THEREZA DE ALMEIDA GARBELOTTO

Filogenia e classificação de Discocephalini (Hemiptera: Pentatomidae: Discocephalinae)

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

Área de Concentração: Biologia Comparada

Orientador: Prof. Dr. Luiz Alexandre Campos

Co-orientadora: Prof.ª. Dra. Jocélia Grazia

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Tese apresentada como parte dos requisitos para obtenção do grau de Doutor em Biologia Animal, área de concentração Biologia Comparada.

Comissão examinadora:

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Prof. Dr. Augusto Ferrari (PPG-BAN/FURG)

_____

Prof. Dr. Cristiano F. Schwertner (UNIFESP)

_____

Prof. Dr. José A. M. Fernandes (UFPA)

_____

Prof. Dr. Luiz Alexandre Campos (Orientador)

Porto Alegre, 08 de julho de 2015.

Aos meus pais, Roslene e Volmar, por todo o apoio, 'paistrocínios', dedicação, amor e, principalmente, por acreditarem muito mais em mim do que sou capaz. ❤

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Ter o mesmo orientador por anos a fio, é ouvir por duas vezes *"não esquece dos agradecimentos hein?!"*. Não sei se ouvirei isso pela terceira vez, mas se ouvir, dessa vez por algum motivo não deixei para começa-los por último não, viu Luiz?! Apenas deixei eles guardadinhos, em um outro arquivo em separado, para ao menos a tradição de todos conhecerem esse meu texto apenas na versão "final" se manter.

Nesta de escrever a parte geral da tese, em vários momentos me peguei abrindo o arquivo da dissertação do mestrado (e as vezes até o TCC da graduação) para servir de inspiração torta. Só que nessa busca da inspiração torta, acabei relendo algumas vezes os agradecimentos da dissertação. E é engraçado ver como algumas coisas não mudam, mesmo que os anos mudem e a gente evolua com eles. Por exemplo:

> "*Começo agradecendo a minha família, todos indispensáveis... Aos meus pais, sem palavras... Obrigada pelo apoio, carinho, conselhos e força sempre dispensados a mim. Ao meu irmão, que adquiriu o detestável hábito de me chamar de "visita" em minha própria casa: obrigada principalmente pelos momentos de brincadeiras, afinal não foram poucas as vezes que a mãe nos pegou jogando "cara a cara" e sério, a cara que ela fazia não tem preço!*".

Agora passei realmente a me considerar visita na casa dos meus pais, mesmo sabendo que sempre poderei chamar aquele lugar de "lar". Mas, algumas coisas mudam com os anos, como as coisas de lugar, e essas p.ex., eu desisti de guarda-las. Mas Vi, agora também és visita, e essa é a minha vingança! *(hahaha – Risada sarcástica).* Mas os momentos de brincadeiras, mesmo depois de teres casado, continuam ali (por incrível que pareça). E se antes recorríamos aos jogos de tabuleiro, agora é ao CandyCrush no tablet a que recorremos. Pai e mãe, a vocês dedico esse trabalho e assim, apenas reforço o que já havia escrito no mestrado, obrigada por TUDO!

> "*As minhas amigas agradeço a companhia, por que:* 'Não há memórias onde não apareçam, nem lembranças em que elas não estejam; tanto nos dias tristes e felizes, foi com elas que eu ri e chorei; se estou longe as sinto por perto...' *À Cí e a May, as quais seus e-mails se tornaram indispensáveis nos últimos dias, obrigada pelos conselhos, pela força e colos virtuais*".

Na época, os e-mails foram indispensáveis para os colos nos momentos de desespero, ou naqueles em que me puxavam a orelha e mandavam trabalhar. Agora isso acontece por WhatsApp, mas a amizade está ali, a mesma dos anos de minha infância. Obrigada meninas! A gente pode até não se ver ou falar com a frequência que gostaríamos, mas *"é a vida de gente grande"* e poder replicar um agradecimento depois de quatro anos me

faz ter mais certeza ainda de que é para a vida, aonde quer que ela nos leve. E ela sempre pode nos levar a lugares como Cancun também. ☺✈

> *"Às bioloukas, em especial a Bru, a Mai e Nega, de quem estive mais próxima nos últimos tempos, pelas alegrias compartilhadas, sessões cinema e fofoca, e principalmente por estarem sempre por perto".*

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À Anne e a Flávia, amizade nascida e criada aqui em Porto mesmo, obrigada por tudo gurias! Desde o compartilhamento de ideias nerds, livros, festas, bebedeiras, sapoboras... Vocês são tipo aquele porto seguro onde eu sei que o assunto "trabalho" se aparecer, será muito brevemente; a mente esvazia, meus mundos paralelos se tornam mais reais, esqueço a idade e saio por aí abraçando ursos, batendo fotos com Minions, discutindo o mundo mágico de Harry Potter, vendo filme *"de criança"*... Enfim, Parabatai resume! ϒ

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reuniões. *English Days*. Muito chimarrão dividido e derrubado (desculpa mesmo Valdenar!), além dos *"Ninguém se mexe!!!"* a cada pigóforo voador ou, *"Nossa!!! Que genitália linda!!!"* a cada nova dissecção. Ah! Foram cinco conjuntos de baralho de UNO e inclusive noites de campeonato! Alguns cartazes de doutorandas princesas Disney espalhados, tubo de corretivo atirado, e muitos, MUITOS plásticos bolhas estourados! 💣 Uns eu já conhecia, outros, essa vida louca trouxe ao meu convívio. Amizades nasceram e se fortaleceram, e outras perderam força. Obrigada por me proporcionarem essa vivência e me desculpem por qualquer coisa.

Ao pessoal do LES-223 não vou conseguir citar os nomes de todos que por aí passaram! Me desculpem! Mas obrigada a todos que compartilharam mementos comigo, sejam estes de laboratório ou fora deles (em festas/churrascos, congressos, dividindo quartos ou fazendo carreteiro em meio as naftalinas). Pelos campeonatos de *"quem incomoda mais"* nos sorteios de amigo secreto do Elfster também! E um agradecimento especial ao Kim, que compartilhou parte da minha vida Californiana. 🚤 Foram muitos momentos de discussão de trabalho ou, de roteiro turístico ou, de conselhos de como levar uma vida mais americanizada. Falavam que voltaríamos com um filho no braço, mas voltamos mesmo foi com colaborações cientificas. *hehe* Obrigada pelos aprendizados e por ser tipo a parte de família brasileira durante aqueles seis meses em um lugar todo novo.

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🗣 🗣 🗣

"... Livre estou! Livre estou! ... "

(Let it go, let it go...).

Tenha Paciência. De um jeito ou de outro as coisas se ajeitam.
Tenha Fé. Seja ela baseada em religião, em tuas crenças pessoais, em ti, no teu potencial. Mas crê em algo.
Aprenda a dosar as duas e receberás tua Recompensa.

Autoria própria.

SUMÁRIO

RESUMO

A subfamília Discocephalinae, proposta por Fieber em 1861, é um grupo de percevejos fitófagos conhecidos apenas da região Neotropical, geralmente reconhecidos por apresentarem a inserção do lábio posterior à margem anterior dos olhos e tricobótrios lateralizados em relação aos espiráculos. Duas tribos são compõe a subfamília, Discocephalini e Ochlerini, entretanto pouco é conhecido de Discocephalini. A tribo teve uma diagnose apresentada quando proposta por Fieber, porém sua composição sofreu grandes alterações até hoje, e em termos de descrição do grupo é dito apenas que estes incluem espécies com corpo geralmente achatado, tamanho pequeno a médio, de coloração geralmente castanha, manchada de preto ou castanho escuro. Abordagens mais recentes baseadas em filogenias apontaram o grupo como parafilético. Com base nesta deficiência de conhecimento de Discocephalini e na incerteza sobre sua monofilia foi feito um estudo abordando a sistemática da tribo. O gênero *Braunus* Distant, antes pertencente à Discocephalini, foi reconhecido como sinônimo sênior de *Lojus* McDonald, e com base na classificação de *Lojus* transferido para Carpocorini (Pentatominae) em uma revisão do gênero que incluiu também a redescrição da espécie tipo do gênero (*B. sciocorinus*) e das demais espécies conhecidas; a descrição de três novas espécies para o gênero (*B. machadoi* sp. nov.; *B. gibbus* sp. nov. e *B. prionotus* sp. nov.); e uma chave de identificação para o gênero. Uma chave ilustrada para os gêneros de Discocephalini foi elaborada além de diagnoses para cada um dos 41 gêneros não-fósseis da tribo, muitos desses conhecidos apenas de suas descrições originais e pouco representados em coleções científicas. Ainda, o gênero *Anhanga* Distant foi transferido para Pentatominae, e *Allinocoris* Ruckes foi sinonimizado a *Uncicrus* Ruckes. Finalmente uma avaliação da monofilia da tribo foi feita utilizando caracteres morfológicos. As análises apontaram Discocephalini como polifilética, no entanto a maioria dos gêneros da tribo agruparam-se em um clado apenas (clado C) e, dentre estes, alguns dos gêneros apontados como relacionados por autores prévios apresentaram algum relacionamento. Uma diagnose para os gêneros do “clado C” foi elaborada, no entanto não foram feitas alterações da classificação atual. As análises ainda apontaram um possível parafiletismo de Discocephalinae.

PALAVRAS CHAVE. Heteroptera, Discocephalinae, filogenia, taxonomia.

ADVERTÊNCIA

Esta tese não constitui uma publicação nos termos do artigo 8 do Código Internacional de Nomenclatura Zoológica. Os nomes novos, e/ou sinonímias novas aqui apresentados não tem validade para fins de nomenclatura.

INTRODUÇÃO

Chamados percevejos (ou *true bugs*), os heterópteros são parte da radiação evolutiva de hemimetábolos mais bem sucedida dentre os Hemiptera (Weirauch & Schuh 2011). Dentre os heterópteros, Pentatomidae é a quarta família mais numerosa e diversa, composta atualmente por aproximadamente 900 gêneros e 4700 espécies mundialmente distribuídos, com maior abundancia nas regiões Oriental, Etiópica e Neotropical (Schuh & Slater 1995; Grazia *et al.* 1999; Rider 2011). Além disso, a família apresenta limites bem estabelecidos taxonomicamente e é suportada como monofilética com base em dados morfológicos e moleculares (Gapud 1991; Hasan & Kitching 1993; Grazia *et al*. 2008).

O relacionamento entre as nove subfamílias atualmente aceitas e sua monofilia ainda está sendo investigado. Gapud (1991) e Hasan & Kitching (1993) apresentaram evidências de parafiletismo para os agrupamentos de subfamílias de Pentatomidae. No entando esses trabalhos apresentam problemas como subamostragem de táxons por exemplo. Hasan & Kitching (1993) não incluíram no estudo as subfamílias e tribos exclusivamente Neotropicais (Fig. 1A) e Gapud (1991) apresenta delimitação de estados e polarização de caracteres questionáveis, uma vez que o estado mais comum no grupo analisado foi tratado como plesiomórfico (Fig. 2). Grazia *et al.* (2008) recuperaram Cyrtocorinae como grupo-irmão das demais subfamílias de Pentatomidae e a maioria destas aparece agrupada em uma grande politomia (Fig. 1B). Ou seja, a classificação de Pentatomidae está em estado de caos (Rider 2000; Gapon & Baena 2005; Rider & Brailovsky 2014).

Análises cladísticas em Pentatomidae começaram a aparecer no fim dos anos 1990, a partir dos esforços principalmente de J. Grazia e seus alunos (Weirauch & Schuh 2011), contudo muitos trabalhos ainda permanecem não publicados (p.ex. Fernandes 1998; Campos 1995; Zahid 2006; Ferrari 2009; Greve 2010). Entre os trabalhos publicados, a maioria trata de filogenia de gêneros, e suporta a monofilia do grupo de interesse (Thomas & Yonke 1985; Grazia 1997; Barcellos & Grazia 2003; Fortes & Grazia 2005; Campos & Grazia 2006; Bernardes *et al.* 2009; Ferrari *et al.* 2010; Memon *et al.* 2011; Genevcius *et al.* 2012; Schwertner & Grazia 2012; Simões *et al.* 2012; Garbelotto *et al.* 2013; Greve *et al.* 2013; Genevcius & Schwertner 2014).

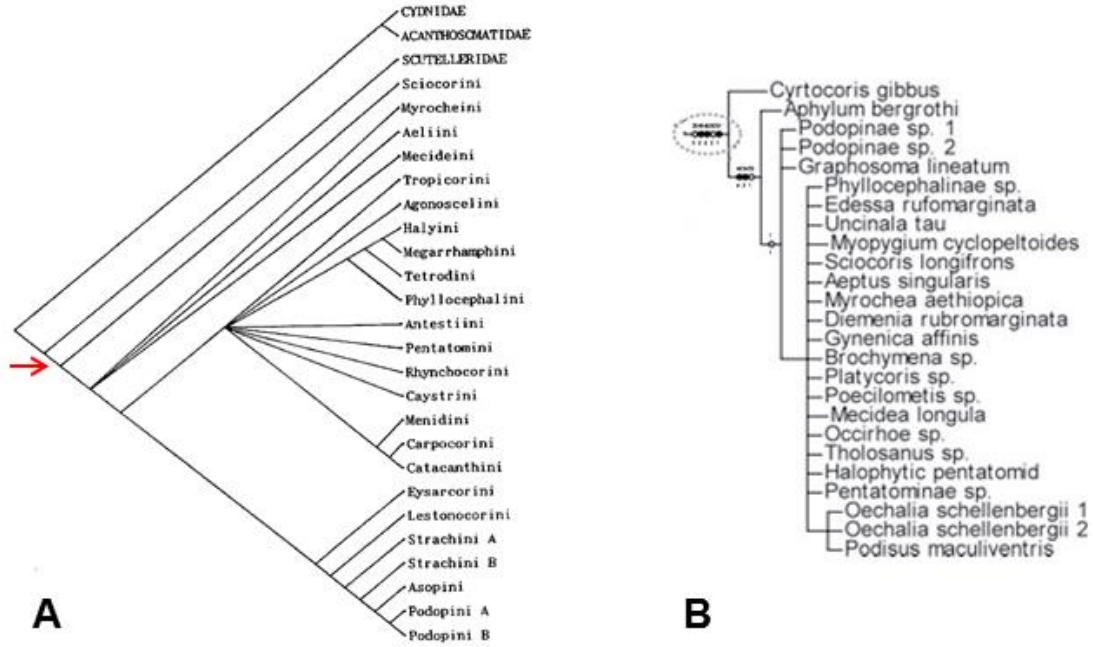

Figura 1 Hipóteses de relacionamento para as subfamílias e tribos de Pentatomidae apresentadas por (A) Hasan & Kitching (1993) e (B) Grazia *et al.* (2008). – Seta: indica o nó de Pentatomidae.

Destes, apenas três tratam do relacionamento dos gêneros em nível de tribos (Campos & Grazia 2006; Memon *et al.* 2011; Schwertner & Grazia 2012) e críticas podem ser feitas a alguns deles (p.ex. Barão *et al.* 2012). Poucos são os que trabalharam com alguma proposta de classificação: Thomas & Yonke (1985) utilizaram os resultados da análise cladística para propor grupos intragenérios em *Banasa* Stål; Barcellos & Grazia (2003) transferiram *Brachystethus* Laporte de Pentatominae para Edessinae baseando-se nos resultados da filogenia; Simões *et al.* (2012) testaram a validade do gênero monotípico *Elsiella* Froeschner incluindo-o na análise cladística de *Serdia* Stål (Fortes & Grazia 2005); e no mais recente deles, Garbelotto *et al.* (2013) porpuseram uma nova classificação para *Alitocoris* Sailer (Ochlerini) onde a maioria das espécies originalmente incluidas no gênero passaram a integrar novos gêneros propostos com base nos clados resultantes da análise filogenética.

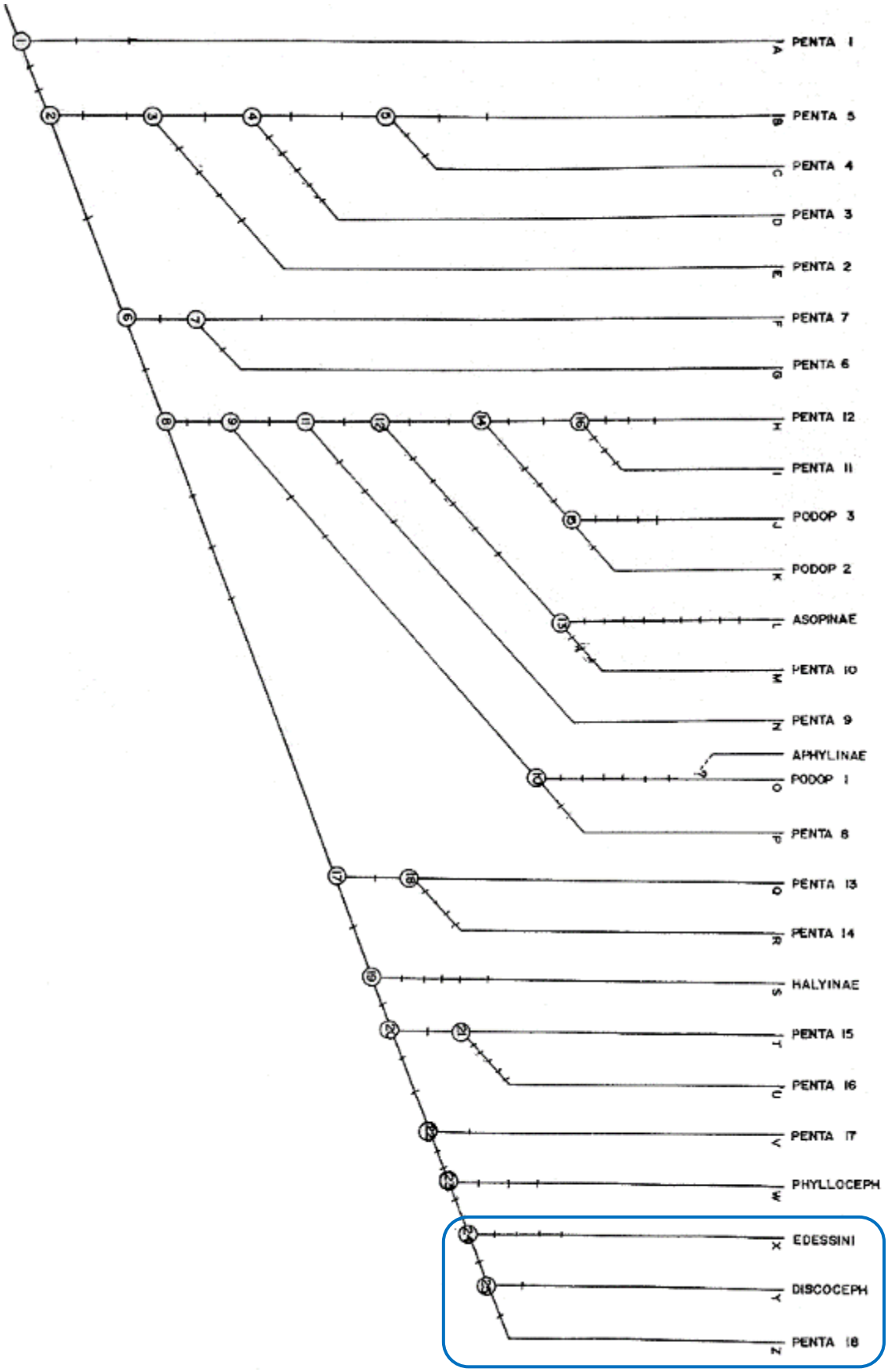

Figura 2 Hipóteses de relacionamento para Pentatomidae *sensu* Gapud (1991). No destaque: clado apical "Edessini + (Discocephalinae + Pentatomine 18)".

Discocephalinae é uma das subfamílias de Pentatomidae conhecidas apenas da região Neotropical, originalmente proposta por Fieber (1861) como "Discocephalida" em nível de família. Stål (1868) foi o primeiro a tratar o grupo como subfamília, proposta seguida por alguns autores subsequentes, algumas vezes alterando a família a qual o grupo estava inserido (Tabela 1). No entanto, aproximadamente menos de metade dos gêneros hoje reconhecidos no grupo eram tratados dentro do mesmo supra-taxon (Tabela 1). Kirkaldy (1909) foi o primeiro a tratar o grupo como tribo, dentro de Pentatominae, e incluir na tribo quase a totalidade dos táxons hoje inseridos no grupo (Tabela 1), arranjo este seguido por aproximadamente 70 anos.

Tabela 1 Classificação dos gêneros hoje incluídos em Discocephalinae em alguns dos principais catálogos em Pentatomidae. **Negrito** indica a primeira menção do grupo em algum nível taxonômico e classificação mais recente aceita.

Catálogos	**Categoria taxonômica.**
Herrich-Shäeffer (1843-44)	Pentatomites
Fieber (1851)	Sciocoridae
Fieber (1861)	**Discocephalida** *fam.*
Walker (1867)	Sciocoridae *fam.* Halydidae *fam.*
Stål (1867)	Discocephalidum Pentatomidum
Stål (1868)	Discocephalida *subfam.* (Pentatomida *fam.*)
Stål (1872)	Discocephalina *subfam.* (Cimicina *fam.*) Pentatomina *subfam.* (Cimicina *fam.*)
Distant (1880-1893)	Discocephalinae *subfam.* (Pentatomidae *fam.*) Pentatominae *subfam.* (Pentatomidae *fam.*)
Distant (1887)	Discocephalinae *subfam.* (Pentatomidae *fam.*)
Lethierry & Severin (1893)	Discocephalidae *subfam.* (Pentatomidae *fam.*)
Distant (1899)	Discocephalinae
Kirkaldy (1909)	**Discocephalini** *tribe* (Pentatominae *subfam.* – Cimicidae *fam.*)
Rolston & McDonald (1979); **Rolston (1981; 1992)**	**Discocephalini** *tribe* (Discocephalinae *subfam.* – Pentatomidae *fam.*) **Ochlerini** *tribe* (Discocephalinae *subfam.* – Pentatomidae *fam.*)

Rolston & McDonald (1979), seguindo Stål, trataram o grupo a subfamília de Pentatomidae, propondo uma diagnose baseada principalmente na posição de inserção do lábio, geralmente posterior à margem anterior dos olhos, e posicionamento dos tricobótrios no esternito VII, geralmente lateralizados em relação aos espiráculos. Os autores também transferiram para a subfamília 23 gêneros americanos de Halyini, que posteriormente foram incluídos em Ochlerini (Rolston 1981, 1992) (Tabela 1). Quando da proposição de Ochlerini, os gêneros previamente incluídos em

Discocephalinae, passaram a compor a tribo nominal Discocephalini, para a qual após a diagnose apresentada por Fieber (1861) apenas Rolston (1981) afimou que: “os demais gêneros discocephalíneos que constituem a tribo nominal, são marrons, frequentemente manchados com preto ou preto brilhante”. Esta classificação é adotada até os dias atuais.

