-posteriorly; (2) ventrally (Barão *et al*., 2017).

88. Peritreme, shape: (0) disc; (1) ruga; (2) spout; (3) bean-shaped; (4) disc 2; (5) swollen; (6) disc 3; (7) absent (Kment and Vilímová, 2010; Barão *et al*., 2017)

The states 4, 5 and 6 are new propositions to this character. “disc 2” (4) has a well-developed and is evanescent. “Swollen” (5) is an ample peritreme, attaining the lateral margin of mesopleura. “disc 3” (6) is similar to “disc”, but is more elevated.

89. Thorax, external scent efferent system, peritreme, median furrow: (0) absent; (1) present (SM3, Fig. 4J) (Hasan & Kitching, 1993; Bianchi *et al*., 2017).

90. Peritreme, median furrow, development related to peritremal length: (0) less than half; (1) more than half (Barão *et al*., 2017, char 6).

91. Metapleuron, evaporatorium, development related to metapleuron width: (0) more than half of; (1) less than half of (Campos & Grazia, 2006; Barão *et al*., 2017).

92. Metapleuron, evaporatorium, range: (0) surrounding peritreme (SM3, Fig. 4I); (1) not surrounding peritreme (SM4, Fig. 1A).

93. Metapleuron, evaporatorium, form of anterolateral margin: (0) rounded; (1) tapered (Barão *et al*., 2017).

Non-comparable to species with evaporatorium not surrounding peritreme.

94. Metapleuron, evaporatorium, area close to outer margin raised: (0) absent; (1) present (Barão *et al*., 2017).

Non-comparable to species with evaporatorium not surrounding peritreme.

95. Mesopleuron, posterior margin, evaporatorium: (0) present (SM4, Fig. 1A); (1) absent.

96. Mesopleuron, evaporatorium, development degree related to anterior limit of mesocoxal suture: (0) surpassing; (1) not attaining (Barão *et al*., 2017).

97. Mesopleuron, anterolateral angle, evaporatorium: (0) absent; (1) present (Barão *et al*., 2017).

98. Mesopleuron, postero-lateral angle, evaporatorium: (0) present; (1) absent (Barão *et al*., 2017).

99. Mesopleuron, outer margin, evaporatorium: (0) present; (1) absent (Barão *et al*., 2017).

100. Mesopleuron, evaporatorium in a diagonal from mesepimeron to mesepisternum: (0) absent; (1) present (Barão *et al*., 2017).

101. Mesopleuron, evaporatorium in a diagonal from mesepimeron to mesepisternum, development related to the anterolateral angle of mesepisternum: (0) reaching; (1) not reaching (Barão *et al*., 2017).

102. Evaporatorium, gyrification: (0) conspicuous; (1) inconspicuous (Barão *et al*., 2017).

103. Evaporatorium, punctuation: (0) absent; (1) present (Barão *et al*., 2017).

104. Metathoracic spiracle, shape: (0) wide; (1) narrow (Barão *et al*., 2017).

Abdomen:

105. Third urosternite, base, tubercle: (0) absent; (1) present (SM4, Fig. 1B; SM4, Fig. 1C) (Gapud, 1991; Campos & Grazia, 2006).

106. Third urosternite, base, tubercle, reach: (0) at most reaching the metacoxae; (1) reaching mesocoxae; (2) between pro and mesocoxae (SM4, Fig. 1B) (Gapud, 1991).

107. Third urosternite, base, tubercle, shape: (0) unilobed (SM4, Fig. 1B); (1) bilobed (SM4, Fig. 1C).

Bilobed abdominal tubercle is one of the diagnostic characteristics for *Glypsus* Dallas, 1851 (Thomas, 1994).

108. Urosternite VII, posterolateral margins, projection: (0) absent; (1) present (SM4, Fig. 1D) (Bianchi *et al*., 2017).

109. Urosternites III and IV, trichobothria, position: (0) lined up to spiracles (SM4, Fig. 1E); (1) external to spiracles (SM4, Fig. 1F) (Gapud, 1991; Grazia *et al.*, 2008).

110. Female, seventh urotergite, membranous longitudinal line: (0) present (SM4, Fig. 1G); (1) absent.

111. Female, seventh urotergite, 1+1 lateral membranous line: (0) absent; (1) present (SM4, Fig. 1H).

112. Female, seventh urotergite, lateral margins, shape: (0) not emarginated; (1) emarginated (SM4, Fig. 1I).

113. Female, seventh urotergite, posterior margin, shape: (0) arcuate (SM4, Fig. 1H); (1) rectilinear (SM4, Fig. 1J); (2) sinuous (SM4, Fig. 1K); (3) concave.

114. Male, urosternite IV, glandular patches: (0) absent; (1) present (Kochenborger, 2018).

The characters 114 to 128 were proposed and illustrated by Kochenborger, 2018.

115. Male, urosternite V, anterior half, glandular patches: (0) absent; (1) present (Kochenborger, 2018).

116. Male, urosternite V, posterior half, glandular patches: (0) absent; (1) present (Kochenborger, 2018).

117. Male, urosternite VI, anterior half, glandular patches: (0) absent; (1) present (Kochenborger, 2018).

118. Male, urosternite VI, posterior half, glandular patches: (0) absent; (1) present (Kochenborger, 2018).

119. Male, urosternite VII, anterior half, glandular patches: (0) absent; (1) present (Kochenborger, 2018).

120. Male, urosternite VII, posterior half, glandular patches: (0) absent; (1) present (Kochenborger, 2018).

121. Male, glandular patches, pores (not comparable in species without glandular patches): (0) absent; (1) present (Kochenborger, 2018).

122. Male, glandular patches, sensilla chaetica I (not comparable in species without glandular patches): (0) absent; (1) present (Kochenborger, 2018).

123. Male, glandular patches, sensilla chaetica II (not comparable in species without glandular patches): (0) absent; (1) present (Kochenborger, 2018).

124. Male, glandular patches, sensilla chaetica III (not comparable in species without glandular patches): (0) absent; (1) present (Kochenborger, 2018).

125. Male, glandular patches, sensilla pit peg I (not comparable in species without glandular patches): (0) absent; (1) present (Kochenborger, 2018).

126. Male, glandular patches, sensilla pit peg II (not comparable in species without glandular patches): (0) absent; (1) present (Kochenborger, 2018).

127. Male, glandular patches, setae, orientation towards the abdomen (not comparable in species without glandular patches): (0) angled; (1) parallel (Kochenborger, 2018).

128. Male, glandular patches, setae, distribution (not comparable in species without glandular patches): (0) grouped; (1) sparse (Kochenborger, 2018).

129. Male, urosternites V and VI, shape: (0) not excavated (SM4, Fig. 1M); (1) excavated (SM4, Fig. 1L).

130. Male, limit between urosternites VI and VII, shape: (0) not sulcated; (1) sulcated.

Female genitalia:

131. Genital plates, position: (0) ventro-posterior (SM4, Fig. 2A); (1) ventral (SM4, Fig. 2B); (2) posterior (SM4, Fig. 2C).

132. Gonocoxites VIII, position: (0) juxtaposed (SM4, Fig. 1N); (1) overlapping (SM4, Fig. 1O) (Bianchi *et al*., 2017).

133. Gonocoxites VIII, disc, form: (0) flat; (1) concave; (2) convex (Bianchi *et al*., 2017).

134. Laterotergites VIII, spiracles: (0) present (SM4, Fig. 1O); (1) absent.

135. Laterotergites VIII, posterior margin, shape: (0) round (SM4, Fig. 1O); (1) acutely projected (SM4, Fig. 1D).

136. Band uniting the laterotergites VIII: (0) tumid (SM4, Fig. 2D); (1) not tumid.

137. Gonapophyses VIII, external position: (0) not exposed; (1) exposed (SM4, Fig. 2E).

138. Gonocoxites IX, shape: (0) longitudinally carinated (SM4, Fig. 2F); (1) flat (SM4, Fig. 2E)

139. Gonocoxites IX, external view, shape: (0) trapezoidal elongated (wider than long) (SM4, Fig. 2E); (1) trapezoidal (as long as wide) (SM4, Fig. 1D); (2) pentagonal (SM4,

Fig. 2G); (3) v-shaped (SM4, Fig. 2I); (4) losangular (SM4, Fig. 2F); (5) triangular (SM4, Fig. 2H); (6) oval (SM4, Fig. 2J).

140. Laterotergites IX, position: (0) not surpassing the band uniting laterotergites VIII (SM4, Fig. 2I); (1) surpassing the band uniting laterotergites VIII (SM4, Fig. 2G).

141. Laterotergites IX: (0) touching each other (SM4, Fig. 2F); (1) away from each other (SM4, Fig. 2I) (Gapud, 1991; Campos & Grazia, 2006; Grazia *et al*., 2008).

142. Segment X, position: (0) visible (SM4, Fig. 2G); (1) hidden by laterotergites IX (SM4, Fig. 2F); (2) hidden by sternite VIII (SM4, Fig. 2K) (Campos & Grazia, 2006).

143. Laterotergites IX, size in relation to the size of gonocoxites VIII: (0) laterotergites IX smaller than gonocoxites VIII (SM4, Fig. 1N); (1) laterotergites IX longer than gonocoxites VIII (SM4, Fig. 1D); (2) laterotergites IX as long as gonocoxites VIII (SM4, Fig. 2E) (Gapus, 1991; Grazia *et al*., 2008).

144. Laterotergites IX, posterior margin, shape: (0) round (SM4, Fig. 2E); (1) acutely projected (SM4, Fig. 2G).

145. Gonocoxites VIII, internal wall, development: (0) more than half of the gonocoxites VIII width (SM4, Fig. 2L); (1) less than half of the gonocoxites VIII width (SM4, Fig. 2M).

146. Ring sclerites: (0) absent; (1) present (SM4, Fig. 2N; SM4, Fig. 2O) (Campos & Grazia, 2006).

147. Ring sclerites, shape: (0) oval (SM4, Fig. 2O); (1) round (SM4, Fig. 2N).

148. Ring sclerites, position: (0) latero-posterior to the thickening of vaginal intima; (1) posterior to the thickening of vaginal intima (SM4, Fig. 3A); (2) lateral to the thickening of vaginal intima (SM4, Fig. 2O).

149. Ring sclerites, size: (0) 1/3 of the length of gonocoxites IX or more (SM4, Fig. 3A); (1) less than 1/5 of the length of gonocoxites IX.

150. Arcus: (0) present (SM4, Fig. 3A); (1) absent.

151 Thickening of vaginal intima, shape: (0) triangular elongated (SM4, Fig. 3C); (1) cylindrical (SM4, Fig. 3B); (2) tubular elongated (SM4, Fig. 2N); (3) oval elongated.

152. Vesicular area, median duct, shape: (0) uniform (SM4, Fig. 3D); (1) expanding to the pars intermedialis (SM4, Fig. 3D).

153. Vesicular area, median duct, proximal half, obtuse enlargement: (0) absent; (1) present (SM4, Fig. 3D).

154. Vesicular area, median duct, size: (0) longer than the length of gonocoxites VIII; (1) equal or shorter than the length of gonocoxites VIII (SM4, Fig. 3F).

155. Ductus receptaculi distal, width: (0) equal or narrower than ductus receptaculi proximal (SM4, Fig. 3D); (1) wider than ductus receptaculi proximal (SM4, Fig. 3G).

156. Pars intermedialis and capsula seminalis, combined length: (0) 1/3 or less the length of vesicular area (SM4, Fig. 3G); (1) about half the length of vesicular area (SM4, Fig. 3D); (2) equal or longer the length of vesicular area (SM4, Fig. 3F) (Campos & Grazia, 2006).

157. Pars intermedialis and capsula seminalis, combined length: (0) equal to the length of posterior margins of gonocoxites VIII; (1) longer than posterior margins of gonocoxites VIII (SM4, Fig. 3L); (2) less than half of posterior margins of gonocoxites VIII; (3) half of posterior margins of gonocoxites VIII; (4) about 2/3 of posterior margins of gonocoxites VIII.

158. Pars intermedialis, shape: (0) cylindrical (SM4, Fig. 3H); (1) medially enlarged (SM4, Fig. 3I); (2) distally enlarged (SM4, Fig. 3J); (3) distally narrowed (SM4, Fig. 3K) (Campos & Grazia 2006).

159. Pars intermedialis, length: (0) equal or shorter than capsula seminalis (SM4, Fig. 3L); (1) 4 times longer than capsula seminalis; (2) at most twice longer than capsula seminalis (SM4, Fig. 3I) (Campos & Grazia 2006).

160. Capsula seminalis, shape: (0) spherical (SM4, Fig. 3I); (1) digitiform (SM4, Fig. 3H); (2) U-shaped (SM4, Fig. 3J); (3) oval (SM4, Fig. 3E).

161. Capsula seminalis, processes: (0) absent; (1) present (SM4, Fig. 3I) (Gapud 1991).

162. Posterior annular crest: (0) developed (SM4, Fig. 3H); (1) not developed.

163. Anterior annular crest, size: (0) equal or wider than posterior annular crest (SM4, Fig. 3G); (1) narrower than posterior annular crest (SM4, Fig. 3K).

164. Posterior annular crest, position: (0) at base of capsula seminalis (SM4, Fig. 3H); (1) directed to the midst of capsula seminalis (SM4, Fig. 3G).

Male genitalia:

165. Pygophore, posterior view, parameres: (0) invisible (SM4, Fig. 3M); (1) visible (SM4, Fig. 3N).

166. Pygophore, surface between superior and inferior layers, shape: (0) not excavated; (1) excavated (SM4, Fig. 3M).

167. Pygophore, ventral rim, inferior layer, 1+1 tubercles: (0) absent; (1) present (SM4, Fig. 3O).

168. Pygophore, ventral rim, position: (0) in line with the apex of posterolateral angles (SM4, Fig. 3O); (1) shorter than apex of posterolateral angles (SM4, Fig. 4A).

169. Pygophore in dorsal view, ventral rim: (0) visible (SM4, Fig. 4C); (1) invisible (SM4, Fig. 4B) (Roell & Campos, 2018).

170. Pygophore, segment X, dorsal view, membranous longitudinal line: (0) absent; (1) present (SM4, Fig. 4D).

171. Segment X, dorsal cuneiform projection: (0) absent; (1) present (SM4, Fig. 4B).

172. Pygophore, segment X, dorsal view, carina: (0) absent; (1) present.

173. Superior process of dorsal rim: (0) absent; (1) present (Roell & Campos, in prep.)

174. Superior process of dorsal rim, proportion: (0) up to half of paramere head; (1) more than half of paramere head (Roell & Campos, in prep.).

175. Superior process of dorsal rim, microsculptures: (0) absent; (1) present (Roell & Campos, in prep.).

176. Superior process of dorsal rim, globose projections: (0) absent; (1) present (Roell & Campos, in prep.).

177. Superior process of dorsal rim, longitudinal elevations: (0) absent; (1) present (Roell & Campos, in prep.).

178. Superior process of dorsal rim, connection with diaphragm, texture: (0) membranous; (1) sclerotized (Roell & Campos, in prep.).

179. Head of parameres, position: (0) totally inside the pygophore; (1) projected beyond of the pygophore (Roell & Campos, in prep.).

180. Head of parameres, internal surface; texture: (0) smooth; (1) with wrinkles or microsculptures (Roell & Campos, in prep.).

181. Head of parameres, external surface, texture: (0) smooth; (1) microsculptured (Roell & Campos, in prep.).

182. Paramere, hairs: (0) present (SM4, Fig. 4E); (1) absent (SM4, Fig. 4F).

183. Phallus, theca, shape: (0) not divided (SM4, Fig. 4G); (1) divided in basal theca and thecal shield (SM4, Fig. 4H) (Hasan e Kitching, 1993).

184. Male, inner genitalia, phallus, basal theca, length: (0) shorter than thecal shield (SM4, Fig. 4I); (1) as long as or longer than thecal shield (SM4, Fig. 4H).

Gapon & Konstantinov (2006) pointed that the phallus of Asopinae can be short and narrow ("scheme A", observed in *Afrius flavirostrum*; *Andrallus spinidens* (Fabricius, 1787); *Discocera coccinea* (Fabricius, 1798); *Dorycoris pavoninus* (Westwood, 1837); *Euthyrhynchus floridanus* (Linnaeus, 1767); *Friarius alluaudi* (Schouteden, 1905); *Macrorhaphis acuta* Dallas, 1851; *Oplomus pulcher* Dallas, 1851; *Platynopiellus septendecimaculatus*) or long and wide ("scheme B and C", *Arma custos* (Fabricius, 1794); *Cazira verrucosa*; *Cermatulus nasalis* (Westwood, 1837); *Coryzorhaphis leucocephala* Spinola, 1837; *Dinorhynchus dybowskyi* Jakovlev, 1876; *Oechalia schellenbergii* (Guérin-Méneville, 1831); *Pinthaeus sanguinipes* (Fabricius, 1781), *Podisus nigrispinus* (Dallas, 1851), *P. distinctus* (Stål, 1860), *Rhacognathus punctatus* (Linnaeus, 1878), *Zicrona caeruela* (Linnaeus, 1758)). We agree with most of their observations, except for *Cazira verrucosa*, *Coryzorhaphis leucocephala*, and *Oechalia schellenbergii*. We also observed that the length and the width of phallus should be treated as different characters, once a short phallus (state 0) can be wide (character 185, state 0) or narrow (character 185, state 1), and vice-versa (e.g. the phallus of *Comperocoris roehneri* (Philipi, 1862) is short and wide, and the phallus of *Jalla dumosa* (Linnaeus, 1758) is long and narrow. Most studied Asopinae have a short basal theca (clade 11).

185. Basal theca, lateral view, distal margin, width: (0) as wide as the thecal shield at the same point (SM4, Fig. 4H; SM4, Fig. 4I); (1) narrower than thecal shield at the same point (SM4, Fig. 4J).

Most studied Asopinae have a narrow thecal shield (clade 11)

186. Phallus, vesica, range: (0) not following ductus seminis distalis to opening (SM4, Fig. 4K); (1) following ductus seminis distalis to opening (SM4, Fig. 4G) (Roell & Campos, 2015).

187. Phallus, vesica, shape: (0) divided in two arms (SM4, Fig. 4H); (1) tubular, not divided in two arms (SM4, Fig. 4G).

188. Conjunctival process: (0) present (SM4, Fig. 4J); (1) absent.

189. Conjunctiva, posterior lobes, apex, sclerotization: (0) absent (SM4, Fig. 4H); (1) present (SM4, Fig. 4K).

190. Conjunctiva, posterior lobes, sclerotization, range: (0) only at the end of lobes, i.e., less than 1/5 of the lobe (SM4, Fig. 4J); (1) 1/3 of the lobe or more (SM4, Fig. 4K).

191. Conjunctiva, posterior lobes, ventral surface, sclerotization: (0) absent; (1) present (SM4, Fig. 4L).

Cladistic analysis
(Figs. 1–6)

Our two hypotheses for the Asopinae phylogeny (A, Figs. 2–5, full dataset and B, Fig. 6, supplementary material 1, dataset excluding taxa examined only by photos and bibliography) are similar regarding the relationships among species and the characters distribution (Figs. 2–6).

The cladistic analyses with equal weights (EW) recovered 76 (A) and 36 (B) most parsimonious trees (Fig. 1). The highest sum of SPR distances of the consensus trees with implied weighting (IW) was obtained for the fifth K-values (K = 11.684 (A);

K= 11.420 (B)) (Figs. 2–6). The clade 4, which includes all Asopinae species (except *Ornithosoma rivierei*), is supported by ten synapomorphies, two non-homoplastic, the first regarding the subquadrate morphology of head in dorsal view (modified in *Cecyrina platyrhinoides* Walker, 1867, *Colpothyreus flavolineatus* (Blanchard, 1843), *Damarius splendidulus* (Fabricius, 1803), *Dinorhynchus dybowskyi*, *Heteroscelis*, *Oechalia schellembergi*, and *Stilbotes semperi*, and reversed in *Leptolobus murrayi* Signoret, 1855) (character 1(1)) (Figs. 2–4), and the second regarding the absence or reduction of female ring sclerites (reversed in *Arma custos* and *Oplomus cruentus* (Burmeister, 1835) (character 149 (1)) (Figs. 2–4). Genera recovered as monophyletic in the EW analysis (Fig. 1) were also recovered with IW (Figs. 2–6), except *Afrius* Stål, 1870. Roell et al. (in press) called attention to the possible non-monophyly of *Afrius* and maintained the genus divided into two subgenera until the proposition of a better elucidation based on a phylogenetic analysis. Here we included the two type species of each subgenus (*Afrius* (*Afrius*) *purpureus* (Westwood, 1837) and *Afrius* (*Subafrius*) *flavirostrum* (Signoret, 1861)) finding a non-monophyly for the genus. The species with male abdominal glandular patches (including *Afrius purpureus*) are arranged in a monophyletic clade (clade 21), separated from the other asopinaes which do not have glandular patches (including *Afrius flavirostrum*, Fig. 5, clade 18). The monophyly of *Afrius* may be tested in the future with the inclusion of *Afrius kolleri* Schouteden, 1911 in the analysis.

Ornithosoma rivierei is in a polytomy with Edessinae, Discocephalinae, and Pentatominae (Figs. 2, 5, clade 1), but this is probably because of the lack of data for the species, as only the original description was consulted, and only 46 characters were coded for it (none for genitalia). It is probably an Asopinae species because it has the first segment of labium free and robust (Kormilev, 1957) but we could not better evaluate its characteristics only based on description. As mentioned by Thomas (1992), this species remembers the *P. falcatus* group of *Podisus* Herrich-Schaeffer, 1851.

Asopinae is monophyletic (clade 4), sister of *Murgantia varicolor* (Pentatominae: Strachiini) (clade 2). This corroborates the hypothesis of Gapud (1991) about the relationship between Asopinae and Pentatominae (Strachiini). In our analysis, Pentatominae is polyphyletic, Podopinae is paraphyletic, and Discocephalinae (clade 3) is monophyletic (Figs. 1, 2, 5, 6).

Most asopines have a long hemelytral membrane surpassing the abdomen (character 77(1)), which supports the clade 5. This clade is also supported by the absence of evaporatorium on postero-lateral angle of mesopleuron (character 98(0)). Many authors have already called attention for the morphological structure of the external thoracic scent efferent system (ESES) of Asopinae (Thomas 1992; Gapud, 1991). Gapud (1991) even cited that Asopinae has a "characteristic ostiolar peritreme", as one of the exclusive characteristics of the subfamily. However, the ESES was never studied in detail in Asopinae. Kment & Vilimová (2010) provided a reviewed terminology for the structures compounding the ESES in Pentatomoidea, and Barão *et al*. (2017) presented variable patterns to Carpocorini (Pentatominae), however, we still observed different shapes of peritreme for Asopinae, which were included as new states for these character (character 88). Most asopines present a "disc", but generally with a well-developed sulcus (not "obsolete" as described by Kment & Vilimová, 2010). Once "disc" is a parallel and slightly elevated with an obsolete sulcus (Kment & Vilimová, 2010), this set of characteristics do not fits to *Platynopus melanoleucus* (Westwood, 1837) and *Parajalla sanguineosignata* (Spinola, 1852), in which the peritreme is evanescent, (called by us as "disc 2" (state 4)), and seems to be evolved independently in these two species. Besides, *Stilbotes semperi* has an ample peritreme, attaining the lateral margin of mesopleurae ("Swollen" (state 5)) and *Blachia ducalis* Walker, 1867 has a peritrema similar to "disc", but more elevated ("disc 3" (6)).

Clade 6 includes the most specious genus of Asopinae, *Podisus*. This genus appears paraphyletic in our analysis but we have sampled only two of its species. The representatives of this clade (clade 6) are generally castaneous, rufous or brownish, and they have a similar pentagonal appearance, profemora not armed, and globose projections on superior processes of diaphragm (Roell & Campos, in prep). *Conquistator mucronatus* (Uhler, 1897) (recently removed from *Podisus* (Gapon, 2009)) is sister to clade 7 (which includes *Tynacantha* Dallas, 1851, *Tyrannocoris* Thomas, 1992, *Oechalia* Stål, 1862, and *Tylospilus* Stål, 1870). *Apateticus* Dallas, 1851 and *Apoecilus* Stål, 1870 are apparently similar with the species of clade 6, but they are placed along the clade 21 with the other species presenting male abdominal glandular patches.

The relations among the species of clade 8 are slightly influenced with the removal of taxa studied only through images and bibliography. In the hypothesis A

(Figs. 3, 5) *Dinorhynchus dybowskyi* is sister to clade 9, and in the hypothesis B (Fig. 6) this species is more related with *Cecyrina platyrhinoides* and *Colpothyreys flavolineatus* (supplementary material 1) sharing a similar shape of head (character 1(3)), the presence of tibial expansion (character 68(1)), and the lateral margins of seventh urotergite emarginated (character 112(1)). In the hypothesis A, *Martinina* Schouteden, 1907 (removed in B) is sister to *Cecyrina platyrhinoides* and *Colpothyreys flavolineatus* (clade 10, Figs. 3, 5) sharing the similar position of gonocoxites VII (juxtaposed, character 132(1)). Although we have consulted only the type specimens of *M. prima* (female, at NHMUK) and *M. inexpectata* (male, at MNHN) this genus was recovered monophyletic, supported by the bucullae developed and round (character 34(1)), the convex lateral margins of pronotum (character 37(0)), and the dorsally directed humeral angles (character 41(1)). These two species are indeed very similar; the humeral angles are ample, subcrectangular and strongly produced, the mandibular plates are longer than clypeus, and the peritrema is a disc surrounded by evaporatorium.

The relationships inside the clade 17 are influenced by the removal of *Ponapea arachnoides* and *Australojalla versicolor*. Although the clade 17 includes same species on hypothesis A and B, *Afrius flavirostrum* is displaced from clade 18 (sister to *Australojalla* + *Macrorhaphis* Dallas, 1851) in the hypothesis A to the base of clade 17 in the hypothesis B (sister to *Jalloides* Schouteden, 1907 and *Damarius* Schouteden, 1907 + *Macrorhaphis*). The positions of *Ponapea* Ruckes, 1963 and *Australojalla* are not very reliable since we could code not even half of the characters for these species (Figs. 5, 6).

Bulbostethus transversalis (hypothesis A) is probably sister to *Dorycoris pavoninus* (clade 26), both do not have evaporatorium on posterior margin of mesosternum (character 95(1)) and have a short abdominal projection (character 106(1)). When *Bulbostethus* is inactivated, *Dorycoris* appear sister to *Stilbotes* + *Leptolobus* (clade 27) (Figs. 4–6).

Discoceraria was proposed to include *Discocera* Laporte, 1833 and *Stiretrus* Laporte, 1833 and was characterized by the enlarged scutellum, covering most of abdomen (Amyot & Serville, 1843; Schouteden, 1907). Thomas (1992) states that, even though different from *Discocera*, the species of *Oplomus*, *Perillus*, *Heteroscelis*, *Coryzorhaphis*, and *Blachia* have also a certain degree of enlargement. Indeed, *Discocera* and *Stiretrus* form a monophyletic clade (clade 34) supported mainly by characters of scutellum shape and size, which would corroborates the validity of Discoceraria tribe. *Oplomus* is sister to the clade of *Discocera* + *Stiretrus* (clade 33) and they are sister of the clade of *Heteroscelis*, *Perillus*, *Coryzorhaphis*, *Blachia*, and *Cazira* (clade 31), all sharing scutellum characteristics (clade 30), already mentioned by Thomas (1992). Furthermore, they share the presence of male glandular patches on seventh urosternite (character 119) (Fig. 4).

Jallini was proposed to include *Jalla* Hahn, 1832 and *Zicrona* Amyot & Serville, 1843, which share a lobed condition of the apex of seventh urotergite that covers the genitalia (Dupuis, 1949; Thomas, 1992). According to Thomas (1992), *Dorycoris* Mayr, 1864 have a similar condition, and *Jalla* and *Zicrona* share other characteristics, as the absence of abdominal tubercle, and the absence of male abdominal glandular patches. However, *Jalla* and *Zicrona* do not form a monophyletic group (Fig. 3), which would invalid the tribe Jallini. Both genera share a rectilinear posterior margin of urotergite VII in females, (character 113) with the majority of studied species, and no other character was sufficient to group them. *Zicrona caerulea* is more closely related to *Comperocoris roehneri* (Philipi, 1862) (clade 13), and *Jalla dumosa* is more related to *Glypsus* (clade 14) (Fig. 3).

Gapud (2015) recently proposed Stilbotini for *Stilbotes semperi* Stål, 1871 based on phallus characteristics; according to him, this tribe is related with Stiretrini and Platynopini. *Stilbotes* and *Leptolobus* are sister genera (clade 27) supported by eleven synapomorphies, including the pronotum medially constricted, which is a diagnostic characteristics for both genera (Thomas, 1994). The tribe Stilbotini (Gapud, 2015) cannot be valid once *Stilbotes* does not appear paraphyletic to one or more taxa of the same rank (Potter & Freudenstein, 2005; Roell & Campos, 2015).

Furthermore, Glypsini *nomen nudum* and Platynopini *nomen nudum* (Gapon, 2008) were not recovered monophyletic. Despite the cladistic analysis had resulted in many monophyletic clades for Asopinae, as Thomas (1992) suggested, we did not find sufficiently distinctive and congruent features to divide Asopinae in tribes.

Finally, there are no many congruencies between the monophyletic clades and the geographic occurrences of its species, i.e. very few related genera are from the same continents (clade 20, *Ealda*+*Pareala*, clade 32, *Blachia*+*Cazira*; clade 33, *Oplomus*+*Discocera*+*Stiretrus*).

Evolution of the male abdominal glandular patches
(Fig. 5)

The presence of glandular patches (GPs) is an exclusive characteristic of the clade 21, at the same time the set of characteristics about the GPs supports this clade and the relationships inside it. Glandular patches are cuticle modifications that expel and induce the propagation of pheromonic compounds produced internally in the abdomen of a group of males of Asopinae (Aldrich, 1988). These modifications include the presence of microsculptures, pores and setae (Thomas 1992, 1994; Kochenborger, 2018). The characteristics regarding the GPs were evaluated by Kochenborger (2018) that proposed fifteen morphological characters treated here as the characters 114 to 128.

The presence of glandular patches were influent on relationships between the two sampled species of *Afrius* (*A. purpureus* have GPs, *A. flavirostrum* does not have), but that was not influent on monophyly of *Leptolobus* (*L. eburneatus* Karsh, 1892 have GPs, *L. murrayi* does not have). Other genus in which the presence of glandular patches is variable is *Macrorhaphis*, but because of availability of material we only sampled *M. acuta* Dallas, 1851 which does not present GPs. An analysis including all species of *Afrius*, *Leptolobus* and *Macrorhaphis* could better expose how influent is the presence of GPs on monophyly of genera of Asopinae.

Ponapea arachnoides possesses glandular patches on fourth and fifth abdominal segments (Ruckes, 1963) but its phylogenetic position on Asopinae tree is dubious as most characters were not evaluated because we had only its original description available. In our analysis the GPs emerged on node 21 (presence= 0.98; absence=0.02), and they may have evolved independently in *Ponapea arachnoides*, or they may be evolved only once, as the phylogenetic place of *Ponapea arachnoides* is dubious. The pores are part of the GPs that emerged at the same time on node 21 (p=0.999; a=<0.01), the positive correlation of presence of pores and presence of glandular patches (p-value=0.03) corroborates that they can serve as channels expelling the secretions (Kochenborger, 2018). No different result is produced on cladistic analysis when this character is deactivated (character 21).

The presence of GPs on fourth abdominal segment is exclusive of *P. arachnoides* (Ruckes, 1963) and *Andrallus spinidens*, which probably evolved independently.

Hoploxys caeruleus Dallas, 1851 is sister to the clade 22 which includes the other Asopinae species having GPs. The distribution of GPs along the urosternites is peculiar in this species, i.e. only on anterior half of urosternites V, VI, and VII. Clade 22 is supported by the presence of GPs on posterior half of segments V and VI (Figs. 4, 5). Furthermore, the GPs extend up to the posterior half of urosternite VII only on *Coryzorhaphis*.

Conjectures about evolution of sensilla are limited since their functions are not surely known, their identifications from scanning electron microscopy images are not very reliable, they can also be present in species without GPs (Kochenborger, 2018), and we do not have the information about pores and sensillae for many species. Nevertheless, at least one species of each genus were evaluated by Kochenborger (2018). It seems that sensilla chaetica I emerged in node 21 (p=0.91; a=0.09) and was lost many times, mainly in the node 30 (p=0.36; a=0.64). The absence of sensilla chaetica II is exclusive for *Apoecilus bracteatus* (Fitch, 1856) and for the clade 24 (p=0.01; a=0.99) (character 123(0)), and resurfaced in *Perillus bioculatus* (Fabricius, 1775). Sensilla chaetica III probably emerged many times over the evolution of the group (node 21, a=0.84; p=0.16). The sensilla pit peg I also emerged on node 21 (p= 0.89; a=0.11) and was lost on nodes 23 and 29. Sensilla pit peg II is exclusive of *Apateticus lineolatus* (Herrich-Schaffer, 1840) and *Dorycoris pavoninus*.

The secretions produced by the GPs can serve to attract females or other insects for feeding (Fleicsher & Krieger, 2018). This can be an extra strategy for the propagation of this group of Asopinae, since the success of insects are generally related with the successful ways of attracting food and mate, which frequently involves the production of chemical compounds (Dickens & Payne, 2018; Fleischer & Krieger, 2018). However, the production of male attractive chemicals is known for many insects of different orders, mainly as a reproductive strategy to attract females (Dickens & Payne, 2018). The production of pheromones can also be associated with aggregation, facilitating protection and cooperativeness in getting food (e.g. Durisko et al., 2014 Riipi et al., 2001; Yew and Chung, 2015). Moreover, pheromone can be produced to repel conspecifics (Yew and Chung, 2015). The function of GPs in Asopinae is producing and dispersing pheromones to attract females for mating (Aldrich & Lusby, 1986). The repellency of conspecific males in the presence of reproductive females could be speculated as a function for these structures, however, although little is known about behavior in Asopinae, it seems that they are usually solitary (Paleari, 2013; Gapud, 2015).

The insects' detection of chemical compounds is usually made by porous sensillae, which are generally concentrated on antennae, mouthparts, and legs. Sensilla with one or no one pores are generally mechanosensory, thermoreceptor, and gustatory (Fleicsher & Krieger, 2018), as the sensillae *chaetica* and *pit peg* (Altner and Prillinger, 1980). Since asopines rub the bristles of their tibiae and tarsi against GPs to disperse the attractive compounds (Aldrich and Lusby, 1986), the sensillae found associated with the glandular patches (Kochenborger, 2018) can indeed have a mechanical function.

Setae of GPs are generally grouped and angled to abdomen, but in a few cases (clade 23, *Leptolobus eburneatus* and *Coryzorhaphis carneolus* Erichson, 1848) they are sparse and parallel to abdomen. The orientation and distribution of setae (characters 127, 128) were significant to phylogeny as these are two of the four characters supporting clade 23. Withal, these characteristics may probably have evolved independently in *Leptolobus eburneatus* and *Coryzorhaphis carneolus*, and perhaps in other not examined species. There are no comparative studies about the compounds produced by *L. eburneatus, Coryzorhaphis carneolus*, the species of clade 23, and by the remaining species of clade 21, and then it is not known if they present any difference regarding the quantity or the volatility of substances produced, which could justify the differences on density of GPs' setae. Our reconstruction points that parallel and sparse setae evolved later on the aforementioned species (node 23, parallel=0.94, angled=0.06; sparse=0.94, grouped=0.06), and they are positively correlated (p-value=0.002)

The excavation of urosternites with GPs is found on species of *Cazira* and *Discocera*. Our initial hypothesis was that this could be a common characteristic between these two genera, but the cladistic analysis point that these genera are not strictly related, as well as that this characteristic is modified in *Cazira insignis* (Schouteden, 1907), so that has probably converged in some species of *Cazira* and *Discocera*.

Conclusion

Asopinae is a natural group of predatory stink bugs characterized by the subquadrate dorsal head, labium robust and place right below labium, bucullae parallel and not projected over the anterior margins of labium, pygophores endowed with superior processes of diaphragm, and phallus divided in basal and apical theca. Many species have a projection on anterior femur, and a monophyletic group of genera have male abdominal glandular patches. The last seems to be evolved once. Predation inside Pentatomidae seems to be evolved once in Asopinae. Although some limitations regarding the taxa sampling, this work represents the first step for systematics studies on subfamily. From this, the addition of data may refine classifications of genus and species in the future, as well as permit new comprehensions about the evolution of exclusive morphological structures of the subfamily.

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Tables

Table 1.

Genera and species valid of Asopinae with the indication of species included in the cladistic analysis and type specimens examined.

* Species examined only by photos and/or descriptions.

Genus	Species	Distribution	Included in the analysis	Types examined
Afrius Stål, 1870	*A. kolleri* Schouteden, 1907	Africa and adjacent islands		RMCA
	A. purpureus (Westwood, 1837)		X	NHMUK, OUMNH, ZMHB
	A. flavirostrum (Signoret, 1861)		X	NHMUK, NHMW
Alcaeorrhynchus Bergroth, 1891	*A. grandis* (Dallas, 1851)	America	X	NHMUK
	A. phymatophora (Palisot de Beauvois, 1805)		X	
Amyotea Ellenreider, 1862	*A. erythromela* (Walker, 1868)	Asia and Oceania		NHMUK
	A. frontalis (Walker, 1868)			NHMUK
	A. glaucolimbata (Tryon, 1892)			
	A. hamata (Walker, 1868)		X	NHMUK
	A. lata Zhao et al., 2011			
	A. malabarica (Fabricius, 1775)		X	
	A. micans (Distant, 1888)			NHMUK
	A. reciproca (Walker, 1868)			NHMUK
	A. maliki Ahmad & Kamaluddin			
Anasida Karsch, 1892	*A. funebris* Distant, 1900	Asia and Africa		NHMUK
	A. orientalis Distant, 1910			NHMUK
	A. schoutedeni Distant, 1910			
	A. tenebrio Karsh, 1892		X	ZMHB
Andrallus Bergroth,1862	*A. spinidens* (Fabricius, 1787)	cosmopolitan	X	RBINS, OUMNH
Apateticus Dallas, 1851	*A. lineolatus* (Herrich-Schaffer, 1840)	America	X	NHMUK
	A. marginiventris (Stål, 1870)			
Apoecilus Stål, 1870	*A. bracteatus* (Fitch, 1856)	America	X	
	A. cynicus (Say, 1831)		X	NHMUK
	A. invarius (Walker, 1867)			NHMUK
Arma Hahn, 1832	*A. custos* (Fabricius, 1794)	America, Asia, Europe	X	ZMUC, ZMHB
	A. ferruginea (Hsiao & Cheng, 1977)			
	A. insperata Horváth, 1899			
	A. koreana Josifov & Kerzhner, 1978			MNHN, ZMHB
	A. maculata Zheng, 1980			
	A. tuberculata (Yang, 1935)			MNHN
	A. velata Walker, 1868			
Australojalla Thomas, 1994	*A. versicolor* (Distant, 1911)	Oceania	X*	NHMUK
Blachia Walker, 1867	*B. ducalis* Walker, 1867	Asia	X	NHMUK
Brontocoris Thomas, 1992	*B. nigrolimbatus* (Spinola, 1852)	America		MNHN
	B. tabidus (Signoret, 1863)		X	
Bulbostethus Ruckes, 1960	*B. chrysopterus* (Herrich-Schaffer, 1844)	Oceania (Mariana islands)		

	B. transversalis Ruckes, 1963		X*	AMNH
Canthecona Amyot & Serville, 1843	*C. discolor* (Palisot de Beauvois, 1811)	Africa	X	
Cantheconidea Schouteden, 1907	*C. acuta* (Vollenhoven, 1868)	Asia		
	C. cyanacantha (Stål, 1870)			NHRS
	C. gaugleri Scheiner, 1940			
	*C. humeralis (*Distant, 1908)			NHMUK
	C. javana (Dallas, 1851)			NHMUK
	C. variabilis (Vollenhoven, 1868)		X	
Cazira Amyot & Serville, 1843	*C. bergrothi* Breddin, 1903			
	C. breddini Schouteden, 1907			MNHN, RBINS
	C. chiroptera (Herrich-Schaeffer, 1840)		X	RBINS
	C. concinna Hsiao & Zheng, 1977			
	C. emeia Zhang & Lin, 1982			
	C. flava Yang, 1934			MNHN
	C. frivaldskyi Horváth, 1889			MNHN, RBINS
	C. fruhstorferi Breddin, 1901			
	C. horvathi Breddin, 1903			
	C. inerma Yang, 1934			MNHN
	C. insignis (Schouteden, 1907)		X	RBINS
	C. internexa Walker, 1867			NHMUK
	C. kirkaldyi Breddin, 1903			
	C. membrania Zhang & Lin, 1982			
	C. montandoni Breddin, 1903			
	C. reuteri Breddin, 1903			
	C. schwarzi Abbasi & Rishi, 1974			
	C. sichuana Zhang & Lin, 1986			
	C. similis Distant, 1902		X	NHMUK
	C. thibetensis Schouteden, 1907			MNHN, RBINS
	C. ulcerata (Burmeister, 1835)			ZMHB
	C. vegeta Kirkaldy, 1909			
	C. verrucosa (Westwood, 1834)			ZMHB
	C. yunnanica (Zhang & Lin, 1982)			
Cecyrina Walker, 1867	*C. platyrhinoides* Walker, 1867	Asia	X	NHMUK
	C. flata Zhao et al., 2016			
	C. rubra Zhao et al., 2016			
Cermatulus Dallas, 1851	*C. nasalis* (Westood, 1837)	Oceania	X	NHMUK, OUMNH
	C. turbotti Woodward, 1950			
Colpothyreus Stål, 1867	*C. flavolineatus* (Blanchard, 1843)	America	X	MNHN
Comperocoris Stål, 1867	*C. roehneri* (Phillipi, 1862)	America	X	
Conquistator Gapon, 2009	*C. mucronatus* (Uhler,1897)	America	X	
Coryzorhaphis Spinola, 1837	*C. carneolus* Erichson, 1848	America	X	NHMUK, ZMHB

	C. cruciata Stål, 1870			
	C. dollingi Thomas, 1992			NHMUK
	C. egeri Thomas, 1992			
	C. leucocephala Spinola, 1837		X	
	C. superba Breddin, 1906			
Damarius Schouteden, 1907	*D. splendidulus* (Fabricius, 1803)	Africa	X	NHMUK
Dinorhynchus Jakovlev, 1876	*D. dybowskyi* Jakovlev, 1876	Asia	X	NHMUK
	D. opulentus (Distant, 1890)			NHMUK
Discocera Laporte, 1833	*D. cayennensis* Laporte, 1833	America	X	ZMHB
	D. coccinea (Fabricius, 1798)		X	ZMHB
Dorycoris Mayr, 1864	*D. pavonivus* (Westwood, 1837)	Africa	X	NHMUK, OUMNH
Ealda Walker, 1867	*E. minax* Walker, 1867	Oceania (New Caledonia)	X	NHMUK
Eocanthecona Bergroth, 1915	*E. binotata* (Distant, 1879)	Asia and Oceania		NHMUK
	E. concinna (Walker, 1867)			NHMUK
	E. eburnea Bergroth, 1915			OUMNH
	E. formosa (Horváth, 1911)			
	E. furcellata (Wolff, 1811)		X	
	E. japonicola (Esaki & Ishihara, 1950)			
	E. kyushuensis (Esaki & Ishihara, 1950)			
	E. atipes (Stal, 1871)			
	E. mitis (Vollenhoven, 1868)			
	E. neotibialis (Ahmad & Rana, 1988)			
	E. ornatula (Distant, 1908)			NHMUK
	E. parva (Distant, 1902)			NHMUK
	E. plebeja (Vollenhoven, 1868)			
	E. populusi (Ahmad & Rana, 1988)			
	E. robusta (Distant, 1879)			NHMUK
	E. rufescens (Vollenhoven, 1868)			
	E. shikokuensis (Esaki & Ishihara, 1950)			
	E. thomsoni (Distant, 1911)			NHMUK
	E. tibialis (Distant, 1879)			NHMUK
	E. vollenhoveni (Breddin, 1902)			
Euthyrhynchus Dallas,1851	*E. floridanus* (Linnaeus 1767)	America	X	NHMUK
Friarius Schouteden, 1907	*F.alluaudi* (Schouteden, 1905)	Africa	X	MNHN
Glypsus Dallas, 1851	*G. abdominalis* Cachan, 1952	Africa		MNHN
	G. bouvieri Schouteden, 1904			MNHN
	G. carinulatus Bergoth, 1904			
	G. conspicuus (Westwood, 1837)		X	NHMUK, ZMHB, OUMNH
	G. erubescens Distant, 1890			NHMUK, RBINS

	G. fuscispinus Stål, 1870			
	G. kuhgatzi Schouteden, 1904		X	MNHN, RMCA
	G. luridus Dallas, 1851			NHMUK
	G. nigripes Horváth, 1911			
	G. sparsus (Westwood, 1837)			OUMNH
	G. truculentus Walker, 1868			NHMUK
	G. vigil (Germar, 1837)			
Hemallia Bergroth, 1908	*H. signitenens* (Schouteden1905)	Africa	X	MNHN
Heteroscelis Latreille, 1829	*H. bimaculata* (Walker, 1867)	America		MLPA, NHMUK
	H. lepida Distant, 1880			NHMUK
	H. servillei Laporte		X	MACN
	H. robustus Thomas, 1992		X	
Hoploxys Dallas, 1851	*coeruleus* Dallas, 1851	Africa	X	NHMUK
Jalla Hahn, 1832	*dumosa* (Linnaeus, 1758)	Asia and Europe	X	
	subcalcarata Jakovlev, 1885			
	subdilatata Reuter, 1900			
Jalloides Schouteden, 1907	*J. opulentus* (Distant, 1911)	Oceania	X	NHMUK
	J. rubricosus (Stål, 1870)		X	NHRS
Leptolobus Signoret, 1855	*L. eburneatus* Karsch, 1892	Africa	X	MNHN, RMCA
	L. insignis (Distant)			NHMUK
	L. karschi Schumacher, 1912			
	*L. martini (*Schouteden, 1904)			MNHN
	L.*murrayi* Signoret, 1855		X	OUMNH
	L. zanzibaricus Bolivar, 1879			
Macrorhaphis Dallas, 1851	*M. dallasi* Schouteden, 1905	Africa		MNHN, NHMUK
	M. leprosa (Germar, 1837)			
	*M. acuta (*Dallas, 1851)		X	NHMUK
	M. wollastoni White, 1878			NHMUK
Marmessulus Bergroth, 1891	*M. brasilianus* Schouteden, 1907	America		
	M. nigricornis (Stål, 1865)		X	NHMUK
Martinina Schouteden, 1907	*M. inexpectata* Schouteden, 1907	Asia	X*	MNHN
	M. prima (Distant, 1908)		X*	NHMUK
Mecosoma Dallas, 1851	*M. coquerelii* Signoret, 1861	Africa		
	M. floridum Distant, 1890			
	M. mensor (Germar, 1837)		X	NHMUK
Montrouzieriellus Kirkaldy, 1908	*M. borneensis* (Distant, 1900)	Africa and Oceania		NHMUK
	M. falleni (Guérin-Méneville)		X	NHMUK
	M. inermis (Schouteden, 1907)			RBINS
	M. laetus (Walker, 1867)			NHMUK
	M. lefebvrei (Spinola, 1837)			
	M. minor (Elleinreider, 1862)			
	M. *purparascens* (Walker, 1868)			NHMUK
	M. turneri (Distant, 1911)			NHMUK
Oechalia Stål, 1862	*O. acuta* Usinger, 1941	Oceania		

	O. bryani Usinger, 1941			NHMUK
	O. ferruginea Usinger, 1941			
	O. grisea (Burmeister, 1834)			ZMHB
	O. hirtipes Van Duzee, 1936			
	O. kaonohi Kirkaldy, 1909			
	O. pacifica Stal, 1859			
	O. patruelis Stal, 1859			
	O. schellembergii (Guérin-Méneville, 1831)		X	NHMUK
	O. similis Usinger, 1941			
	O. sinuata Usinger, 1941			
	O. suehiroae Usinger, 1941			
	O. swezeyi Usinger, 1941			
	O. virescens Usinger, 1941			NHMUK
	O. virgula Van Duzee, 1936			NHMUK
Oplomus Spinola, 1837	*O. annotatus* Uhler, 1863	America		
	O. catena (Drury, 17*82)*		X	
	O. cruentus (Burmeister, 1835)		X	ZMHB
	O. dichrous (Herrich-Shaeffer, 1838)			ZMHB
	O. ebulinus (Herrich-Shaeffer, 1844)			NHMUK, RBINS, ZMHB
	O. marginalis (Westwood, 1837)			NHMUK, OUMNH
	O. mundus Stål, 1862			NHMUK
	O. mutabilis Stål, 1862			NHMUK
	O. pulcher Dallas, 1851			NHMUK
	O. pulchriventris Horváth, 1911			
	O. punctatus Montandon, 1895			NHMUK
	O. salamandra (Burmeister, 1835)			NHMUK, ZMHB
Ornithosoma Kormilev, 1957	*O. rivierei* Kormilev, 1957	America	X*	
Parajalla Distant, 1911	*P. sanguineosignata* (Spinola, 1852)	America	X	
Parealda Schouteden, 1907	*P. bouvieri* Schouteden, 1907	Oceania (Mariana islands)	X*	MNHN
Perillus Stål, 1862	*P. bioculatus* (Fabricius, 1775)	America	X	NHRS
	P. circumcinctus Stål, 1862		X	
	P. confluens (Herrich-Schaeffer, 1840)			NHMUK
	P. exapus (Say, 1825)		X	NHMUK
	P. lunatus Knight, 1952			
	P. splendidus (Uhler, 1861)			
	P. strigipes (Herrich-Schaeffer, 1851)			
Picromerus Amyot & Serville, 1843	*P. bidens* (Linnaeus, 1758)	America, Asia, Europe	X	
	P. brachypterus Ahmad & Onder, 1990			
	P. conformis (Herrich-Schaeffer, 1841)			