Apesar da carência de uma diagnose atualizada para a tribo, hoje são incluídos pouco mais de 40 gêneros e 190 espécies em Discocephalini (para uma listagem completa veja Grazia *et al.* [no prelo]), incluindo um gênero monotípico fóssil (Petrulevicius & Popov 2014). Historicamente alguns autores reconheceram por meio de inferências de taxonomia clássica semelhanças entre grupos de gêneros que eram tratados como próximos ou relacionados. Uma interpretação feita a partir destas inferências está representada na forma de dendrograma na Fig. 3.

O grupo chamado de discocephalíneos de cabeça larga (*broadheaded discocephalines*), com catorze gêneros (*Acclivilamna* Ruckes, *Allinocoris* Ruckes, *Alveostethus* Ruckes, *Colpocarena* Stål, *Discocephala* Laporte, *Discocephalessa* Kirkaldy, *Harpogaster* Kormilev, *Ischnopelta* Stål, *Lineostethus* Ruckes, *Phoeacia* Stål, *Placidocoris* Ruckes, *Platycarenus* Fieber, *Tetragonotum* Ruckes e *Uncicrus* Ruckes), é o maior destes agrupamentos. Estes gêneros foram considerados relacionados por possuírem a distância interocular igual ou maior que o comprimento da cabeça, o primeiro segmento do lábio atingindo o prosterno e o segmento basal do abdômen desprovido de tubérculo ou espinho mediano (Ruckes 1966b; Becker 1977a; Rolston, 1990). Rolston (1990) afirmou ainda que neste grupo nem todos os gêneros são fortemente relacionados, e que a maioria deles tem um aspecto geral similar e facilmente reconhecível (Fig. 3 – grupo A).

Ablaptus Stål, *Agaclitus* Stål, *Sympiezorhincus* Spinola e *Uncinala* Ruckes foram agrupados especialmente pelo dimorfismo sexual na membrana do hemiélitro, que se apresenta nos machos com sulcos e áreas esclerotizadas transversais e, com exceção de *Ablaptus* Stål, apresentam ainda o ângulo apical externo do cório atingindo o ápice da membrana (Ruckes 1965; Becker & Ruckes 1969; Becker & Grazia 1989a, 1992, 1995). Becker & Grazia (1989a) aproximaram *Ablaptus* Stål a *Uncinala* Ruckes pelo dimorfismo sexual na membrana e no ângulo apical externo do hemiélitro, além de possuírem ainda um processo mediano na margem posterior do sétimo tergito dos machos; e *Agaclitus* Stål a *Sympiezorhincus* Spinola por não apresentarem o processo mediano na margem posterior do sétimo tergito dos machos, e por caracteres de

genitália de macho. *Cataulax* Spinola foi incluído posteriormente nesse grupo de gêneros por Grazia *et al.* (2000), porém sem indicação de maior proximidade com algum dos outros gêneros (Fig. 3 – grupo B).

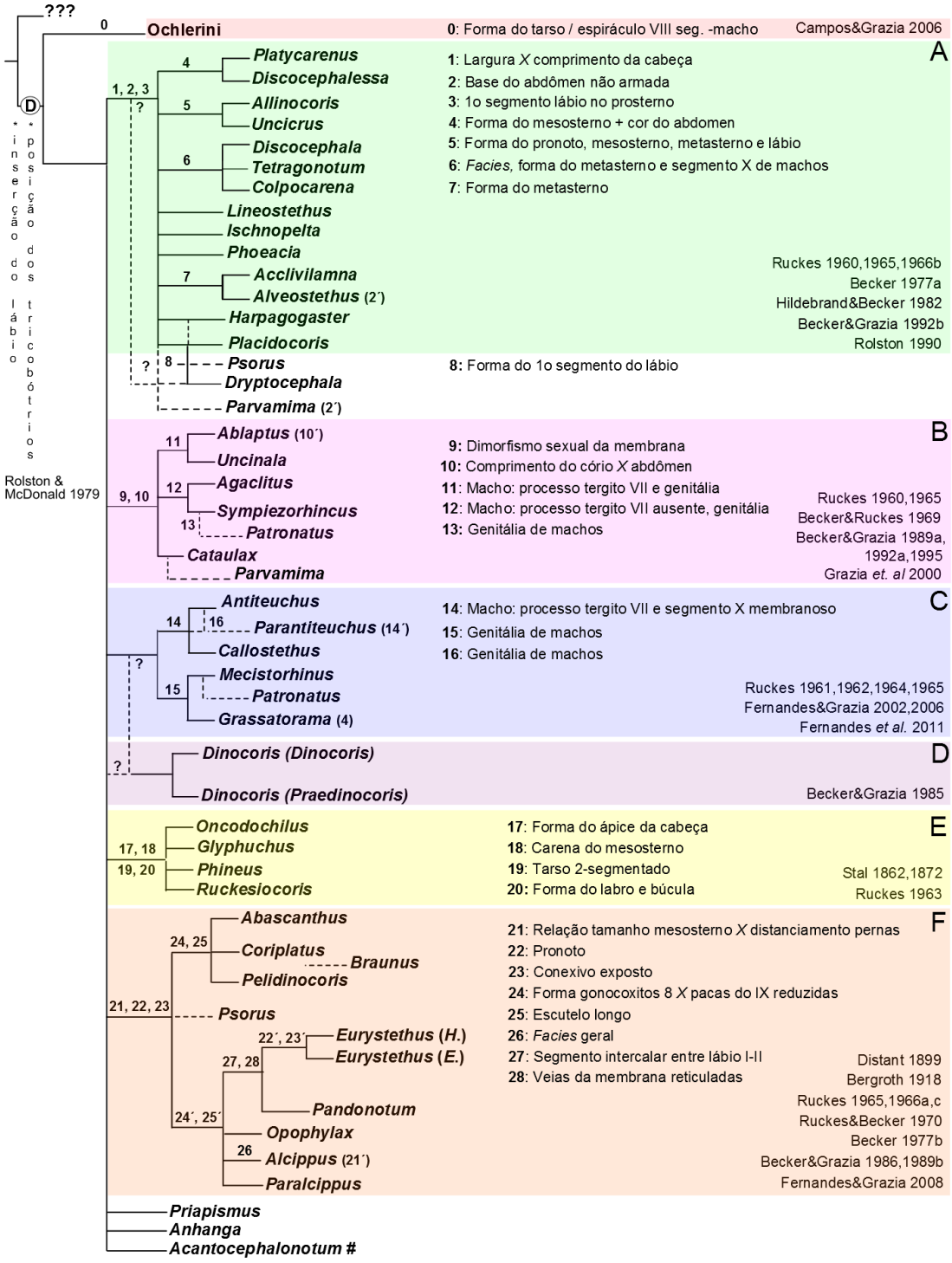

Figura 3 Interpretação na forma de dendrograma dos relacionamentos entre gêneros de Discocephalini, deduzidos a partir de publicações taxonômicas. Cores: destacam os agrupamentos também indicados por uma letra no canto superior direito. Números: relacionam as características utilizadas para agrupar táxons e seus opostos são indicados por números

seguidos de apóstrofo (’). Referências utilizadas para desenhar os agrupamentos estão relacionadas no canto inferior direito de cada grupo. # = gênero fóssil.

Antiteuchus Dallas é o maior gênero de Discocephalini, e classicamente foi relacionado a *Callostethus* Ruckes, *Mecistorhinus* Dallas e *Parantiteuchus* Ruckes (Ruckes 1961, 1964). No entanto mais recentemente foi aproximado a *Callostethus* Ruckes e *Parantiteuchus* Ruckes por morfologia de genitália dos machos (Fernandes & Grazia 2002, 2006; Fernandes *et al.* 2011). Ruckes (1965) ao descrever Grassator Ruckes (pré-ocupado, = *Grassatorama* Rider) e *Patronatus* Ruckes os relacionou a *Mecistorhinus* Dallas também por morfologia de genitália, contudo ao mesmo tempo relacionou *Patronatus* Ruckes a *Sympiezorhincus* Spinola (Fig. 3 – grupo C).

Embora nunca tratados conjuntamente como um agrupamento, *Glyphuchus* Stål, *Oncodochillus* Fieber, *Phineus* Stål e *Ruckesiocoris* Rider podem ser associados por características de morfologia de cabeça, labro e número de artículos tarsais reduzidos a dois (à exceção de *Phineus* Stål que se aproxima apenas pela morfologia de cabeça) (Stål 1862, 1872; Ruckes 1963) (Fig. 3 – grupo E).

Os gêneros *Abascantus* Stål, *Coriplatus* White, *Eurystethus* Mayr, *Paralcippus* Becker & Grazia e *Pelidnocoris* Stål foram relacionados por apresentarem o metasterno amplamente hexagonal, o que causa um distanciamento entre as mesocoxas maior que entre as respectivas metacoxas; à exceção de *Eurystethus*, os gêneros compartilham a forma do pronoto e conexivos amplamente expostos (Ruckes 1966a; Becker & Grazia 1986). Entre estes, *Abascantus*, *Coriplatus* e *Pelidnocoris* compartilham a forma do escutelo e a estrutura de genitália de fêmea (Ruckes 1966c; Ruckes & Becker 1970; Becker 1977b). *Pandonotum* Ruckes também foi considerado próximo a *Eurystethus*, porém por compartilharem uma cabeça alongada, escutelo estreito e lábio com um segmento articular entre os segmentos I e II, além da venação reticulada da membrana do hemiélitro (Ruckes, 1965). *Alcippus* Stål foi relacionado a *Paralcippus* e *Eurystethus* Mayr por compartilhar com estes a presença de laterotergitos IX desenvolvidos, o escutelo curto e o aspecto geral semelhante aquele de *Paralcippus*, apesar de as meso e metacoxas serem equidistantes (Becker & Grazia 1986, 1989b). Segundo Fernandes *et al.* (2008) *Psorus* Bergroth deveria ser relacionado com esses gêneros relacionados acima. Ainda, *Opophylax* Bergroth deveria ser colocado como próximo de *Alcippus* e *Eurystethus* conforme Bergroth (1918) (Fig. 3 – grupo F). Por fim, alguns gêneros foram tratados com relacionamentos incertos ou pouco citados ou

até nunca comparados com outros gêneros (*Anhanga* Distant, *Braunus* Distant, *Dinocoris* Burmeister, *Dryptocephala* Laporte, *Parvamima* Ruckes, *Priapismus* Distant) (Fig. 3).

Em termos de relacionamentos filogenéticos pouco se conhece do posicionamento da subfamília. Gapud (1991) reconheceu Discocephalinae como parte do clado apical "Edessini + (Discocephalinae+Pentatominae 18)" sendo o grupo 'Pentatominae 18' composto pelos gêneros *Arvelius* Spinola, *Chlorocoris* Spinola, *Loxa* Amyot & Serville e *Vulsirea* Spinola (Fig. 2). Ainda, apenas *Eurystethus* Mayr foi utilizado para representar Discocephalinae. Campos & Grazia (2006) recuperaram a monofilia da subfamília ao investigar o status filogenético de Ochlerini, no entanto, os autores utilizaram apenas *Discocephala* Laporte como representante de Discocephalini na análise. Recentemente, com uma amostragem mais representativa da tribo, Roell & Campos (no prelo) investigaram o posicionamento de um novo gênero dentro de Discocephalinae, indicando o parafiletismo de Discocephalini onde *Priapismus* aparece em um clado distinto daquele que reúne os demais discocephalineos, e dentro deste, algumas das relações apontadas em trabalhos de taxonomia clássica são resgatadas.

Poucas foram as tentativas de investigar a monofilia de gêneros de Discocephalini. O gênero *Antiteuchus* foi o primeiro da tribo a ter sua filogenia investigada, resultando no reconhecimento do grupo como monofilético (Fernandes 1998), entretanto estes resultados nunca foram publicados e pelos comentários de Fernandes & Grazia (2006) aparentemente *Callostethus* seria o grupo-irmão do gênero. Barreiro *et al.* (em prep.) investigaram o relacionamento das espécies de *Dryptocephala*, onde a monofilia do gênero é confirmada e *Harpagogaster* Kormilev é sugerido como grupo-irmão de *Dryptocephala*.

Tendo em vista a inexistência de hipóteses filogenéticas para Discocephalini e de dúvidas apontadas a respeito da monofilia da tribo, uma análise cladística abrangente de Discocephalini faz-se necessária. A partir da elaboração de uma hipótese de relacionamento filogenético para os gêneros da tribo será possivel a verificação dos relacionamentos entre os grupos gêneros classicamente tratados como próximos, além da ampliação do conhecimento acerca do relacionamento entre as tribos de Discocephalinae.

OBJETIVOS

Objetivo geral

Trabalhar a sistemática de Discocephalini e apresentar uma hipótese de parentesco para os gêneros da tribo.

Objetivos específicos

- Avaliar a condição sistemática de gêneros de Discocephalini.
- Descrever possíveis novos táxons.
- Elaborar chave ilustrada e diagnoses para os gêneros de Discocephalini.
- Avaliar a monofilia de Discocephalini com base em dados morfológicos.

MATERIAIS E MÉTODOS

Escolha dos táxons

Para o grupo interno de análise foram incluídos pelo menos uma espécie representante de cada gênero de Discocephalini, excluindo-se o gênero fóssil. Para aqueles gêneros com subgêneros descritos (*Dinocoris*, *Eurystethus* e *Oncodochilus*) uma espécie de cada subgênero foi incluída, à exceção de *Oncodochilus*, devido ao não encontro de material seguramente identificado para o subgênero *Oncoeochilus*. Além disso, para outros seis gêneros foram inclusas duas espécies como terminais devido a variações morfológicas, totalizando 49 táxons no grupo interno. Para *Allinocoris* Ruckes, *Anhanga* Distant, *Braunus* Distant e *Glyphuchus* Stål foi possível apenas o acesso a fotos do holótipo.

Para compor o grupo externo de análise, *Cyrtocoris egeris* Packauskas & Schaefer, 1998 (Cyrtocorinae) foi escolhido para a polarização dos caracteres e enraizamento das árvores por ser representante da subfamília mais basal em Pentatomidae segundo as análises de Grazia *et al.* (2008). Ademais foram escolhidos pelo menos um representante de Asopinae, Edessinae, Pentatomine e seis representantes de Ochlerini, totalizando 12 táxons no grupo externo (vide Capítulo 3 – Apêncice 1 para listagem completa de táxons utilizados).

Os espécimes avaliados pertencem as seguintes coleções (siglas seguindo Evenhuis 2015; curadores entre parênteses): AMNH – American Museum of Natural History, Nova Iorque, EUA (Randall Schuh); BPBM – Bishop Museum, Honolulu, EUA (Shepherd P. Myers); BMNH – The Natural History Museum, Londres, Inglaterra (Mick Webb); CAS – California Academy of Sciences, São Francisco, EUA (Norman Penny); CMNH – Carnegie Museum of Natural History, Pittsburgh, EUA (John Rawlins); DBTC – Donald B. Thomas, personal collection, Weslaco, EUA (Donald Thomas); DCMP – Universidade Federal do Paraná, Curitiba, Brasil (Rodney Cavichioli); DARC – David A. Rider Collection, Fargo, USA (David Rider); FIOC – Fundação Instituto Oswaldo Cruz, Rio de Janeiro, Brasil (Jane Costa); INPA – Instituto Nacional de Pesquisas da Amazonia, Manaus, Brasil (José Albertino Rafael); JEE – Joseph E. Eger Collection, Tampa, EUA (Joseph Eger); MCNZ – Museu de Ciências

Naturais da Fundação Zoobotanica do Rio Grande do Sul, Porto Alegre, Brasil (Aline Barcellos); MIZA – Museo del Instituto de Zoología Agrícola, Maracay, Venezuela (Marco Giani); MLPA – Museo de La Plata, La Plata, Argentina (Maria Del Carmen Coscarón); MNHN – Muséum Nationale d'Histoire Naturelle, Paris, França (Eric Guilbert); MNRJ – Museu Nacional, São Cristóvão, Brasil (Gabriel Mejdalani); MPEG – Museu Paraense Emilio Goeldi, Belém, Brasil (Orlando Silveira); NHMW – Naturhistorisches Museum Wien, Viena, Austria (Herbert Zettel); NHRS – Naturhistoriska riksmuseet, Estocolmo, Suíça (Gunvi Lindberg); NMPC – National Museum, Praga, República Checa (Petr Kment); UCRC – Entomology Research Museum, University of California Riverside, EUA; UEMA – Universidade Estadual do Maranhão, São Luís, Brasil (Francisco Oliveira); UFRG – Departamento de Zoologia da Universidade Federal do Rio Grande do Sul, Porto Alegre, Brasil (Jocelia Grazia); UNAM – Universidad Nacional Autonoma de Mexico, Mexico D. F., México (Harry Brailovsky); UNSM – University of Nebraska, State Museum, Lincoln, EUA (Brett Ratcliffe); USNM – National Museum of Natural History, Washington D.C., EUA (Thomas Henry).

Avaliações morfológicas

Para avaliação as estruturas morfológicas e suas variações os espécimes foram observados sob estereomicroscópio equipado com ocular graduada para medições. A investigação das estruturas genitais internas se deu por dissecção da genitália de ambos os sexos, quando disponível. As peças removidas (abdômen de fêmeas e pigóforo de machos) foram diafanizadas em KOH 10% a quente, por até 10 minutos. Após dissecção as estruturas foram lavadas com água desmineralizada, desidratadas com álcool 80% e, quando necessário, coradas com Vermelho Congo ou Clorazol Black. A conservação final foi feita em glicerina líquida.

Fotografias foram feitas para detalhamento de estruturas em estereomicroscópio com equipamento fotográfico Nikon AZ100M acompanhado do *software* Nikon NIS-Elements Ar Microscope Imaging Software. As imagens foram tratadas digitalmente em Adobe Photoshop® CS4.

A terminologia utilizada seguiu Baker (1931) e Dupuis (1970) para morfologia geral de genitália, Becker (1977a) e Becker & Grazia (1995) para morfologia de genitália específica de Discocephalini; Kment & Vilimová (2010) e

Barão *et al.* (em prep.) para estruturas do sistema eferente torácico, e Ruckes (1964, 1966b) para morfologia de tórax de Discocephalini.

Análises filogenéticas

A elaboração de caracteres e estados seguiu Sereno (2007) e a codificação dos estados seguiu o método de polarização e comparação com o grupo externo de Nixon & Carpenter (1993). A matriz foi gerenciada com o programa Mesquite (Maddison & Maddison 2015), e possui 138 caracteres e 62 táxons. Do total de caracteres, 97 são de morfologia geral, sendo três exclusivos de fêmeas e 13 de machos; 19 de genitália de macho e 20 de genitália de fêmea; 111 binários e 27 multiestados.

Para o levantamento das hipóteses de parentesco de Discocephalini os caracteres foram tratados como discretos, não ordenados e com pesos iguais em análises utilizando-se o programa TNT (Goloboff *et al.* 2008). As buscas foram feitas com a matriz de dados completa e excluindo-se o táxon "Thailand". Trata-se de um espécime de Pentatominae incluído na matriz por apresentar semelhanças morfológicas com Discocephalini, no entanto com disponibilidade de um indivíduo fêmea gerando entradas faltantes na matriz.

As árvores foram geradas utilizando-se o programa TNT (Goloboff *et al.* 2008) a partir de buscas heurísticas com o algoritmo TBR, com 599 aleatorizações e100 árvores salvas por aleatorização, para um espaço de 59999 árvores na memória. Foram feitos também os cálculos de consenso estrito, e suporte de Bremer (Bremer 1994) para árvores subótimas com 10 passos adicionais e colapsando os ramos com suporte inferior a 0; e Jackknife com 1000 réplicas, 36% de probabilidade de remoção de caracteres e colapsando ramos com frequência absoluta abaixo de 50. A visualização e mapeamento de sinapomorfias e homoplasias nos cladogramas foi feita com auxílio do programa WinClada 1.00.08 (Nixon 2002), sendo apresentadas e discutidas no cladograma apenas as transformações não ambíguas dos caracteres.

ESTRUTURA DA TESE

Esta tese está organizada em três capítulos, todos escritos em inglês e seguindo a formatação das revistas a que foram e/ou serão submetidos, indicadas no início do capítulo. As informações das revistas, bem como os links para as suas normas de formatação encontram-se no Anexo 1.

O capítulo 1 trata da situação taxonômica do gênero *Braunus* Distant, 1899 que conhecido de duas fêmeas de *B. sciocorinus* (Walker, 1867) fazia parte de Discocephalini. Com a obtenção de fotos do holótipo foi possível além da percepção de que *Braunus* não pertencia a Discocephalini (utilizando-se por base os caracteres diagnósticos reconhecidos até então), o reconhecimento de que *Braunus* e *Lojus* McDonald, 1982 (Pentatominae – Carpocorini) são sinônimos. Utilizando-se dessas justificativas, *Braunus* é revisado, redescrito e transferido para Carpocorini (Pentatominae), e *Lojus* sinonimizado a este. Além disso, três novas espécies são descritas para o gênero. Este capítulo encontra-se aceito para publicação na Zootaxa.

O capítulo 2 apresenta uma chave de identificação ilustrada bem como diagnoses para os 41 gêneros atuais de Discocephalini. A chave contém um passo inicial para separar os discocephalíneos pertencentes a Ochlerini dos não-Ochlerini. Optou-se por fazer a chave para todos os gêneros classicamente incluídos em Discocephalini pois muitos destes foram pouco mencionados na literatura ao longo dos anos, e a maioria está pouco representada em coleções científicas. Também é estabelecida nesse capítulo a sinonímia de *Allinocoris* Ruckes, 1966 a *Uncicrus* Ruckes, 1966.

No capítulo 3 a monofilia de Discocephalini é investigada por meio de metodologia cladística utilizando-se de dados morfológicos. A matriz de 62 táxons e 138 caracteres foi analisada utilizando-se do método de parcimônia. As análises foram conduzidas com matrizes completas e excluindo-se um táxon de grupo externo da Tailândia que apresenta características morfológicas semelhantes aos discocephalineos, mas está disponível apenas um espécime fêmea. As análises recuperam um clado que reúne a maioria dos gêneros de Discocephalini, a exceção de quatro gêneros. O relacionamento dos gêneros que se mantêm em Discocephalini é discutido.

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CAPÍTULO 1

Normas editoriais: *Zootaxa* (Anexo 1).
Situação: Aceito para publicação

Unusual looking pentatomids: reassessing the taxonomy of Braunus Distant and Lojus McDonald (Heteroptera: Pentatomidae)

KIM RIBEIRO BARÃO[1]*, THEREZA DE ALMEIDA GARBELOTTO[1]*, LUIZ ALEXANDRE CAMPOS[1] & JOCELIA GRAZIA[1]

[1] *Programa de Pós-Graduação em Biologia Animal & Departamento de Zoologia, Universidade Federal do Rio Grande do Sul, Av. Bento Gonçalves 9500, Porto Alegre, Rio Grande do Sul, Brazil 91501-970. Emails: kbarao@yahoo.com.br; therezagarbelotto@hotmail.com; luiz.campos@ufrgs.br; jocelia@ufrgs.br*

** Contributed equally to this work*

Abstract

The Neotropical genus *Braunus* Distant is revised. Based on general morphology, *Braunus* is transferred to the Pentatominae and *Lojus* is proposed as a junior synonym of *Braunus*. The male and female genitalia of *Braunus sciocorinus* (Walker) are described for the first time. Three new species from the Peruvian and Bolivian Andes and from Colombia are described, *Braunus machadoi* Barão & Garbelotto **sp. nov.** (Holotype male deposited in AMNH: Peru, Cuzco, 01.XII.2011, C. Weirauch leg.), *Braunus gibbus* Garbelotto & Barão **sp. nov.** (Holotype female deposited in AMNH: Bolivia, Santa Cruz, Prov. Caballero, 15–21.X.2001, S. Spector & J. Ledezma leg.), and *Braunus prionotus* Barão & Garbelotto **sp. nov.** (Holotype female deposited in MNHN: Colombia, VII.1974, Steinheil leg.), respectively. Also, we describe the internal male and female genitalia of *Braunus ocellatus* (Thomas) **comb. nov.** A key to species and comments on subfamilial and tribal placements and on wing polymorphism are provided.