	P. elevatus Zhao et al 2013			
	P. fasciaticeps Zheng & Liu, 1987			
	P. griseus (Dallas, 1851)			NHMUK
	P. lewisi Scott, 1874			NHMUK
	P. nigridens (Fabricius, 1803)			
	P. orientalis Rishi & Abbasi, 1973			
	P. pseudobidens Ahmad & Onder, 1990			
	P. viridipunctatus Yang, 1934			
Pinthaeus Stål, 1867	*P. sanguinipes* (Fabricius, 1781)	Asia, Europe	X	ZMUC
Planopsis Schouteden, 1907	*P. silvaticus* (Distant, 1890)	Africa	X	MNHN, NHMUK, RMCA
Platynopiellus Thomas, 1994	*P. delevali* (Schouteden, 1910)	Africa		
	P. dispar (Schouteden, 1916)			
	P. fallax (Schouteden, 1904)			MNHN
	P. horvathi (Schouteden, 1904)			
	P. reichi (Signoret, 1858)			
	P. scutellatus (Distant, 1900)			NHMUK
	P. septendecimaculatus (Palisot de Beavois, 1811)		X	NHMUK
	P. thomsonii (Signoret, 1858)			
Platynopus Amyot & Serville, 1843	*P. calliger* Horváth, 1911	Asia		
	P. carbonarius Horváth, 1911			
	*P. dalpadoides (*Vollenhoven, 1867) *P. indicus* Chaterjee, 1934			
	P. melanoleucus (Westwood, 1837)		X	NHMUK, OUMNH
Podisus Herrich-Shäffer, 1851	*P. aenescens* (Stål, 1860)	America		NHRS
	P. affinis Distant, 1880			
	P. borinquensis Barber, 1939			
	P. brevispinus Philips, 1982			
	P. congrex (Stål, 1862)			NHMUK
	P. cornutus (Dallas, 1851)			
	P. crassimargo (Stål, 1860)			
	P. curvispina Bergroth, 1891			
	P. distinctus (Stål, 1860)			NHMUK
	P. falcatus Distant, 1889			NHMUK
	P. formosus Costa Leite, 1957			
	P. gundlachii (Guérin-Méneville, 1857)			
	P. insignis Distant, 1880			NHMUK
	P. maculiventris (Say, 1831)		X	NHMUK
	P. mactans Thomas, 1992			
	P. mexicanus Distant, 1880			NHMUK
	P. mucronatus Uhler, 1987			
	P. neglectus Westwood, 1837			OUMNH

	P. nigrispinus (Dallas, 1851)		X	NHMUK
	P. nigriventris Distant, 1880			NHMUK
	P. pallipes (Dallas, 1851)			NHMUK
	P. placidus Uhler, 1870			
	P. rostralis (stal, 1860)			NHMUK
	P. sagitta (Fabricius, 1794)			NHMUK
	P. sculptus Distant, 1889			NHMUK
	P. semialbus (Walker, 1868)			NHMUK
	P. sordidus (Stal, 1859)			
	P. subferrugineus Barber & Bruner, 1932			
	P. tinctus (Dallas, 1851)			NHMUK
	P. trucidatus Thomas, 1992			
	P. ventralis (Dallas, 1851)			NHMUK
	P. volxemi Distant, 1887			
Ponapea Ruckes, 1963	*P. arachnoides* Ruckes, 1963	Oceania (Caroline islands)	X*	
Pseudanasida Schouteden, 1907	*P. fallax* Schouteden, 1907	Asia	X*	MNHN
	P. ikrami (Ahmad & kamaluddin, 1983)			
Rhacognathus Fieber, 1860	*R. callosus* Horváth, 1903	America, Asia, Europe		
	R. corniger Hsiao & Zheng, 1977			
	R. lamellifer Josifov & Kerzner			
	R. punctatus (Linnaeus, 1758)		X	MNHN, RBINS
	R. americanus Stål, 1870		X	NHRS
Stilbotes Stål, 1867	*S. semperi* Stål, 1871	Asia	X	
	S. goulae Roca-Cusachs & Jung 2018			
Stiretrus Laporte, 1833	*S. anchorago* (Fabricius, 1775)	America		NHMUK, NHRS, OUMNH, ZMHB
	S. bifrenatus Breddin, 1906			
	S. cinctellus Germar, 1839			ZMHB
	S. decastigmus (Herrich-Schaeffer, 1838)		X	ZMHB
	S. decemguttatus (Lepeletier & Serville, 1828)		X	OUMNH, ZMHB
	S. erythrocephalus (Lepeletier & Serville, 1828)		X	NHRS, OUMNH, ZMHB
	S. loratus Germar, 1839			ZMHB
	S. quinquepunctatus Germar, 1839			ZMHB
Supputius Distant, 1889	*S. cincticeps* (Stål, 1858)	America	X	NHMUK, NHRS
	S. pulchricornis (Stål, 1862)			
	S. typicus (Distant, 1889)		X	NHMUK
Troilus Stål, 1867	*T. luridus* (Fabricius, 1775)	Asia, Europe	X	NHMUK
	T. testaceus Zheng & Liu, 1987			

Tylospilus Stål, 1870	*T. acutissimus* Stål, 1870	America		NHRS
	T. armatus Thomas, 1992			
	T. chilensis (Spinola, 1852)		X	MNHN
	T. cloelia (Stål, 1862)		X	
	T. distans Bergroth, 1891			
	T. megaspilus (Walker, 1867)			NHMUK
	T. nigrobinotatus (Berg, 1879)			NHMUK
	T. peruvianus (Horváth, 1911)			
Tynacantha Dallas, 1851	*T. marginata* Dallas, 1851	America	X	NHMUK
	T. splendens Distant, 1889			NHMUK
Tyrannocoris Thomas, 1992	*T. rex* Thomas, 1992	America	X	AMNH
	T. nigriceps Thomas, 1992		X	AMNH
	T. rideri Thomas, 1992			
	T. jole (Stål, 1862)			
Zicrona Amyot & Serville, 1843	*Z. caerulea* (Linnaeus, 1758)	America, Asia, Europe	X	NHMUK
	Z. hisarensis Chopra & Sucheta 1984			
	Z. americana Thomas, 1992			
	Z. murreensis Rana & Ahmad, 1988			

Figures

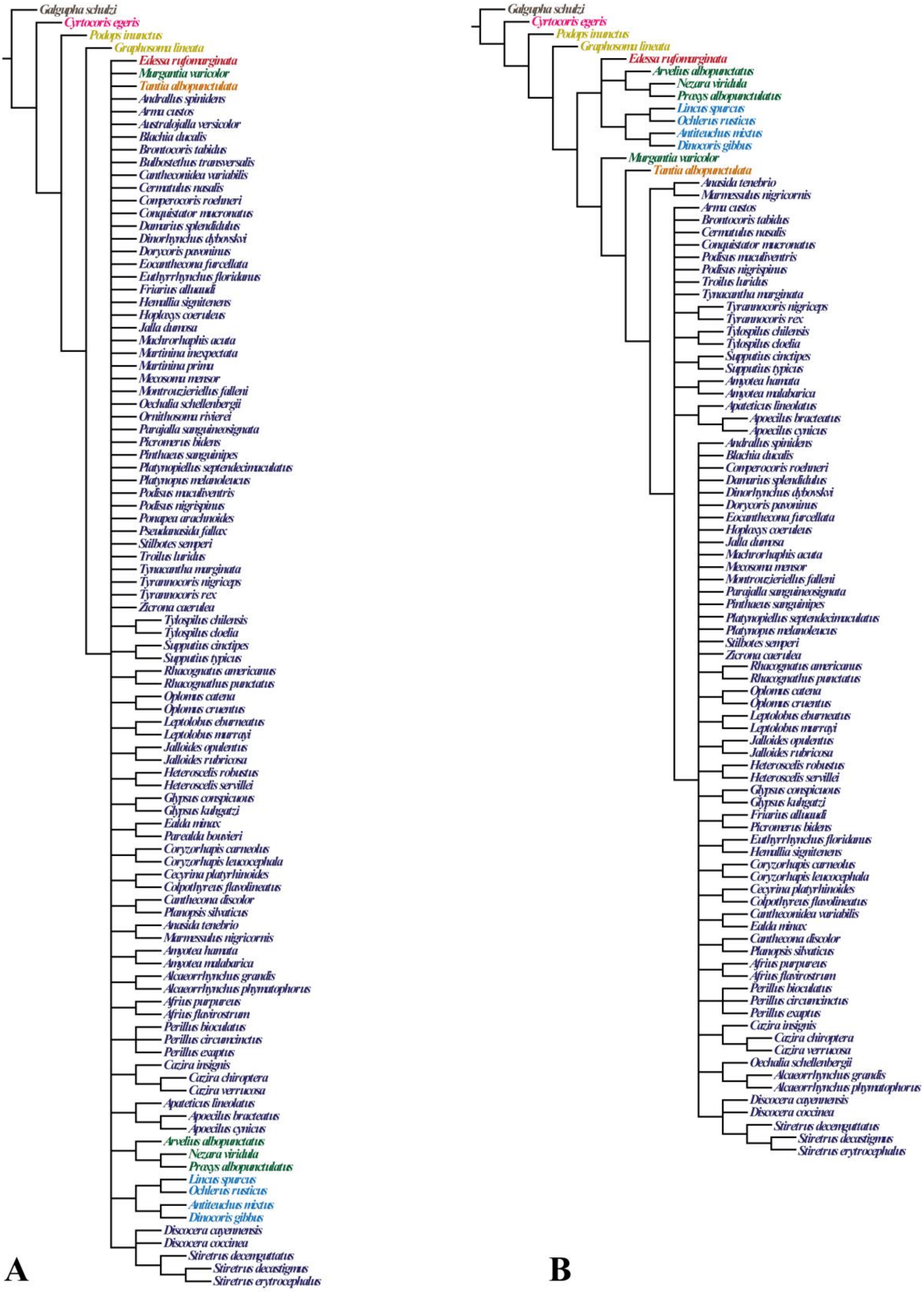


Fig. 1. Strict consensus of 76 (A) and 36 (B) equally parsimonious trees calculated under equal weights. A, Full dataset. B, Taxa examined only by photos or description deactivated.

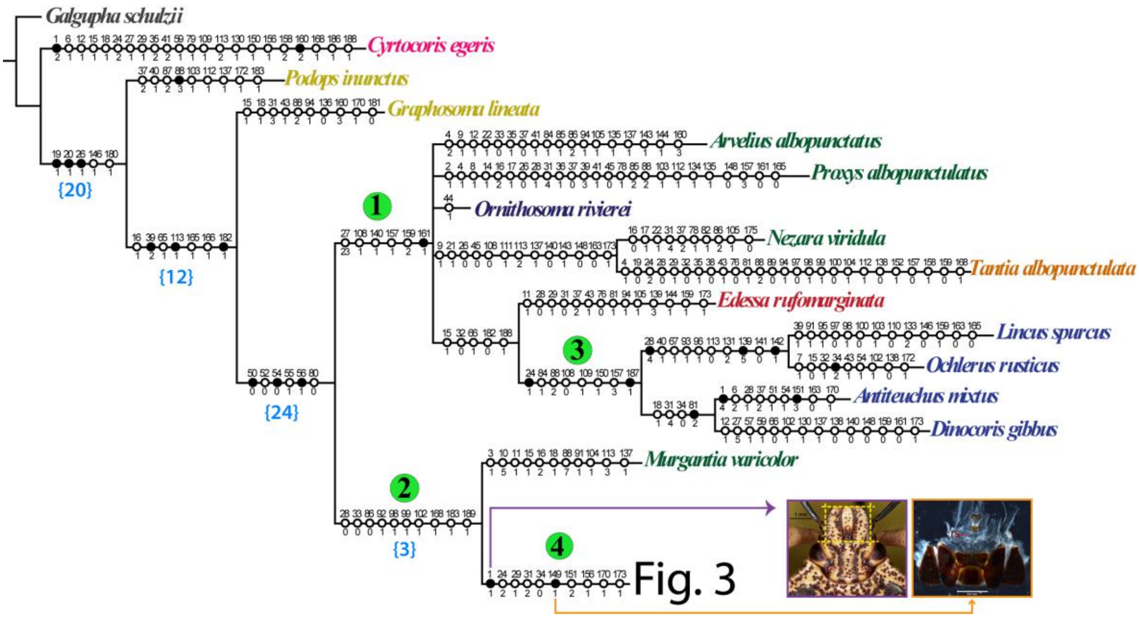


Fig. 2. First hypothesis (A) for the classification of Asopinae generated from an analysis including all taxa examined (Table 1) and analyzed under implied weighting (K=11.684), outgroup relationships. White circles, homoplasious transformations; black circles, nonhomoplasious transformations. Numbers below branches indicate relative Bremer support. The terminal names are coloured according to the family or subfamily to which they belong: grey, Thyreocoridae; pink, Cyrtocorinae; yellow, Podopinae; green, Pentatominae; orange, Phyllocephalinae; red, Edessinae; light blue, Discocephalinae; dark blue, Asopinae.

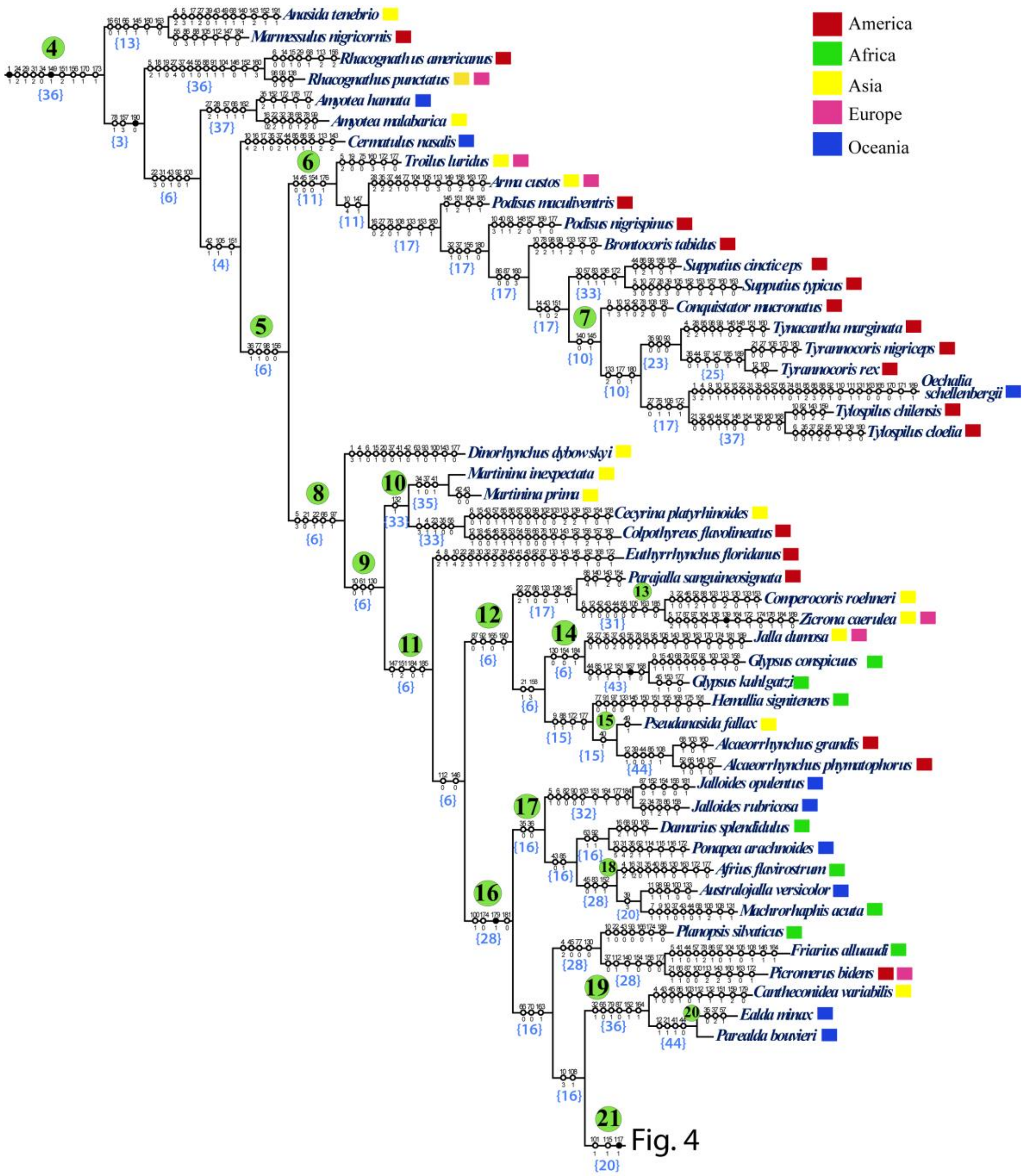


Fig. 3. First hypothesis (A) for the classification of Asopinae generated from an analysis including all taxa examined (Table 1) and analyzed under implied weighting (K=11.684), clade 4. White circles, homoplasious transformations; black circles, nonhomoplasious transformations. Numbers below branches indicate relative Bremer support. Colored rectangles beside terminal names indicate in which continents the species are distributed.

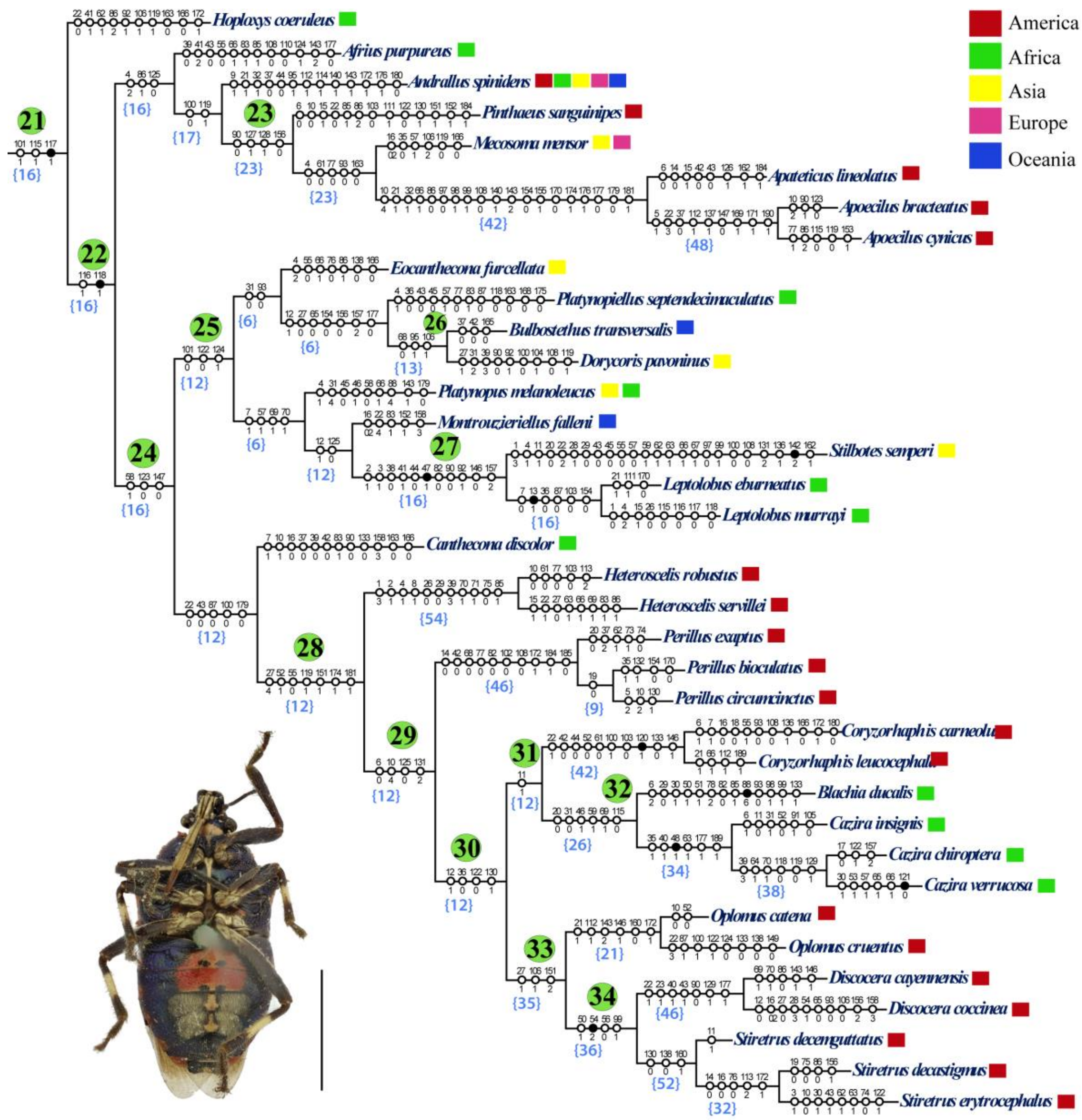


Fig. 4. First hypothesis (A) for the classification of Asopinae generated from an analysis including all taxa examined (Table 1) and analyzed under implied weighting (K=11.684), clade 21. White circles, homoplasious transformations; black circles, nonhomoplasious transformations. Numbers below branches indicate relative Bremer support. Colored rectangles beside terminal names indicate in which continents the species are distributed. The specimen illustrated on inferior left lateral have abdominal male glandular patches. Scale bar = 4mm.

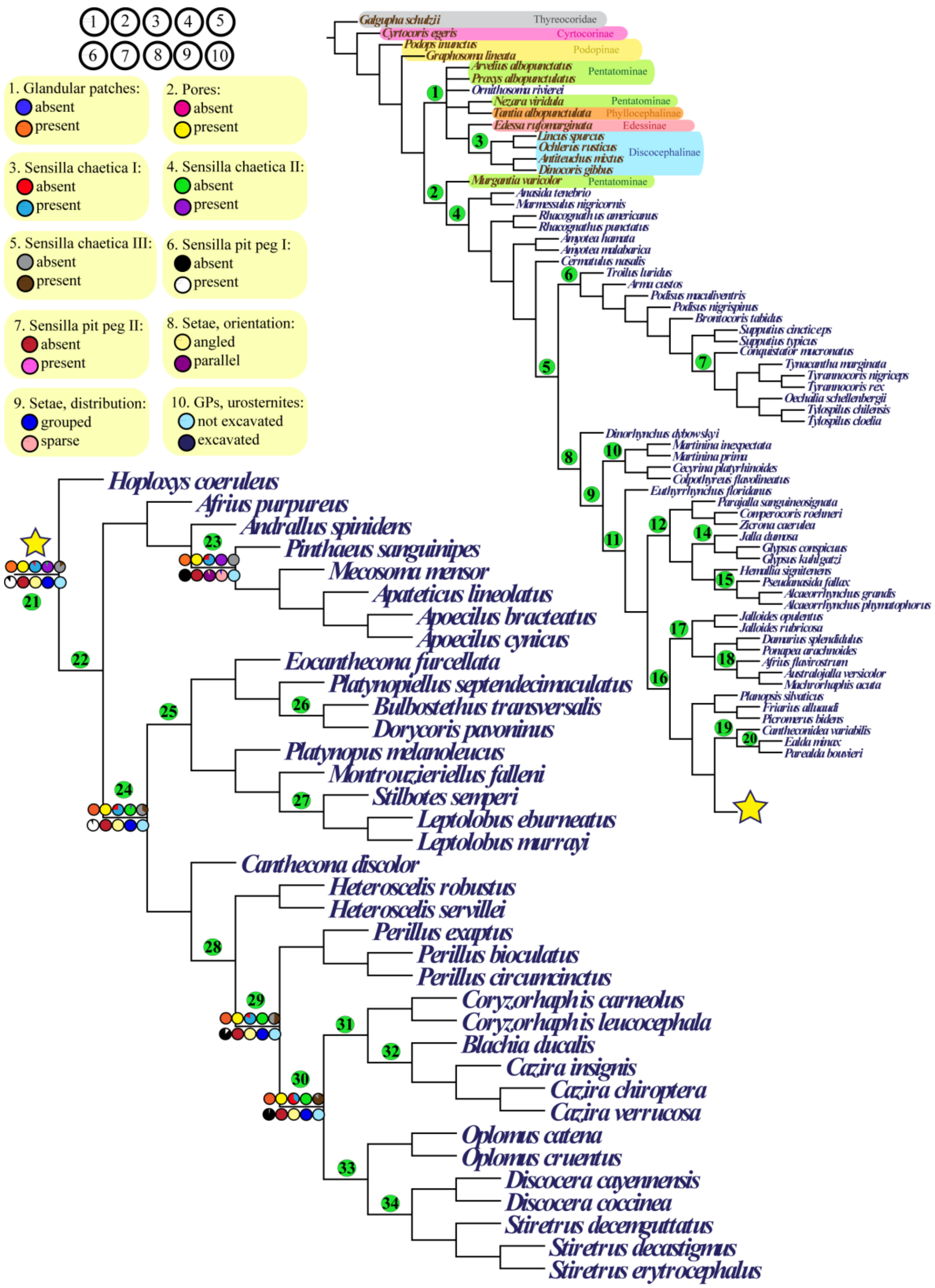


Fig. 5. First hypothesis (A) for the classification of Asopinae generated from an analysis including all taxa examined (Table 1) and analyzed under implied weighting (K=11.684). Ancestral reconstruction of male abdominal glandular patches for the clade 21. Circles on nodes indicate the probabilities of each state for ancestrals.

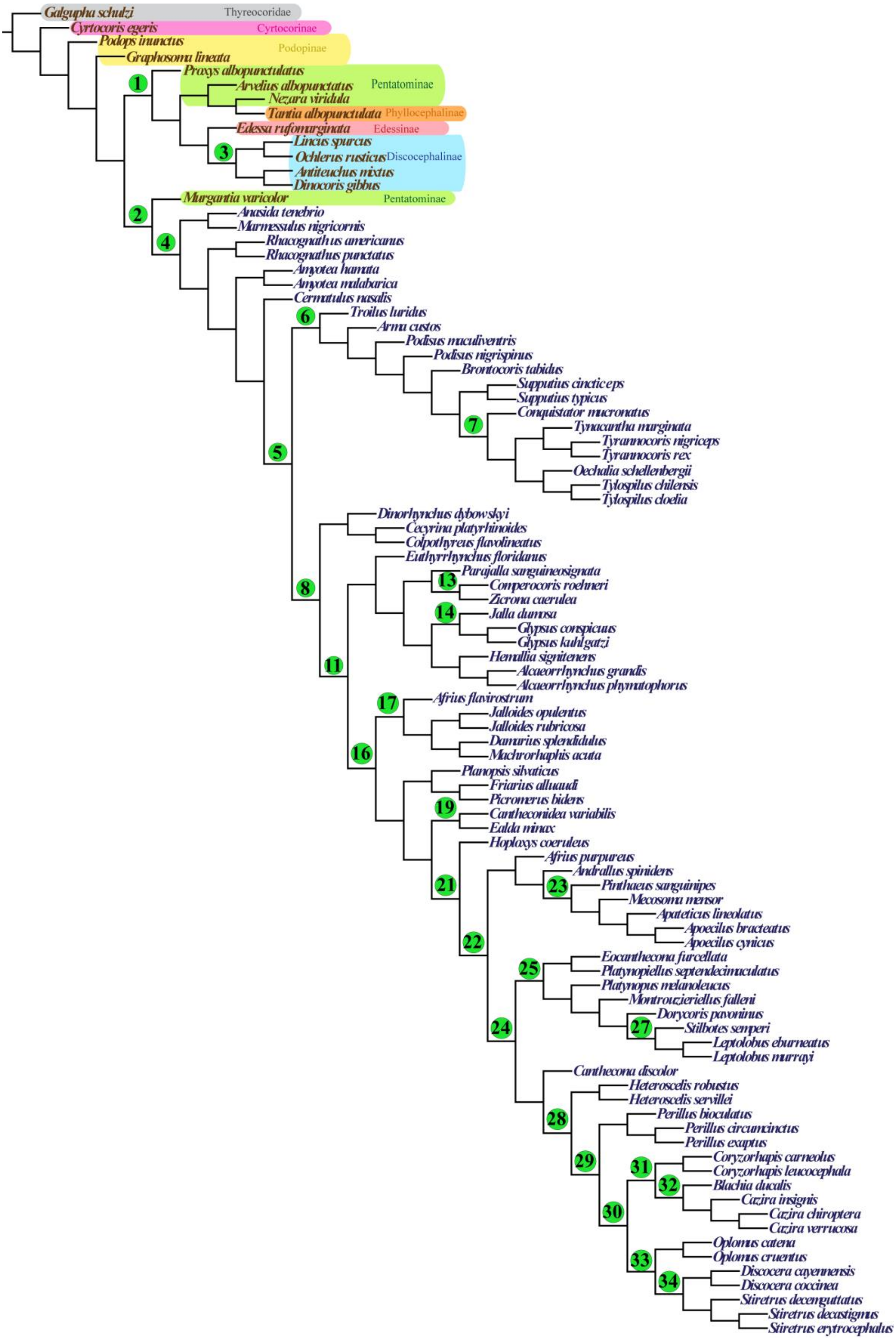

Galgupha schulzi
Thyreocoridae
Cyrtocoris egeris
Cyrtocorinae
Podops inunctus
Podopinae
Graphosoma lineata
1
Praxys albopunctulatus
Arvelius albopunctatus
Pentatominae
Nezara viridula
Tantia albopunctulata
Phyllocephalinae
Edessa rufomarginata
Edessinae
3
Lincus spurcus
Ochlerus rusticus
Discocephalinae
Antiteuchus mixtus
Dinocoris gibbus
Murgantia varicolor
Pentatominae
2
Anasida tenebrio
Marmessulus nigricornis
4
Rhacognathus americanus
Rhacognathus punctatus
Amyotea hamata
Amyotea malabarica
Cermatulus nasalis
6
Troilus luridus
Arma custos
Podisus maculiventris
Podisus nigrispinus
Brontocoris tabidus
Supputius cincticeps
Supputius typicus
Conquistator mucronatus
7
Tynacantha marginata
Tyrannocoris nigriceps
Tyrannocoris rex
5
Oechalia schellenbergii
Tylospilus chilensis
Tylospilus cloelia
Dinorhynchus dybowskyi
Cecyrina platyrhinoides
Colpothyreus flavolineatus
Euthyrrhynchus floridanus
Parajalla sanguineosignata
13
Comperocoris roehneri
8
Zicrona caerulea
14
Jalla dumosa
Glypsus conspicuus
Glypsus kuhlgatzi
Hemallia signitenens
11
Alcaeorrhynchus grandis
Alcaeorrhynchus phymatophorus
17
Afrius flavirostrum
Jalloides opulentus
Jalloides rubricosa
16
Damarius splendidulus
Machrorhaphis acuta
Planopsis silvaticus
Friarius alluaudi
Picromerus bidens
19
Cantheconidea variabilis
Ealda minax
Hoploxys coeruleus
Afrius purpureus
Andrallus spinidens
21
23
Pinthaeus sanguinipes
Mecosoma mensor
22
Apateticus lineolatus
Apoecilus bracteatus
Apoecilus cynicus
25
Eocanthecona furcellata
Platynopiellus septendecimaculatus
Platynopus melanoleucus
Montrouzieriellus falleni
Dorycoris pavoninus
24
27
Stilbotes semperi
Leptolobus eburneatus
Leptolobus murrayi
Cantheconia discolor
Heteroscelis robustus
Heteroscelis servillei
28
Perillus bioculatus
Perillus circumcinctus
Perillus exaptus
29
31
Coryzorhapis carneolus
Coryzorhapis leucocephala
32
Blachia ducalis
30
Cazira insignis
Cazira chiroptera
Cazira verrucosa
Oplomus catena
Oplomus cruentus
33
Discocera cayennensis
34
Discocera coccinea
Stiretrus decemguttatus
Stiretrus decastigmus
Stiretrus erytrocephalus

Fig. 6. Second hypothesis (B) for the classification of Asopinae generated from an analysis not including all taxa examined (Table 1) and analyzed under implied weighting (K=11.420).

Supplementary material

SM1. Second hypothesis (B) for the classification of Asopinae generated from an analysis not including all taxa examined (Table 1) and analyzed under implied weighting (K=11.420). White circles, homoplasious transformations; black circles, nonhomoplasious transformations.

SM2. Data matrix

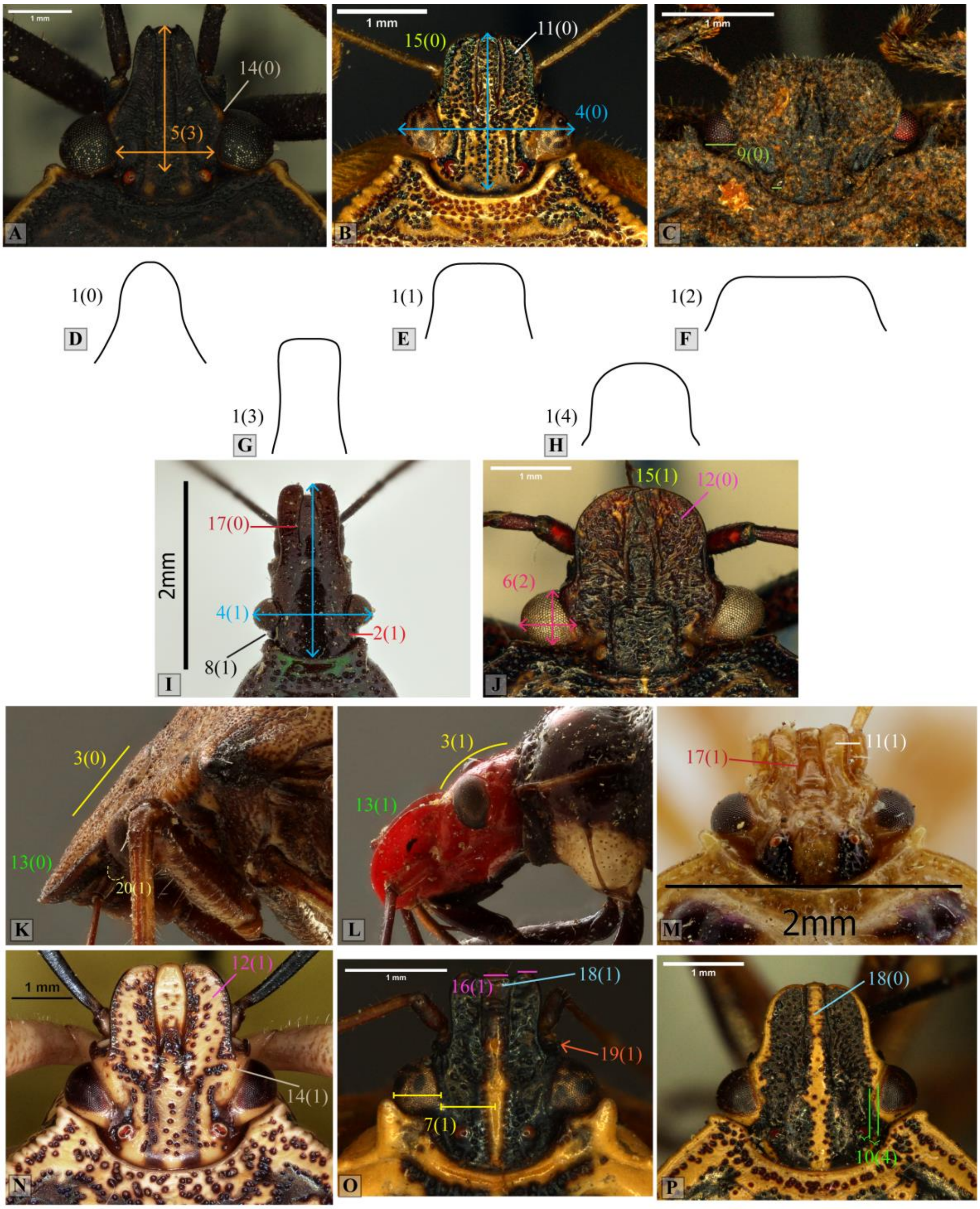
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
Galgupha schulzi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0	1
Cyrtocoris egeris	2	0	1	0	0	1	0	0	0	5	0	1	0	0	1	0	0	1	0	0	0	0	0	2	0	0	1	3	1	0	4	0	1	1	2	-	1	1	1	0	2	0	0	0	1	0	0	0	0	1
Antiteuchus mixtus	4	0	0	0	1	2	0	0	0	4	0	0	0	0	1	1	0	1	1	1	0	2	0	1	1	1	3	1	0	0	4	0	1	0	0	0	2	1	2	0	0	0	0	0	1	0	0	0	0	0
Dinocoris gibbus	0	0	0	0	1	0	0	0	0	0	0	1	0	0	1	1	0	1	1	1	0	-	-	1	1	1	5	3	0	0	4	0	1	0	0	0	1	1	2	0	0	0	0	0	1	0	0	0	0	0
Lincus spurcus	0	0	0	0	3	0	0	0	0	1	0	0	0	0	1	1	0	0	1	1	0	0	0	1	1	1	3	4	0	0	1	0	1	1	0	0	1	1	1	1	0	0	0	0	1	0	0	0	0	0
Ochlerus rusticus	0	0	0	0	3	0	1	0	0	1	0	0	0	0	0	1	0	0	1	1	0	0	0	1	0	1	3	4	0	0	1	1	1	2	0	0	1	1	2	1	0	0	1	0	1	0	0	0	0	0
Edessa rufomarginata	0	0	0	0	1	1	0	0	0	0	1	-	0	0	1	1	0	0	1	1	0	0	0	0	0	1	1	0	1	0	0	0	1	1	0	0	2	1	2	0	0	0	1	0	1	0	0	0	0	0
Arvelius albopunctatus	0	0	0	2	3	0	0	0	1	1	0	1	0	0	0	1	0	0	1	1	0	1	0	0	0	1	3	3	0	0	1	1	0	1	1	-	0	1	2	0	1	0	0	0	1	0	0	0	0	0
Murgantia varicolor	0	0	1	0	0	0	0	0	0	5	1	-	0	1	1	2	0	1	1	1	0	?	0	0	0	1	0	0	0	0	1	1	0	1	0	0	1	1	2	0	0	0	0	0	1	0	0	0	0	0
Nezara viridula	0	0	0	0	1	1	0	0	1	3	0	0	0	0	0	0	1	0	1	1	1	1	0	0	0	0	2	3	0	0	4	1	1	1	0	0	2	1	2	0	0	0	0	0	0	0	0	0	0	0
Proxys albopunctulatus	0	1	0	1	3	1	0	1	0	1	0	0	0	1	0	2	1	0	1	1	0	0	0	0	0	0	2	1	0	0	4	1	?	1	0	1	0	1	3	0	1	0	0	0	0	0	0	0	0	0
Graphosoma lineata	0	0	0	0	1	0	0	0	0	2	0	0	0	1	1	1	0	1	1	1	0	0	0	0	0	1	0	3	0	0	3	0	1	1	0	0	1	1	2	0	0	0	1	0	1	0	0	0	0	1
Podops inunctus	0	0	1	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	3	0	0	1	0	1	0	0	0	2	1	1	1	0	0	0	0	1	0	0	0	0	1
Tantia albopunctulata	0	0	0	1	3	1	0	0	1	0	0	0	0	0	0	1	0	0	0	1	1	0	0	2	0	0	4	0	1	0	1	0	1	1	1	-	1	0	-	0	0	0	1	0	0	0	0	0	0	0
Afrius purpureus	1	0	0	2	3	1	0	0	0	3	0	0	0	1	0	0&1	1	1	1	1	0	1	0	2	0	1	0	0	1	0	2	0	0	0	1	-	1	1	0	1	2	1	0	1	1	0&1	0	0	0	0
Afrius flavirostrum	1	0	0	2	3	1	0	0	0	0	0	0	0	1	0	1&2	0&1	1	1	1	1	1	0	2	0	1	0	0	1	0	0	0	0	0	1	0	1	1	2	1	0	1	0	1	0	0&1	0	0	0	0
Alcaeorrhynchus grandis	1	0	0	0	3	1	0	0	1	3	0	1	0	1	0	0	0	0	1	1	1	1	0	2	0	1	0	0	1	0	2	0	0	0	1	-	1	1	0	1	0	1	1	0	0	0	0	0	0	0
Alcaeorrhynchus phymatoph	1	0	0	0	3	1	0	0	1	3	0	1	0	1	0	0	0	0	1	1	1	1	0	2	0	1	0	0	1	0	2	0	0	0	1	-	1	1	0	1	0	1	1	0	0	0	0	0	0	0
Amyotea hamata	1	0	0	0	1	1	0	0	0	2	0	0	0	1	0	1	0	0	1	1	1	3	0	2	0	1	2	1	1	1	0	0	0	0	2	-	1	1	2	0	0	0	1	0	1	0	0	0	0	0
Amyotea malabarica	1	0	0	0	1	1	0	0	0	2	0	0	0	1	0	0&2	0	0	1	1	1	2	0	2	0	1	2	1	1	1	0	1	0	0	1	-	1	0	-	0	0	0	1	0	1	0	0	0	0	0
Anasida tenebrio	1	0	0	2	3	1	0	0	0	0	0	0	0	1	0	0	1	0	1	1	1	1	0	2	0	1	2	0	1	0	2	0	0	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0	1	0
Andrallus spinidens	1	0	0	2	3	1	0	0	1	3	0	0	0	1	0	0&1	1	0	1	1	1	1	0	2	0	1	0	0	1	0	0	1	0	0	1	-	0	1	2	1	0	1	1	0	0&1	0	0	0	0	0
Apateticus lineolatus	1	0	0	0	3	0	0	0	0	4	0	0	0	0	1	1	0	0	1	1	1	1	0	2	0	1	0	0	1	0	3	1	0	0	1	-	1	1	2	0	0	0	0	0	1	0	0	0	0	0
Apoecilus bracteatus	1	0	0	0	1	1	0	0	0	2	0	0	0	1	0	1	0	0	1	1	1	3	0	2	0	1	0	0	1	0	3	1	0	0	1	-	0	1	2	0	0	1	1	1	0	0	0	0	0	0
Apoecilus cynicus	1	0	0	0	1	1	0	0	0	4	0	0	0	1	0	1	0	0	1	1	1	3	0	2	0	1	0	0	1	0	3	1	0	0	1	-	0	1	2	0	0	1	1	0	0	0	0	0	0	0
Arma custos	1	0	0	0	1	1	0	0	0	4	0	0	0	0	0	1	0	1	1	1	1	3	0	2	0	1	0	2	1	0	0	0	0	0	2	-	2	1	2	0	0	1	1	1	0	0	0	0	0	0
Australojalla versicolor	1	0	0	?	?	?	0	0	0	0	1	-	0	?	0	0	1	?	?	?	1	?	?	2	0	?	?	?	?	?	?	?	?	0	0	0	1	1	3	0	0	1	0	1	?	0	0	0	0	0
Blachia ducalis	1	0	0	0	1	2	0	0	0	0	1	-	0	1	0	1	1	1	1	0	0	0	0	2	0	1	4	0	0	1	0	0	0	0	0	0	1	1	2	0	0	1	0	1	1	1	0	0	0	1
Brontocoris tabidus	1	0	0	0	1	1	0	0	0	2	0	0	0	0	0	0	0	1	1	1	1	3	0	2	0	1	2	0	1	0	0	1	0	0	1	-	0	1	2	0	0	1	1	0	0	0	0	0	0	0
Bulbostethus transversalis	?	0	?	0	?	?	0	0	0	?	0	1	0	?	0	0	?	?	?	?	?	?	0	2	0	1	0	0	?	0	0	?	0	0	1	-	0	1	2	0	0	0	1	?	?	0	0	0	0	0
Canthecona discolor	1	0	0	0	3	1	1	0	0	1	0	0	0	1	0	0	1	0	1	1	0	0	0	2	0	1	2	0	1	0	1	0	0	0	1	-	0	1	0	0	0	0	0	1	1	0	0	0	0	0
Cantheconidea variabilis	1	0	0	1	3	1	0	0	0	3	0	0	0	1	0	0	1	1	1	1	0	1	0	2	0	1	2	0	1	0	1	1	0	0	1	-	1	1	2	0	0	0	0	1	0	0	0	0	0	0
Cazira chiroptera	1	0	0	0	3	0	1	0	0	0	1	-	0	1	0	1	0	1	1	0	0	0	0	2	0	1	0	0	1	0	0	0	0	0	1	-	1	1	3	1	0	1	0	1	1	1	0	1	0	0
Cazira insignis	1	0	0	2	3	1	1	0	0	0	0	1	0	1	0	1	1	1	1	0	0	0	0	2	0	1	2	0	1	0	1	0	0	0	1	-	1	1	2	1	0	1	0	1	1	1	0	1	0	0
Cazira verrucosa	1	0	0	2	3	0	0	0	0	0	1	-	0	1	0	1	1	1	1	0	0	0	0	2	0	1	0	0	1	1	0	0	0	0	1	-	1	1	3	1	0	1	0	1	1	1	0	1	0	0
Cecyrina platyrhinoides	3	0	0	1	3	0	0	0	0	0	0	0	0	1	1	1	0	1	1	1	0	1	1	2	0	1	0	0	1	0	1	0	0	0	0	1	1	1	2	0	0	1	0	1	1	0	0	0	0	0
Cermatulus nasalis	1	0	0	0	1	1	0	0	0	4	0	0	0	1	0	2	1	0	1	1	1	3	0	2	0	1	0	0	1	0	0	0	0	0	0	0	2	1	2	0	0	1	1	1	1	0	0	0	0	0
Colpothyreus flavolineatus	3	0	0	1	3	1	0	0	0	0	0	1	0	1	0	1	0	0	1	1	0	1	1	2	0	1	0	0	1	0	2	0	0	0	0	1	1	1	2	0	0	1	1	1	0	1	0	0	0	0
Comperocoris roehneri	1	0	1	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1	0	0	0	2	0	1	1	0	1	0	2	0	0	0	0	1	1	1	2	0	0	0	0	0	1	1	0	0	0	0
Conquistator mucronatus	1	0	0	0	1	1	0	0	1	3	0	1	0	1	0	0&2	1	1	1	1	1	3	0	2	0	1	2	0	1	0	0	1	0	0	1	-	2	1	2	0	0	0	0	0	1	0	0	0	0	0
Coryzorhapis carneolus	1	0	0	0	3	1	1	0	0	0	1	-	0	1	0	0	0	0	1	1	0	1	0	2	0	1	4	0	1	0	2	0	0	0	0	0	1	1	2	0	0	0	0	0	1	0	0	0	0	0
Coryzorhapis leucocephala	1	0	0	0	3	0	0	0	0	4	1	-	0	1	0	1	0	1	1	1	1	1	0	2	0	1	4	0	1	0	2	0	0	0	0	0	1	1	2	0	0	0	0	0	1	0	0	0	0	0
Damarius splendidulus	3	0	0	0	3	1	0	0	0	0	0	1	0	1	0	2	1	1	1	1	0	1	0	2	0	1	0	0	1	0	2	0	0	0	0	0	1	1	0	0	0	1	0	1	1	0	0	0	0	0
Dinorhynchus dybovskvi	3	0	0	1	3	0	0	0	0	2	0	0	0	1	1	1	0	1	1	0	0	1	0	2	0	1	0	0	1	0	2	0	0	0	1	-	0	1	2	0	1	0	1	0	1	0	0	0	0	0
Discocera cayennensis	1	0	0	0	2	0	0	0	0	4	0	1	0	1	0	1	0	1	1	1	0	1	1	2	0	1	1	0	1	0	2	0	0	0	0	0	1	1	2	1	0	1	1	1	0	0	0	0	0	1
Discocera coccinea	1	0	0	0	1	0	0	0	0	4	0	0	0	1	0	0&2	0	1	1	1	0	1	1	2	0	1	0	3	1	0	2	0	0	0	0	0	1	1	2	1	0	1	1	1	1	0	0	0	0	1
Dorycoris pavoninus	1	0	0	0	3	0	0	0	0	0	0	1	0	1	0	0&2	0	1	1	1	0	0	0	2	0	1	1	0	1	0	2	0	0	0	0	1	1	1	3	0	0	1	1	1	1	0	0	0	0	0
Ealda minax	1	0	0	0	3	1	0	0	0	3	0	1	0	1	0	2	1	0	1	1	1	3	0	2	0	1	0	0	1	0	1	1	0	0	0	1	2	1	2	0	1	1	1	0	1	0	0	0	0	0
Eocanthecona furcellata	1	0	0	2	3	1	0	0	0	1	0	0	0	1	0	1&2	0	0&1	1	1	1	1	0	2	0	1	2	0	1	0	0	0	0	0	1	-	1	1	2	1	0	1	1	1	1	0	0	0	0	0
Euthyrrhynchus floridanus	1	0	0	2	3	1	0	1	0	4	0	0	0	1	0	1	1	1	1	1	0	2	0	2	0	1	2	3	1	1	0	1	0	0	1	-	2	1	3	1	2	1	0	0	1	0	0	0	0	0
Friarius alluaudi	1	0	0	2	1	1	0	0	0	0	0	0	0	1	0	1	0	0	1	1	0	1	0	2	0	1	2	0	1	0	0	0	0	0	1	-	0	1	2	0	1	1	1	0	0	0	0	0	0	0
Glypsus conspicuous	1	0	0	2	3	1	0	0	1	3	0	0	0	1	1	1	0	1	1	1	1	1	0	2	0	1	0	0	1	0	0	0	0	0	1	-	1	1	2	1	0	1	1	0	0	0	0	0	0	0
Glypsus kuhgatzi	1	0	0	2	1	1	0	0	0	4	0	0	0	1	0	1	0	1	1	1	1	1	0	2	0	1	2	0	1	0	3	0	0	0	1	-	1	1	2	0	0	1	1	0	1	0	0	0	0	0
Hemallia signitenens	1	0	0	2	3	1	0	0	1	3	0	0	0	1	0	0	0	1	1	1	1	1	0	2	0	1	2	0	1	0	0	0	0	0	1	-	1	1	2	0	0	1	1	1	0	0	0	0	0	0
Heteroscelis robustus	3	1	0	1	3	1	0	1	0	0	0	0	0	1	0	1	0	1	1	1	0	0	0	2	0	0	4	0	0	0	2	0	0	0	0	1	1	1	3	1	0	1	0	1	1	0&1	0	0	0	0
Heteroscelis servillei	3	1	0	1	3	1	0	1	0	3	0	0	0	1	1	1	0	1	1	1	0	1	0	2	0	0	0	0	0	0	2	0	0	0	0	1	1	1	3	1	0	1	0	1	1	0	0	0	0	0
Hoploxys coeruleus	1	0	0	0	3	1	0	0	0	3	0	0	0	1	0	1	0	0	1	1	0	0	0	2	0	1	0	0	1	0	1	0	0	0	0	1	1	1	2	0	1	1	1	1	1	0	0	0	0	0
Jalla dumosa	1	0	0	2	1	1	0	0	0	0	0	0	0	1	0	0	0	1	1	1	1	0	0	2	0	1	1	0	1	0	2	0	0	0	0	1	2	1	2	0	0	1	0	1	0	0	0	0	0	0
Jalloides opulentus	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	1	1	1	0	1	0	2	0	1	0	0	1	0	2	0	0	0	0	0	1	1	2	0	0	1	1	1	1	0	0	0	0	0
Jalloides rubricosa	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	1	1	1	1	0	0	0	2	0	1	0	0	1	0	2	0	0	1	0	0	1	1	2	0	0	1	1	1	1	0	0	0	0	0
Leptolobus eburneatus	1	1	1	0	3	1	0	0	0	2	0	-	1	1	0	1	0	1	1	1	1	1	0	2	0	1	4	0	1	0	2	0	0	0	0	0	1	0	-	0	1	0	1	0	1	0	1	0	0	0
Leptolobus murrayi	0	1	1	2	3	1	0	0	0	2	0	1	1	1	1	1	0	1	1	1	0	?	?	2	0	0	4	0	1	0	2	0	0	0	0	0	1	0	-	0	1	0	1	0	1	0	1	0	0	0
Machrorhaphis acuta	1	0	0	0	3	1	1	0	1	1	0	1	0	1	0	0	1	1	1	1	0	1	0	2	0	1	2	0	1	0	2	0	0	0	0&1	0	0	1	3	0	0	1	1	0	0	0	0	0	0	0
Marmessulus nigricornis	1	0	0	0	1	1	0	0	0	4	0	0	0	1	0	0	0	0	1	1	1	4	0	2	0	1	0	0	1	0	2	0	0	0	1	-	1	1	2	0	0	0	0	0	0	0	0	0	0	0
Martinina inexpectata	1	0	0	?	?	?	0	?	0	?	0	0	0	?	0	1	0	1	?	?	?	?	0	2	0	1	?	0	1	0	?	0	0	1	1	-	0	1	2	0	1	1	1	1	?	0	0	0	0	0
Martinina prima	1	0	0	0	?	?	0	0	0	?	0	0	0	?	0	1	0	1	?	?	?	?	0	2	0	1	2	0	1	0	1	?	0	1	1	-	0	1	2	?	1	0	0	1	1	0	0	0	0	0
Mecosoma mensor	1	0	0	0	3	1	0	0	0	3	0	0	0	1	0	0&2	1	0&1	1	1	0	1	0	2	0	1	0	0	1	0	2	0	0	0	0	0	1	1	2	0	0	1	1	1	0	0	0	0	0	0
Montrouzieriellus falleni	1	0	0	0	3	0	1	0	0	3	0	1	0	1	0	0&2	0	1	1	1	0	4	0	2	0	1	2	0	1	0	1	0	0	0	0	1	1	1	0	1	0	1	1	1	1	0	0	0	0	0
Oechalia schellenbergii	3	0	0	2	3	1	0	0	1	1	0	1	0	1	1	0	0	0	1	1	1	1	0	2	0	1	0	0	1	0	1	1	0	0	1	-	0	1	0	0	0	1	1	0	0	0	0	0	0	0
Oplomus catena	1	0	0	0	1	0	0	0	0	0	0	1	0	1	0	1	1	1	1	1	1	0	0	2	0	1	1	0	1	0	2	0	0	0	0	0	1	1	2	0	0	1	0	1	1	0	0	0	0	0
Oplomus cruentus	1	0	0	0	1	0	0	0	0	4	0	1	0	1	0	1	0	1	1	1	1	3	0	2	0	1	1	0	1	0	2	0	0	0	0	0	1	1	2	0	0	1	0	1	1	0	0	0	0	0
Ornithosoma rivierei	?	0	?	?	?	?	?	?	?	?	0	?	0	?	0	?	?	?	1	?	?	?	0	?	?	?	?	?	?	?	?	1	?	?	?	?	1	1	?	?	?	?	?	1	?	?	0	0	?	0
Parajalla sanguineosignata	1	0	0	0	1	1	0	0	0	0	0	0	0	1	0	1	0	0	1	1	0	2	0	2	0	1	1	0	1	0	0	0	0	0	0&1	1	1	1	2	0	0	1	1	1	0	0	0	0	0	0
Parealda bouvieri	1	0	0	0	?	?	0	0	?	?	0	1	0	?	0	2	?	?	?	1	1	?	0	2	0	1	2	0	?	0	1	?	0	0	1	-	1	1	2	0	1	0	1	0	?	0	0	0	0	0
Perillus bioculatus	1	0	0	0	1	0	0	0	0	4	0	0	0	0	0	1	1	1	0	1	0	0	0	2	0	1	4	0	1	0	2	0	0	0	1	-	1	1	2	0	0	0	0	1	1	0	0	0	0	0
Perillus circumcinctus	1	0	0	0	2	0	0	0	0	2	0	0	0	0	0	1	1	1	0	1	0	0	0	2	0	1	4	0	1	0	2	0	0	0	0	1	1	1	2	0	0	0	0	1	1	0	0	0	0	0
Perillus exaptus	1	0	0	0	1	0	0	0	0	4	0	0	0	0	0	1	1	1	1	0	0	0	0	2	0	1	4	0	1	0	2	0	0	0	0	1	2	1	2	0	0	0	0	1	1	0	0	0	0	0
Picromerus bidens	1	0	0	2	3	1	0	0	0	0	0	0	0	1	0	1	0	0	1	1	1	1	0	2	0	1	0	0	1	0	3	0	0	0	1	-	0	1	2	0&1	0	1	1	1	0	0	0	0	0	0
Pinthaeus sanguinipes	1	0	0	2	3	0	0	0	0	0	0	0	0	1	1	1	0	1	1	1	0	0	0	2	0	1	0	0	1	0	3	0	0	0	1	-	1	1	2	0	0	1	1	1	1	0	0	0	0	0
Planopsis silvaticus	1	0	0	2	3	1	0	0	0	1	0	0	0	1	0	0	1	0	1	1	0	0	0	2	0	1	2	0	1	0	1	0	0	0	0&1	1	1	1	2	0	0	1	0	1	0	0	0	0	0	0
Platynopiellus septendecima	1	0	0	1	3	1	0	0	0	0	0	1	0	1	0	0&1	1	0&1	1	1	1	1	0	2	0	1	0	0	1	0	0	0	0	0	0	0	1	1	2	0	0	1	0	1	0	0	0	0	0	0
Platynopus melanoleucus	1	0	0	1	3	1	1	0	0	3	0	0	0	1	0	0&1&2	1	0	1	1	1	1	0	2	0	1	2	0	1	0	4	0	0	0	0	1	1	1	3	1	0	0	1	1	0	1	0	0	0	0
Podisus maculiventris	1	0	0	0	1	1	0	0	0	4	0	0	0	0	0	0	0	1	1	1	1	3	0	2	0	1	2	0	1	0	0	0	0	0	1	-	1	1	2	0	0	1	1	0	0	0	0	0	0	0
Podisus nigrispinus	1	0	0	0	1	1	0	0	0	3	0	0	0	0	0	0	0	1	1	1	1	3	0	2	0	1	2	0	1	0	0	1	0	0	1	-	0	1	2	1	0	1	1	0	0	0	0	0	0	0
Ponapea arachnoides	?	?	?	?	?	?	?	?	0	5	0	1	?	?	?	0	?	?	1	?	?	?	?	?	?	?	?	?	?	0	4	?	?	?	2	-	?	1	?	0	?	?	?	?	?	?	?	?	0	0
Pseudanasida fallax	1	0	0	?	?	?	0	?	?	?	0	0	0	?	0	?	?	?	?	?	?	?	0	2	0	1	?	0	1	0	2	?	0	?	1	-	1	1	2	1	0	1	1	1	?	?	0	0	1	0
Rhacognatus americanus	1	0	0	0	2	0	0	0	0	2	0	0	0	0	1	1	0	1	0	1	0	0	0	2	0	1	4	0	0	1	2	0	0	0	1	-	0	1	2	0&1	0	0	0	1	0	0	0	0	0	0
Rhacognathus punctatus	1	0	0	0	2	1	0	0	0	2	0	0	0	1	0	1	0	1	0	1	0	0	0	2	0	1	4	0	1	1	2	0	0	0	1	-	0	1	2	0	0	0	0	1	0	0	0	0	0	0
Stilbotes semperi	3	1	1	1	3	0	1	0	0	4	1	-	0	1	0	1	0	1	1	0	0	2	0	2	0	1	1	1	0	0	2	0	0	0	0	1	1	0	-	0	1	0	0	0	0	0	1	0	0	0
Stiretrus decastigmus	1	0	0	0	2	0	0	0	0	4	0	1	0	0	0	0	0	1	0	1	0	0	0	2	0	1	1	0	1	0	2	0	0	0	0	0	1	1	2	0	0	1	0	1	0	0	0	0	0	1
Stiretrus decemguttatus	1	0	0	0	2	0	0	0	0	4	1	-	0	1	0	1	0	1	1	1	0	0	0	2	0	1	1	0	1	0	2	0	0	0	0	0	1	1	2	0	0	1	0	1	0	0	0	0	0	1
Stiretrus erytrocephalus	1	0	1	0	2	0	0	0	0	0	0	1	0	0	0	0	0	1	1	1	0	0	0	2	0	1	1	0	1	1	2	0	0	0	0	0	1	1	2	0	0	1	1	1	0	0	0	0	0	1
Supputius cinctipes	1	0	0	0	1	1	0	0	0	4	0	0	0	1	0	0&2	0	0	1	1	1	3	0	2	0	1	2	0	1	1	0	1	0	0	1	-	0	1	2	0	0	1	0	1	0	0	0	0	0	0
Supputius typicus	1	0	0	0	3	1	0	0	0	0	0	0	0	1	0	2	1	0	1	1	1	3	0	2	0	1	5	3	1	1	0	1	0	0	1	-	0	1	3	0	0	1	0	0	0	0	0	0	0	0
Troilus luridus	1	0	0	0	2	1	0	0	0	2	0	0	0	0	0	1	0	0	0	1	1	3	0	2	0	1	0	0	1	0	0	0	0	0	1	-	1	1	2	0	0	1	1	0	0	0	0	0	0	0
Tylospilus chilensis	1	0	0	0	1	1	0	0	0	0	0	0	0	1	0	0	1	0	1	1	0	3	0	2	0	1	0	0	1	0	0	0	0	0	1	-	0	1	2	1	0	1	0	1	1	0	0	0	0	0
Tylospilus cloelia	1	0	0	0	1	0	0	0	0	4	0	0	0	1	0	2	0	0	1	1	0	1&3	0	2	0	1	0	0	1	0	0	0	0	0	0	1	1	1	2	1	0	1	0	1	1	0	0	0	0	0
Tynacantha marginata	1	0	0	2	3	1	0	0	0	4	0	0	0	1	0	2	1	0	1	1	1	3	0	2	0	1	2	2	1	0	0	1	0	0	0	1	2	1	2	0	0	1	0	0	0	0&1	0	0	0	0
Tyrannocoris nigriceps	1	0	0	0	3	1	0	0	0	3	0	0	0	1	0	2	1	1	1	1	0	3	0	2	0	1	0	0	1	0	0	1	0	0	0	0	2	1	2	0	0	1	0	1	1	0	0	0	0	0
Tyrannocoris rex	1	0	0	0	3	1	0	0	0	0	0	1	0	1	0	2	1	1	1	1	1	3	0	2	0	1	2	0	1	0	0	1	0	0	0	0	2	1	2	0	0	1	0	1	1	0	0	0	0	0
Zicrona caerulea	1	0	0	0	2	0	0	0	0	0	0	1	0	1	0	1	1	1	1	1	0	2	0	2	0	1	1	0	1	0	2	0	0	0	0	1	1	1	2	0	0	0	0	0	1	0	0	0	0	0