Keywords. Andean Region, brachyptery, Discocephalinae, Pentatominae

Introduction

Braunus was described by Distant (1899), in the Discocephalinae (Pentatomidae), to include *Coriplatus sciocorinus* Walker, 1867, known only from two female specimens. Since the work of Distant (1899) and Walker (1867), other references to *Braunus* and *C. sciocorinus* in the literature have been restricted to catalogs and lists (Kirkaldy 1909), and *Braunus* has remained monotypic until now. Analyzing photographs of the type material of *B. sciocorinus* and other specimens from Ecuador allowed us to recognize that *Braunus* does not have diagnostic characteristics of the Discocephalinae (see Rolston & McDonald 1979 and Rolston 1981).

Observation of specimens of both sexes of *B. sciocorinus* and a preliminary study of type specimens of *Lojus* McDonald, 1982 allowed us to identify a series of shared characteristics between *Lojus* and *Braunus*, both of general and genital morphology. McDonald (1982: 327) described *Lojus asperus*, as "an unusual looking pentatomid [...] strongly corrugated and pitted on the dorsal surface and has a simple and very reduced metasternal scent gland opening [...]". Subsequently, four other species have been described in the genus: *L. bordoni* Brailovsky & Rolston, 1986, *L. brettlizorum* Thomas, 1997, *L. ateuchus* Thomas, 1997, and *L. ocellatus* Thomas, 2001.

Here *Braunus* is revised, with *Lojus* being proposed as its junior synonym. Three new species are described and fully illustrated: *Braunus machadoi* **sp. nov.**, from Peru, *Braunus gibbus* **sp. nov.**, from Bolivia, and *Braunus prionotus* **sp. nov.**, from Colombia. The so far unknown internal male and female genitalia of *Braunus ocellatus* (Thomas) **comb. nov.** and *B. sciocorinus* are described as well. The main generic characters are illustrated, a key to all species is provided, and species distributions are mapped. Based on general morphology and on the available diagnoses of Pentatomidae subfamilies, we transfer *Braunus* to the Pentatominae and tentatively place it within the Carpocorini.

Material and methods

Specimens were photographed with a Leica Z16 APO and pictures stacked with the software Leica Application Suite. Genitalia were prepared with 10% KOH, in room temperature for six hours, and stained with Chlorazol Black, for 30 s. Line drawings were made with a vectorial image processor on the pictures taken and checked under

light microscopy. Measurements [mean ± standard deviation (minimum–maximum)], given in millimeters, were taken using micrometer eyepiece only for species/specimens not measured elsewhere. Species distribution were retrieved from collecting labels and mapped on Quantum GIS Lisboa software, overlapping the species georeferenced occurrence points on the Blue Marble Earth's image by NASA's Earth Observatory. When GPS coordinates were not available, only unambiguous localities were georeferenced to the geodetic center of the city based on online global gazetteers.

Morphological terminology for the external scent efferent system of the metathoracic gland follows Kment & Vilímová (2010), and for genital terminology, Baker (1931) and Dupuis (1970). Therefore, the phallus terminology used by McDonald (1982) and Thomas (1997) is reinterpreted as follows: phallotheca (in McDonald as theca); ventral processes of conjunctiva (in McDonald as conjunctival appendages; in Thomas as thecal appendages); laterodorsal processes of conjunctiva (in McDonald as thecal processes; in Thomas as conjunctival appendages); vesica (in McDonald and Thomas as median penial lobes); ductus seminis distalis (in McDonald as ejaculatory duct). Species of this genus are similar in color and general morphology, but differ in their external male and female genitalia. Therefore, in order to avoid repetitions a detailed description of the genus is provided, but the species descriptions are short and focus on the diagnostic characters of each species.

The following collections (curators within parenthesis) are depositories for specimens studied here:

AMNH – American Museum of Natural History, United States (Randall Schuh);
BMNH – The Natural History Museum, England (Mick Webb);
CMNH – Carnegie Museum of Natural History, United States (John Rawlins);
DBTC – Donald B. Thomas, personal collection, United States (Donald Thomas);
MNHN – Muséum Nationale d'Histoire Naturelle, France (Eric Guilbert);
NMPC – National Museum, Czech Republic (Petr Kment);
UCRC – Entomology Research Museum, University of California Riverside, United States;
UNAM – Universidad Nacional Autónoma de México, México (Harry Brailovsky);
UNSM – University of Nebraska, State Museum, United States (Brett Ratcliffe);
USNM – National Museum of Natural History, United States (Thomas Henry).

Taxonomy

Braunus Distant, 1899

Braunus Distant, 1899: 422–423; Kirkaldy, 1909: 220.
Lojus McDonald, 1982: 327. **syn. nov.**

Type species. *Braunus*: *Coriplatus sciocorinus* Walker, 1867, by monotypy. *Lojus*: *Lojus asperus* McDonald, 1982, by original designation.

Diagnosis. Mandibular plates widely triangular apically, at least as long as clypeus. Costal margin of each forewing with a basal process. Peritreme of the metathoracic gland obsolete; mesial margin of each ostiole bordered by a globoid tubercle. Abdominal sternite III projected over abdominal sternite IV ventro-medially. Male genitalia: dorsal rim of pygophore concave with 1+1 trapezoidal expansions laterad to segment X; segment X rectangular. Female genitalia: sutural margin of each gonocoxite 8 parallel basally, usually juxtaposed, and divergent apically.

Description. Brown to dark-brown or mottled brown and ivory; legs dark-brown or yellowish with brown, circular spots; dorsal and ventral surfaces of connexivum light brown medially. Integument strongly corrugated dorsally. Head longer than wide; mandibular plates equal to or longer than clypeus, but usually not meeting anterior to clypeus, widely triangular apically; anterior margin of each bucculae triangular, each posterior margin tapering towards base of head; ocelli from rudimentary to well-developed; antennae five-segmented; labium arising before anterior margin of eyes, attaining from hind coxae to abdominal sternite III. Anterior angles of pronotum obtuse or acutely projected; anterolateral margins smooth or with spine-like tubercles; humeral angles strongly projected laterad or anteriad, each with a single process or quadrate with two or more processes marginally; posterolateral margin each with or without a median tubercle and indentation; posterior margin straight to strongly concave; cicatrices swollen (Figs 1–11). Scutellum foveate in basal angles. Costal margin of each forewing with an obtuse process basally; radial vein calloused or not apically; membranal veins coarse and reticulated; length of corium and membrane variable (Figs 14–15, 56–57). Peritreme of metasternal gland obsolete; mesial margin of ostiole bordered by a rounded process; evaporatorium concolorous with pleural color pattern, reaching halfway to lateral metapleural margin and to the posterior margin of mesopleura (Figs 17, 51, 59). Posterolateral angles of abdominal sternites each projected posterolaterally, obtuse

apically. Median portion of abdominal sternite III projected onto base of abdominal sternite IV.

Male genitalia. Pygophore sub-quadrate (Figs 18–23, 38–43, 60–65). Dorsal rim concave with 1+1 trapezoidal projections laterally to segment X. Segment X rectangular (Figs 25, 67). Parameres F-shaped (Figs 24, 66), placed laterad to segment X. Inferior layer of ventral rim uniformly excavated or emarginated; superior layer of ventral rim depressed medially. Apical margin of phallotheca with a membranous thecal shield (Figs 26–31, 68–73; *ts*). Ventral and laterodorsal conjunctival processes present, ventral hatchet-like.

Female genitalia (Figs 32–33, 46–47, 52–53, 74–75)**. S**utural margins of gonocoxites 8 each parallel basally, usually juxtaposed, and divergent apically. Gonapophyses 8 visible, usually carinated medially. Spiracle of laterotergites 8 visible, placed posterior to lateral angle of each gonocoxite 8. Gonocoxites 9 rectangular or trapezoidal. Laterotergites 9 basally depressed, rounded apically. Segment X rectangular.

Distribution. Central America: Costa Rica. South America: Venezuela, Colombia, Ecuador, Peru and Bolivia (Figs 78–82).

Remarks. McDonald (1982) related *Braunus* [sic *Lojus*] to *Berecynthus* Stål, 1862, *Padaeus* Stål, 1862, and *Proxys* Spinola, 1837 based on the shape of metasternal gland (MG) peritreme and projections on the anterolateral margins of pronotum. However, while the MG peritreme is obsolete in *Braunus*, it is fully developed, spout-shaped on *Berecynthus*, *Padaeus* and *Proxys*. Similarly, the anterolateral margins of the pronotum are armed with finger-like process in *Braunus* and *Berecynthus*, whereas smooth in *Padaeus* and *Proxys*. The corrugate dorsal appearance, brachyptery, obsolete MG peritreme, and genitalia structure of *Braunus* is similar to *Pentatomiana* Grazia & Barcellos, 2004, as noted by Grazia & Barcellos (2004).

Key to species of *Braunus* Distant, 1899

1. Lateral margin of each mandibular plate denticulate (Fig. 50); humeral angles of pronotum projected anteriad, each with multiple processes (Figs 6, 48); apex of scutellum explanate (Fig. 48) … *B. prionotus* Barão & Garbelotto **sp. nov.**
1’. Lateral margin of each mandibular plate smooth; humeral angles of pronotum projected laterad, each with 1–4 processes (Figs 1–5, 7–11); apex of scutellum smooth

… 2

2(1). Anterolateral margins of pronotum smooth, except for a weak tubercle at each anterior angle; humeral angles of pronotum each with single digitoid process at apex (Fig. 8) … *B. ateuchus* (Thomas) **comb. nov.**

2'. Anterolateral margins of pronotum each with spine-like tubercles; humeral angles of pronotum each with two or more processes apically (Figs 1–5, 7, 9–11) … 3

3(2'). Anterior angles of pronotum each with a spine-like tubercle surpassing the lateral margin of each compound eye in dorsal view (Figs 1–4, 7) … 4

3'. Anterior angles of pronotum each with a spine-like tubercle not surpassing the lateral margin of each compound eye in dorsal view (Figs 5, 9–11) … 6

4(3). Head uniformly dark brown dorsally; posterolateral margins of pronotum sinuated, each with median indentation (Figs 1–3); internal margin of each pronotal cicatrix with white spot … *B. sciocorinus* (Walker) (Figs 12–13)

4'. Head uniformly castaneous dorsally; posterolateral margins of pronotum sinuated, each with tubercle and indentation medially (Figs 4, 7); internal margin of each pronotal cicatrix concolorous with remainder of pronotum … 5

5(4'). Outline of each mandibular plate black dorsally; anterolateral margins of pronotum each with stout tubercles; each humeral angle trilobed apically; posterior margin of pronotum slightly concave (Fig. 4); abdomen dark brown ventrally with 1+1 yellowish bands mediolaterally … *B. machadoi* Barão & Garbelotto **sp. nov.** (Figs 36–37)

5'. Outline of each mandibular plate concolorous with remainder of head; anterolateral margins of pronotum each with small tubercles; each humeral angle singled lobed apically; posterior margin of pronotum straight (Fig. 7); abdomen uniformly reddish-brown ventrally … *B. asperus* (McDonald) **comb. nov.**

6(3'). Tubercles on each anterolateral margin of pronotum obtuse; humeral angles of pronotum each with two processes apically, one anteriorly and one posteriorly (Fig. 10) … *B. brettlizorum* (Thomas) **comb. nov.**

6'. Tubercles on each anterolateral margin of pronotum acute; humeral angles of pronotum each with three processes apically, two anterior and one posterior (Figs 5, 9, 11)… 7

7(6'). Ocelli absent; apex of each hemelytral radial vein not calloused; inferior layer of ventral rim of pygophore smooth … *B. bordoni* (Brailovsky & Rolston) **comb. nov.**

7'. Ocelli present; apex of each hemelytral radial vein calloused; inferior layer of ventral

rim of pygophore projected medially (except *B. gibbus* Garbelotto & Barão **sp. nov.**, male unknown) … 8

8(7'). Dark brown dorsally; abdomen uniformly dark brown ventrally; anterior lobe of pronotum as long as posterior lobe of pronotum (Fig. 11) … *B. ocellatus* (Thomas) **comb. nov.** (Figs 54–55)

8'. Light brown to yellowish dorsally; abdomen dark brown ventrally with 1+1 yellowish bands mediolaterally; anterior lobe of pronotum shorter than posterior lobe of pronotum (Fig. 5) … *B. gibbus* Garbelotto & Barão **sp. nov.** (Figs 44–45)

***Braunus sciocorinus* (Walker, 1867)**

(Figures 1–3, 12–35, 78–79)

Coriplatus sciocorinus Walker, 1867: 197–198.

Braunus sciocorinus: Distant, 1899: 423; Kirkaldy, 1909: 220.

Material examined. Lectotype f#, [ECUADOR, Napo], Archidona (BMNH), here designated. Paralectotype f# [ECUADOR, Napo], Archidona (BMNH), here designated. 1f#, ECUADOR, Pichincha, Bellavista Cloud Forest Reserve, 0°00'55"N 78°40'49"W, 2200–2300 m, tropical cloud forest, M.V. light, 24–28.VII.2007, CPDT Gillet leg. (BMNH); 3m#, 4f#, ECUADOR, Napo, Yanayacu Biological Station, 2144 m, 0.60°S 77.89°W, 24–30.XI.2009, D. Forero leg. [EC09_L1] (1m# 1f# UCRC; 1m# 1f# USNM; 1m# 2 f# MNRJ).

Diagnosis. Head dark brown dorsally (Figs 12–13). Anterior angles of pronotum each with a stout, spine-like tubercle, surpassing lateral margins of each compound eye; anterolateral margins each with 1–2 small tubercles; each humeral angle bilobed apically, anterior lobe with 2–3 processes; posterior margin weakly concave (Figs 1–3). Apex of hemelytral radial vein calloused; corium ivory, reaching anterior margin of abdominal segment VI; membrane reaching anterior margin of abdominal segment VIII on females (Fig. 15) and surpassing abdominal apex on males (Fig. 14). Male genitalia: posterolateral angles of pygophore rounded; inferior layer of ventral rim weakly emarginate, with a bilobed projection medially; parameres acute apically (Figs 18–24). Female genitalia: posterior margin of each gonocoxite 8 rectilinear; posterior margin of each laterotergite 8 acute; laterotergites 9 digitiform (Figs 32–35).

Male genitalia. Dorsal rim concave with 1+1 trapezoidal projections laterally to

segment X (Figs 18–19; *dr*). Inferior layer of ventral rim projected posteriorly, bilobed apically (Figs 20–23; *vr*). Superior layer of ventral rim depressed medially (Figs 18–21; *sl*). Posterolateral angles rounded, bearing setae (Figs 18–19; *pa*). Abdominal segment X rectangular (Figs 18–19, 25; *X*). Parameres F-shaped; head of paramere blade-like, acute apically; in lateral view, paramere with a rounded, median process bearing setae (Figs 18–21, 24; *par*). Phallus: limit between sclerotized and membranous area of phallotheca sinuous (Figs 28–29; *ph*). Ventral conjunctival processes curved toward vesica apically, its dorsal surface concave (Figs 26–31; v*cp*). Laterodorsal conjunctival processes each digitiform, membranous, shorter than vesica (Figs 28–29; *lcp*). Vesica cup-like, projected dorsally; dorsal margin strongly sclerotized and emarginated medially (Figs 28–31; *v*). Ductus seminis distalis curved ventrally, originating from central part of vesica (Figs 30–31; *ds*). Process of gonopore bilobed apically.

Female genitalia. Gonocoxites 8 longer than wide; each sutural margin parallel basally, sinuous and divergent apically; sutural margins setose, setae covering gonapophyses 8; posterior margins rectilinear (Figs 32–33; *gc8*). Gonapophyses 8 visible, subtriangular, carinated medially (Figs 32–33; *g8*). Laterotergites 8 triangular, each longer than wide; posterior margin acute, surpassing tergite 8 (Figs 32–33; *la8*). Gonocoxites 9 trapezoidal, each with 1+1 tufts of long setae on its disc (Figs 32–35; *gc9*). Laterotergites 9 depressed basally; lateral margins concave; apices rounded, each barely surpassing tergite 8 (Figs 32–33; *la9*). Segment X rectangular (Figs 32–33; *X*). Gonapophyses 9 with 1+1 lateral sclerotized areas placed along with chitinellipsen (Figs 34–35; *ch*) and 1+1 lateral folds partially covering chitinellipsen (Figs 34–35; *lf*). Chitinellipsen elliptical (Figs 34–35; *ch*). Thickening of vaginal intima circular with an anterior subtriangular projection (Figs 34–35; *tvi*). Median duct of vesicular area sinuous at base (Figs 34–35; *md*). Capsula seminalis with three finger-like processes (Figs 34–35; *cs*).

Measurements. Total length, 9.6±0.42 (8.4–11.5); head length, 2.2 ± 0.05 (2.1–2.5); head width, 1.6 ± 0.04 (1.5–1.8); length of pronotum, 1.9 ± 0.06 (1.8–2.3); width of pronotum at base, 4.3 ± 0.16 (3.7–5.1); maximum width of pronotum at humeral angle, 5.0 ± 0.18 (4.5–6.0); length of scutellum, 3.0 ± 0.11 (2.6–3.5); width of scutellum, 2.8 ± 0.10 (2.5–3.3); width of abdomen across third segment, 5.5 ± 0.13 (5.0–5.8).

Distribution. Ecuador (Napo, Pichincha) (Figs 78–79).

***Braunus machadoi* Barão & Garbelotto sp. nov.**

(Figures 4, 36–43, 78, 80)

Material examined. Holotype m#, PERU, Cuzco, Wayqecha Research Center, 2921 m, 13°10’21”S 71°34’53”W, 1.XII.2011, C. Weirauch leg., P11L32 sweep/beat (AMNH).

Diagnosis. Head light castaneous dorsally; outline of each mandibular plate black. Each anterior angle of pronotum with a stout, spine-like tubercle, barely surpassing lateral margin of each compound eye; each anterolateral margin with stout tubercles; each humeral angle bilobed apically, with two processes anteriorly and one process posteriorly; each posterolateral margin sinuated, with a median tubercle; posterior margin weakly concave (Fig. 4). Apex of hemelytral radial vein calloused; corium reaching abdominal segment VII. Male genitalia: posterolateral angles of pygophore quadrate; inferior layer of ventral rim strongly emarginated, with bilobed projection medially; parameres rounded apically (Figs 38–43).

Description. Body color mottled dark brown and yellowish, predominantly yellowish dorsally and dark brown ventrally; head yellowish, outline of each mandibular plate black dorsally; labial apex brown; anterior and posterior margins of each connexival segment black, yellow medially; legs yellowish with brown spots (Figs 36–37). Mandibular plates longer than clypeus. Proportion of antennal segments: I=II<III=IV<V. Labial apex attaining posterior margin of metasternum. Spiny projection at each anterior angle of pronotum directed anterolaterad, barely exceeding lateral limit of each compound eye. Anterolateral margins of pronotum each bearing 2+2 well-produced, finger-like tubercles; each humeral angle bilobed apically, with two processes anteriorly and one process posteriorly; posterolateral margins sinuate, each with a median tubercle; pronotal disc calloused between cicatrices; cicatrices swollen (Fig. 4). Scutellum reaching posterior margin of abdominal segment VI; lateral margins of scutellum each with shallow excavation; scutellum swollen longitudinally, medially; postfrenal lobe about 1/3 of length of frenal lobe. Corium longer than scutellum, reaching anterior margin of abdominal segment VII; hemelytral membrane surpassing apex of abdomen; veins coarse, reticulate. Hind wings reduced. Mesosternum with median carina slightly elevated. Metasternum with shallow median furrow.

Male genitalia. Dorsal rim concave with 1+1 flap-like projections laterally to segment X (Figs 38–39; *dr*). Each posterolateral angle quadrate bearing tufts of setae (Figs 38–39; *pa*). Inferior layer of ventral rim projected posteriorly, bilobed apically

(Figs 42–43; *vr*); superior layer of ventral rim depressed medially (Figs 38–41; *sl*). Segment X rectangular (Figs 38–41; *X*). Parameres F-shaped; paramere head blade-like, rounded apically; in lateral view, with a rounded, median process (Fig. 41; *par*).

Measurements. Total length, 7.8; head length, 2.1; head width, 1.4; length of pronotum, 1.6; width of pronotum at base, 4.0; maximum width of pronotum at humeral angle, 5.2; length of scutellum, 2.7; width of scutellum, 2.7; width of abdomen across third segment, 5.1.

Etymology. *machadoi*, genitive singular; named after Angelo B. M. Machado on the occasion of his 80th birthday.

Distribution. Peru (Cuzco) (Figs 78, 80).

Remarks. Female unknown.

***Braunus gibbus* Garbelotto & Barão sp. nov.**

(Figures 5, 44–47, 78)

Material examined. Holotype f#, BOLIVIA, Depart. Santa Cruz, Prov. Caballero, PN Amboro, 17°50.8'S 64°23.23'W, 2050 m, 15–21.X.2001, S. Spector & J. Ledezma leg., general hand collecting, COBIMI 0003905 (AMNH).

Diagnosis. Head yellowish dorsally. Each anterior angle of pronotum with an acute process; each anterolateral margin with three small tubercles; posterior lobe of pronotum twice as long as the anterior lobe; humeral angles directed anterolaterad (Fig. 5). Apex of hemelytral radial vein calloused; corium reaching abdominal segment VI. Abdomen dark brown with 1+1 yellowish lines ventrally. Female genitalia: posterior margin of each gonocoxite 8 concave; posterior margin of each laterotergite 8 acute; laterotergites 9 triangular (Figs 46–47).

Description. Body color mottled dark-yellowish and brown, predominantly yellowish dorsally and abdomen dark brown with 1+1 yellowish lines ventrally; head yellowish; labial apex brown (Figs 44–45). Mandibular plates longer than clypeus. Proportion of antennal segments: I=II<III=IV<V. Labial apex attaining abdominal sternite III. Processes at anterior angles of pronotum each directed anteriorly, acute apically, barely reaching posterior margin of each compound eye. Anterolateral margins of pronotum each with 3+3 little-produced, finger-like tubercles; each humeral angle bilobed apically, with two processes anteriorly and one process posterolaterally; posterolateral margins sinuate; pronotal disc calloused between cicatrices (Fig. 5).

Scutellum reaching posterior margin of abdominal segment V; lateral margins of scutellum each with shallow excavation; scutellum swollen longitudinally, medially; postfrenal lobe about 1/2 of length of frenal lobe. Hemelytral corium reaching posterior margin of abdominal segment VI; membrane slightly surpassing abdominal apex, veins coarse and reticulate. Hind wings reduced. Mesosternum with median carina slightly elevated. Metasternum with shallow median furrow.

Female genitalia. Gonocoxites 8 longer than wide; each sutural margin parallel and juxtaposed at 1/3 basal portion, widely separated and sinuous on remaining 2/3; posterior margins concave (Figs 46–47; *gc8*). Gonapophyses 8 visible, subtriangular, with median carina (Figs 46–47; *g8*). Laterotergites 8 triangular, longer than wide; each posterior margin acute, reaching to posterior margins of tergite 8 (Figs 46–47; *la8*). Gonocoxites 9 trapezoidal, with median sulcus (Figs 46–47; *gc9*). Each laterotergites 9 triangular, strongly depressed basally, apices rounded, reaching to posterior margin of tergite 8 (Figs 46–47; *la9*). Segment X subtriangular (Figs 46–47; *X*).

Measurements. Total length, 10.0; head length, 2.0; head width, 1.4; length of pronotum, 2.2; width of pronotum at base, 5.1; maximum width of pronotum at humeral angle, 7.0; length of scutellum, 3.4; width of scutellum, 3.3; width of abdomen across third segment, 5.4.

Etymology. *gibbus* (m.), from the Latin, meaning humped, in reference to the enlarged pronotum.

Distribution. Bolivia (Santa Cruz) (Fig. 78).

Remarks. Male unknown.

***Braunus prionotus* Barão & Garbelotto sp. nov.**

(Figures 48–53)

Material examined. Holotype f#, COLOMBIA, VII.1974, Steinheil leg. (MNHN).

Diagnosis. Lateral margins of mandibular plates denticulate (Fig. 48, 50). Anterior angle of pronotum with an obtuse process; anterolateral margins with two small tubercles; humeral angles directed anteriad, each with multiple tubercles (Fig. 6, 48). Apex of hemelytral radial vein calloused; corium reaching abdominal segment VI. Apex of scutellum reflexed laterally. Female genitalia: gonocoxites 8 wider than long; posterior margin of each gonocoxite 8 concave; posterior margin of each laterotergite 8 obtuse; posterior margin of gonocoxites 9 concave (Figs 52–53).

Description. Body color dark brown (Figs 48–49). Mandibular plates longer than clypeus; lateral margins denticulate (Fig. 48). Proportion of antennal segments: I<II=IV<III (antennal segment V missing). Labial apex attaining abdominal sternite IV (Fig. 49). Processes at anterior angles of pronotum each directed laterally, obtuse apically, not reaching posterior margins of compound eyes. Anterolateral margins of pronotum each bearing 2+2 little-produced, finger-like tubercles; humeral angles projected anteriad, each with multiple processes; each posterolateral margin sinuate; pronotal disc calloused between cicatrices (Fig. 6). Scutellum reaching posterior margin of abdominal segment VI; scutellum swollen longitudinally, medially; postfrenal lobe about 1/2 of length of frenal lobe; apex of scutellum reflexed laterally. Hemelytral corium reaching abdominal segment VI; radial vein calloused apically; membrane reduced, not surpassing abdominal segment VI, veins absent. Hind wings reduced.

Female genitalia. Gonocoxites 8 wider than long; each sutural margin parallel and juxtaposed at 1/3 basal portion, widely separated and concave on the remaining 2/3; posterior margins concave (Figs 52–53; *gc8*). Gonapophyses 8 visible, subtriangular, with median carina (Figs 52–53; *g8*). Laterotergites 8 triangular, longer than wide, each posterior margin obtuse, surpassing tergite 8 (Figs 52–53; *la8*). Gonocoxites 9 trapezoidal, posterior margin convex (Figs 52–53; *gc9*). Laterotergites 9 finger-like, each strongly depressed basally; apices rounded, each barely surpassing posterior margin of tergite 8 (Figs 52–53; *la9*). Segment X subrectangular (Figs 52–53; *X*).

Measurements. Total length, 11.3; head length, 3.0; head width, 2.9; length of pronotum, 2.4; width of pronotum at base, 5.1; maximum width of pronotum at humeral angle, 5.8; length of scutellum, 3.6; width of scutellum, 4.0; width of abdomen across third segment, 6.8.**Etymology.** *prionotus*, from the Greek, *prionotos*, meaning denticulate, serrate, in reference to the unique characteristic of the lateral margins of mandibular plates and humeral angles.

Distribution. Colombia.

Remarks. Male unknown.

***Braunus asperus* (McDonald, 1982) comb. nov.**

(Figures 7, 78)

Lojus asperus McDonald, 1982: 327–329, figs 1–9; Thomas, 1997: 572.

Material examined. Holotype m#, ECUADOR, Loja a Zamora, 1800 m, 26–27.XI.1970, L.E. Pena leg. (USNM).

Diagnosis. Body color mottled yellowish and brown; predominantly yellowish dorsally and brown ventrally. Each anterior angle of pronotum with a slender spine-like projection, surpassing the lateral margin of each compound eye; anterolateral margins strongly concave, each bearing 3+3 spine-like processes; humeral angles truncate apically, each with a finger-like process directed posteriorly; posterolateral margins sinuate, each with a tubercle medially; posterior margin straight (Fig. 7). Apex of scutellum reaching abdominal segment VII. Apex of hemelytral radial vein calloused; corium reaching posterior margin of abdominal segment VII; membrane surpassing apex of abdomen. Male genitalia: each posterolateral angle of pygophore rounded; ventral rim sinuous, inferior layer of ventral rim emarginate with one projection medially. Phallus: lateroventral conjunctival processes each digitiform; ductus seminis distalis dorsally curved.

Distribution. Ecuador (Loja, Zamora) (Fig. 78).

Remarks. Female unknown.

***Braunus ateuchus* (Thomas, 1997) comb. nov.**

(Figures 8, 78)

Lojus ateuchus Thomas, 1997: 572, figs 6–7.

Material examined. Holotype f#, ECUADOR, Pichincha, Palmeras, 1.V.1987, L.D. Sanchez leg. (CMNH).

Diagnosis. Body color dark brown with yellowish spots on corium and connexival segments. Anterior angles of pronotum each with small, rounded projection; each anterolateral margin unarmed; humeral angles projecting laterad, each with single, digitoid process at apex; posterior margin straight (Fig. 8). Apex of scutellum reaching abdominal segment V. Apex of hemelytral radial vein calloused; corium reaching abdominal segment V; membrane reaching abdominal segment VII. Hind wings reduced. Female genitalia: sutural margin of each gonocoxite 8 divergent basally and distally, parallel medially; posterior margin of each gonocoxite 8 straight; lateral margins of each laterotergite 8 sinuous; laterotergites 9 quadrate.

Distribution. Ecuador (Pichincha) (Fig. 78).

Remarks. Male unknown.

***Braunus bordoni* (Brailovsky & Rolston, 1986) comb. nov.**

(Figures 9, 78)

Lojus bordoni Brailovsky & Rolston, 1986: 31, 33–35, figs 1–3; Thomas, 1997: 572.

Material examined. Holotype m#, VENEZUELA, Táchira, La Grilla, 2400m, 16.III.1983, C. Bordon leg. (UNAM).

Diagnosis. Body color dark brown with yellowish spots on corium and connexival segments. Anterior angles of pronotum each with an obtuse projection; humeral angles quadrate, projecting laterad, each with single, small, obtuse process apically; posterior margin strongly concave (Fig. 9). Apex of scutellum reaching anterior margin of abdominal segment VII. Apex of hemelytral radial vein not calloused; corium reaching abdominal segment VI. Male genitalia: inferior layer of ventral rim of pygophore deeply excavated, without projections medially.

Distribution. Venezuela (Tachira) (Fig. 78).

Remarks. Female unknown.

***Braunus brettlizorum* (Thomas, 1997) comb. nov.**

(Figures 10, 78)

Lojus brettlizorum Thomas, 1997: 570–572, figs 1–5, 8.

Material examined. Holotype m#, COSTA RICA, Cartago, Ref. Nac. Tapanti, 9°42’N 83°46’W, 20–21.V.1995, 4200 ft, B. Ratcliffe & M. Jameson leg. (UNSM). Paratypes 1 m#, 1f#: same label data as holotype (DBTC).

Diagnosis. Body color dark brown. Anterior angles of pronotum each with small, inconspicuous, obtuse projection; each anterolateral margin serrated; humeral angles projecting laterad, each bilobed apically, lobes acute; posterior margin of pronotum concave (Fig. 10). Apex of scutellum reaching anterior margin of abdominal segment VII on males and anterior margin of abdominal segment VI on females. Apex of hemelytral radial vein calloused; corium reaching posterior margin of abdominal segment VI; membranal veins linear, not reticulated; membrane fully developed on males, surpassing abdominal apex, and reduced to a thin stripe on females. Male

genitalia: inferior layer of ventral rim of pygophore emarginated, with two small projections medially. Phallus: limit of sclerotized and membranous area of phallotheca straight. Each lateroventral conjunctival process hatchet-like, strongly sclerotized. Vesica cup-like ventrally. Process of gonopore bilobed apically. Female genitalia: sutural margins of each gonocoxite 8 parallel basally, divergent and straight apically; posterior margins of each gonocoxite 8 and laterotergite 8 straight; laterotergites 9 digitiform.

Distribution. Costa Rica (Cartago) (Fig. 78).

***Braunus ocellatus* (Thomas, 2001) comb. nov.**

(Figures 11, 54–79, 81–82)

Lojus ocellatus Thomas, 2001: 854–857, figs 1–4.

Material examined. Holotype m#, ECUADOR, Napo, Cabañas San Isidro, 2 km NW Cosanga, 0°40’S 77°55’W, 22–30.I.1996, T.J. Henry leg. (USNM). Paratype f#, same label data as holotype (DBTC). Paratype m#, ECUADOR, Napo, CabañasSan Isidro, 2 km NW Cosanga, 0°33’S 77°55’W, 20–23.VII.1998, 2150 m, premontaine rain forest, Ratcliffe, Jameson, Smith and Villatoro leg. (UNSM). Additional material examined. 3 m# 3 f#, ECUADOR, Napo, Yanayacu Biological Station, 2144 m, 0.60°S 77.89°W, 24–30.XI.2009, D. Forero leg. [EC09_L1] (1m# 1f# UCRC; 1m# 1f# USNM; 1m# 1f# MNRJ); 1f#, ECUADOR, Napo, 1.3 km SW of Baeza, 2050 m, 00°28’34”S 77°53’47”W, 11.XI.2006, J. Skuhrovec leg. (NMPC).

Diagnosis. Body color light brown (Figs 54–55). Anterior angles of pronotum each with obtuse projection; each anterolateral margin with three small spines, not evenly distributed; humeral angles quadrate, each with bilobed apex, anterior lobe with 1–2 spines and posterior lobe with a digitoid process; posterior margin weakly concave (Fig. 11). Apex of scutellum reaching abdominal segment V. Apex of hemelytral radial vein calloused; corium reaching abdominal segment VI; membrane reaching anterior margin of abdominal segment VII on females (Fig. 57) and surpassing abdominal apex on males (Fig. 56). Male genitalia: posterolateral angles obtuse; inferior layer of ventral rim emarginate with one projection medially (Figs 60–65). Female genitalia: posterior margin of each gonocoxite 8 concave; posterior margin of each laterotergite 8 acute; lateral margin of each laterotergite 9 straight (Figs 74–75).

Male genitalia. Dorsal rim sinuous (Figs 60–61; *dr*). Posterolateral angles obtuse (Figs 60–61; *pa*). Inferior layer of ventral rim with median projection (Figs 64–65; *vr*); superior layer of ventral rim depressed medially (Figs 62–63; *sl*). Segment X rectangular (Figs 62–63, 67; *X*). Parameres F-shaped, apex acute dorsally and ventrally; basal process rounded bearing setal tuft (Figs 60–63, 66; *par*). Phallus: limit of sclerotized and membranous area of phallotheca straight (Figs 70–71; *ph*). Ventral conjunctival processes each curved toward vesica apically, dorsal surface concave (Figs 68–73; *vcp*). Each laterodorsal conjunctival process digitiform, sclerotized, longer than vesica (Figs 68–73; *lcp*). Vesica cup-like, strongly projected dorsally, with dorsal margin uniformly concave (Figs 70–73; *v*). Ductus seminis distalis ventrally curved, originating in central part of vesica (Figs 70–73; *ds*). Process of gonopore absent.

Female genitalia. Gonocoxites 8 longer than wide; sutural margins juxtaposed at 1/3 basal portion, each widely separated and sinuous on the remaining 2/3; posterior margins concave; each sutural margin with fringe of setae covering gonapophyses 8 (Figs 74–75; *gc8*). Gonapophyses 8 visible, carinated medially (Figs 74–75; *g8*). Laterotergites 8 triangular, longer than wide; each posterior margin acute surpassing tergite 8; each spiracle placed posterior to lateral angle of each gonocoxite 8 (Figs 74–75; *la8*). Gonocoxites 9 trapezoidal, each with 1+1 tufts of long setae on disc (Figs 74–77; *gc9*). Each laterotergite 9 digitiform, depressed basally; apex rounded and surpassing tergite 8 (Figs 74–75; *la9*). Segment X rectangular (Figs 74–75; *X*). Gonapophyses 9 each 1+1 sclerotized areas surrounding chitinellipsen (Figs 76–77; *ch*) and 1+1 lateral folds reaching posterior margin of chitinellipsen (Figs 76–77; *ch*). Chitinellipsen circular (Figs 76–77; *ch*). Thickening of vaginal intima tube-like (Figs 76–77; t*vi*). Median duct of vesicular area with a sclerotized ring at base (Figs 76–77; *md*). Capsula seminalis with three processes (Figs 76–77; *cs*).

Measurements. Total length, 8.5 ± 0.37 (7.7–9.5); head length, 2.2 ± 0.11 (1.9–2.5); head width, 1.4 ± 0.04 (1.3–1.5); length of pronotum, 1.7 ± 0.05 (1.6–1.9); width of pronotum at base, 3.9 ± 0.16 (3.5–4.3); maximum width of pronotum at humeral angle, 5.4 ± 0.20 (4.9–6.0); length of scutellum, 2.6 ± 0.15 (2.3–3.0); width of scutellum, 2.5 ± 0.10 (2.5–2.8); width of abdomen across third segment, 4.6 ± 0.21 (4.2–5.4).

Distribution. Ecuador (Napo) (Figs 78–79, 81–82).

Discussion

Subfamilial placement of *Braunus*. The monophyly of Pentatomidae is supported by morphological and molecular data (Gapud 1991; Grazia *et al.* 2008). However, relationships among the nine subfamilies of Pentatomidae, and their monophyly, remain under investigation. Gapud (1991) and Hasan & Kitching (1993) provided evidence of the paraphyly of the subfamilial groupings, but their taxon sampling for most subfamilies was poor. Their studies did not affect the systematics of the family and the subfamilial groupings are still based only on taxonomic reasoning.

Discocephalinae occur only in the Neotropics and comprise about 300 species assigned to 77 genera in two tribes, Discocephalini and Ochlerini. Rolston & McDonald (1979, p. 200) assigned subfamilial status to the group within Pentatomidae based on the labial insertion (arising on or posterior to an imaginary line traversing head on anterior limit of eyes) and position of trichobothria (laterad of an imaginary band connecting spiracles on sternites III–VI and caudad of spiracle on sternite VII). However, Discocephalinae have not been properly tested phylogenetically yet. Studying the Ochlerini, Campos & Grazia (2006) also included one species of Discocephalini, recovering the subfamily monophyly and recognizing the characters proposed by Rolston & McDonald (1979) as diagnostic.

The Pentatominae, the largest pentatomid subfamily, is cosmopolitan. According to Rolston & McDonald (1979, p. 202), diagnostic characteristics of pentatomines include: "trichobothria paired, usually at least one pair on each side of urosternites III–VII on or near imaginary band connecting spiracles, pair rarely well mesad of spiracles; metasternum rarely produced anteriorly onto mesosternum, if so rostrum reaching metacoxae; basal segment of labium arising anterior to line traversing head at anterior margin of eyes, not especially stout, lying entirely between bucculae or distal end surpassing bucculae; scutellum not attaining apex of abdomen; frena extending 4/10 or more of scutellum length". The most reliable results of Gapud (1991) and Hasan & Kitching (1993) are showing that the Pentatominae is polyphyletic, thus, probably most characters treated as diagnostic for the subfamily actually represent convergences.

As described here, *Braunus* has the basal segment of labium arising anterior to the limit of eyes, and lying entirely between bucculae; the trichobothria are caudad to spiracles in all sternites; scutellum do not reach the abdominal apex and the frena extends more than 4/10 of length of scutellum. Besides, we observed the presence of

large conjunctival processes on the phallus. Based on these characters, *Braunus* does not match the diagnostic features of and should not be placed in the Discocephalinae, thus we are transferring *Braunus* from Discocephalinae to Pentatominae.

It is noteworthy that *Braunus* cannot be transferred to any other American pentatomid subfamily because it has: (1) paired trichobothria, while Podopinae has single trichobothria; (2) three tarsal segments, whereas Cyrtocorinae and Stirotarsinae taxa has two-segmented tarsi; (3) flat scutellum, while in Cyrtocorinae it bears a hump or spine on its dorsal surface; (4) four segmented labium, whereas the Stirotarsinae has only three labial segments; (5) first labial segment concealed between bucculae and slender and the pygophore lacks pygophoral plates, whereas in the Asopinae the first labial segment is stout and pygophoral plates are present; and (6) metasternum not produced anteriorly onto mesosternum as seen in the Edessinae (based on characters and hypotheses from: Rolston & McDonald 1979; Packauskas & Schaefer 1998; Rider 2000; Grazia *et al.* 2008).

Tribal placement of *Braunus*. The tribal classification of the Pentatominae is chaotic (Rider 2000), probably because of a lack of a modern catalog of the family; moreover, most tribes lack a formal diagnosis, in part because of the great diversity included in the subfamily or because of the lack of phylogenetic testing of its limits. Thus, the tribes of Pentatominae still represent taxonomic arrangements based on morphological similarities and shared taxonomic history. In the following paragraphs, we provide some reasoning why *Braunus* should or should not belong to one or another tribe, but doing so, we do not intend to provide diagnosis to such tribes.

Twelve pentatomine tribes occur in the New World: Aeliini, Carpocorini, Catacanthini, Halyini, Mecideini, Menidini, Nezarini, Pentatomini, Piezodorini, Procleticini, Sciocorini, and Strachiini. The highest diversity of Halyini and Menidini are found in the Old World. Defining characters of Halyini are few and related to male genital features (see Gross 1976), but Wall (2004) found these characters as homoplasious and the tribe as paraphyletic, thereby making it impossible to define the tribe upon exclusive synapomorphies (Barão *et al.* 2012). Only two genera assigned to Halyini are known from the Neartic and Neotropical regions: *Brochymena* Amyot & Serville, 1843 and *Parabrochymena* Larivière, 1992. Species of both genera have cryptic coloration, slender and flattened bodies, mandibular plates with a lateral process apically, and parameres T or L-shaped, with a setose lobe basally. Menidini is also represented by two genera in the Neotropics: *Elanela* Rolston, 1980 and *Rio* Kirkaldy,

1909. Menidines usually have oval body, the head is wider than long, humeral angles not developed, and the integument is shiny; male and female genital characters are greatly diverse.

The Sciocorini, represented in the New World by only three genera (*Antillosciocoris* Thomas, 2005, *Sciocoris* Fallén, 1829, and *Trincavellius* Distant, 1900) are usually small and have the lateral margins of head, pronotum and hemelytral corium expanded (Rider 2012). Aeliines are restricted to the Nearctic and Palearctic regions and are characterized by the produced prosternum covering the base of head, sometimes reaching the antennifer tubercles (Rider 2012). The Mecideini is characterized by stridulatory areas on the abdominal sternites, comprised by elongate, slender species feeding primarily on grasses (Rider 2012) and, according to Sailer (1952), occur in subtropical and temperate areas, on xerophytic environments of the Old and New Worlds.

The Strachiini, more common in the Old World, and the Catacanthini, more common on the Neotropics, are usually bright colored with shiny integument. According to Rider (2012), Strachiines are characterized by the ostiole of the metathoracic scent gland located more mesially between the mid and hind coxae, and ostiole, peritreme, and evaporatorium obsolete. To our knowledge, catacanthines can be recognized by the explanate anterolateral margins of pronotum and by the peritreme of metathoracic scent gland ruga-type (except *Boea* Walker, 1967, where the peritreme and evaporatorium are absent, and *Vulsirea* Spinola, 1837, where the peritreme is spout-shaped).

With a mainly Neotropical distribution, Procleticini is one of the few tribes phylogenetically tested. Schwertner & Grazia (2012) found it monophyletic and diagnosable by the metasternum sulcate, the ventral rim of pygophore with a medial U-shaped emargination and 1 + 1 processes with different developmental degrees, and gonocoxites 8 smaller than laterotergites 9. Other characteristics of Procleticini can be found on Rider (1994) and Bernardes *et al.* (2009).

The Piezodorini are represented in the New World only by *Piezodorus* Fieber, 1860 and the tribe was characterized by Atkinson (1888) as having the tibiae generally rounded, rarely furrowed dorsally, or flat and emarginate; third abdominal segment spinose medially, spine sometimes extended to the head. The Nezarini, are commonly called green stink bugs: the integument is green and usually remains green after death. However, as Rider (2012, p. 351) points out “it is very risky to make determinations

based on color characters; it is even more risky to base classifications on color characters".

After the organization of the other tribes, those remaining genera which have median process at the third abdominal segment ventrally have been placed in the Pentatomini (Rider 2012). However, this characteristic is shared with other tribes (e.g. Piezodorini, Menidini, some Procleticini). On the other hand, the remaining genera without a median process at the third abdominal segment ventrally and with a spout-shape peritreme of the metathoracic gland have been placed in the Carpocorini (some genera have an elongate peritreme, rounded apically, such as *Carpocoris* Kolenati, 1846). The Carpocorini represent the most diverse tribe within the Pentatominae, comprising about 500 species and 100 genera. In the Neotropical region, Carpocorini are represented by 44 genera and about 260 species, some of which are important crop pests (e.g. *Dichelops* Spinola, 1837, *Euschistus* Dallas, 1851, *Oebalus* Stål, 1862, and *Tibraca* Stål, 1860).

Braunus shares characteristics with some of the tribes occurring in the Neotropical region, but can be easily distinguished from Aeliini, Catacanthini, Mecideini, Menidini, Nezarini, Piezodorini, Procleticini, Sciocorini, and Strachiini by the general characteristics listed above. When describing *Lojus*, McDonald (1982, p. 329) related it to *Berecynthus* Stål, 1862, *Padaeus* Stål, 1862, and *Proxys* Spinola, 1837 by the reduced peritreme of the metathoracic scent glands (*sic* metathoracic scent glands openings) and the anterior pronotal margins dentate (*sic* projections on the anterior margins of pronotum). These genera are currently assigned to Carpocorini, as well as *Lojus*. Thomas (1997) indicated some similarities and dissimilarities between *Lojus* and Halyini and Diemeniini, leaving *Lojus* in Carpocorini.