	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
Galgupha schulzi	2	1	0	3	0	0	0	-	0	-	0	-	0	-	0	0	0	0	-	-	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0
Cyrtocoris egeris	0	1	0	3	0	0	0	-	1	0	0	-	0	-	0	0	0	0	-	-	0	-	0	0	1	1	0	2	1	1	-	-	0	-	-	?	?	0	?	1	?	?	?	?	?	?	?	?	?	?
Antiteuchus mixtus	1	0	0	1	0	1	0	-	0	-	0	-	0	-	1	1	0	0	-	-	0	-	?	?	?	1	0	2	0	0	2	0	0	1	0	0	0	2	0	-	0	0	0	0	0	0	1	0	1	1
Dinocoris gibbus	0	0	0	0	1	1	1	3	1	0	0	-	0	-	1	0	0	0	-	-	0	-	?	?	?	1	0	2	0	0	2	0	0	1	0	0	1	2	0	-	0	0	0	0	0	0	1	0	0	1
Lincus spurcus	0	0	0	0	1	1	0	-	0	-	0	-	0	-	1	1	1	0	-	-	0	-	?	?	?	1	0	2	0	0	0	0	0	1	0	1	1	2	0	-	1	0	1	0	1	1	0	1	1	0
Ochlerus rusticus	0	0	0	1	0	1	0	-	0	-	0	-	0	-	1	1	1	0	-	-	0	-	?	?	?	1	0	2	0	0	0	0	0	1	0	0	1	2	1	1	0	0	1	0	0	1	1	0	0	1
Edessa rufomarginata	0	0	0	0	0	1	0	-	0	-	0	-	0	-	1	1	0	0	-	-	0	-	?	?	?	0	0	2	0	0	1	0	0	0	-	1	0	0	1	0	0	0	0	1	0	0	1	0	1	1
Arvelius albopunctatus	0	0	0	0	1	1	0	-	0	-	0	-	0	-	1	0	0	0	-	-	0	-	0	0	1	1	0	2	0	0	0	0	0	1	1	2	1	0	1	0	0	0	0	1	0	0	1	0	0	1
Murgantia varicolor	0	0	0	0	1	1	0	-	0	-	0	-	0	-	1	0	0	0	-	-	0	-	?	?	?	1	0	2	0	0	0	0	0	0	0	0	0	7	0	-	1	1	-	-	1	-	0	1	1	0
Nezara viridula	0	0	0	0	1	1	0	-	0	-	0	-	0	-	1	0	0	0	-	-	0	-	?	?	?	1	0	1	0	0	0	1	0	0	0	2	0	0	1	1	0	0	0	0	0	0	1	0	0	1
Proxys albopunctulatus	0	0	0	0	1	1	0	-	0	-	0	-	0	-	1	0	0	0	-	-	0	-	?	?	?	1	0	1	0	0	0	0	0	0	2	1	1	2	1	1	0	0	0	0	0	0	1	0	0	1
Graphosoma lineata	0	1	0	3	0	0	0	-	0	-	0	-	0	-	1	0	0	0	-	-	0	-	?	?	?	1	0	2	0	1	-	-	-	0	2	1	0	2	0	0	0	0	0	1	0	0	1	0	0	1
Podops inunctus	0	1	0	3	0	0	0	-	0	-	0	-	0	-	0	0	0	0	-	-	0	-	?	?	?	1	0	2	0	1	-	-	-	0	2	1	2	3	0	0	0	0	0	0	0	0	0	0	0	0
Tantia albopunctulata	0	0	0	0	1	1	0	-	0	-	0	-	0	-	1	0	0	0	-	-	0	-	?	?	?	0	0	2	0	0	1	0	0	0	0	1	2	2	0	0	0	0	0	1	0	0	0	1	1	0
Afrius purpureus	0	0	0	0	0	1	0	-	0	-	1	0	0	-	1	1	0	1	0	0	0	-	?	?	?	1	1	1	0	0	0	1	1	0	1	1	1	0	1	1	0	0&1	1	0	0	1	1	0	0	1
Afrius flavirostrum	0	0	0	0	0	1	0	-	0	-	1	0	0	-	1	1	0	0	-	-	0	-	0	1	1	1	1	1	0	0	0	1	1	0	1	1	1	0	1	1	0	0	1	0	0	1	1	0	0	1
Alcaeorrhynchus grandis	0	0	0	0	1	1	0	-	0	-	1	0	0	-	1	1	0	1	0	0	0	-	0	1	1	1	1	1	0	0	0	1	0	0	1	1	1	1	1	1	0	1	-	-	0	1	1	0	0	1
Alcaeorrhynchus phymatophorus	0	1	0	0	1	1	0	-	0	-	1	0	0	-	1	0	0	0	-	-	0	-	?	?	?	1	1	1	0	0	0	1	0	0	1	1	1	1	1	1	0	1	-	-	0	1	1	0	0	1
Amyotea hamata	0	0	0	0	1	1	1	0	0	-	0	-	0	-	1	1	0	0	-	-	0	-	?	?	?	1	0	1	0	0	0	1	0	0	0	2	1	0	1	1	0	0	1	0	0	1	0	1	1	0
Amyotea malabarica	0	0	0	0	1	1	1	0	0	-	0	-	0	-	1	1	0	1	0	1	0	-	0	1	1	1	0	2	0	0	0	1	0	0	0	0	1	0	1	1	0	0	1	0	0	1	0	1	0	0
Anasida tenebrio	0	0	0	0	1	1	0	-	0	-	1	0	0	-	1	1	0	1	0	0	0	-	?	?	?	1	0	2	0	0	0	0	0	0	0	0	0	0	1	1	0	1	-	-	1	-	0	1	1	0
Andrallus spinidens	0	0	0	0	1	1	0	-	0	-	1	0	0	-	1	0	0	0	-	-	0	-	0	1	1	1	1	1	0	0	0	1	0	0	0	1	0	0	1	1	1	0	1	0	1	-	1	0	0	0
Apateticus lineolatus	0	0	0	0	1	1	0	-	0	-	0	-	0	-	1	1	0	0	-	-	0	-	?	?	?	1	0	1	0	0	0	1	0	0	0	0	1	0	1	0	0	0	0	0	0	1	0	1	1	0
Apoecilus bracteatus	0	0	0	0	1	1	0	-	0	-	0	-	0	-	1	1	0	0	-	-	0	-	?	?	?	1	0	1	0	0	0	1	0	0	0	0	1	0	1	1	0	0	0	0	0	1	0	1	1	0
Apoecilus cynicus	0	0	0	0	1	1	0	-	0	-	0	-	0	-	1	1	0	0	-	-	0	-	0	1	1	1	1	1	0	0	0	1	0	0	0	2	1	0	1	0	0	0	0	0	0	1	0	1	1	0
Arma custos	0	0	0	0	1	1	0	-	0	-	0	-	0	-	1	0	0	0	-	-	0	-	0	1	1	1	0	1	0	0	0	1	0	0	0	2	1	0	1	1	0	0	1	0	0	1	0	0	0	0
Australojalla versicolor	0	0	0	0	1	1	0	-	0	-	1	0	0	-	?	?	?	0	-	-	0	-	?	?	?	1	1	?	?	?	?	?	?	?	?	?	?	0	?	?	?	0	1	0	0	1	1	1	1	0
Blachia ducalis	1	1	0	0	0	1	0	-	1	0	1	0	0	-	0	0	0	1	1	0	1	0	?	?	?	1	1	2	0	0	0	0	0	0	1	2	0	6	1	1	0	0	0	0	0	1	0	1	1	0
Brontocoris tabidus	0	0	0	0	1	1	0	-	0	-	0	-	0	-	0	0	0	0	-	-	0	-	0	1	1	0	1	2	0	0	0	1	0	0	0	0	0	0	1	1	0	0	1	0	0	1	0	1	1	0
Bulbostethus transversalis	0	0	0	?	1	1	0	-	0	-	?	?	0	-	?	?	?	0	-	-	0	-	?	?	?	?	1	?	?	0	0	1	?	?	?	?	?	0	1	1	0	0	?	0	1	-	1	0	?	1
Canthecona discolor	0	0	0	0	1	1	0	-	0	-	1	0	0	-	1	0	0	1	0	0	0	-	?	?	?	1	1	1	0	0	0	1	1	0	0	0	0	0	1	0	0	0	1	0	0	1	0	0	0	0
Cantheconidea variabilis	0	0	0	0	1	1	0	-	0	-	1	0	0	-	0	0	0	0	-	-	0	-	?	?	?	1	1	1	1	-	0	-	-	0	-	1	0	0	1	0	0	0	1	0	0	1	1	0	0	1
Cazira chiroptera	0	1	0	0	0	1	0	-	1	1	1	0	1	1	0	0	0	1	1	1	1	0	?	?	?	1	1	1	0	0	0	1	0	0	0	1	1	0	1	0	0	0	1	0	0	1	1	0	0	0
Cazira insignis	0	0	0	1	0	1	0	-	1	1	1	0	1	0	0	0	0	1	1	0	1	0	?	?	?	1	1	1	0	0	0	1	0	0	-	1	1	0	1	0	1	0	1	0	0	1	1	0	0	0
Cazira verrucosa	0	1	1	1	0	1	1	1	1	1	1	0	1	1	1	1	0	1	1	1	1	0	0	1	1	1	1	1	0	0	0	1	0	0	-	1	1	0	1	1	0	0	1	0	0	1	1	0	0	0
Cecyrina platyrhinoides	0	0	0	0	0	1	1	2	0	-	1	0	0	-	1	1	0	1	1	1	0	-	?	?	?	1	1	1	0	0	0	1	0	0	1	1	0	0	1	0	0	0	1	0	0	1	1	0	1	0
Cermatulus nasalis	0	0	0	0	1	1	0	-	0	-	0	-	0	-	1	0	0	0	-	-	0	-	0	1	1	1	0	1	0	0	0	1	0	0	1	1	0	0	1	0	0	0	1	0	1	-	0	1	1	0
Colpothyreus flavolineatus	0	1	1	1	0	0	0	-	0	-	1	-	0	-	1	0	0	1	1	1	0	-	?	?	?	0	1	1	0	0	0	1	0	0	0	0	1	0	1	1	0	0	1	0	0	1	1	0	0	1
Comperocoris roehneri	0	2	0	0	0	1	0	-	0	-	1	1	0	-	0	0	0	0	-	-	0	-	?	?	?	1	0	1	0	0	0	1	0	0	0	2	0	1	1	1	0	1	-	-	0	1	1	0	0	0
Conquistator mucronatus	0	0	0	0	1	1	0	-	0	-	0	-	0	-	0	0	0	0	-	-	0	-	0	1	1	0	1	2	0	0	0	1	0	0	0	0	0	0	1	1	0	0	1	0	0	1	0	0	0	0
Coryzorhapis carneolus	0	0	0	0	1	1	0	-	0	-	0	-	0	-	0	0	0	1	0	0	0	-	1	1	1	1	1	1	0	0	0	1	0	0	0	0	1	0	1	1	0	0	0	0	0	1	1	0	0	1
Coryzorhapis leucocephala	0	0	0	0	0	1	0	-	0	-	0	-	0	-	1	1	0	1	0	0	1	0	?	?	?	1	1	1	0	0	0	1	0	0	0	1&3	1	0	1	1	0	0	1	0	0	1	1	0	0	1
Damarius splendidulus	0	0	0	0	0	1	1	2	0	-	1	0	1	-	1	1	0	1	0	1	0	-	?	?	?	1	1	1	0	0	0	1	0	0	1	2	1	0	1	0	0	1	-	-	0	1	1	0	0	1
Dinorhynchus dybovskvi	0	0	0	0	1	1	0	-	0	-	0	-	1	-	1	1	0	1	0	0	0	-	0	1	1	1	1	1	0	0	0	1	0	0	0	2	1	0	1	1	0	0	0	0	0	1	1	0	0	1
Discocera cayennensis	1	1	0	2	0	0	0	-	0	-	1	0	0	-	1	0	0	1	1	1	0	-	?	?	?	1	1	1	0	0	0	1	0	0	0	0	0	0	1	0	1	0	1	0	0	1	0	1	1	0
Discocera coccinea	1	1	0	1	0	0	0	-	0	-	1	0	0	-	0	0	0	1	0	0	0	-	1	1	0	1	1	1	0	0	0	1	0	0	0	2	0	0	1	0	0	0	0	0	0	1	0	0	1	0
Dorycoris pavoninus	0	0	0	0	1	1	0	-	0	-	1	1	0	-	0	0	0	0	-	-	0	-	1	0	1	1	1	1	0	0	0	1	0	0	1	0	1	0	1	0	0	1	-	-	1	-	1	0	0	0
Ealda minax	0	0	0	0	1	1	1	2	0	-	0	-	0	-	0	0	0	0	-	-	0	-	?	?	?	0	0	1	1	-	-	-	-	0	-	0	0	0	1	0	0	0	1	0	0	1	1	0	0	1
Eocanthecona furcellata	0	0	0	0	0	1	0	-	0	-	1	0	0	-	1	1	0	1	0	0	0	-	?	?	?	0	1	1	0	0	0	1	0	0	-	1	1	0	1	1	0	0	0	0	0	1	1	0	0	1
Euthyrrhynchus floridanus	0	0	0	0	1	1	0	-	0	-	1	1	0	-	1	1	0	1	0	1	0	-	0	1	1	1	1	1	0	0	0	1	0	0	0	0	1	0	1	1	0	0	1	0	0	1	0	0	0	0
Friarius alluaudi	0	0	0	0	1	1	1	3	0	-	1	0	0	-	1	0	0	1	0	0	0	-	?	?	?	1	0	2	0	0	0	1	0	0	0	1	1	0	1	1	0	0	1	0	0	1	0	0	0	1
Glypsus conspicuous	0	0	0	0	1	1	0	-	0	-	1	0	0	-	1	1	0	1	0	1	0	-	0	1	0	1	1	1	1	0	0	1	0	0	1	1	1	0	1	1	0	0	1	0	0	1	1	0	0	1
Glypsus kuhgatzi	0	0	0	0	1	1	0	-	0	-	1	0	0	-	1	1	0	0	-	-	0	-	?	?	?	1	1	1	0	0	0	1	0	0	1	0	0	0	1	1	0	1	-	-	0	1	1	0	0	0
Hemallia signitenens	0	0	0	0	1	1	0	-	0	-	1	0	0	-	1	1	0	0	-	-	0	-	?	?	?	1	0	1	0	0	0	1	0	0	0	0	0	1	1	1	1	1	-	-	0	1	0	0	0	0
Heteroscelis robustus	0	1	0	0	0	1	0	-	0	-	0	-	0	-	1	0	0	1	0	1	1	1	0	1	0	1	0	1	0	0	0	1	0	0	1	0	0	0	1	1	0	0	1	0	0	1	1	0	0	0
Heteroscelis servillei	0	1	0	0	0	1	0	-	0	-	1	1	1	1	1	1	0	1	1	1	1	1	0	1	0	1	1	1	0	0	0	1	1	0	1	1	0	0	1	1	0	0	1	0	0	1	1	0	0	0
Hoploxys coeruleus	0	0	0	0	1	1	0	-	0	-	1	1	0	-	1	0	0	0	-	-	0	-	?	?	?	1	1	1	0	0	0	1	0	0	0	2	1	0	1	0	0	1	-	-	0	1	1	0	0	1
Jalla dumosa	0	0	0	0	0	1	0	-	0	-	1	0	0	-	1	1	0	0	-	-	0	-	0	1	1	1	1	2	0	0	0	1	0	0	0	1	0	0	1	1	1	1	-	-	1	-	-	-	-	-
Jalloides opulentus	0	0	0	0	1	1	0	-	0	-	1	0	0	-	1	1	0	0	-	-	0	-	?	?	?	1	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	1	1	0	0	1
Jalloides rubricosa	0	0	0	0	1	1	0	-	0	-	1	0	0	-	1	1	0	0	-	-	0	-	?	?	?	1	1	2	0	0	0	0	0	0	0	1	1	0	1	0	0	0	1	0	0	1	1	0	0	1
Leptolobus eburneatus	0	0	0	0	1	1	1	1	0	-	1	0	0	-	0	0	0	0	-	-	0	-	?	?	?	1	1	1	0	0	0	0	0	0	0	0	0	1	1	0	0	1	-	-	0	1	1	0	0	1
Leptolobus murrayi	0	0	0	0	1	1	1	1	0	-	1	0	0	-	0	0	0	0	-	-	0	-	?	?	?	1	1	1	0	0	0	0	0	0	0	0	0	1	1	0	0	1	-	-	0	1	1	0	0	1
Machrorhaphis acuta	0	0	0	0	1	1	0	-	0	-	1	0	0	-	1	1	0	1	0	1	0	-	0	1	1	1	1	1	0	0	0	1	1	0	2	0	0	0	1	1	0	0	1	0	0	1	1	0	0	1
Marmessulus nigricornis	0	0	0	0	0	1	0	-	0	-	1	0	0	-	1	1	0	0	-	-	0	-	?	?	?	1	0	2	0	0	0	1	0	0	0	3	0	1	1	1	0	1	-	-	1	-	0	1	1	0
Martinina inexpectata	0	0	0	0	1	1	?	?	0	-	?	?	0	-	1	?	?	?	?	?	?	?	?	?	?	1	1	?	0	0	?	?	?	?	?	?	1	0	1	1	0	0	1	0	0	1	1	0	0	?
Martinina prima	0	0	0	0	1	1	?	?	0	-	?	?	0	-	1	?	?	0	-	-	0	-	?	?	?	1	1	?	0	0	0	?	?	?	?	?	?	0	1	1	0	0	1	0	0	1	1	0	?	?
Mecosoma mensor	0	0	0	0	1	1	1	2	0	-	0	-	0	-	1	0	0	0	-	-	0	-	?	?	?	1	0	1	0	0	0	1	0	0	0	1	1	0	1	0	0	0	0	0	0	1	1	0	0	0
Montrouzieriellus falleni	0	0	0	0	1	1	1	1	0	-	1	0	0	-	0	0	0	0	-	-	0	-	0	1	0	1	1	1	0	0	0	1	1	0	0	2	1	0	1	1	0	0	1	0	0	1	1	0	0	1
Oechalia schellenbergii	0	0	0	0	1	1	1	1	0	-	0	-	0	-	1	0	0	0	-	-	0	-	0	0	0	1	1	1	0	0	1	1	0	0	2	3	0	7	-	-	1	1	-	-	0	1	0	0	0	0
Oplomus catena	0	0	0	0	0	1	0	-	0	-	1	0	0	-	1	0	0	1	0	0	0	-	0	1	1	1	1	1	0	0	0	1	0	0	0	2	0	0	1	1	0	0	1	0	0	1	0	0	0	0
Oplomus cruentus	0	1	0	0	0	1	0	-	0	-	1	0	0	-	1	0	0	1	0	0	0	-	0	1	1	1	1	1	0	0	0	1	0	0	0	2	1	0	1	1	0	0	1	0	0	1	1	0	0	1
Ornithosoma rivierei	?	0	0	?	?	1	?	?	0	-	0	-	0	-	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	0	0	?	?	0	?	?	?	?	?	?	0	?	?	?	0	?	?	?	?	?
Parajalla sanguineosignata	0	0	0	0	0	1	0	-	0	-	1	0	0	-	1	0	0	0	-	-	0	-	?	?	?	1	?	1	0	0	0	1	0	0	0	1	0	4	1	1	0	1	-	-	0	1	1	0	0	0
Parealda bouvieri	0	0	0	?	1	1	0	-	0	-	?	?	?	?	?	?	?	0	-	-	0	-	?	?	?	?	?	?	1	?	?	?	?	?	?	?	?	0	1	1	0	0	?	0	0	?	1	0	?	1
Perillus bioculatus	0	1	0	0	0	1	0	-	0	-	1	0	0	-	0	0	0	0	-	-	0	-	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	1	0	0	0	0
Perillus circumcinctus	0	1	0	0	0	1	0	-	0	-	1	0	0	-	0	0	0	0	-	-	0	-	?	?	?	1	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	1	-	0	0	1	0	0	0	0
Perillus exaptus	0	1	0	0	0	1	0	-	0	-	1	1	0	-	0	0	0	0	-	-	0	-	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	1	-	-	0	1	0	0	0	0
Picromerus bidens	0	0	0	0	1	1	0	-	0	-	1	0	0	-	1	1	0	0	-	-	0	-	0	1	1	1	0	1	0	0	0	1	0	0	0	0	0	0	1	1	0	0	1	0	0	1	1	0	0	0
Pinthaeus sanguinipes	0	0	0	0	1	1	0	-	0	-	1	0	0	-	1	0	0	1	0	1	0	-	0	1	1	1	1	1	0	0	0	1	0	0	1	2	0	0	1	0	1	0&1	1	-	0	1	1	0	0	0
Planopsis silvaticus	0	0	0	0	1	1	0	-	0	-	1	0	0	-	1	0	0	1	0	0	0	-	?	?	?	1	0	1	0	0	0	1	0	0	0	0	1	0	1	1	0	0	0	0	0	1	1	0	0	1
Platynopiellus septendecimaculat	0	0	0	0	1	1	1	1	0	-	1	0	0	-	0	0	0	1	0	0	0	-	?	?	?	1	0	1	0	0	0	1	1	0	1	0	0	0	1	1	0	0	0	0	0	1	1	0	0	1
Platynopus melanoleucus	0	0	0	0	1	1	1	0	0	-	1	0	0	-	1	1	0	1	1	1	0	-	?	?	?	1	1	1	0	0	0	1	0	0	1	2	1	4	1	1	0	0	1	0	0	1	1	0	0	1
Podisus maculiventris	0	0	0	0	1	1	0	-	0	-	0	-	0	-	1	0	0	0	-	-	0	-	0	1	1	0	1	1	0	0	0	1	0	0	0	2	1	0	1	1	0	0	1	0	0	1	0	0	0	0
Podisus nigrispinus	0	0	0	0	1	1	0	-	0	-	0	-	0	-	1	0	0	0	-	-	0	-	0	1	1	0	1	1	0	0	0	1	1	0	0	2	1	0	1	1	0	0	1	0	0	1	0	0	0	0
Ponapea arachnoides	?	0	?	?	?	?	?	?	?	?	1	1	1	0	?	1	?	0	-	-	0	-	?	?	?	1	?	?	?	?	?	?	?	?	?	?	?	?	1	1	?	1	?	?	?	?	?	?	?	?
Pseudanasida fallax	0	0	0	?	1	1	?	?	0	-	1	?	0	-	?	?	?	?	?	?	?	?	?	?	?	?	1	?	?	?	?	?	?	0	0	?	?	1	1	1	0	?	?	?	?	?	?	?	?	?
Rhacognatus americanus	0	2	0	0	0	1	0	-	0	-	0	-	0	-	1	0	0	1	0	0	0	-	?	?	?	1	0	1	0	0	0	1	0	0	0	2	0	1	1	0	1	1	-	-	0	1	0	1	1	0
Rhacognathus punctatus	0	1	0	0	0	1	0	-	0	-	0	-	0	-	1	0	0	0	-	-	0	-	0	1	1	1	0	1	0	0	0	1	0	0	0	2	0	1	1	0	1	1	-	-	0	1	0	0	0	0
Stilbotes semperi	0	0	0	0	0	1	0	-	1	1	1	1	1	0	1	1	1	1	1	1	0	-	?	?	?	1	1	1	0	0	0	0	0	0	0	1	1	5	1	0	0	1	-	-	0	1	0	0	1	0
Stiretrus decastigmus	2	1	0	2	0	0	0	-	0	-	1	0	0	-	1	0	0	1	0	0	0	-	0	1	0	0	1	1	0	0	0	1	0	0	0	0	0	0	1	1	1	0	1	0	0	1	0	1	1	0
Stiretrus decemguttatus	2	1	0	2	0	0	0	-	0	-	1	0	0	-	1	0	0	1	0	0	0	-	0	1	1	1	0	1	0	0	0	1	0	0	0	2	0	0	1	1	1	0	1	0	0	1	0	1	1	0
Stiretrus erytrocephalus	2	1	0	2	0	0	0	-	0	-	1	1	1	0	1	0	0	1	0	0	0	-	0	0	1	0	0	1	0	0	0	1	0	0	0	2	0	0	1	1	1	0	1	0	0	1	0	1	1	0
Supputius cinctipes	0	0	0	0	1	1	1	1	0	-	0	-	0	-	1	0	0	0	-	-	0	-	0	1	0	0	1	1	0	0	0	1	1	0	0	2	0	0	1	1	0	0	1	0	0	1	0	0	1	0
Supputius typicus	0	0	0	0	1	1	1	1	0	-	0	-	0	-	1	0	0	0	-	-	0	-	?	?	?	0	1	1	0	0	0	1	1	0	0	0	0	0	1	1	0	0	1	0	0	1	0	0	0	0
Troilus luridus	0	0	0	0	1	1	0	-	0	-	0	-	0	-	1	0	0	0	-	-	0	-	0	1	0	1	1	1	0	0	0	1	0	0	0	0	1	0	1	1	0	0	1	0	0	1	0	0	1	0
Tylospilus chilensis	0	0	0	0	1	1	0	-	0	-	0	-	0	-	0	0	0	0	-	-	0	-	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	1	1	0	1	0	0	1	1	0	0	0
Tylospilus cloelia	0	2	0	0	0	1	0	-	0	-	0	-	0	-	0	0	0	0	-	-	0	-	0	1	0	1	1	1	0	0	0	1	0	0	0	0	0	0	1	1	0	0	1	0	0	1	1	0	0	1
Tynacantha marginata	0	0	0	0	1	1	0	-	0	-	0	-	0	-	0	0	0	0	-	-	0	-	0	1	1	0	1	1	0	0	0	1	0	0	1	0	0	0	1	0	0	0	0	0	0	1	0	1	1	0
Tyrannocoris nigriceps	0	0	0	0	1	1	0	-	0	-	0	-	0	-	0	0	0	0	-	-	0	-	?	?	?	0	1	1	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1	0	0	0
Tyrannocoris rex	0	0	0	0	1	1	0	-	0	-	0	-	0	-	0	0	0	0	-	-	0	-	0	1	1	0	1	1	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1	0	0	1
Zicrona caerulea	0	0	0	0	1	1	0	-	0	-	1	-	0	-	0	0	0	0	-	-	0	-	?	?	?	1	0	1	0	0	0	1	0	0	0	0	1	0	1	1	0	1	-	0	0	1	0	0	0	0