Mulsant & Rey (1866) proposed the Carpocorini (*sic* Carpocorates) mainly based on coloration, the most distinct being the metathoracic pleura and connexivum with black spots, to include *Carpocoris*, *Antheminia* Mulsant & Rey, 1866, *Codophila* Mulsant & Rey, 1866, *Dolycoris* Mulsant & Rey, 1866, *Holcostethus* Fieber, 1860, and *Peribalus* Mulsant & Rey, 1866. According to Gross (1976, p. 334), the most characteristic feature of the Carpocorini (*sic Carpocoris* group) "is the strong and thick F-shaped clasper (paramere) with sculptured lateral surfaces". Gross also suggests a quite variable structure of the phallus in the tribe, but "there is a tendency for the vesica to be robust, often sclerotised, and sometimes quite long". We follow the taxonomic history of *Lojus*, the structure of the parameres and of the phallus, and tentatively place

Braunus in the Carpocorini. Such decision can be only supported after a phylogenetic analysis of the tribe, which is being conducted (K.R. Barão, unpublished).

Comments on wing polymorphism. Species of *Braunus* present variable degrees of wing development, from macroptery to brachyptery (Figs 14–16, 56–58). Macroptery is the condition where the clavus and corium are distinct, the membrane is well developed, and hind wings are elongate; whereas brachyptery is characterized by forewings reduced, not covering abdominal terga VI–VII, clavus and corium fused or not, but elements recognizable, and hind wings reduced, but usually not flaplike (Schuh & Slater 1995).

Wing dimorphism and brachyptery are frequently associated with flightlessness. However, species exhibiting wing dimorphism vary in flight capabilities of the wing morphs: in some species both morphs can fly, in others only the long-winged morph can fly, while in others neither morph is capable of flight (Guerra 2011).

Hypothesis to wing polymorphism and flightlessness in insects include a variety of biotic and abiotic explanations. Abiotic explanations include habitat stability and altitudinal and latitudinal clines. It has been advocated that stable environments would most likely drive flightlessness, as organisms would not need to migrate to seek habitat along time and space (Southwood 1962; Roff 1990). In higher altitudes and latitudes, habitat duration should increase (i.e., more permanent than others) and selection should favor a decrease in the frequency of migrant forms, as suggested by Southwood (1962) and Roff (1990). However, what is a stable habitat for one species may not be for another (Schuh & Slater 1995), as habitat is dependent in scale and microclimatic conditions.

Biotic hypothesis for the evolution of wing polymorphism mainly includes life-history trade-offs. Overall, there seems to exist a positive trade-off in short-winged females, as long-winged females have a later onset of egg production, lower fecundity, and invest less into gonads (Guerra 2011). Even though data on male-reproductive trade-offs are scarce, there are some trade-off trends: long-winged males invest less into attracting mates than do short-winged males; long-winged males have a lower propensity for mating, invest less into nuptial gifts, acquire fewer matings, and are less preferred by females as potential mates (Guerra 2011). However, the trends of traits used to study reproductive trade-offs differ considerably according to insect order (Roff 1995; Guerra 2011).

As most species of *Braunus* are known from few specimens, it is hard to

determine whether each species is wing-polymorphic or not. Only known from male specimens, *B. asperus* and *B. bordoni* are macropterous. Males and females of *B. sciocorinus* (Figs 14–16) and *B. ocellatus* (Figs 56–58) have fully developed forewings, but differing in size, and hind wings lacking jugal fold (Figs 16, 58); the same pattern of wing development is observed on the single known male of *B. machadoi* (Fig. 36) and the female of *B. gibbus* (Fig. 44). Males of *B. brettlizorum* are macropterous, while females are brachypterous, having both fore and hind wings reduced, as well as the female of *B. prionotus*. Finally, the female of *B. ateuchus* is brachypterous.

Brachyptery in *Braunus* do not present any gender trend, having both males and females brachypterous and macropterous specimens. However, all specimens of *Braunus* known by us were collected over 1200 m above sea level (as high as 2900 m a.s.l.), and occurring in rainforest zones, areas considered to be permanent. Either reproductive trade-offs, or altitudinal and habitat permanence, or both may play a role in wing reduction in the group. Further life-history driven studies are necessary to elucidate the evolution of wing dimorphism in *Braunus*.

Acknowledgments

We are thankful to Dr. Christiane Weirauch for providing access to specimens and imaging equipment; to curators of the listed collections, who provided images or access to type specimens; to Drs. Christiane Weirauch, Dimitri Forero and Jiří Skuhrovec for kindly providing images of collection localities; and to two anonymous reviewers for improving the manuscript. Financial support from Conselho Nacional de Desenvolvimento Científico e Tecnológico - CNPq (Ed. Universal 470796/2012-0), scholarships from Coordenação de Aperfeiçoamento de Pessoal de Nível Superior - CAPES and CNPq to K.R.B. (CNPq 142447/2011-0; CAPES 5641-13-6) and T.A.G. (CNPq 142448/2011-7; CAPES 5788-13-7), and CNPq fellowships to J.G. and L.A.C. (305367/2012-9) are also gratefully acknowledged.

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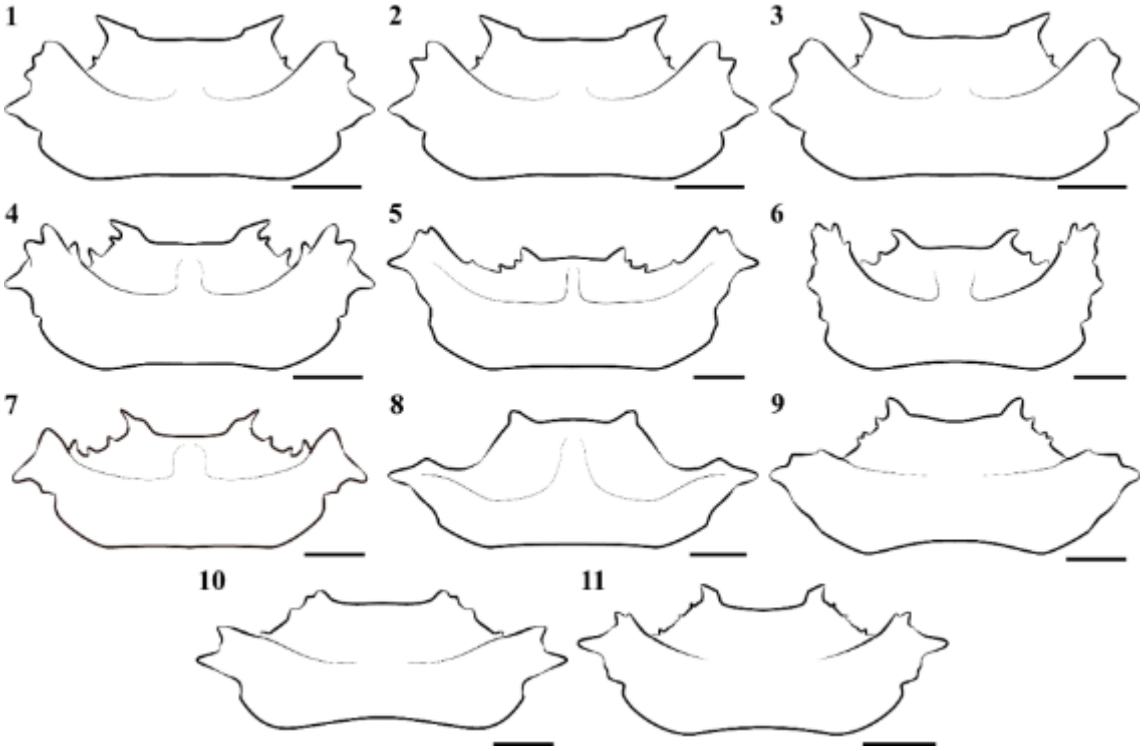
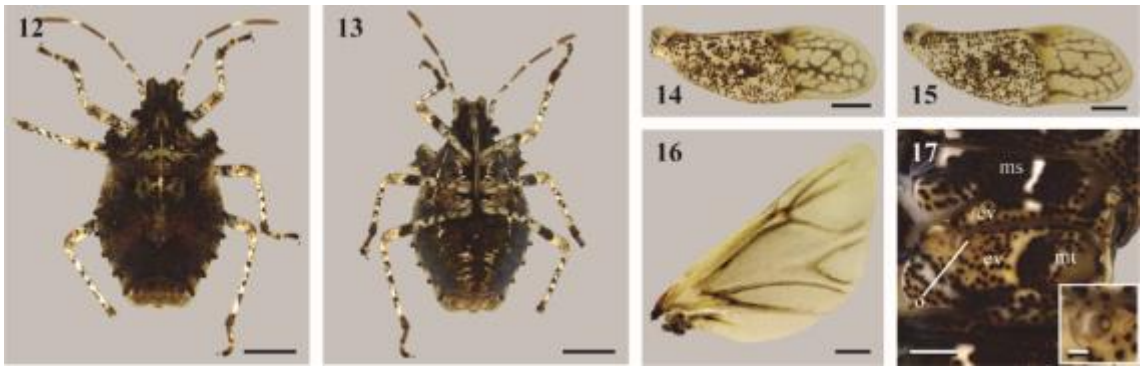
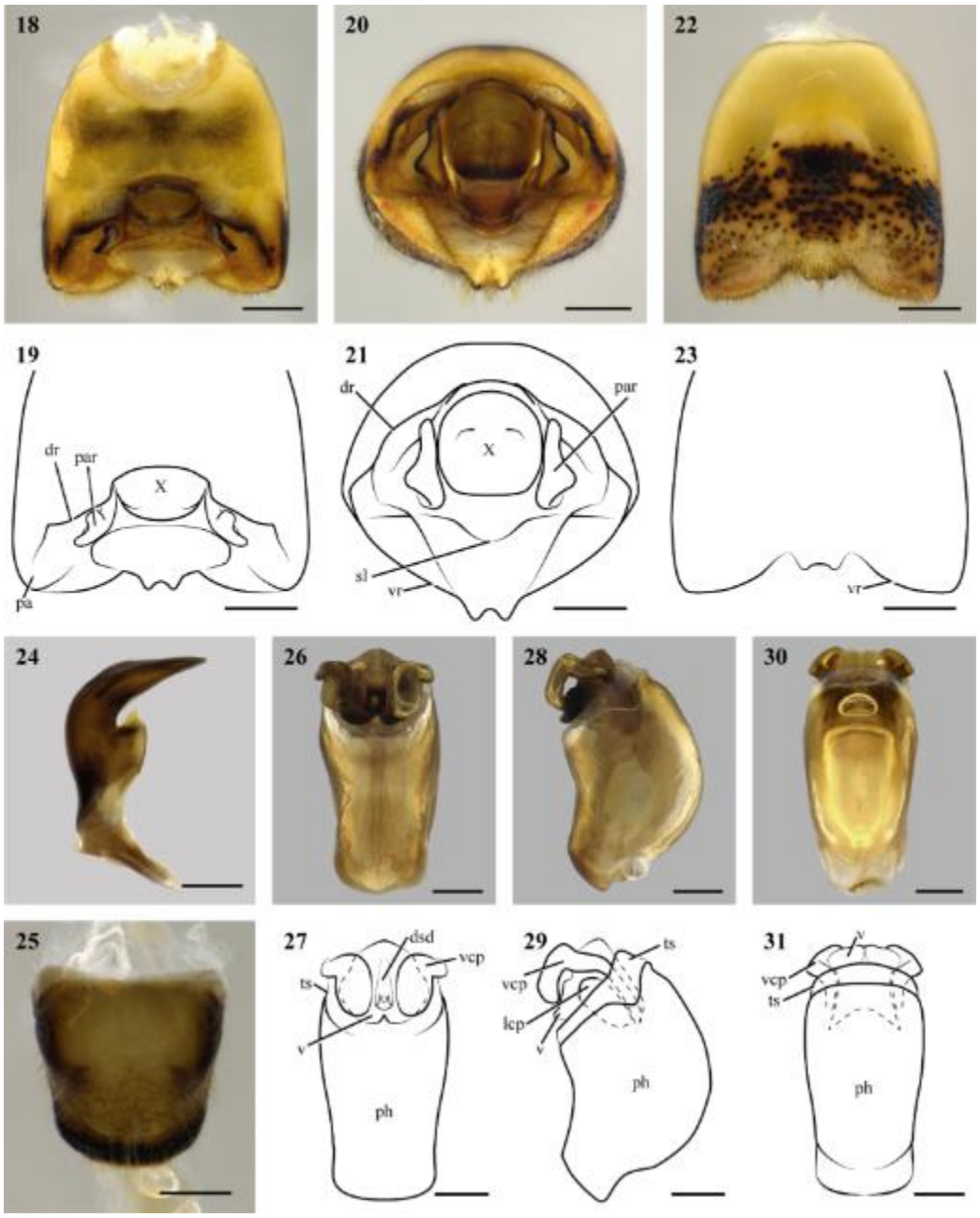


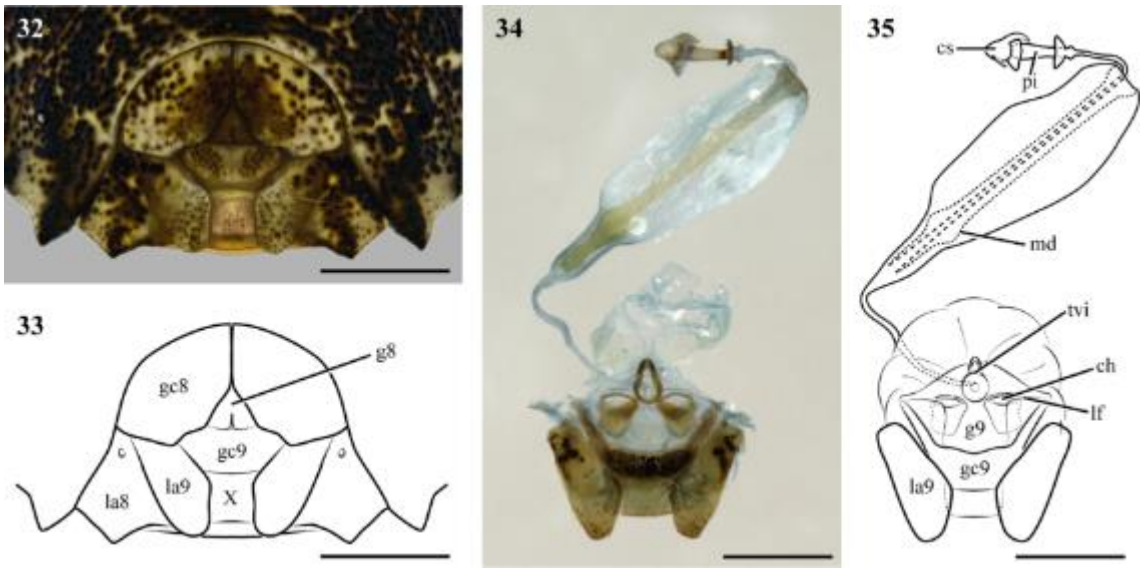
FIGURES 1–11. Schematic drawings of pronotum of *Braunus* Distant, 1899 in dorsal view. **1–3**. *B. sciocorinus* (Walker, 1867); 4. *B. machadoi* Barão & Garbelotto **sp. nov.**; 5. *B. gibbus* Garbelotto & Barão **sp. nov.**; 6. *B. prionotus* Barão & Garbelotto **sp. nov.**; 7. *B. asperus* (McDonald, 1982) **comb. nov.**; 8. *B. ateuchus* (Brailovski & Rolston, 1986) **comb. nov.**; 9. *B. bordoni* (Thomas, 1997) **comb. nov.**; 10. *B. brettlizorum* (Thomas, 1997) **comb. nov.**; 11. *B. ocellatus* (Thomas, 2001) **comb. nov.** Scales = 1 mm.



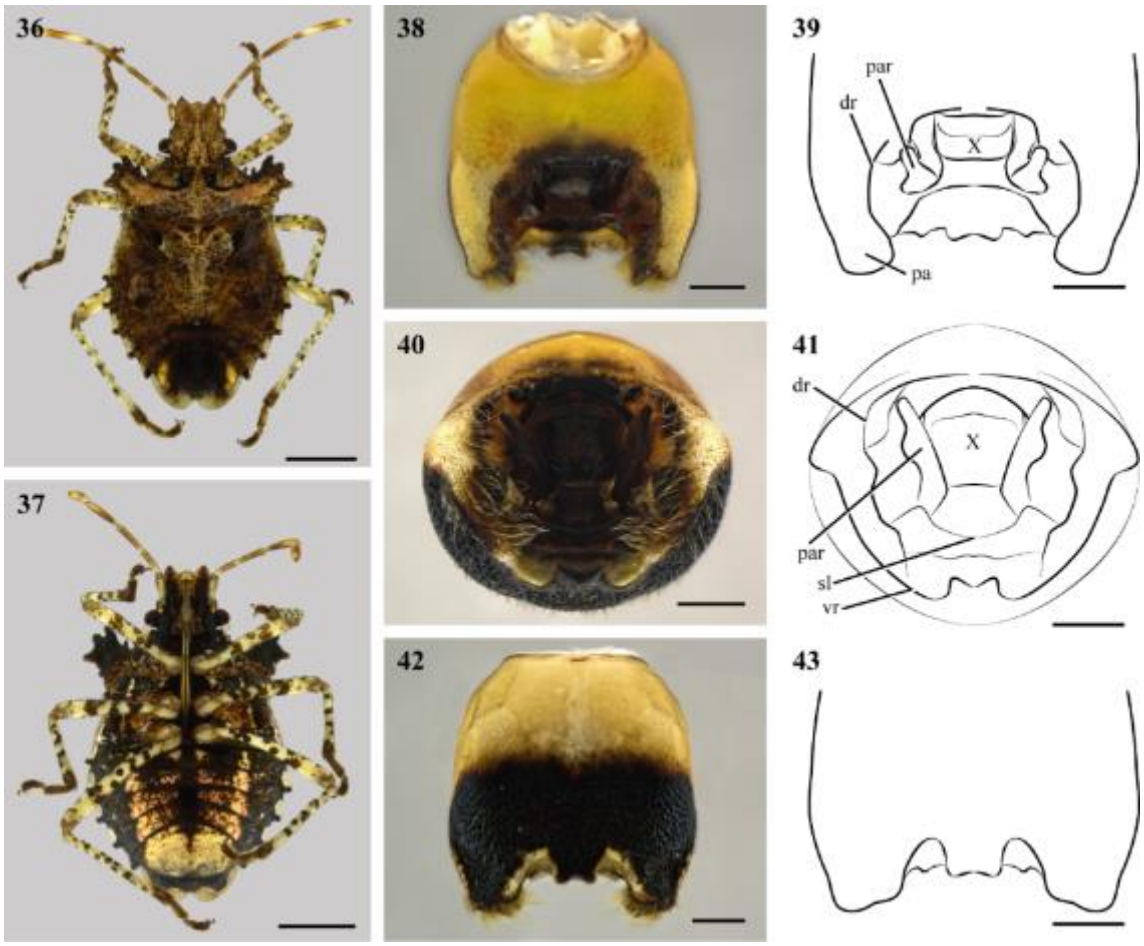
FIGURES 12–17. *Braunus sciocorinus* (Walker, 1867), general morphology. **12–13**. habitus; 12. dorsal view; 13. ventral view; 14. male forewing; 15. female forewing; 16. male hindwing; 17. external scent efferent system, inset showing ostiolar area. Abreviattions: ev = evaporatorium; ms = mesopleura; mt = metapleura; o = ostiole. Scales: 11–12 = 2 mm; 13–16 = 0.5 mm.



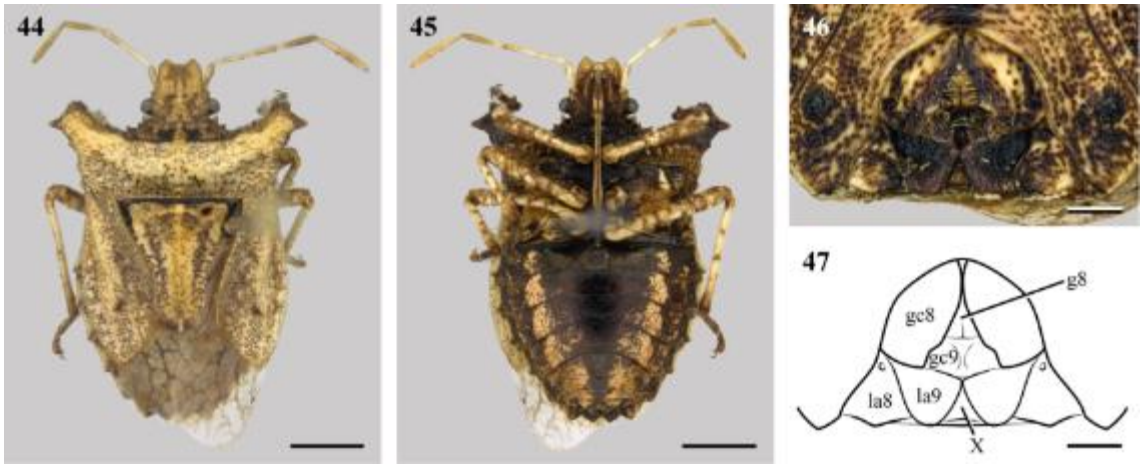
FIGURES 18–31. *Braunus sciocorinus* (Walker, 1867), male genitalia. **18–23**, pygophore; 18–19. dorsal view; 20–21. posterior view; 22–23. ventral view; 24. right paramere, lateral view; 25. abdominal segment X, dorsal view; **26–31**. phallus; 26–27. dorsal view; 28–29. lateral view; 30–31. ventral view. Abbreviations: dr = dorsal rim; ds = ductus seminis distalis; lcp = laterodorsal conjunctival process; pa = posterolateral angle; par = paramere; ph = phallotheca; sl = mid depression of superior layer of ventral rim; ts = thecal shield; v = vesica; vcp = ventral conjunctival process; vr = ventral rim; X = abdominal segment X. Scale bars: 17–22 = 0.5; 23–30 = 0.25 inset of Fig. 17 = 0.2 mm.



FIGURES 32–35. *Braunus sciocorinus* (Walker, 1867), female genitalia. **32–33**. genital plates, ventroposterior view; **34–35**. female receptaculum seminis and ausenwand, ventral view. Abbreviations: ch = chitinellipsen; cs = capsula seminalis; gc8 = gonocoxites 8; gc9 = gonocoxites 9; g8 = gonapophyses 8; g9 = gonapophyses 9; la8 = laterotergites 8; la9 = laterotergites 9; lf = lateral folding of gonapophyses 9; md = median duct of vesicular area; pi = pars intermedialis; tvi = thickning of vaginal intima; X = abdominal segment X. Scale bars = 1 mm.