	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140
Galgupha schulzi	-	0	0	0	0	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	0	-	0
Cyrtocoris egeris	?	?	?	1	0	-	-	0	1	1	0	0	2	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	0	1	0	0	1	0	0	1	0	1	6	0
Antiteuchus mixtus	0	0	0	0	0	-	-	0	1	1	0	0	1	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	1	0	1	-	1
Dinocoris gibbus	0	1	0	0	0	-	-	0	1	1	0	0	1	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	0	1	0	0	0	0	0	1	1	0	2	0
Lincus spurcus	-	0	1	0	0	-	-	0	1	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	0	0	2	0	2	0	0	1	0	1	5	1
Ochlerus rusticus	0	1	0	0	0	-	-	0	1	1	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	0	0	2	0	0	0	0	1	0	0	5	1
Edessa rufomarginata	0	0	0	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	1	0	1	3	1
Arvelius albopunctatus	0	0	0	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	0	0	0	0	0	0	1	1	1	1	2	1
Murgantia varicolor	-	1	0	1	0	-	-	0	0	1	0	0	3	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	0	0	0	0	0	1	0	1	1	1	2	0
Nezara viridula	0	0	0	0	1	0	0	0	0	1	1	0	2	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	0	0	0	0	2	0	0	1	1	1	2	0
Proxys albopunctulatus	0	0	1	0	0	-	-	1	0	1	0	1	1	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	0	0	0	0	2	1	1	1	0	1	2	1
Graphosoma lineata	0	0	0	0	0	-	-	0	0	1	1	0	1	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	0	0	0	0	2	1	0	0	0	1	2	0
Podops inunctus	-	0	1	1	0	-	-	0	0	1	1	1	0	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	0	0	0	0	2	1	0	1	1	1	2	0
Tantia albopunctulata	-	0	0	1	0	-	-	0	0	1	1	1	2	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	0	0	0	0	2	0	0	1	1	0	2	0
Afrius purpureus	1	1	1	0	1	0	0	0	0	0	0	0	1	0	1	1	1	1	0	0	1	1	1	1	0	0	0	0	0	0	0	0	2	0	0	0	0	1	0	0
Afrius flavirostrum	0	1	1	0	1	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	-	0	0	0	2	0	0	0	0	1	0	0
Alcaeorrhynchus grandis	1	1	0	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	0	1	0	0	2	0	0	0	0	1	0	0
Alcaeorrhynchus phymatophorus	1	1	1	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	0	1	0	0	2	0	0	0	0	1	0	1
Amyotea hamata	-	1	1	0	0	-	-	0	0	1	0	1	1	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	1	0	0
Amyotea malabarica	-	1	1	0	0	-	-	0	0	1	0	1	1	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	1	0	0
Anasida tenebrio	-	-	-	0	0	-	-	0	0	1	0	0	1	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	0	0	0	0	2	0	0	0	0	1	0	1
Andrallus spinidens	-	1	1	0	1	0	0	1	0	1	0	1	1	1	1	1	1	1	1	0	1	1	1	0	0	0	0	0	0	0	0	0	2	0	0	0	0	1	0	1
Apateticus lineolatus	-	1	1	0	1	0	0	0	0	1	0	0	1	0	1	1	1	1	1	0	1	1	1	0	0	1	1	1	0	0	0	0	2	0	0	0	0	1	0	1
Apoecilus bracteatus	-	1	1	0	1	0	0	0	0	1	0	1	1	0	1	1	1	1	1	0	1	1	0	0	0	0	1	1	0	0	0	0	2	0	0	0	1	1	0	1
Apoecilus cynicus	-	1	1	0	1	0	0	0	0	1	0	1	1	0	0	1	1	1	0	0	1	1	1	0	0	0	1	1	0	0	0	0	2	0	0	0	1	1	0	1
Arma custos	-	1	1	1	0	-	-	0	0	1	0	0	3	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	0	0	0	0	2	0	0	0	0	1	0	1
Australojalla versicolor	-	1	1	0	1	0	0	0	0	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	0	0	0	0	0	?	0	?	0	0
Blachia ducalis	-	1	1	0	1	0	0	1	0	1	0	0	1	0	0	1	1	1	1	0	1	0	0	1	0	0	0	0	0	1	2	0	1	0	0	0	0	1	0	0
Brontocoris tabidus	-	1	1	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	0	0	0	0	2	0	0	0	1	1	0	1
Bulbostethus transversalis	0	?	1	0	1	1	0	1	0	?	?	?	?	0	1	1	1	1	0	0	?	?	?	?	?	?	?	?	0	?	?	?	?	?	?	?	?	?	?	?
Canthecona discolor	-	1	1	0	1	0	0	1	0	1	0	1	1	0	1	1	1	1	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Cantheconidea variabilis	0	1	0	0	1	0	0	1	0	1	0	1	1	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	0	1	0	1	2	0	0	0	0	1	0	0
Cazira chiroptera	-	1	1	0	1	0	0	1	0	1	0	0	1	0	0	1	1	0	0	0	1	1	0	1	1	0	0	0	1	1	2	0	2	0	0	0	0	1	0	0
Cazira insignis	-	1	1	0	0	-	0	1	0	1	0	0	1	0	0	1	1	1	1	0	?	?	?	?	?	?	?	?	0	1	2	0	2	0	0	0	0	1	0	0
Cazira verrucosa	-	1	1	0	1	0	0	1	0	1	0	0	1	0	0	1	1	0	0	0	0	0	0	1	1	0	0	0	1	1	2	0	2	0	0	0	0	1	0	0
Cecyrina platyrhinoides	-	0	0	0	1	0	0	0	0	1	0	1	2	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	0	1	0	1	2	0	0	0	0	1	2	0
Cermatulus nasalis	-	1	1	0	1	0	0	0	0	1	0	0	2	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	0	0	0	0	2	0	0	0	0	1	0	1
Colpothyreus flavolineatus	0	1	1	0	1	0	0	0	0	1	0	1	1	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	0	1	2	0	0	0	0	1	0	0
Comperocoris roehneri	-	1	0	0	0	-	-	0	0	1	0	0	2	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	0	0	0	0	1	0	0	0	0	1	3	0
Conquistator mucronatus	-	1	1	0	1	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	1	0	0
Coryzorhapis carneolus	1	1	0	0	1	0	0	0	0	1	0	0	1	0	1	1	1	1	1	1	1	0	0	1	0	0	1	1	0	1	2	0	0	0	0	1	0	1	0	0
Coryzorhapis leucocephala	1	1	0	0	1	0	0	1	0	1	0	1	1	0	1	1	1	1	1	1	?	?	?	?	?	?	?	?	0	1	2	0	0	0	0	0	0	1	0	0
Damarius splendidulus	0	1	1	0	1	1	0	1	0	1	0	1	1	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	0	1	0	0	0	0	0	0	0	1	0	0
Dinorhynchus dybovskvi	0	1	1	0	1	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	0	0	0	0	2	0	0	0	0	1	0	0
Discocera cayennensis	-	1	0	0	1	1	0	0	0	1	0	0	1	0	1	1	1	1	1	0	?	?	?	?	?	?	?	?	1	1	2	0	2	0	0	0	0	1	0	0
Discocera coccinea	-	1	1	0	1	0	0	0	0	1	0	0	1	0	0	1	1	1	1	0	1	0	0	1	0	0	0	0	1	1	2	0	2	0	0	0	0	1	0	0
Dorycoris pavoninus	-	1	1	1	1	1	0	0	0	1	0	0	2	0	1	1	1	1	1	0	1	0	0	1	1	1	0	0	0	1	0	0	2	0	0	0	0	1	0	1
Ealda minax	0	1	1	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	0	1	0	0	2	0	0	0	0	1	0	0
Eocanthecona furcellata	0	1	1	0	1	0	0	1	0	1	0	1	1	0	1	1	1	1	0	0	1	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Euthyrrhynchus floridanus	-	1	1	0	1	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	0	1	0	0	0	0	0	0	0	1	0	0
Friarius alluaudi	0	1	1	1	0	-	-	1	0	1	0	1	1	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	0	0	0	0	2	0	0	0	0	1	0	1
Glypsus conspicuous	0	1	1	0	1	0	1	0	0	1	0	1	1	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	0	0	0	0	1	0	0	0	0	1	0	0
Glypsus kuhgatzi	-	1	1	0	1	0	1	0	0	1	0	1	1	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	0	0	0	0	2	0	0	0	0	1	0	0
Hemallia signitenens	-	1	1	0	1	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	0	1	0	0	0	0	0	0	0	1	0	0
Heteroscelis robustus	-	1	0	0	1	0	0	1	0	1	0	1	2	0	1	1	1	1	1	0	?	?	?	?	?	?	?	?	0	0	0	0	2	0	0	0	0	1	0	0
Heteroscelis servillei	-	1	1	0	1	0	0	1	0	1	0	0	1	0	1	1	1	1	1	0	1	1	0	0	1	0	0	0	0	0	0	0	2	0	0	0	0	1	0	0
Hoploxys coeruleus	1	1	1	0	1	1	0	1	0	1	0	0	1	0	1	0	1	0	1	0	1	1	1	0	1	0	0	0	0	1	0	0	2	0	0	0	0	1	0	0
Jalla dumosa	-	1	1	0	0	-	-	0	0	1	0	0	1	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	0	0	0	0	2	0	0	0	0	1	0	0
Jalloides opulentus	0	1	0	0	1	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	0	1	0	0	2	0	0	0	0	1	0	0
Jalloides rubricosa	0	1	0	0	1	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	0	1	0	0	2	0	0	0	0	1	0	0
Leptolobus eburneatus	0	1	0	0	0	-	-	1	0	1	1	0	2	0	1	1	1	1	0	0	1	0	0	1	0	0	1	1	0	1	0	0	2	0	0	0	0	1	7	0
Leptolobus murrayi	0	1	0	0	1	0	0	1	0	1	0	0	2	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	0	1	0	0	2	0	0	0	0	1	7	0
Machrorhaphis acuta	0	1	1	0	1	2	0	1	0	1	0	0	2	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	0	1	1	0	2	0	0	0	0	1	0	0
Marmessulus nigricornis	-	1	0	0	1	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	0	0	0	0	2	0	0	1	0	1	2	0
Martinina inexpectata	?	?	1	0	1	0	0	?	0	?	?	?	?	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	0	1	?	?	?	?	?	?	?	?	?	?
Martinina prima	?	?	?	0	1	0	0	?	0	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	0	1	2	0	0	0	0	1	0	1
Mecosoma mensor	-	1	1	0	1	2	0	1	0	1	0	0	1	0	1	1	1	1	0	0	1	1	1	0	0	0	1	1	0	0	0	0	2	0	0	0	0	1	0	0
Montrouzieriellus falleni	0	1	1	0	1	0	0	1	0	1	0	0	1	0	1	1	1	1	0	0	1	0	0	1	0	0	0	0	0	1	0	0	2	0	0	0	0	1	0	0
Oechalia schellenbergii	-	1	0	0	1	1	0	1	0	0	1	0	1	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	0	0	1	0	2	0	0	0	0	1	0	0
Oplomus catena	-	1	1	0	1	1	0	1	0	1	0	1	1	0	1	1	1	1	1	0	1	0	0	1	0	0	0	0	0	1	2	1	2	0	0	0	0	1	0	0
Oplomus cruentus	1	1	1	0	1	1	0	1	0	1	0	1	1	0	1	1	1	1	1	0	1	1	0	0	0	0	0	0	0	1	2	1	0	0	0	0	0	0	0	0
Ornithosoma rivierei	?	?	?	?	0	-	-	1	?	?	?	?	?	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	?	?	?	?	?	?	?	?	?	?	?	?
Parajalla sanguineosignata	-	1	1	0	1	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	0	1	0	0	0	0	0	0	0	1	3	1
Parealda bouvieri	0	?	?	?	?	?	?	1	0	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	0	1	?	?	?	?	?	?	?	?	?	?
Perillus bioculatus	-	0	1	0	1	0	0	0	0	1	0	0	1	0	1	1	1	1	1	0	1	1	1	0	0	0	0	0	0	0	2	1	2	0	0	0	0	1	0	0
Perillus circumcinctus	-	0	1	0	1	0	0	0	0	1	0	0	1	0	1	1	1	1	1	0	?	?	?	?	?	?	?	?	0	1	2	0	2	0	0	0	0	1	0	0
Perillus exaptus	-	0	1	0	1	0	0	0	0	1	0	0	1	0	1	1	1	1	1	0	1	1	0	1	0	0	0	0	0	0	2	0	2	0	0	0	0	1	0	0
Picromerus bidens	-	1	1	0	1	0	0	0	0	1	0	1	2	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	1	0	1
Pinthaeus sanguinipes	-	1	0	0	1	0	0	1	0	1	1	0	1	0	1	1	1	1	1	0	1	0	1	0	0	0	1	1	0	1	0	0	2	0	0	0	0	1	0	0
Planopsis silvaticus	0	1	1	0	1	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	1	0	0
Platynopiellus septendecimacula	0	1	1	0	1	0	0	1	0	1	0	1	1	0	1	1	1	0	0	0	1	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0
Platynopus melanoleucus	0	1	1	0	1	0	0	1	0	1	0	1	1	0	1	1	1	1	0	0	1	0	0	1	1	0	0	0	0	1	0	0	2	0	0	0	0	1	0	0
Podisus maculiventris	-	1	1	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	1	0	1
Podisus nigrispinus	-	1	1	0	1	0	0	1	0	1	0	1	1	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	1	0	1
Ponapea arachnoides	?	?	?	?	1	0	0	?	?	?	?	?	?	1	1	1	0	0	0	0	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
Pseudanasida fallax	?	?	?	0	?	?	?	0	0	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	0	2	0	0	0	0	?	0	0
Rhacognatus americanus	-	1	0	1	0	-	-	0	0	1	0	0	2	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	1	0	0
Rhacognathus punctatus	-	1	0	1	0	-	-	0	0	1	0	0	1	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	0	0	0
Stilbotes semperi	-	1	1	0	0	-	-	0	0	1	0	0	3	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	2	0	2	0	0	1	0	1	?	0
Stiretrus decastigmus	-	1	0	0	1	1	0	0	0	1	0	0	2	0	0	1	1	1	1	0	1	0	0	1	0	0	0	0	0	0	2	1	2	0	0	0	0	0	0	1
Stiretrus decemguttatus	-	1	0	0	1	1	0	1	0	1	0	0	1	0	0	1	1	1	1	0	?	?	?	?	?	?	0	0	0	0	2	1	2	0	0	0	0	0	0	1
Stiretrus erytrocephalus	-	1	0	0	1	1	0	0	0	1	0	0	2	0	1	1	1	1	1	0	1	1	0	1	0	0	0	0	0	0	2	1	2	0	0	0	0	0	0	0
Supputius cinctipes	-	1	0	0	1	0	0	1	0	1	0	1	1	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	1	0	1	0	1
Supputius typicus	-	1	0	0	0	-	-	1	0	1	0	0	1	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	1	0	1	0	1
Troilus luridus	-	1	1	0	1	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	0	0	0	0	2	0	0	0	0	1	0	1
Tylospilus chilensis	-	1	0	0	1	1	0	1	0	1	0	1	1	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	0	0	0	0	2	0	0	0	0	1	0	0
Tylospilus cloelia	0	1	0	0	1	1	0	1	0	1	0	1	1	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	0	0	0	0	2	0	0	0	0	1	3	0
Tynacantha marginata	-	1	0	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	0	0	0	0	2	0	0	0	0	1	0	0
Tyrannocoris nigriceps	-	1	0	0	1	1	0	1	0	1	0	1	1	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	0	0	0	0	2	0	0	0	0	1	0	0
Tyrannocoris rex	1	1	0	0	1	0	0	1	0	1	0	1	1	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	0	0	0	0	2	0	0	0	0	1	0	0
Zicrona caerulea	-	1	1	1	0	-	-	0	0	1	0	0	1	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	0	1	0	0	0	0	0	1	0	1	4	0