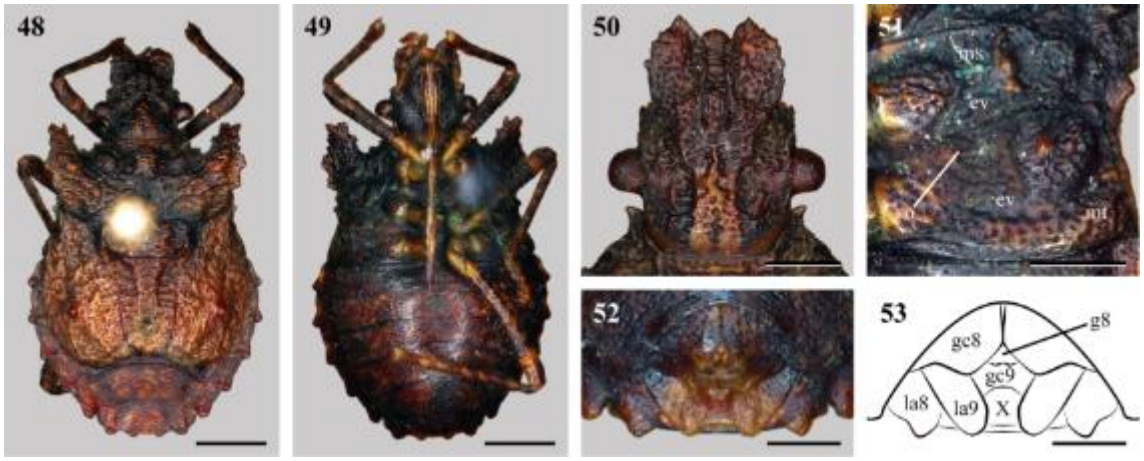


FIGURES 36–43. *Braunus machadoi* Barão & Garbelotto **sp. nov.** 36–37. habitus; 36. dorsal view; 37. ventral view; 38–43. pygophore; 38–39. dorsal view; 40–41. posterior view; 42–43. ventral view. Abbreviations: dr = dorsal rim; pa = posterolateral angle; par = paramere; sl = mid depression of superior layer of ventral rim; vr = ventral rim; X = abdominal segment X. Scales: 35–36 = 2 mm; 37–42 = 0.5 mm.



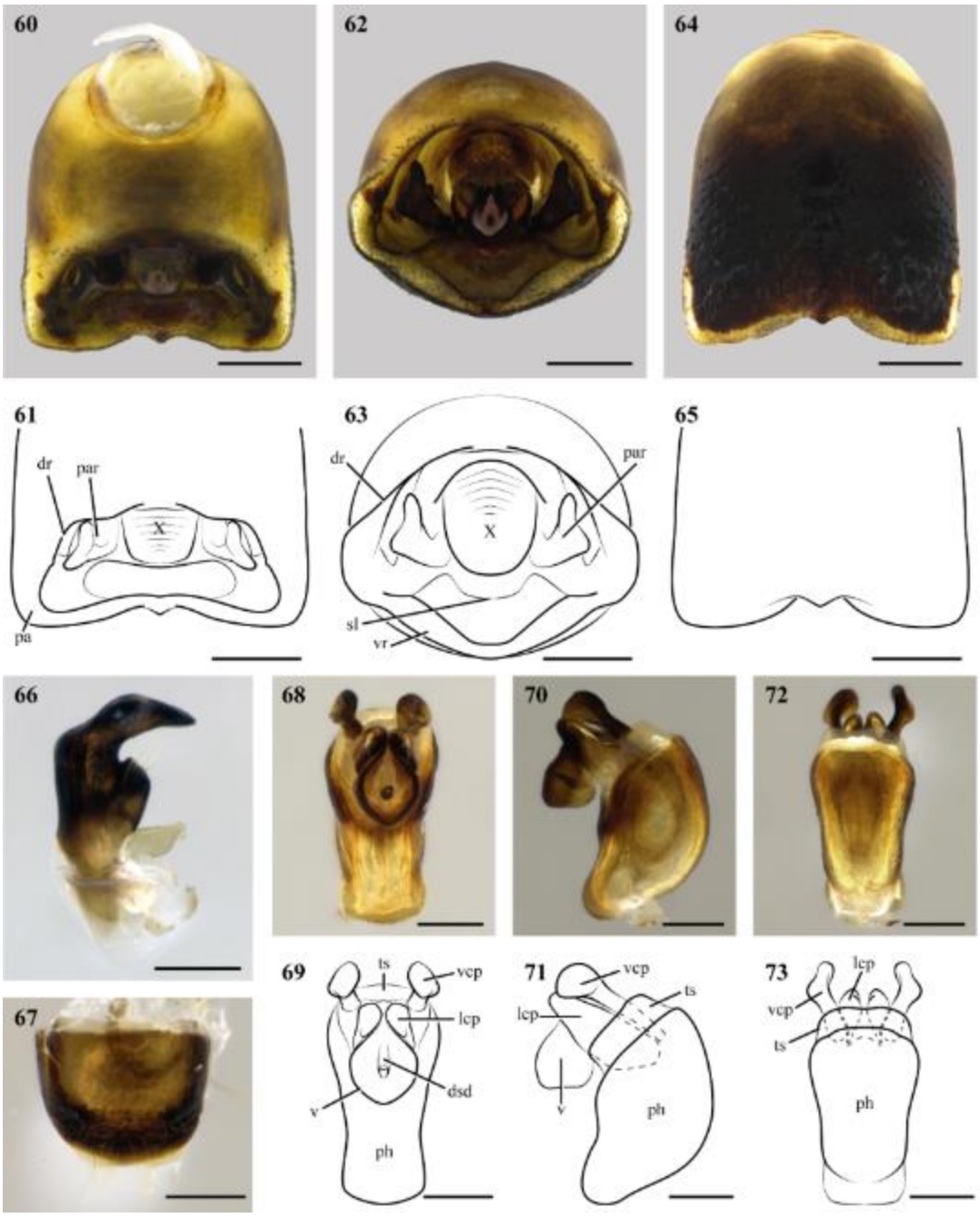
FIGURES 44–47. *Braunus gibbus* Garbelotto & Barão **sp. nov.** 44–45. habitus; 44. dorsal view; 45. ventral view; 46–47. genital plates. Abbreviations: gc8 = gonocoxites

8; gc9 = gonocoxites 9; g8 = gonapophyses 8; la8 = laterotergites 8; la9 = laterotergites 9; X = abdominal segment X. Scales: 43–44 = 2 mm; 45–46 = 0.5 mm.

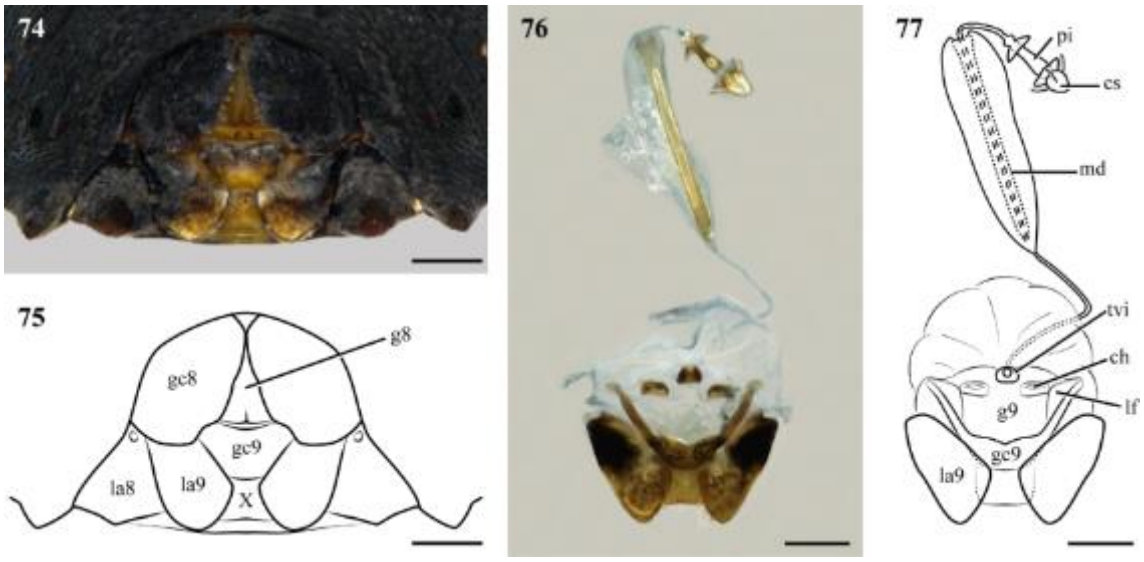


FIGURES 48–53. *Braunus prionotus* Barão & Garbelotto **sp. nov.** 48–49. habitus; 48. dorsal view; 49. ventral view; 50. head, dorsal view; 51. external scent efferent system; 52–53. genital plates. Abbreviations: ev = evaporatorium; gc8 = gonocoxites 8; gc9 = gonocoxites 9; g8 = gonapophyses 8; la8 = laterotergites 8; la9 = laterotergites 9; ms = mesopleura; mt = metapleura; o = ostiole; X = abdominal segment X. Scales: 48–49 = 2 mm; 50–53 = 1 mm.

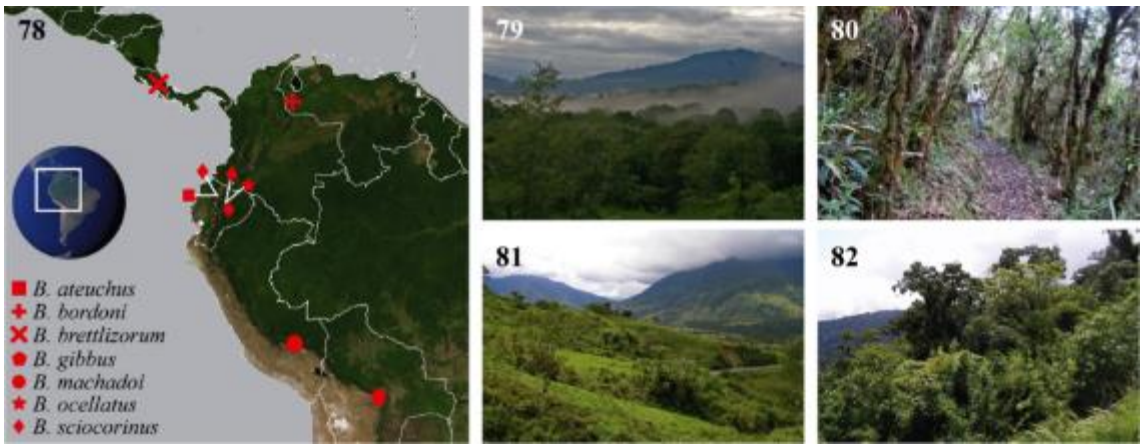
FIGURES 54–59. *Braunus ocellatus* (Thomas, 2001) **comb. nov.**. 54–55. habitus; 54. dorsal view ; 55. ventral view; 56. male forewing; 57. female forewing; 58. male hindwing; 59. external scent efferent system. Abreviattions: ev = evaporatorium; ms = mesopleura; mt = metapleura; o = ostiole. Scales: 47–48 = 2 mm; 49–52 = 0.5 mm.



FIGURES 60–73. *Braunus ocellatus* (Thomas, 2001) **comb. nov.**, male genitalia. 60–65. pygophore; 60–61. dorsal view; 62–63. posterior view; 64–65. ventral view; 66. right paramere, lateral view; 67. abdominal segment X, dorsal view; 68–73. phallus; 68–69. dorsal view; 70–71. lateral view; 72–73. ventral view. Abbreviations: dr = dorsal rim; ds = ductus seminis distalis; lcp = laterodorsal conjunctival process; pa = posterolateral angle; par = paramere; ph = phallotheca; sl = mid depression of superior layer of ventral rim; ts = thecal shield; v = vesica; vcp = ventral conjunctival process; vr = ventral rim; X = abdominal segment X. Scales: 52–58 = 0.5 mm; 59–60 = 0.25 mm.



FIGURES 74–77. *Braunus ocellatus* (Thomas, 2001) **comb. nov.**, female genitalia. 74–75. genital plates, ventroposterior view; 76–77. female receptaculum seminis and ausenwand, ventral view. Abbreviations: cs = capsula seminalis; gc8 = gonocoxites 8; gc9 = gonocoxites 9; g8 = gonapophyses 8; g9 = gonapophyses 9; la8 = laterotergites 8; la9 = laterotergites 9; lf = lateral folding of gonapophyses 9; md = median duct of vesicular area; pi = pars intermedialis; rs = ring sclerites; tvi = thickning of vaginal intima; X = abdominal segment X. Scales: 67–68 = 0.5 mm; 69–70 = 0.25 mm.



FIGURES 78–82. Distribution of species of *Braunus* Distant, 1899 and localities of some collection events. 78. map of localities; 79. a collection locality of *B. sciocorinus* (Walker, 1867) and *B. ocellatus* (Thomas, 2001) **comb. nov.** (ECUADOR, Napo, Yanayacu Biological Station; photo by D. Forero); 80. type locality of *B. machadoi* Barão & Garbelotto **sp. nov.** (PERU, Cuzco, Wayqecha Research Center; photo by C. Weirauch); 81–82. a collection locality of *B. ocellatus* (Thomas, 2001) **comb. nov.** (ECUADOR, Napo, 1.3 km SW of Baeza; photos by J. Skuhrovec).

CAPÍTULO 2

Normas editoriais: *Zootaxa* (Anexo 1).
Situação: Em preparação.

Key and diagnoses for non-Ochlerini genera of Discocephalinae (Hemiptera: Heteroptera: Pentatomidae).

BÁRBARA DA SILVA VICENTINI, THEREZA DE ALMEIDA GARBELOTTO* and LUIZ ALEXANDRE CAMPOS

Programa de Pós-Graduação em Biologia Animal & Departamento de Zoologia, Universidade Federal do Rio Grande do Sul, Av. Bento Gonçalves 9500, Porto Alegre, RS, Brazil 91501-970. Emails: barbara_vicentini@hotmail.com.br; therezagarbelotto@hotmail.com; luiz.campos@ufrgs.br
**Corresponding author*

Abstract

The Discocephalinae currently includes more than 70 genera from Neotropics grouped by the labium insertion and trichobothria position. The subfamily has two tribes, and after the proposition of Ochlerini, all the other genera were placed in the nominal tribe Discocephalini. Since then the Discocephalini received little attention from taxonomists and neither a key nor a diagnosis were propose for this group of genera. Here we present an illustrated key and diagnoses for the extant genera of non-Ochlerini Discocephalinae. Additionally we are proposing a new synonym and a new combination.

Key words: Discocephalini; taxonomy; Neotropical fauna.

Introduction

Discocephalinae is a group of phytophagous pentatomids (76 genera; more than 300 species, Grazia *et al.* in press) restricted to the Neotropical region. Discocephalines are diagnose primarily by the insertion of the labium, described as usually arising on or posterior to the anterior limit of eyes, and by abdominal trichobothria usually placed laterad of imaginary line connecting spiracles (Rolston & McDonald 1979, Rolston 1981). The two tribes of Discocephalinae, Discocephalini and Ochlerini, can be distinguished from one another by the general aspect, color, and the structure of the

dorsal surface of the third tarsal segment of the hind legs of females (and sometimes of males as well), convex in Discocephalini and shallowly excavated or flattened in Ochlerini (Rolston 1992), with few exceptions.

Systematics of Discocephalinae is yet in a very early stage (Grazia *et al.* in press), and although a key is available for Ochlerini genera (Rolston 1992a), even it is waiting for a revision due the new genera described posteriorly, the absence of a comprehensive key for the remaining genera hampers further taxonomic studies. There are 42 genera included between the Discocephalini and keys are available only for two groups of genera, one for the broadheaded discocephalines (Rolston 1990) and another to separate *Antiteuchus* Dallas of some similar genera (Ruckes 1964). Taken together these keys include 17 out of 41 non-fossil genera currently classified in Discocephalini.

An ilustrated key and diagnoses for 41 genera of non-Ochlerini discocephalines is provide here. The fossil genus *Acantocephalonotum* Petrulevičius & Popov, 2014 is not included here (for more information about this genus see Petrulevičius & Popov 2014), and here we are establishing *Allinocoris* Ruckes as a junior synonymy of *Uncicrus* Ruckes (see diagnose section).

Material and Methods

The key was prepared taking together specimens observation under stereomicroscope with relevant literature for each genus (see diagnose section for references). The diagnoses include also the main references for the genera and the total number of species. For a complete list of species by genera, see Grazia *et al.* (in press.). Terminologies of Dupuis (1970) for genitalic structures, Ruckes (1964; 1966b) for thoracic structures, and Kment & Vilímová (2010) for cuticular structures of the external scent efferent system were adopted. Photographs were taken using a Nikon AZ100M stereomicroscope and pictures stacked with the software Nikon NIS-Elements Ar Microscope Imaging Software. The images were digitally processed with Photoshop CS4.

The specimens examined belong to the following collections (acronyms follow Evenhuis 2015; curators within parenthesis): AMNH – American Museum of Natural History, New York, USA (Randall Schuh); BPBM – Bishop Museum, Honolulu, USA (Shepherd P. Myers); BMNH – The Natural History Museum, London, England (Mick Webb); CAS – California Academy of Sciences, San Francisco, USA (Norman Penny);

DCMP – Universidade Federal do Paraná, Curitiba, Brazil (Rodney Cavichioli); DARC – David A. Rider Collection, Fargo, USA (David Rider); FIOC – Fundação Instituto Oswaldo Cruz, Rio de Janeiro (Jane Costa); INPA – Instituto Nacional de Pesquisas da Amazonia, Manaus, Brazil (José Albertino Rafael); JEE – Joseph E. Eger Collection, Tampa, USA (Joseph Eger); MCNZ – Museu de Ciencias Naturais da Fundação Zoobotanica do Rio Grande do Sul, Porto Alegre, Brazil (Aline Barcellos); MIZA – Museo del Instituto de Zoología Agrícola, Maracay, Venezuela (Marco Giani); MLPA – Museo de La Plata, La Plata, Argentina (Maria Del Carmen Coscarón); MNRJ – Museu Nacional, São Cristovão, Brazil (Gabriel Mejdalani); MPEG – Museu Paraense Emilio Goeldi, Belém, Brazil (Orlando Silveira); NHMW – Naturhistorisches Museum Wien, Wien, Austria (Herbert Zettel); NHRS – Naturhistoriska riksmuseet, Stockholm, Sweden (Gunvi Lindberg); UEMA – Universidade Estadual do Maranhão, São Luís, Brazil (Francisco Oliveira); UFRG – Departamento de Zoologia da Universidade Federal do Rio Grande do Sul, Porto Alegre, Brazil (Jocelia Grazia); UNAM – Universidad Nacional Autonoma de Mexico, Mexico D. F., Mexico (Harry Brailovsky); USNM – National Museum of Natural History, Washington D.C., USA (Thomas Henry).

Results and Discussion

Excluded taxa

Distant (1887) described *Anhanga modesta* from Brazil in Discocephalinae known only from the holotype. This species was posteriorlly mentioned just by Lethierry & Severin (1893) and Kirkaldy (1909) and both maintained its placement in Discocephalinae. We had access to the holotype and the specimen is in such poor condition without head, pronotum and wings dorsally and half of the abdomen ventrally. However, the genital plates and the trichobothrial position permits an identification and the recognition that this species probably belongs to Pentatominae. Here we are transferring this genus and its taxonomy will be treat elsewhere.

Key to separate Ochlerini and non-Ochlerini discocephalines

1 Body usually convex and matte black, if lighter colored or glossy than the body is elongated and an intercalary rostral segment may be present between segments I and II; or dorsal surface of the last tarsomere of hindtarsi excavated in females; dorsal surface

of third tarsal segment of hind legs shallowly excavated or flattened in males of some genera (Fig. 1B, D); ... Ochlerini.

- Body usually flattened straw colored or light brown to brown, matte or glossy, if dark colored always glossy; if light brown with black macules and punctures coarse froming patches, an intercalary rostral segment may be present between segments I and II; or dorsal surface of the last tarsomere of hind tarsi usually convex, rarely plain, in both sexes; if female may be shallowly excaveted (Fig. 1A, C) ... non Ochlerini discocephalines.

Key to genera of non-Ochlerini discocephalines

1 Scutellum reaching or surpassing posterior angle of connexival segment VI; apex of scutellum usually surpassing apex of corium (Fig. 2A) ... 6

- Scutellum not reaching posterior angle of connexival segment VI; apex of scutellum not surpassing or rarely attaining apex of corium (Fig. 2B) ... 2

2(1) Labrum longer than labium, forming a loop before fitting on labium (Fig. 3A); spines or thick bristles on median and hind tibiae (Fig. 3B); length of mandibular plates subequal to clypeus ... *Priapismus* Distant (Fig. 4)

- Labrum shorter than labium, not forming a loop; tibiae unarmed; mandibular plates usually longer than clypeus ... 3

3(2) Labrum proportionately large, lunate in silhouette (Fig. 5) ... 4

- Labrum slender, not lunate in silhouette ... 13

4(3) Anteocular processes short and truncated; scutellum subtriangular, post-frenal lobe shorter than parafrenal lobe (Fig. 6A); mesosternum with a large median carina (Fig. 6B) ... *Ruckesiocoris* Rider (Fig. 7)

- Anteocular processes acutely projected (Fig. 8A, aop); scutellum tongue like, post-frenal lobe subequal to or longer than parafrenal lobe (Fig. 6C); mesosternum usually without carina or weakly carinated (Fig. 6D) ... 5

5(4) Abdominal margin sinuous to uniformly convex (Fig. 8B); anterolateral margins of pronotum sinuous, with a median depression (Fig. 8A); clypeus elongated ... *Oncodochilus* Fieber (Fig. 9)

- Abdominal margin coarsely serrate (Fig. 8C); anterolateral margins of pronotum subrectilinear; clypeus minute ... *Glyphuchus* Stål (Fig. 10)

6(1) Width of pronotum almost subequal to width of head including eyes, each humeral angle of pronotum exceeding laterally the head by less the width of one eye (Fig. 11A); head discoid (Fig. 11A) ... *Ischnopelta* Stål (part) (Fig. 12)

- Width of pronotum much greater than width of head including eyes, each humeral angle of pronotum exceeding laterally the head by more than the width of one eye (Fig. 11B); head not discoid (Fig. 8A) ... 7

7(6) Connexivum widely exposed, margin coarsely serrate; anterolateral margins of pronotum expanded, foliaceous or with spines; mandibular plates tongue like or spatulate (Fig. 13A-C) ... 8

- Connexivum widely or moderately exposed, margin not coarsely serrate; anterolateral margins of pronotum subrectilinear to convex; mandibular plates not as above, uniformly rounded on apex (Fig. 13D) ... 11

8(7) Anteocular processes short and truncated (Fig. 14A, *aop*); connexival segments without punctures; antennae four- or five-segmented ... *Abascantus* Stål (Fig. 15)

- Anteocular processes projected acutely or spatulate (Fig. 8A, 14B, *aop*); connexival segments with punctures; antennae five-segmented ... 9

9(8) Body color light castaneous to ochraceous, punctures dark brown to ferrugineous forming patches; mandibular plates spatulate, sutural margins elevated as a crest above the apex of clypeus (Fig. 16, cmp); anterolateral margins of pronotum convex (Fig. 17) ... *Psorus* Bergroth (part) (Fig. 17)

- Body color yellowish, punctures brown not forming patches; mandibular plates tongue like, sutural margins not elevated; anterolateral margins of pronotum projected in spines or lobes (Fig. 13B, 19, 20) ... 10

10(9) Pronotum surface irregular, with tubercles (Fig. 18, *tu*); processes before humeri thin, spiniform and posteriorly directed (Fig. 13B, 19, *pbh)*; first antennal segment reaching apex of head ... *Coriplatus* White (Fig. 19)

- Pronotum surface smooth, without tubercles; processes before humeri lobular, foliaceous and anteriorly directed (Fig. 20); first antennal segment not reaching apex of head ... *Pelidnocoris* Stål (Fig. 20)

11(7) Apex of scutellum broadly rounded and surpassing apex of corium (Fig. 21A); antennae four-segmented ... *Phoeacia* Stål (Fig. 22)

- Apex of scutellum not as above (Fig. 21B, C); antennae five-segmented ... 12

12(11) Metasternum elevated into a thicket plate (Fig. 23A, *mt*); abdominal segment III with a basal, flat tubercle which fits in apical emargination of the metasternum (Fig.

23A, at); small calloused yellowish tubercles next to spiracles ... *Cataulax* Spinola (part) (Fig. 24)

- Metasternum with a thin median carina (Fig. 23B, *mtc*); abdominal segment III without basal tubercle; without small calloused yellowish tubercles next to spiracles ... *Antiteuchus* Dallas (part) (Fig. 25)

13(3) Pronotum with projections at anterior angle or before humeri (Fig. 26A, B, *paa*, *pbh*), and anterolateral margins of pronotum slightly to clearly sinuous (Fig. 26A, B); OR anterolateral margins of pronotum broadly foliaceous (Fig. 26C) ... 36

- Pronotum without projections as above (small tooth at anterior angle are not considered projections), nor broadly foliaceous; anterolateral margins of pronotum slightly concave, convex or subrectilinear ... 14

14(13) Abdominal base with tubercle (Fig. 23A, 27C) ... 15

- Abdominal base without tubercle (Fig. 23B) ... 18

15(14) Mandibular plates as long as clypeus; anteocular processes acutely projected (Fig. 8A, *aop*); abdominal tubercle acute (Fig. 27A, *at*) ... *Phineus* Stål (Fig. 28)

- Mandibular plates longer than clypeus, overlapping or just touching each other apically; anteocular processes absent or short and truncated (Fig. 14A, *aop*); abdominal tubercle rounded (Fig. 23A, 27B, *at*) ... 16

16(15) Mesosternum elevated mesialy into a thicket plate which fits on anterior margin of metasternum (Fig. 23A, *ms, mt*); small calloused yellowish tubercles next to spiracles ... *Cataulax* Spinola (part) (Fig. 24)

- Mesosternum with a thick medial carina (Fig. 27C, *msc*) or grooved anteriorly and thinly carinate posteriorly (Fig. 27B, *msc*); without small calloused yellowish tubercles next to spiracles ... 17

17(16) Head and pronotum before humeri lighter colored than remaining parts of the body (Fig. 29); metasternum elevated into a thicket plate (Fig. 27C, *mt*) ... *Parvamima* Ruckes (Fig. 29)

- Body uniformly colored; metasternum grooved mesialy (Fig. 27B, *mt*) ... *Alveostethus* Ruckes (Fig. 30)

18(14) Median portion of venter dark, from abdomen to thorax, including mesial portion of mesosternum (Fig. 32B, 33B, 34B) ... 19

- Median portion of venter not contrastingly darker ... 21

19(18) Anterolateral margins of pronotum finely serrate (Fig. 31A); peritreme short, digitiform (Fig. 31B, pe) ... *Platycarenus* Fieber (Fig. 32)

- Anterolateral margins of pronotum not serrate; peritreme long, scalpeliform (Fig. 31C, *pe*) ... 20

20(19) Median portion of venter broadly dark (Fig. 33B); suture of mandibular plates shorter than or equal to the length of an eye; labium surpassing abdominal segment V ... *Grassatorama* Rider (part) (Fig. 33)

- Median portion of venter narrowly dark (Fig. 34B); suture mandibular plates longer than the length of an eye; labium not surpassing abdominal segment V ... *Discocephalessa* Kirkaldy (Fig. 34)

21(18) Length of suture of mandibular plates sub-equal or greater than the length of an eye (Fig. 35A, B); head wide, interocular width grater than the head length (Fig. 35A, B) ... 22

- Length of suture of madibular plates shorter than the length of an eye (Fig. 35C); head not so wide, interocular width equal to or shorter than the head length (Fig. 35C) ... 30

22(21) Anterolateral margins of pronotum expanded, broadly convex (Fig. 36A, 37A); scutellum and corium short, exposing part of the abdominal tergites (Fig. 36B, 37B) ... 23

- Anterolateral margins of pronotum not expanded nor broadly convex (Fig. 12A, 39A, 43A, 44A); scutellum and corium not as above ... 24

23(22) Anteocular processes acute; apex of corium rounded (Fig. 36A) ... *Harpagogaster* Kormilev (Fig. 36)

- Anteocular processes rounded; apex of corium acute (Fig. 37A) ... *Placidocoris* Ruckes (Fig. 37)

24(22) Mandibular plates uniformly wide through its length (Fig. 35A), head not triangular; each humeral angle of pronotum exceeding laterally the head by less than the width of one eye (Fig. 11A) ... 25

- Mandibular plates wider posteriorly than apically (Fig. 35B), head triangular or subtriangular; each humeral angle of pronotum exceeding laterally the head by more than the width of one eye (Fig. 11B) ... 27

25(24) Scutellum surpassing connexival segment VI (Figs. 2A, 12A), and covering at least half the hemelytral membrane; length of scutellum and corium subequal ... *Ischnopelta* Stål (part) (Fig. 12)

- Scutellum not surpassing connexival segment VI (Fig. 2B, 38), leaving uncovered more than half the hemelytral membrane; corium longer than scutellum ... 26

26(25) Anterolateral margins of pronotum concave; post-frenal lobe of scutellum slender than and subequal to parafrenal lobe (Fig. 38A); veins of hemelytral membrane branched (Fig. 38A); lateral margin of mandibular plates convex; mandibular plates suture longer than clypeus (Fig. 35A) ... *Tetragonotum* Ruckes (Fig. 39)

- Anterolateral margins of pronotum rectilinear; post-frenal lobe of scutellum broad and clearly shorter than parafrenal lobe (Fig. 38B); veins of hemelytral membrane not branched; lateral margin of mandibular plates sinuous; mandibular plates suture shorter than or subequal to clypeus ... *Discocephala* Laporte (Fig. 40)

27(24) Post-frenal lobe of scutellum slender and shorter than parafrenal lobe (Fig. 41A); each humeral angle of pronotum exceeding laterally the head by less than the width of one eye (Fig. 11A, 41A) ... *Colpocarena* Stål (Fig. 41)

- Post-frenal lobe of scutellum broad and subequal to or longer than parafrenal lobe; each humeral angle of pronotum exceeding laterally the head by more than the width of one eye (Fig. 11B) ... 28

28(27) Anterior angles of pronotum with small tooth; anterolateral margins of pronotum rectilinear ... *Uncicrus* Ruckes (Fig. 42)

- Anterior angles of pronotum without tooth; anterolateral margins of pronotum convex (Figs. 43A, 44A) ... 29

29(28) Apex of corium surpassing posterior angle of connexival segment VI (Fig. 43A); distance between trichobothria and spiracles not greater than the width of one spiracle ... *Lineostethus* Ruckes (Fig. 43)

- Apex of corium at most reaching but not surpassing the posterior angle of connexival segment VI (Fig. 44A); distance between trichobothria and spiracles greater than the width of one spiracle ... *Acclivilamna* Ruckes (Fig. 44)

30(21) Dorsal surface hispid, matte (Fig. 46A); ventral surface glossy (Fig. 46B); pronotum with six trans-humeral tubercles, inconspicuous in some specimens (Fig. 45A, *tu*); base of scutellum with a pair of tubercles (Fig. 45A, *ts*); hemelytral membrane reticulated (Fig. 45B) ... *Eurystethus* Mayr (part) (Fig. 46)

- Dorsal and ventral surface usually glossy, when matte both dorsal and ventral surface matte; pronotum and base of scutellum without tubercles; hemelytral membrane not reticulated ... 31

31(30) Pronotum with calloused yellow spots on anterior half (Fig. 47A, *csp*); two lateral yellow spots ventrally on each abdominal segment (Fig. 48B); margin of

metapleura reddish or yellowish (Fig. 47B, *mm*); base of scutellum on females with a pair of calloused spots (Fig. 47A, *css*) ... *Callostethus* Ruckes (Fig. 48)

- Pronotum and abdomen ventrally without calloused spots; margin of metapleura not colored (Fig. 49A); female scutellum not as above ... 32

32(31) Apex of scutellum reflected (Fig. 49A); peritreme cuspidate at apex, short and anteriorly curved, almost touching anterior margin of evaporatorium (Fig. 49B, *pe, ev*); male with stridulatory apparatus on abdominal segments V-VII (Fig. 49C, *str*) and plectrum on hind tibiae (Fig. 49A, *plc*), and apex of corium ornate (Fig. 49A) ... *Uncinala* Ruckes (Fig. 50)

- Apex of scutellum not reflected; peritreme not as above; males without stridulatory apparatus and plectrum nor corium ornate ... 33

33(32) Body surface with long setae, denser on antennae and legs ... *Dinocoris* Burmeister (part) (Fig. 51)

- Body surface glabrous or with short and sparse setae ... 34

34(33) Evaporatorium poorly differentiated, punctured (Fig. 52A, *ev*); antennal tubercles not visible dorsally; antennae four-segmented ... *Patronatus* Ruckes (Fig. 53)

- Evaporatorium well differentiated, not punctured (Fig. 52B, *ev*); antennal tubercles usually visible dorsally; antennae five-segmented ... 35

35(34) Labium not surpassing abdominal segment V; margins of mandibular plates not reflected ... *Antiteuchus* Dallas (part) (Fig. 25)

- Labium surpassing abdominal segment VI; margins of mandibular plates reflected ... *Mecistorhinus* Dallas (Fig. 54)

36(13) - Sutural margins of mandibular plates elevated as a crest above the apex of clypeus (Fig. 16, *cmp*); scutellum with a low mesial tubercle; post-frenal lobe long, broad, covering at least half the hemelytral membrane (Fig. 17A); peritreme long, cuspidate at apex, reaching lateral margin of evaporatorium (Fig. 55A, *pe, ev*) ... *Psorus* Bergroth (part) (Fig. 17)

- Mandibular plates not as above; scutellum without mesial tubercle; post-frenal lobe leaving uncovered more than half the hemelytral membrane (Fig. 2B); peritreme not reaching lateral margin of evaporatorium (Fig. 55B, *pe, ev*) ... 37

37(36) Labium not surpassing mesocoxae, first segment robust, shorter than length of bucculae (Fig. 56B); eyes small, each eye narrower than base of clypeus (Fig. 56A) ... *Dryptocephala* Laporte (Fig. 56)

- Labium surpassing mesocoxae, first segment slender, long (Fig. 51B, D, 58B, 60B), subequal or longer than length of bucculae; eyes large, each eye wider than base of clypeus (Fig. 51A, C, 58A, 60A) ... 38

38(37) Peritreme auricular, short, length equals about the diameter of one spiracle (Fig. 57A, *pe*); evaporatorium small, not reaching half the distance between ostiole and margin of metapleura (Fig. 57A, *ev*); trichobothria paired longitudinally (Fig. 57C, *tr*) ... *Opophylax* Bergroth (Fig. 58)

- Peritreme shape variable, always larger than spiracle diameter (Fig. 57B, *pe*); evaporatorium reaching or surpassing half the distance between ostiole and margin of metapleura (Fig. 57B, *ev*); trichobothria paired transversally ... 39

39(38) Ostiole broad, peritreme low, long, needle-shaped (Fig. 57B, *o*); mesosternum with longitudinal calloused carina (Fig. 59A, *msc*); labium not surpassing abdominal segment IV ... *Ablaptus* Stål (Fig. 60)

- Ostiole small (Fig. 57A, *o*), peritreme elevated, shape variable; mesosternum carinate or furrowed; carina, when present, not caloused as above (Fig. 59B, *msc*); labium usually surpassing abdominal segment IV ... 40

40(39) Base of scutellum without tubercles nor tumescent ... 41

- Base of scutellum with tubercles or tumescent (Fig. 45A, 66, 69, *ts*) ... 44

41(40) Anteocular processes absent, margin of head adjacent to eyes sinuous at most (Fig. 51A, C); body surface with long setae, denser on antennae and legs; labium not surpassing abdominal segment V ... *Dinocoris* Burmeister (part) (Fig. 51)

- Anteocular processes present, acutely projected (Fig. 8A, *aop*); body surface glabrous or with short and sparse setae; labium surpassing abdominal segment V ... 42

42(41) Mesosternum and metasternum carinate mesially (Fig. 61A, *msc*, *mtc*); peritreme digitiform with thick projection continued from anterior margin (Fig. 62A, *tpp*); anterolateral margins of pronotum concave ... *Sympiezorhinchus* Spinola (Fig. 63)

- Mesosternum and metasternum without carina (Fig. 61B, *ms*, *mt*); peritreme without thick projection (Fig. 62B); anterolateral margins of pronotum sinuous or convex ... 43

43(42) Apex of scutellum reflected (Fig. 64, *as*); anterior angles of pronotum projected, reaching the level of anterior margin of eyes (Fig. 65A); head length greater than interocular width ... *Pandonotum* Ruckes (Fig. 65)

- Apex of scutellum not reflected; anterior angle of pronotum not projected (Fig. 33A); head length subequal to interocular width ... *Grassatorama* Rider (part) (Fig. 33)

44(40) Base of scutellum with a pair of tubercles (Fig. 45A, *ts*); mesosternum and metasternum without mesial carina ... 45
- Base of scutellum smooth or tumescent (Fig. 66, 69, *ts*), sometimes with small lateral tubercles; mesosternum and metasternum with or without mesial carina ... 46
45(44) Hemelytral membrane not reticulated; dorsal surface glossy (Fig. 67A); labium not surpassing abdominal segment IV; anterolateral margins of pronotum sinuous, with a median notch (Fig. 67A) ... *Paralcippus* Becker & Grazia (Fig. 67)
- Hemelytral membrane reticulated (Fig. 45B, 68B, D); dorsal surface hispid, matte (Fig. 68A, C); labium surpassing abdominal segment IV; anterolateral margins of pronotum convex or sinuous, but without median notch ... *Eurystethus* Mayr (part) (Fig. 68)
46(44) Anteocular processes present, acutely projected (Fig. 70A); hemelytral membrane reticulated (Fig. 70A); pronotum with six trans-humeral tubercles (Fig. 69, *tu*) ... *Alcippus* Stål (Fig. 70)
- Anteocular processes absent, margins of head adjacent to eyes sinuous at most (Fig. 51A, C, 72A, 73A, C); hemelytral membrane not reticulated; pronotum without trans-humeral tubercles ... 47
47(46) Body surface with long setae, denser on antennae and legs; labium not surpassing abdominal segment V ... *Dinocoris* Burmeister (part) (Fig. 51)
- Body surface glabrous or with short and sparse setae; labium surpassing abdominal segment V ... 48
48(47) Apex of scutellum not reflected; hemelytral membrane with multiple branches from the main vein, laterally distributed; pronotum deeply punctured, of rough aspect (Fig. 66B); evaporatorium not punctured, easily distinguishable (Fig. 71A, *ev*) ... *Parantiteuchus* Ruckes (Fig. 72)
- Apex of scutellum reflected (Fig. 64, *as*); hemelytral membrane with one or two long longitudinal branches from the main vein; pronotum with shallow punctures, surface not rough; evaporatorium punctured, difficult to distinguish (Fig. 71B, *ev*) ... *Agaclitus* Stål (Fig. 73)

Diagnoses to genera of non-Ochlerini discocephalines

***Abascantus* Stål, 1864 (Figs. 15 A-B)**

Type species: *Abascantus lobatus* Stål, 1864 (by monotypy).

Yellowish, sometimes ambar; punctures dark brown, forming clusters or not; macules, when present, brown; body oval. Head longer than interocular width, mandibular plates margins slightly sinuous; anteocular process absent. Antennae four-segmented. Eyes globose, not pedunculated. Bucculae widened posteriorly, strongly elevated. Labium reaching abdominal segment VII. Pronotum subtrapezoidal, anterior half declivous; shape of anterior angle variable; anterolateral margins usually sinuous with an ante-humeral spine. Scutellum tongue shaped, longer than corium and extending to apex of abdomen or nearly so. Meso and metasternum furrowed; metasternum hexagonal. Evaporatorium reaching, at most, midline of mesopleurae and extending beyond half of metapleurae; peritreme spout, troughed. Meso and metacoxae farther apart from themselves transversely than from one another longitudinally. Connexivum segments broadly expanded and serrated. Abdominal disc grooved. Female genital plates: gonocoxites 8 subtriangular, expanded to apex of abdomen and covering completely the plates of 9th and 10th segments; posterior margin of laterotergites 8 acute, spiracles hidden; plates of 9th and 10th segments reduced and fused into a campanulate piece along with gonapophysys; ring sclerites absent; thickening of vaginal intima tubular; capusla seminalis globose with projections. Male genitalia: pygophore subrectangular; dorsal rim sinuous; posterolateral angles projected; parameres ventral to segment X and overlapping ventral rim; phallotheca globose; conjunctiva absent; vesica along with ductus seminalis, both shorter than phallotheca.

Remarks. *Abascantus* was revised by Becker (1977b) and has three known species since then. Becker made an extensive genital study for this genus but did not provide a key to its species.

***Ablaptus* Stål, 1864 (Figs. 60 A-B)**

Type species: *Ablaptus amazonus* Stål, 1864 (by monotypy).

Light brown to brown with brown punctures; body oval. Head longer than interocular width, mandibular plates smoothly sinuous; anteocular process absent. Eyes globose, not pedunculated. Bucculae subrectilinear, strongly elevated. Labium reaching at least abdominal segment IV. Pronotum subhexagonal, anterior angle with a denticle or spine, humeral angles projected; anterior half declivous. Scutellum subtriangular, shorter than corium. Mesosternum medially with tumescent carina. Metasternum hexagonal, finely carinated. Evaporatorium extended beyond half of meso and metapleurae; peritreme bilobed. Abdominal disc grooved; segment III with median

tubercle, truncated; males with median process on posterior margin of tergite VII and with anterior margin of sternites VI-VII wedge. Sexual dimorphism on wings, where males have a longer corium with posterior margin of hemelytral membrane straight, coarse veins, tranversal furrow and apical thickening juxtaposed to corium margin. Female genitalia: gonocoxites 8 subtrapezoidal; laterotergites 8 with visible or hidden spiracles; laterotergites 9 digitiform; sexgment X hidden or exposed; ring sclerites apart from thickening of vaginal intima, the last subrectangular; capsula seminalis globose and without processes. Male genitalia: pygophore subrectangular; dorsal rim sinuaous; posterolateral angles projected and joint; parameres about as long as posterolateral angles, lateral to segment X and overlapping ventral rim; phallotheca elongated; connctiva present with 1+1 lateral process; vesica cuplike; ductus seminis distalis shorther than phallotheca.

Remarks. *Ablaptus* Stål was revised by Becker & Grazia (1989a) when the authors include variations to the previous diagnose of Rolston (1988) for the genus, and provided a key for the male specimens. Posteriorly, Grazia & Zwetsch (2000) described two new species based only on female specimens and provided a key for the female specimens of *Ablaptus*. The genus has eight known species.

***Acclivilamna* Ruckes, 1966 (Figs. 44 A-B)**

Type species: *Discocephala vicina* Signoret, 1851 (by original designation).

Straw colored with brown punctures; body oval. Head wider than long, mandibular plates smoothly sinuous, without anteocular processes. Eyes globose, pedunculated, slightly bent down. Bucculae widened posteriorly, barely elevated. Ventrally structured as horn, where: ocular peduncle, maxillary plates, gula and base of antennal tubercles are tumescent and mandibular plates flat. Labium reaching base of abdomen. Pronotum subtrapezoidal. Scutellum subtriangular, reaching apex of corium at most. Mesosternum laterally tumescent, without furrow, carinated only on xyphus. Metasternum hexagonal, furrowed and finely carinated. Evaporatorium extended beyond half of meso and metapleurae; peritreme spout, scalpeliform. Anterior margin of abdominal sternites VI-VII wedge on males. Female genital plates: gonocoxites 8 subrectangular; laterotergites 8 with hidden spiracles; laterotergites 9 subtriangular; segment X barely exposed; ring sclerites apart from thickening of vaginal intima, the last tubular, long; capsula seminalis globose without processes. Male genitalia: pygophore subrectangular; dorsal rim with 1+1 subrectangular projections covering

genital cup; posterolateral angles truncated, not projected; parameres lateral to segment X and parallel to ventral rim, stout and with a dorsal plate containing a series of striae appearing to be stridular patches; phallotheca globose; conjunctiva present with 1+1 lateral lobes; vesica along with ductus seminis distalis, both shorter than phallotheca.
Remarks. *Acclivilamna* is a monotypic genus described by Ruckes (1966b) and diagnosed by Rolston (1990).

***Agaclitus* Stål, 1864 (Figs. 73 A-B)**

Type species: *A. dromedarius* Stål, 1864 (by subsequent designation [Kirkaldy, 1909]).

Light brown to brown, sometimes yellowish, with brown to black punctures, these sometimes coarse and forming patches; body oval and dorsally convex. Head longer than interocular distance, margins of mandibular plates smoothly sinuous; antocular processes present, truncated. Eyes globose, pedunculated. Bucculae subrectilinear to sinuous, strongly elevated. Labium reaching at least abdominal segment VI. Pronotum subhexagonal, anterior angle with a denticle or spine, humeral angles projected; anterior half declivous. Scutellum subtriangular, shorter than corium, sometimes almost reaching apex of abdomen; humped on disc, and apex with 1+1 lateral folds. Mesosternum laterally tumescent, slightly sulcated at most, carina variable in extension; metasternum hexagonal, finely carinated. Evaporatorium extended beyond half of meso and metapleurae; peritreme spout, troughed. Abdominal disc grooved; anterior margin of sternites VI-VII wedge on males. Sexual dimorphism on wings, where males have a longer corium with posterior margin of hemelytral membrane straight, coarse veins and apical thickening juxtaposed to corium margin. Female genitalia: gonocoxites 8 subtriangular; laterotergites 8 with visible spiracles; laterotergites 9 digitiform, separated by an exposed segment X; ring sclerites apart from thickening of vagina intima, the last subrectangular; capsula seminalis globose without projections. Male genitalia: pygophore subrectangular; dorsal rim sinuous; posterolateral angles projected, joint; parameres at least reaching posterolateral angles, lateral to segment X, and overlapping ventral rim; phallotheca elongated; conjunctiva present with 1+1 lateral lobes; vesica cup like; ductus seminis distalis shorter than phallotheca.
Remarks. Becker & Grazia (1992a) revised and provided a species key for *Agaclitus*. The genus has three known species.