	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191
Galgupha schulzi	0	0	0	0	0	0	-	-	-	0	0	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	0	0	0	0	0	-	-	0	0	0	0	-	-
Cyrtocoris egeris	1	0	0	0	0	0	-	-	-	1	-	0	0	0	0	1	0	2	0	2	0	0	1	1	0	-	-	1	0	0	0	0	0	-	-	-	-	-	0	0	1	0	0	-	-	1	0	1	-	-	-
Antiteuchus mixtus	1	0	0	0	0	1	0	2	0	1	3	0	0	0	0	0	3	1	2	0	1	0	0	0	1	0	0	1	0	1	0	0	0	-	-	-	-	-	0	1	0	0	0	-	-	1	1	1	-	-	-
Dinocoris gibbus	1	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0	3	1	0	0	0	0	1	0	1	-	-	1	0	0	0	0	1	0	0	0	0	1	0	1	0	0	0	-	-	1	1	1	-	-	-
Lincus spurcus	0	1	0	0	0	0	-	-	-	1	1	0	0	0	0	0	3	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	-	-	-	-	-	0	1	0	0	0	-	-	0	1	1	-	-	-
Ochlerus rusticus	0	1	0	0	0	1	0	2	0	1	1	0	0	0	0	0	3	1	2	0	1	0	1	0	1	0	0	1	0	0	0	1	0	-	-	-	-	-	0	1	1	0	0	-	-	1	1	1	-	-	-
Edessa rufomarginata	1	0	0	1	1	1	0	2	0	0	1	0	0	0	0	0	1	0	1	0	1	0	1	0	1	-	0	0	0	0	0	0	1	0	1	0	0	1	0	1	1	0	0	-	-	0	0	1	-	-	-
Arvelius albopunctatus	1	0	1	1	0	1	0	2	0	0	1	0	1	0	0	0	1	0	2	3	1	0	1	0	1	-	0	0	0	0	0	0	0	-	-	-	-	-	0	1	1	1	0	-	-	0	0	0	0	-	0
Murgantia varicolor	1	0	0	0	0	1	0	2	0	0	1	?	?	0	0	0	0	0	0	0	0	0	1	0	1	-	0	1	0	0	0	0	0	-	-	-	-	-	0	1	1	1	1	1	0	0	0	0	1	1	0
Nezara viridula	1	0	1	0	1	1	0	0	0	0	1	0	0	0	0	0	1	0	2	0	1	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	1	0	1	1	1	0	-	-	0	0	0	0	-	-
Proxys albopunctulatus	1	0	0	0	1	1	0	0	0	0	1	0	1	0	0	0	3	0	2	0	0	0	1	0	0	1	0	0	0	0	0	0	0	-	-	-	-	-	0	1	1	1	0	-	-	0	0	0	0	-	-
Graphosoma lineata	1	0	0	0	0	1	0	2	0	0	1	?	?	?	0	?	0	0	0	3	0	0	1	0	1	1	0	0	0	1	0	0	0	-	-	-	-	-	0	1	0	1	0	-	-	0	0	0	0	-	0
Podops inunctus	1	0	0	0	0	1	0	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	-	-	-	-	-	0	1	1	0	1	1	1	0	0	0	0	-	0
Tantia albopunctulata	1	0	1	0	1	1	0	0	0	0	1	1	1	0	0	0	0	1	0	0	1	0	0	0	1	1	0	1	0	0	0	0	1	0	1	0	0	0	0	1	1	1	0	-	-	0	0	0	0	-	0
Afrius purpureus	1	0	2	0	0	0	-	-	-	0	2	0	0	1	0	1	3	0	0	0	0	0	1	0	1	1	0	1	0	1	0	0	1	0	1	0	0	0	1	1	0	1	1	0	1	0	0	0	1	0	0
Afrius flavirostrum	1	0	0	0	0	0	-	-	-	0	2	1	0	1	0	1	3	0	0	3	0	0	1	0	1	1	0	1	0	1	0	1	1	0	1	0	0	0	1	1	0	1	1	0	1	0	0	0	1	0	0
Alcaeorrhynchus grandis	1	0	0	0	0	0	-	-	-	0	2	1	0	1	0	1	3	3	0	1	0	0	0	1	1	1	0	1	0	1	0	1	1	1	1	1	0	0	0	1	1	1	1	0	1	0	0	0	1	1	0
Alcaeorrhynchus phymatophorus	1	0	2	0	0	0	-	-	-	0	2	0	0	1	0	1	0	3	0	3	0	0	0	1	1	1	0	1	0	1	0	1	1	1	1	1	0	0	0	0	1	1	1	0	1	0	0	0	1	1	0
Amyotea hamata	1	0	0	0	0	1	0	0	1	0	2	1	0	1	0	1	3	0	0	0	0	1	-	-	1	1	0	1	0	1	0	1	1	1	1	1	0	0	0	1	1	1	1	1	0	0	0	0	1	0	0
Amyotea malabarica	1	0	0	0	0	1	0	0	1	0	2	0	0	1	0	1	3	0	0	0	0	1	-	-	1	1	0	1	0	1	0	0	1	1	1	0	1	0	0	1	1	1	1	1	0	0	0	0	1	0	0
Anasida tenebrio	1	0	2	0	1	1	0	1	1	0	2	1	0	0	0	1	0	0	0	1	0	0	0	0	1	1	0	1	0	1	0	0	1	1	1	0	1	0	0	1	1	1	1	1	0	0	0	0	1	1	1
Andrallus spinidens	1	0	1	0	0	1	1	0	1	0	2	0	0	1	0	1	3	0	0	3	0	0	1	0	1	1	0	1	0	1	0	1	1	0	1	1	1	0	1	0	0	1	1	0	1	0	0	0	1	0	0
Apateticus lineolatus	1	0	2	0	0	1	1	0	1	0	2	0	0	0	1	0	2	0	0	3	0	1	-	-	1	1	0	1	0	0	0	0	1	1	1	1	0	0	0	1	1	1	1	1	0	0	0	0	1	0	0
Apoecilus bracteatus	1	0	2	0	0	1	0	0	1	0	2	0	0	0	1	0	2	0	0	3	0	0	0	1	1	1	0	1	1	0	1	0	1	1	1	1	0	0	0	1	1	1	1	0	0	0	0	0	1	1	0
Apoecilus cynicus	1	0	2	0	0	1	0	0	1	0	2	0	1	0	1	0	3	0	0	3	0	0	0	1	1	1	0	1	1	0	1	0	1	1	1	1	0	0	0	1	1	1	1	0	0	0	0	0	1	1	0
Arma custos	1	0	0	0	0	1	1	0	0	0	1	0	0	0	0	0	3	2	0	0	0	0	0	0	1	1	0	1	0	0	0	0	1	1	1	1	1	0	0	1	1	1	1	1	0	0	0	0	1	0	0
Australojalla versicolor	1	0	0	0	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
Blachia ducalis	1	0	0	0	0	0	-	-	-	0	1	0	0	0	0	0	3	0	0	0	0	0	1	1	1	1	0	1	0	1	0	0	1	1	1	0	0	0	0	1	1	1	1	1	0	0	0	0	0	-	0
Brontocoris tabidus	1	0	0	0	0	1	1	0	1	0	1	0	1	0	0	1	3	0	0	3	0	0	1	0	1	1	0	1	0	0	0	0	1	1	1	1	1	0	0	0	1	1	1	1	0	0	0	0	0	-	0
Bulbostethus transversalis	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	0	?	0	?	?	?	?	?	1	?	?	?	?	?	1	?	?	?	?	?	?	?	?	?	?	?	?
Canthecona discolor	1	0	0	0	0	0	-	-	-	0	2	1	0	1	0	1	3	3	0	0	0	0	0	0	1	0	0	1	0	1	0	0	1	0	1	0	1	0	0	1	0	1	1	0	1	0	0	0	0	-	0
Cantheconidea variabilis	1	0	0	0	0	0	-	-	-	0	1	1	0	1	0	1	2	0	2	0	0	0	1	1	1	1	0	1	0	1	0	0	1	0	1	0	1	0	0	1	0	1	1	0	1	0	0	0	1	0	0
Cazira chiroptera	1	0	0	0	0	0	-	-	-	0	1	0	0	0	0	0	2	0	0	0	0	0	1	1	1	1	0	1	0	1	0	0	1	1	1	0	1	0	0	1	1	1	1	0	1	0	0	0	1	0	0
Cazira insignis	1	0	0	0	0	0	-	-	-	0	1	0	0	0	0	0	3	0	0	3	0	0	1	0	1	1	0	1	0	1	0	0	1	1	1	0	1	0	0	1	1	1	1	1	0	0	0	0	1	0	0
Cazira verrucosa	1	0	0	0	0	0	-	-	-	0	1	0	0	0	0	0	3	0	0	0	0	0	1	1	1	1	0	1	0	1	0	0	1	1	1	0	1	0	0	1	1	1	1	0	1	0	0	0	1	0	0
Cecyrina platyrhinoides	1	0	0	0	0	1	0	0	1	0	1	0	1	0	0	0	3	1	0	0	0	0	1	0	1	1	0	1	0	1	0	0	1	1	1	1	1	0	0	1	1	1	1	1	0	0	0	0	1	0	0
Cermatulus nasalis	1	0	2	0	0	1	0	0	1	0	1	0	0	1	0	1	3	0	0	0	0	0	1	0	1	1	0	1	0	1	0	0	1	1	1	0	1	0	0	1	1	1	1	1	0	0	0	0	0	-	0
Colpothyreus flavolineatus	1	0	1	0	0	1	0	0	1	0	1	1	0	1	0	2	1	0	0	1	0	0	1	0	?	?	?	?	?	?	?	?	?	?	?	?	1	?	?	?	?	?	?	?	?	?	?	?	?	?	?
Comperocoris roehneri	1	0	0	0	1	0	-	-	-	0	2	0	1	1	0	0	3	0	0	3	0	0	1	0	0	1	0	1	0	1	0	0	1	1	1	0	1	0	0	1	1	1	1	0	0	0	0	0	1	1	0
Conquistator mucronatus	1	0	0	0	1	1	1	0	1	0	2	0	1	1	0	0	3	0	0	3	0	0	1	1	1	1	0	1	0	1	0	0	1	1	1	1	1	0	0	0	1	1	1	1	0	0	0	0	0	-	0
Coryzorhapis carneolus	1	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	3	0	0	3	0	0	1	0	1	0	0	1	0	1	0	1	1	1	1	0	0	0	0	0	1	1	1	0	1	0	0	0	0	-	0
Coryzorhapis leucocephala	1	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	3	0	0	3	0	0	1	0	1	1	0	1	0	1	0	0	1	1	1	0	0	0	0	1	1	1	1	0	1	0	0	0	1	0	0
Damarius splendidulus	1	0	0	0	0	0	-	-	-	0	2	0	1	1	0	1	3	0	0	3	0	0	0	0	1	1	0	1	0	1	0	0	1	0	1	0	1	0	1	1	0	1	1	0	1	0	0	0	1	0	-
Dinorhynchus dybovskvi	1	0	1	0	0	1	0	0	1	0	1	0	0	1	0	0	3	0	0	0	0	0	0	0	1	1	0	1	0	1	0	0	1	1	1	0	0	0	0	1	1	1	1	1	0	0	0	0	0	-	0
Discocera cayennensis	1	0	1	0	0	1	0	0	1	0	2	0	0	0	0	0	2	0	0	3	0	0	1	0	1	1	0	1	0	1	0	0	1	1	1	0	1	0	0	1	1	1	1	0	1	0	0	0	0	-	0
Discocera coccinea	1	0	0	0	0	0	-	0	1	0	2	1	0	1	0	2	2	3	0	3	0	0	1	0	1	1	0	1	0	1	0	0	1	1	1	0	1	0	0	1	1	1	1	0	1	0	0	0	0	-	0
Dorycoris pavoninus	1	0	0	0	0	0	-	-	-	0	2	0	0	0	0	0	2	0	0	0	0	0	1	0	1	1	0	1	0	1	0	0	1	0	1	0	0	0	1	1	0	1	1	0	1	0	0	0	1	0	0
Ealda minax	1	0	0	0	0	1	0	0	1	0	2	1	0	1	0	2	2	3	0	0	0	0	1	1	1	0	0	1	0	1	0	0	1	0	1	0	1	0	1	0	0	1	1	0	1	0	0	0	1	0	0
Eocanthecona furcellata	1	0	0	0	0	1	0	0	1	0	2	0	0	1	0	1	3	0	0	3	0	0	1	0	1	0	0	1	0	1	0	0	1	0	1	0	1	0	1	1	0	1	1	0	1	0	0	0	0	-	0
Euthyrrhynchus floridanus	1	0	1	0	1	1	1	0	1	0	2	1	0	1	0	1	3	0	0	0	0	0	0	0	1	1	0	0	0	1	0	1	1	1	1	0	1	0	0	0	1	1	1	0	1	0	0	0	0	-	0
Friarius alluaudi	1	0	0	0	0	1	1	0	1	0	2	0	0	0	0	0	2	0	0	0	0	0	1	1	1	1	0	1	0	1	0	0	1	0	1	0	0	0	1	1	0	1	1	0	1	0	0	0	1	0	0
Glypsus conspicuous	1	0	0	0	0	0	-	-	-	0	1	0	0	0	0	0	1	0	0	3	0	0	0	1	0	1	1	0	0	1	0	0	1	1	1	0	1	0	0	1	1	1	1	1	1	0	0	0	1	1	0
Glypsus kuhgatzi	1	0	0	0	0	0	-	-	-	0	1	0	1	0	0	0	1	3	0	3	0	0	0	1	0	1	1	0	0	1	0	0	1	1	1	0	0	0	0	1	1	1	1	1	1	0	0	0	1	1	0
Hemallia signitenens	1	0	2	0	1	0	-	-	-	1	0	1	0	1	1	2	3	3	0	3	0	0	0	1	0	1	0	0	0	1	0	1	1	1	0	0	0	0	0	0	1	1	1	0	1	0	0	0	1	1	1
Heteroscelis robustus	1	0	0	0	0	0	-	-	-	0	1	1	0	1	0	1	3	0	0	3	0	0	1	0	1	1	0	1	0	1	0	0	1	1	1	0	1	0	0	1	1	1	1	0	1	0	0	0	1	0	0
Heteroscelis servillei	1	0	0	0	0	0	-	-	-	0	1	1	0	1	0	1	3	0	0	3	0	0	1	0	1	1	0	1	0	1	0	0	1	1	1	0	1	0	0	1	1	1	1	0	1	0	0	0	1	0	0
Hoploxys coeruleus	1	0	0	0	0	1	1	0	1	0	2	0	0	1	0	1	2	0	0	0	0	0	0	0	1	0	0	1	0	1	0	1	1	0	1	0	1	0	1	1	0	1	1	0	1	0	0	0	1	0	0
Jalla dumosa	1	0	1	0	0	0	-	-	-	0	2	0	0	0	0	0	0	3	0	0	0	0	1	0	0	1	0	1	0	0	0	0	1	0	1	0	1	0	0	0	0	1	1	1	1	0	0	0	0	-	0
Jalloides opulentus	1	0	0	0	0	0	-	-	-	0	1	1	0	0	0	0	3	0	0	3	0	0	0	1	1	1	0	1	0	1	0	0	1	0	1	0	0	0	1	1	1	1	1	1	1	0	0	0	1	0	0
Jalloides rubricosa	1	0	0	0	0	0	-	-	-	0	1	0	0	1	0	1	3	1	0	3	0	0	0	1	1	1	0	1	0	1	0	0	1	0	1	0	0	0	1	1	0	1	1	1	1	0	0	0	1	0	0
Leptolobus eburneatus	1	0	0	0	0	0	-	-	-	0	2	0	0	0	0	0	2	0	0	3	0	0	0	0	1	1	0	0	0	0	0	0	0	-	-	-	-	-	1	1	0	1	1	0	1	0	0	0	1	0	0
Leptolobus murrayi	1	0	0	0	0	0	-	-	-	0	2	0	0	0	0	?	?	?	?	?	?	?	?	?	1	1	0	0	0	1	0	0	0	-	-	-	-	-	1	1	0	1	1	0	1	0	0	0	1	0	0
Machrorhaphis acuta	1	0	0	0	0	0	-	-	-	0	2	1	0	1	0	1	3	0	0	3	0	0	0	0	1	1	0	0	0	1	0	0	1	0	1	0	1	0	1	1	0	1	1	0	1	0	0	0	1	0	0
Marmessulus nigricornis	1	0	0	0	1	1	1	1	1	0	2	0	0	1	0	1	0	0	0	1	0	0	0	0	1	1	0	1	0	1	0	0	1	1	1	0	1	0	0	1	1	1	1	0	0	0	0	0	1	1	0
Martinina inexpectata	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	0	?	?	?	?	?	?	?	?	?	?	?	1	1	?	?	?	0	1	0	?
Martinina prima	1	0	0	0	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
Mecosoma mensor	1	0	0	0	0	1	1	0	1	0	2	0	0	1	0	0	3	0	0	3	0	0	0	0	1	0	0	1	0	1	0	0	1	0	1	0	1	0	1	1	0	1	1	0	1	0	0	0	1	0	0
Montrouzieriellus falleni	1	0	0	0	0	1	0	0	1	0	2	1	0	1	0	1	3	3	0	0	0	0	1	0	1	1	0	1	0	1	0	0	1	1	1	0	1	0	1	1	0	1	1	0	1	0	0	0	0	-	0
Oechalia schellenbergii	1	0	0	0	1	1	1	0	1	0	2	0	0	1	0	1	3	0	0	3	0	0	0	0	1	0	0	1	0	0	1	1	1	1	1	1	0	0	0	1	1	1	1	1	0	0	0	0	1	0	0
Oplomus catena	1	0	2	0	0	1	0	0	1	0	2	1	0	1	0	1	3	0	0	0	0	0	1	0	1	1	0	1	0	1	0	1	1	1	1	1	0	0	0	1	1	1	1	0	1	0	0	0	0	-	0
Oplomus cruentus	1	0	2	0	0	1	0	0	0	0	2	1	0	1	0	1	3	0	0	0	0	0	1	0	1	1	0	1	0	1	0	1	1	1	1	1	0	0	0	1	1	1	1	0	1	0	0	0	0	-	0
Ornithosoma rivierei	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
Parajalla sanguineosignata	1	0	2	0	1	0	-	-	-	0	2	0	0	0	0	0	3	0	0	3	0	0	0	0	0	1	0	1	0	1	0	0	1	1	1	0	1	0	0	0	1	1	1	0	1	0	0	0	1	1	0
Parealda bouvieri	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	1	0	1	?	?	?	?	?	?
Perillus bioculatus	1	0	0	0	0	?	?	?	?	0	1	0	0	0	0	1	3	0	0	3	0	0	1	0	1	1	0	1	0	0	0	1	1	1	1	1	0	0	0	1	1	1	1	1	0	0	0	0	0	-	0
Perillus circumcinctus	1	0	0	0	0	1	0	0	1	0	1	1	0	1	0	1	3	0	0	3	0	0	1	0	1	1	0	1	0	1	0	1	1	1	1	1	0	0	0	1	1	1	1	1	0	0	0	0	0	-	0
Perillus exaptus	1	0	0	0	0	0	-	-	-	0	1	0	0	1	0	1	3	0	0	3	0	0	1	0	1	1	0	1	0	1	0	1	1	1	1	1	1	0	0	1	1	1	1	1	0	0	0	0	0	-	0
Picromerus bidens	1	0	2	0	0	0	-	-	-	0	2	0	0	0	0	0	2	0	0	3	0	0	0	0	1	1	0	1	0	1	0	1	1	0	1	0	0	0	1	1	0	1	1	0	1	0	0	0	1	0	0
Pinthaeus sanguinipes	1	0	0	0	0	0	-	-	-	0	1	1	0	1	0	0	2	0	0	3	0	0	1	0	1	1	0	1	0	1	0	0	1	0	1	0	1	0	1	1	0	1	1	1	0	0	0	0	1	0	0
Planopsis silvaticus	1	0	0	0	0	0	-	-	-	0	2	0	0	1	0	1	3	0	0	0	0	0	1	0	1	0	0	1	0	1	0	0	1	1	1	0	1	0	1	1	0	1	1	0	1	0	0	0	0	-	0
Platynopiellus septendecimaculatı	1	0	0	0	0	1	0	0	1	0	2	0	0	0	0	0	2	0	0	3	0	0	0	0	1	1	0	0	0	1	0	0	1	0	0	0	0	0	1	1	0	1	1	0	1	0	0	0	0	-	0
Platynopus melanoleucus	1	0	1	0	0	1	0	0	1	0	2	0	0	1	0	1	3	0	0	3	0	0	1	0	1	1	0	1	0	1	0	0	1	0	1	0	1	0	0	1	0	1	1	0	1	0	0	0	1	0	0
Podisus maculiventris	1	0	0	0	1	1	1	0	1	0	2	0	1	0	0	0	3	0	0	1	0	0	1	1	1	1	0	1	0	1	0	0	1	1	1	1	1	0	0	1	1	1	1	1	1	0	0	0	1	0	0
Podisus nigrispinus	1	0	0	0	0	1	1	2	1	0	1	0	1	0	0	1	0	0	0	1	0	0	1	0	1	1	0	1	1	1	0	0	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0	0	-	0
Ponapea arachnoides	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	1	?	?	?	?	?	?	1	?	?	?	?	?	?	?	?	?	?	?	?
Pseudanasida fallax	1	0	?	0	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
Rhacognatus americanus	1	0	0	0	0	0	-	-	-	0	2	1	0	1	0	2	3	0	0	3	0	0	1	0	1	1	0	1	0	1	0	0	1	1	1	0	1	0	0	1	1	1	1	1	0	0	0	0	1	0	0
Rhacognathus punctatus	1	0	0	0	0	0	-	-	-	0	2	1	0	1	0	1	3	0	0	3	0	0	1	0	1	1	0	1	0	1	0	0	1	1	1	0	1	0	0	1	1	1	1	1	0	0	0	0	1	0	0
Stilbotes semperi	1	2	0	0	0	0	-	-	-	0	2	0	0	1	0	1	2	0	0	0	0	1	-	-	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
Stiretrus decastigmus	1	0	0	0	0	0	-	-	-	0	2	0	0	0	0	1	4	0	0	1	0	0	1	0	1	1	0	1	0	1	0	1	1	1	1	1	0	0	0	1	1	1	1	0	1	0	0	0	0	-	0
Stiretrus decemguttatus	1	0	0	0	0	0	-	-	-	0	2	1	0	0	0	0	4	0	0	1	0	0	1	0	1	1	0	1	0	1	0	0	1	1	1	1	0	0	0	1	1	1	1	0	1	0	0	0	0	-	0
Stiretrus erytrocephalus	1	0	0	0	0	0	-	-	-	0	2	0	0	0	0	0	3	0	0	1	0	0	1	0	1	1	0	1	0	1	0	1	1	1	1	1	0	0	0	1	1	1	1	0	1	0	0	0	0	-	0
Supputius cinctipes	1	0	0	0	0	1	1	0	1	0	2	0	1	0	0	0	3	1	0	3	0	0	1	1	1	1	0	1	0	1	0	1	1	1	1	1	1	0	0	0	1	1	1	1	0	0	0	0	0	-	0
Supputius typicus	1	0	0	0	0	1	1	0	1	0	2	1	0	1	0	1	4	0	0	1	0	0	0	1	1	1	0	1	0	1	0	1	1	1	1	1	1	0	0	0	1	1	1	1	0	0	0	0	0	-	0
Troilus luridus	1	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	3	0	0	3	0	0	1	0	1	1	0	1	0	1	0	1	1	1	1	1	0	0	0	1	1	1	1	1	0	0	0	0	0	-	0
Tylospilus chilensis	1	0	2	0	1	0	-	-	-	0	2	0	0	0	0	0	3	0	2	0	0	0	1	0	1	1	0	0	0	1	0	1	1	1	1	1	0	0	0	1	1	1	1	1	0	0	0	0	0	-	0
Tylospilus cloelia	1	0	0	0	1	0	-	-	-	0	2	0	1	0	0	0	3	0	0	0	0	0	1	0	1	1	0	0	0	1	0	1	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0	0	-	0
Tynacantha marginata	1	0	0	0	0	1	1	2	1	0	1	0	1	1	0	1	3	0	0	0	0	0	1	0	1	1	0	1	0	1	0	0	1	1	1	1	0	0	0	1	1	1	1	1	0	0	0	0	0	-	0
Tyrannocoris nigriceps	1	0	0	0	1	1	0	0	1	0	2	0	0	1	0	?	3	0	0	3	0	0	1	0	1	1	0	1	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	1	0	0	0	1	0	0
Tyrannocoris rex	1	0	0	0	1	1	0	0	1	0	2	0	0	1	0	1	3	0	0	3	0	0	1	0	1	1	0	1	0	1	0	0	1	1	1	1	0	0	0	1	1	1	1	1	1	0	0	0	1	0	0
Zicrona caerulea	1	0	0	0	1	0	-	-	-	0	2	0	0	1	0	1	3	0	0	3	0	0	1	1	0	1	0	1	0	1	0	1	1	0	1	1	1	0	0	1	1	1	1	1	0	0	0	0	0	-	0

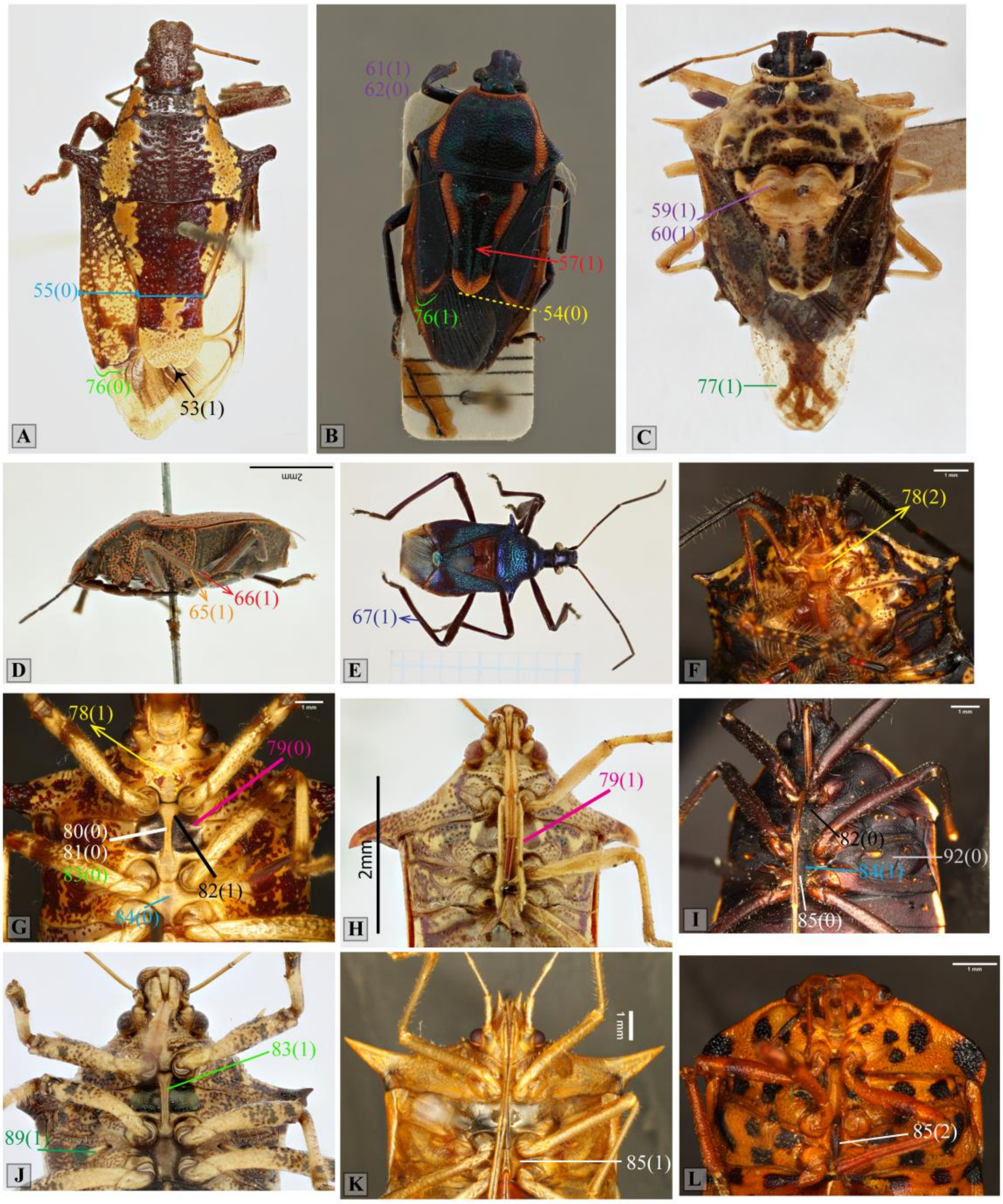
SM3. Illustrations of the morphological characters



SM3. Figure 1. Characters of head. A,D, *Ochlerus rusticus*, B, E, *Podisus nigrispinus*, C, F, *Cyrtocoris egeris*, G, I, Heteroscelis servillei, H, J, Antiteuchus mixtus, K, *Glypsus kuhlgatzi*, L, *Leptolobus murrayi*, M, *Blachia ducalis*, N, *Alcaeorrhynchus grandis*, O, *Cazira insignis*, P, *Cermatulus nasalis*.

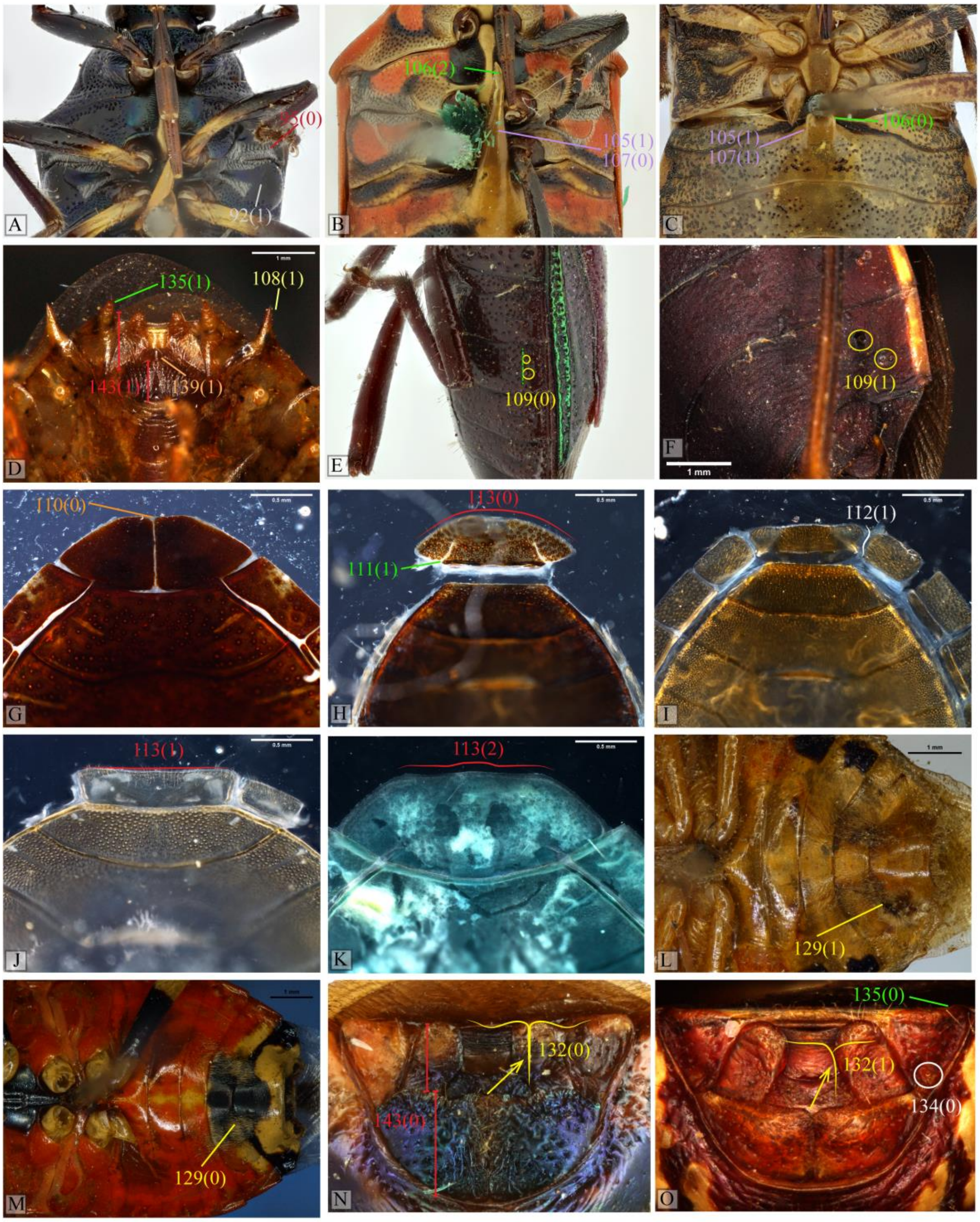
SM3. Figure 2. Characters of head and pronotum. A, F, J, *Alcaeorrhynchus grandis*, B, *Antiteuchus mixtus*, C, *Nezara viridula*, D, *Stilbotes semperi*, E, *Podisus nigrispinus*, G, *Proxys albopunctulatus*, H, *Podisus* sp., I, *Damarius splendidulus*, K, *Arma custos*, L, *Ochlerus rusticus*.

SM3. Figure 3. Characters of pronotum and scutellum. A, *Tynacantha marginata*, B, *Dinorhynchus dybowskyi*, C, N, *Heteroscelis servillei*, D, *Dinocoris gibbus*, E, M, *Ealda minax*, F, *Euthyrhynchus floridanus*, G, *Podisus nigrispinus*, H, J, *Cazira chiroptera*, I, *Leptolobus eburneatus*, K, *Pseudanasida fallax*, L, P, *Stiretrus decastigmus*, O, *Discocera coccinea*.



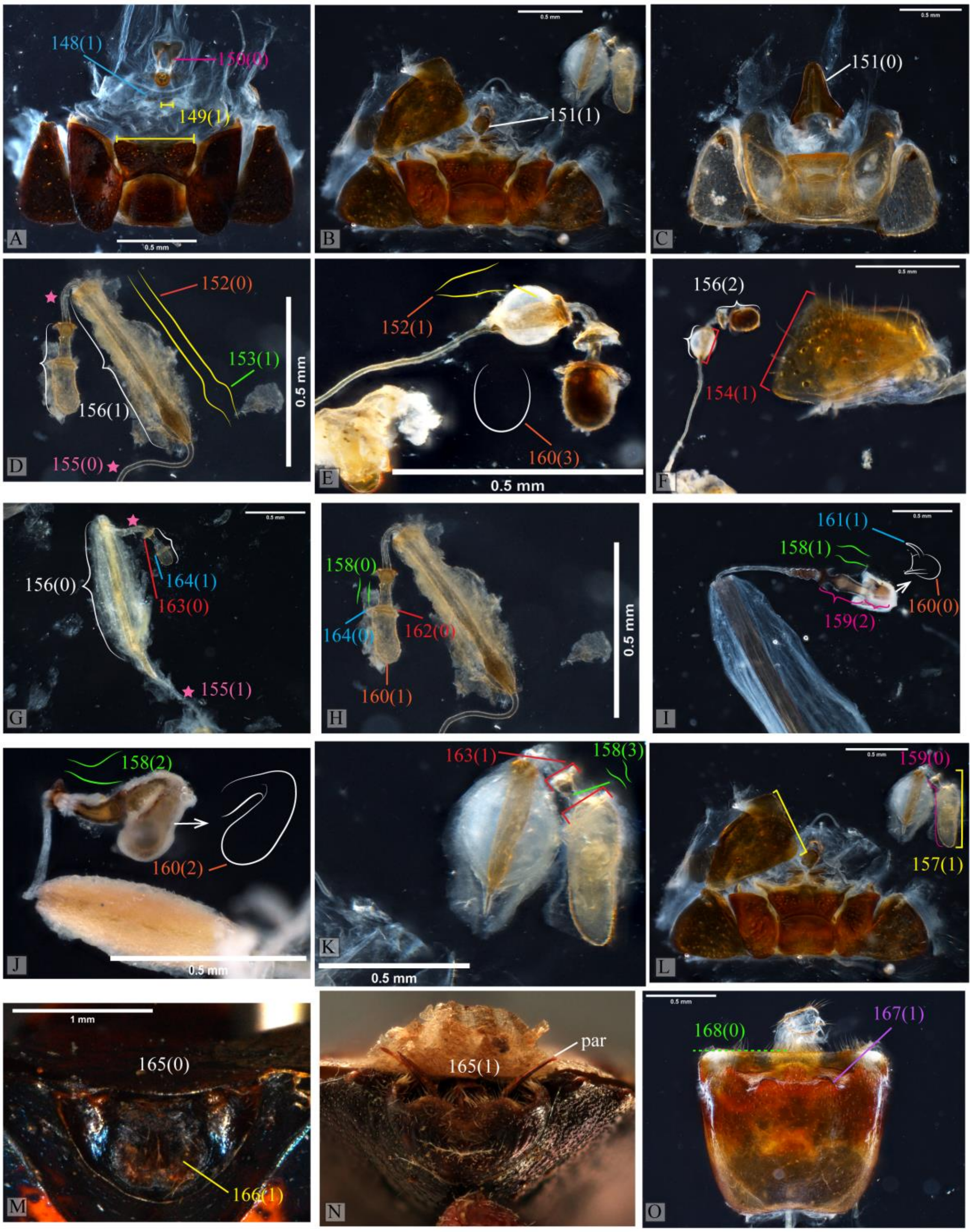
SM3. Figure 4. Characters of scutellum, wings, legs, and ventral thorax. A, *Comperocoris roehneri,* B, *Damarius splendidulus*, C, *Cazira insignis*, D, *Marmessulus nigricornis*, E, *Stilbotes semperi*, F, *Dinocoris gibbus*, G, *Alcaeorrhynchus grandis*, H, *Ealda minax*, I, *Ochlerus rusticus*, J, *Afrius flavirostrum*, K, *Arvelius albopunctatus*, L, *Graphosoma lineata*.

SM4. Illustrations of the morphological characters.



SM4. Figure 1. Characters of abdomen and female genital plates. A, *Damarius bicolor*, B, *Mecosoma mensor*, C, *Glypsus* sp., D, *Arvelius albopunctatus*, E, *Heteroscelis servillei*, F, *Ochlerus rusticus*, G, *Lincus spurcus*, H, *Podops inunctus*, I, *Tylospilus cloelia*, J, *Discocera coccinea*, K, *Nezara viridula*, L. *Blachia ducalis*, M, *Coryzorhaphis* sp., N, *Jalloides opulentus*, O, *Colpothyreus flavolineatus*.

SM4. Figure 2. Characters of female genitalia. A, *Hemallia signitenens*, B, M *Oechalia schellembergii*, C, *Cazira insignis*, D, *Apoecilus cynicus*, E, *Apoecilus cynicus*, F, O, *Ochlerus rusticus*, G, *Edessa rufomarginata*, H, *Cyrtocoris egeris*, I, *Zicrona caerulea*, J, *Leptolobus eburneatus*, K, *Stilbotes semperi*, L, *Discocera coccinea*, N, *Podisus nigrispinus.*



SM54 Figure 3. Characters of female and male genitalia. A, *Anasida tenebrio*, B, K, L, *Colpothyreus flavolineatus*, C, *Hemallia signitenens*, D, H, *Podisus nigrispinus*, E, F, *Discocera coccinea*, G, *Apoecilus cynicus*, I, *Ochlerus rusticus*, J, *Cyrtocoris egeris*, M, *Comperocoris roehneri*, N, *Friarius alluaudi*, O, *Glypsus conspicuus.* Abbreviation: par, paramere.

SM4. Figure 4. Characters of male genitalia. A, B, *Apoecilus cynicus*, C, *Tantia albopunctulata*, D, *Ealda minax*, E, *Lincus spurcus*, F, *Discocera cayennensis*, G, *Dinocoris gibbus*, H, *Dynorhynchus dybowskyi*, I, *Apoecilus bracteatus*, J, *Coryzorhaphis leucocephala*, K, *Glypsus conspicuus,* L, *Anasida tenebrio*. Abbreviations: bt, basal theca; dr, dorsal rim; ds, ductus seminis distalis; ts, thecal shield; v, vesica; vr, ventral rim.

CONCLUSÃO GERAL

Asopinae é um grupo natural de percevejos predadores que possuem uma aparência geral similar aos outros representantes da mesma família, sendo diferenciados principalmente pela cabeça retangular e lábio robusto. Além disso, o pigóforo em Asopinae contém 1+1 processos superiores do diafragma, e estes são bastante desenvolvidos, apresentando variações morfológicas quando observados em microscopia eletrônica de varredura. Estes processos não contêm cerdas nem sensilas e podem estar associados ao comportamento de cópula. “Processo superior do diafragma” é um termo que propomos neste trabalho a fim de padronizar a terminologia de trabalhos futuros em Pentatomidae, uma vez que estes processos também são encontrados em outras subfamílias.

Diversos clados foram recuperados na análise filogenética, mas nós não conseguimos definir características exclusivas e consistentes para grupos de gêneros e decidimos, por isto, não propor uma divisão de tribos para a subfamília. As espécies cujos machos possuem modificações abdominais que externalizam excreções feromônicas produzidas internamente na mesma região formam um grupo monofilético, e esta característica parece ter evoluído de forma única no grupo. A análise filogenética apresentada neste trabalho recuperou a monofilia de vários gêneros os quais pudemos amostrar mais de uma espécie, exceto *Afrius* Stål, 1870. As duas espécies amostradas, *A.*(*Subafrius*) *flavirostrum* (Signoret, 1861) e *A.* (*Afrius*) *purpureus* (Westwood, 1837) ocupam posições em clados diferentes, principalmente pelo fato de uma das espécies (*A. purpureus*) apresentar manchas glandulares abdominais masculinas. Como o gênero possui três espécies válidas (*A.* (*Subafrius*) *flavirostrum, A.* (*Afrius*) *kolleri* Schouteden, 1911 and *A.* (*Afrius*) *purpureus*), talvez um estudo cladístico futuro incluindo todas elas possa esclarecer melhor se *Afrius* é ou não monofilético.