***Alcippus* Stål, 1867 (Figs. 70A-B)**

Type species: *Coriplatus reticulatus* Stål, 1864 (by monotypy).

Yellowish with brown punctures sometimes coarse and forming patches; body oval. Head longer than interocular distance, margins of mandibular plates strongly sinuous; anteocular processes present, digitiform. Eyes globose, pedunculated. Bucculae sinuous, slightly elevated. Labium at least reaching abdominal segment IV. Pronotum subtrapezoidal; anterior angles projected in truncate lobe; anterolateral margins sinuous and expanded, expansion ending on middle of humeral angle; usually six transhumeral tubercles present; anterior half declivous. Scutellum sutriangular, shorter than corium, humped on disc, and apex with 1+1 lateral folds. Meso and metasternum furrowed; mesosternum carinated only on xyphus; metasternum hexagonal and finely carinated. Evaporatorium extended beyond half of meso and metapleurae; peritreme spout, troughed. Meso and metacoxae farther apart from themselves transversely than from one another longitudinally. Hemelytral membrane with coarse and reticulated veins. Abdominal disc grooved; anterior margin of sternites VI-VII wedge on males. Female genital plates: gonocoxites 8 subtrapezoidal; laterotergites 8 with hidden spiracles; laterotergites 9 digitiform, separated by an exposed segment X; ring sclerites apart from thickening of vaginal intima, the last subrectangular; capsula seminalis globose with projections. Male genitalia: phygophore subrectangular; dorsal rim sinuous, projected onto base of segment X; posterolateral angles projected; parameres as long as posterolateral angles, lateral to segment X and overlapping ventral rim; phallotheca elongated; conjunctiva present with 1+1 lateral process; vesica cup like; ductus seminis distalis shorter than phallotheca.

Remarks. *Alcippus* is a monotypic genus, it was redescribed along with its type species by Becker & Grazia (1989b). The authors also provided illustrations of genital structures.

***Alveostethus* Ruckes, 1966 (Figs. 30 A-D)**

Type species: *Discocephala latifrons* Dallas, 1851 (by original designation).

Brown with concolor punctures, sometimes also with ivory macules; body oval. Head wider than long, margins of mandibular plates smoothly sinuous; anteocular processes absent. Eyes globose, sometimes slightly bent down. Bucculae widened posteriorly, barely elevated. Labium reaching abdominal segment III at most. Pronotum subtrapezoidal, not declivous. Scutellum subtriangular, shorter than corium.

Mesosternum tumescent, carinated only on xyphus; metasternum pentagonal, furrowed. Evaporatorium extended beyond half of meso and metapleurae; peritreme spout, scalpeliform. Abdominal segment III with median tubercle, truncated; anterior margin of sternites VI-VII wedge on males. Female genital plates: gonocoxites 8 subtrapezoidal; laterotergites 8 with hidden spiracles; laterotergites 9 truncated, separated by an exposed segment X; ring sclerites apart from thickening of vaginal intima, the last tubular; capsula seminalis globose without projections. Male genitalia: pygophore subquadrangular to subrectangular; dorsal rim convex to sinuous, projected onto base of segment X or not; posterolateral angles truncated or projected; parameres lateral or ventral to segment X and overlapping or not ventral rim; phallotheca globose; conjunctiva present with 1+1 short lateral processes; vesica along with ductus seminis distalis, both shorter than phallotheca.

Remarks. *Alveostethus* was redescribed by Ruckes (1966b) who also keyed its four species, and diagnosed by Rolston (1990).

***Antiteuchus* Dallas, 1851 (Figs. 25 A-B)**

Type species: *Cimex mixtus* Fabricius, 1787 (by subsequent designation [Kirkaldy, 1909]).

Color extremely variable both between and within species. Light brown to dark brown, males usually uniformelly brown, and females uniformelly colored or variegated; punctures, sometimes coarse, orange to black forming patches, transversal lines, or none; macules, when present, orange or brown to black; body oval, dorsally convex. Head longer than interocular width, margins of mandibular plates strongly sinuous; anteocular processes present, truncated. Eyes globose, pedunculated. Bucculae sinuous, strongly elevated. Labium reaching abdominal segment V. Pronotum subhexagonal, with a minute denticle on anterior angles; anterior half declivous. Scutellum subtriangular, subequal to corium at most, sometimes reching apex of abdomen or nearly so. Mesosternum slightly sulcated at most, carinated only on xyphus; metasternum hexagonal, finely carinated. Evaporatorium extended beyond half of meso and metapleurae; peritreme spout, fingerform. Abdominal disc grooved; dorsal surface of tergite VII with a median process on males; anterior margin of sternites VI-VII wedge on males. Female genital plates: gonocoxites 8 subrectangular; laterotergites 8 with visible spiracle; laterotergites 9 digitiform, separated by an exposed segment X; ring sclerites apart from thickening of vaginal intima, the last circular; capsula seminalis

globose without projections. Male genitalia: pygophore subrectangular; dorsal rim usually sinuous; posterolateral angles projected, joint, and usually tumescent; parameres laterateral to segment X and overlapping ventral rim; segment X centrally membranous; phallotheca globose; conjunctiva if present with 1+1 short lateral lobes; vesica along with ductus seminis distalis, both longer than phallotheca.

Remarks. *Antiteuchus* is the biggest genus among the discocephalines, with 45 included species and two *species inquirenda*. Fernandes & Grazia (2006) revised the genus, where the species were organized in six groups based on an unpublished phylogenetic study; all the groups are described and keyed, and keys for species in each group are available. All the keys work just for male specimens; the authors considered that females have no substantial interspecific variation in *Antiteuchus*. In the same year, Rider (2006) described another species that was not included in the review.

***Callostethus* Ruckes, 1961 (Figs. 48 A-B)**

Type species: *Edessa guttattopunctata* Fabricius, 1803 (by original designation).

Brown to dark brown, with dark brown punctures and yellow calloused maculae. Head longer than interocular width, mandibular plates margins strongly sinuous; anteocular process present, truncated. Eyes globose, pedunculated. Bucculae subrectilinear to widened posteriorly, slightly elevated. Labium reaching abdominal segment IV at most. Pronotum hexagonal, anterior angles with minute denticle; anterior half declivous. Scutellum subtriangular, shorter than corium, extending to apex of abdomen or nearly so; basal angles with a pair of calloused yellow maculae, usually more developed on females. Mesosternum with medial tumescent carinae. Metasternum hexagonal, finely carinated. Evaporatorium extended beyond half of meso and metapleurae; peritreme spout, fingerform. Abdominal disc grooved; dorsal surface of tergite VII with a median process on males; anterior margin of sternite VII wedge on males. Female genital plates: gonocoxites 8 subrectangular; laterotergites 8 with visible spiracle; laterotergites 9 digitiform, separated by an exposed segment X; ring sclerites apart from thickening of vaginal intima, the last subrectangular; capsula seminalis globose without projections. Male genitalia: pygophore subrectangular; dorsal rim sinuous; posterolateral angles projected, joint; parameres as long as posterolateral angles, lateral to segment X and overlapping ventral rim; phallotheca globose; conjunctiva present without processes; vesica along with ductus seminis distalis, both shorter than phallotheca.

Remarks. Fernandes *et al.* (2011) revised the genus when describing a new species. The genus has two known species.

***Cataulax* Spinola, 1837 (Figs. 24 A-D)**

Type species: *Hypata eximia* Stål, 1860 (by subsequent designation [Kirkaldy, 1909]).

Light brown to brown, sometimes reddish, with brown to black punctures; punctures forming patches or lines; body oval. Head longer than interocular distance, mandibular plates smoothly sinuous; anteocular processes absent or weakly developed. Eyes globose, pedunculated. Bucculae subrectilinear, strongly elevated. Labium reaching abdominal segment V; with pseudosegment between segments I and II. Pronotum hexagonal with minute denticle on anterior angles; anterior half declivous. Scutellum subtriangular, subequal to corium at most, extending to apex of abdomen or nearly so. Mesosternum with medial tumescent carina. Metasternum hexagonal, carina as a flat-topped plate. Evaporatorium extended beyond half of meso and metapleurae; peritreme spout, scalpefiform. Abdominal sternite III with median tubercle, truncated; spiracles with yellow lateral tubercle; anterior margin of sternite VII wedge on males. Sexual dimorphism on wings, where males have a longer corium, membrane with transversal furrow and posterior margin of hemelytral membrane straight; coarse veins and apical thickening juxtaposed to corium margin. Female genital plates: gonocoxites 8 subrectangular; laterotergites 8 with visible spiracles; laterotergites 9 digitiform, separated by an exposed segment X; ring sclerites apart from thickening of vaginal intima, the last subrectangular; capsula seminalis globose with or without projections. Male genitalia: pygophore subrectangular; dorsal rim convex to sinuous; posterolateral angles projected, joint; parameres projected, about as long as posterolateral angles, lateral to segment X and parallel to ventral rim; phallotheca elongated; conjunctiva present with 1+1 lateral lobes; vesica cuplike; ductus seminis distalis shorter than phallotheca.

Remarks. Revised by Grazia *et al.* (2000), *Cataulax* has eight known species but three are *insertae sedis*. The five species were keyed by the authors, but in certain point the key works only for male specimens.

***Colpocarena* Stål, 1868 (Figs. 41 A-B)**

Type species: *Sciocoris complanatus* Burmeister, 1835 (by monotypy).

Light brown, with brown punctures and macules; body oval and flat. Head wider than long, mandibular plates strongly sinuous; anteocular processes present. Eyes globose, pedunculated and slightly bent down. Bucculae widened posteriorly, barely elevated. Ventrally structured as horn, where: ocular peduncle, maxillary plates, gula and base of antennal tubercles are tumescent and mandibular plates flat. Labium reaching base of abdomen. Pronotum subrectangular, anterior angles with minute denticle. Scutellum subtriangular, shorter than corium. Mesosternum flat; metasternum hexagonal, furrowed. Evaporatorium extented beyond half of meso and metapleurae; peritreme spout, scalpeliform. Connexival segments broadly expanded. Female genital plates: gonocoxites 8 subtrapezoidal; laterotergites 8 with visible spiracles; laterotergites 9 digitiform, divergent; segment X barely exposed; ring sclerites juxtaposed to thickening of vaginal intima, the last tubular; capsula seminalis globose with projections. Male genitalia: pygophore oval; dorsal rim straight; posterolateral angles truncated, not projected; parameres ventral to segment X, and parallel to ventral rim; segment X membranous; phallotheca globose; conjunctiva present without lateral processes; vesica along with ductus seminis distalis, both shorther than phallotheca. **Remarks**. The genus and its only species were redescribed by Becker (1977a), with a full genital study. Rolston (1990) diagnosed, and Rider (2015) provided in his website a photo of facies and illustration of an unpublished new species of *Colpocarena*.

***Coriplatus* White, 1842 (Figs. 19 A-B)**

Type species: *Coriplatus depressus* White, 1842 (by monotypy).

Straw colored with brown punctures and macules; body oval, flat. Head longer than interocular width; margins of mandibular plates strongly sinuous; anteocular processes present, acute. Eyes globose, not pedunculated. Bucculae widened posteriorly, slightly elevated. Labium reaching abdominal segment VII. Pronotum subtrapezoidal; anterior angles acutely projected; anterolateral margins expanded, bilobed; usually six transhumeral tubercles present. Scutellum tongue shaped, longer than corium and extending to apex of abdomen or nearly so; 1+1 basal tubercles on disc, and 1+1 lateral folds on mid length of postfrenal lobe. Meso and metasternum furrowed; metasternum hexagonal. Evaporatorium reaching on maximum midline of mesopleurae and extending beyond half of metapleurae; peritreme spout, auricular. Meso and metacoxae farther apart from themselves transversely than from one another longitudinally. Connexival segments broadly expanded and serrated. Abdominal disc grooved. Female

genital plates: gonocoxites 8 subtriangular, expanded to apex of abdomen and covering completely the plates of 9th and 10th segments; posterior margin of laterotergites 8 acute, hidden spiracles; plates from 9th and 10th segments reduced and fused into a campanulate piece along with gonapophysys; ring sclerites absent; thickening of vaginal intima tubular; capusla seminalis globose with projections. Male genitalia: pygophore subrectangular; dorsal rim sinuous; posterolateral angles projected; parameres lateral to segment X and parallel to ventral rim; ventral rim developed, reaching posterolateral angles; phallotheca globose; conjunctiva absent; vesica along with ductus seminis distalis, both shorter than phallotheca.

Remarks. Ruckes & Becker (1970) redescribed the genus and its species with a genital study.

***Dinocoris* Burmeister, 1835 (Figs. 51A-D)**

Type species: *Dinidor maculatus* Laporte, 1832 (by subsequent designation [Kirkaldy, 1909]).

Light brown to brown, coarsely punctured in dark drown, punctures usually forming lines and maculae; sometimes with black maculae; hispid; body elliptical to oval. Head longer than interocular width; mandibular plates smoothly sinuous; anteocular processes absent. Antennae long and covered with long setae. Eyes globose, non-pedunculated. Bucculae sinuous, slightly elevated. Labium reaching at least abdominal segment IV. Pronotum subtrapezoidal, usually with a minute denticle on anterior angles; humeral angles sometimes projected; anterior half declivous. Scutellum subtriangular, subequal to corium at most; sometimes humped on disc. Mesosternum laterally tumescent, furrowed or not, carinated only on xyphus; mestasternum hexagonal, finely carinated. Evaporatorium extended beyond half of meso and metapleurae; peritreme spout, fingerform. Meso and metacoxae farther apart from themselves transversely than from one another longitudinally. Legs covered with long setae. Hemelytral membrane with coarse veins, ramose or reticulated. Connexivum segments sometimes broadly expanded. Abdominal disc grooved; anterior margin of sternite VII wedge on males. Female genital plates: gonocoxites 8 subrectangular, sinuous or not; laterotergites 8 with visible spiracles; laterotergites 9 digitiform, separated by an exposed segment X; ring sclerites apart from thickening of vaginal intima, the last circular to subrectangular; capsula seminalis globose with or without projections. Male genitalia: pygophore subrectangular; dorsal rim sinuous;

posterolateral angles projected, joint or not; parameres usually as long as posterolateral angles, lateral to segment X and parallel to ventral rim; phallotheca elongated or globose; conjunctiva absent; vesica along with ductus seminis distalis, both shorter than phallotheca.

Remarks. Becker & Grazia (1985) revised the genus and subdivided it in two subgenera, *Dinocoris* and *Praedinocoris*. A key for the *Dinocoris* genus species is also provided where the first step separates the two subgenera. *Dinocoris* has 15 species, 12 in the nominal subgenus and three in *Praedinocoris*.

***Discocephala* Laporte, 1832 (Figs. 40A-B)**

Type species: *Discocephala marmorea* Laporte, 1832 (by monotypy).

Light brown to brown, with brown punctures and maculae; body oval. Head wider than long, mandibular plates smoothly concave; anteocular processes absent. Eyes globose, pedunculated. Bucculae sinuous, barely elevated. Ventrally structured as horn, where: ocular peduncle, maxillary plates, gula and base of antennal tubercles are tumescent and mandibular plates flat. Labium not reaching abdominal base. Pronotum subrectangular, non-declivous. Scutellum subtriangular, shorter than corium. Meso and metasternum without furrow or carinae; metasternum hexagonal. Evaporatorium extended beyond half of meso and metapleurae; peritreme spout, troughed. Female genital plates: gonocoxites 8 subtriangular; laterotergites 8 with visible spiracles; laterotergites 9 digitform, separated by an exposed segment X; internally gonocoxites 9 superficially divided; ring sclerites juxtaposed to thickening of vaginal intima, the last tubular; capsula seminalis forked. Male genitalia: pygophore subrectangular; dorsal rim sinuous; posterolateral angles truncated; parameres ventral to segment X and parallel to ventral rim; segment X laterally expanded; phallotheca globose; conjunctiva present without projections; vesica along with ductus seminis distalis, both shorter than phallotheca.

Remarks. *Discocephala* has three species and was diagnosed by Rolston (1990) and revised by Becker & Grazia (1992b).

***Discocephalessa* Kirkaldy, 1909 (Figs. 34A-B)**

Type species: *Discocephala notulata* Stål, 1862 (by original designation).

Brown with dark brown punctures and maculae; ventrally black on median region; body elliptical. Head wider than long, margins of mandibular plates strongly

sinuate; anteocular processes present, truncated. Eyes globose, pedunculated. Bucculae widened posteriorly, slightly elevated. Labium reaching abdominal segment IV at most. Pronotum subtrapezoidal. Scutellum subtriangular, shorter than corium. Meso and metasternum medially furrowed; mesosternum laterally tumescent, metasternum hexagonal. Evaporatorium extended beyond half of meso and metapleurae; peritreme spout, scalpeliform. Abdominal disc grooved; anterior margin of sternites VI-VII wedge on males. Female genital plates: gonocoxites 8 subrectangular, expanded; laterotergites 8 with visible spiracles; laterotergites 9 digitiform or truncated; segment X barely visible; ring sclerites apart from thickening of vaginal intima, the last tubular; capsula seminalis globose without projections. Male genitalia: pygophore oval; dorsal rim sinuous; posterolateral angles projected; parameres lateral to segment X and parallel to ventral rim; phallotheca globose; conjunctiva present with 1+1 lateral processes; vesica along with ductus seminis distalis, both shorter than phallotheca.

Remarks. Erected as a genus by Ruckes (1966b), *Discocephalessa* has five species and one of the biggest taxonomic issues between discocephaline genera. Ruckes (1966b) redescribed the genus and its species (with the exception of *D. humilis*), and did not provide a key for its species because of what he called the '*humilis* complex of species'. The author says that the holotype of *D. humlis* is lost and he found, at least, 12 distinct patterns of pygophores in male specimens labeled as '*D. humilis*', and no one of these are from the type locality, Colombia. Rolston (1990) diagnosed the genus.

***Dryptocephala* Laporte, 1832 (Figs. 56A-B)**

Type species: *Dryptocephala brullei* Laporte, 1832 (by monotypy).

Straw colored with brown or black punctures and maculae; body oval to subquadrangular. Head wider than long, margins of mandibular plates strongly sinuous; anteocular processes, when present, acute or lobular. Eyes small, globose, and pedunculated. Bucculae widened posteriorly, slightly elevated. Labium not reaching base of abdomen. Pronotum subreniform, anterolateral margins expanded and sometimes with projections; anterior half declivous. Scutellum subtriangular, subequal to corium at most. Meso and metasternum furrowed; metasternum hexagonal. Evaporatorium extended beyond half of meso and metapleurae; peritreme spout, troughed. Abdominal sternite III sometimes with median tubercle, truncated; anterior margin of sternite VI-VII sometimes wedge on males. Female genital plates: gonocoxites 8 subrectangular; laterotergites 8 with spiracles visible or hidden;

laterotergites 9 digitiform, separated by an exposed segment X; ring sclerites apart from thickening of vaginal intima, the last tubular; capsula seminalis globose with or whithout projections. Male genitalia: pygophore oval; dorsal rim sinuous, sometimes projected over base of segment X; posterolateral angles projected; parameres projected, about as long as posterolateral angles, lateral to segment X and parallel to ventral rim; phallotheca globose; conjunctiva present with 1+1 process; vesica along with ductus seminis distalis, both shorter than phallotheca.

Remarks. *Dryptocephala* is the third biggest genus between the discocephalines with 15 known species (two placed as *insertae sedis*). The genus was revised and keyed by Ruckes (1966c), and Barreiro *et al.* (in prep.) are redescribed *D. spiniosa* and provided a phylogenetic relationship hypothesis for the species of the genus.

***Eurystethus* Mayr, 1864 (Figs. 68A-D)**

Type species: *Eurystethus nigropunctatus* Mayr, 1864 (by monotypy).

Color extremely variable between species (straw colored, light brown to dark brown), puncutures usually brown to black; maculae, when present, brown to black, sometimes reddish; surface sometimes hispid; body elliptical to oval. Head longer than interocular width; margins of mandibular plates smoothly to strongly sinuous; anteocular processes absent to present, acute. Eyes globose, pedunculated or not. Bucculae sinuous or larger posteriorly, strongly elevated. Labium reaching at least middle of abdominal disc; with pseudo-segment between segments I and II. Pronotum subtrapezoidal to subrectangular, anterolateral margins expanded or not; anterior angles with minute denticle to acutely projected, or lobular; anterior half slightly to strongly declivous; usually six transhumeral tubercles present, or absent. Scutellum subtriangular, shorter or subequal to corium; disc usually with 1+1 tubercles. Mesosternum on maximum with a shallow furrow. Metasternum hexagonal, sometimes furrowed. Evaporatorium usually extended beyond half of meso and metapleurae; peritreme spout, troughed. Meso and metacoxae farther apart from themselves transversely than from one another longitudinally. Hemelytral membrane with reticulated veins. Abdominal disc grooved. Female genital plates: gonocoxites 8 subrectangular; laterotergites 8 usually with hidden spiracles; laterotergites 9 digitiform to hatchet shaped; segment X hidden; ring sclerites usually juxtaposed to thickening of vaginal intima, the last tubular; capsula seminalis usually globose with projections. Male genitalia: pygophore subrectangular; dorsal rim sinuous projecting or not over

base of segment X; posterolateral angles projected; parameres usually lateral to segment X and overlapping ventral rim; phallotheca globose; conjunctiva absent; vesica along with ductus seminis distalis, both shorther than phallotheca.

Remarks. *Eurystethus* is the second largest genus between the discocephalines with 18 species. Ruckes (1966d) revised the genus and subdivided it into two subgenera: *Eurystethus* and *Hispidisoma*. The subgenus *Eurystethus* has nine known species, and *Hispidisoma* has seven; additionally there are two species described by Becker (1966) not included in any of the subgenera, or in the keys provided by Ruckes (1966a). Trophobiosis between ants and *E. (H). microlobatus* Ruckes was recorded (Guerra *et al.* 2011).

***Glyphuchus* Stål, 1860 (Figs. 10A-B)**

Type species: *Glyphucus sculpturatus* Stål, 1860 (by monotypy).

Light brown with brown punctures; body oval. Head longer than interocular width; margins of mandibular plates strongly sinuous, apex straight; anteocular processes present, acute. Eyes globose, not pedunculated. Bucculae widened posteriorly, strongly elevated. Labium reaching abdominal base. Labrum large, lunate in silhouette. Pronotum subrectangular; anterolateral margins explanate, declivous on anterior half. Scutellum subtriangular, subequal to corium. Mestasternum hexagonal. Evaporatorium extended beyond half of metapleurae; peritreme spout, troughed. Meso and metacoxae farther apart from themselves transversely than from one another longitudinally. Tarsi 2-segmented. Connexival segments broadly expanded and serrated. Female genital plates: gonocoxites 8 subtrapezoidal; laterotergites 8 with visible spiracles, posterior margin acute; laterotergites 9 digitiform, juxtaposed; segment X hidden; internal structures unknown. Male unknown.

Remarks. *Glyphuchus* is a monotypic genus known only from the female holotype of its species, and the most recent citation was made in Kirkaldy's catalog (1909). The diagnosis provided here was made only from photos of the holotype, because of this some structures that we cannot see perfectly are not included.

***Grassatorama* Rider, 1998 (Figs. 33A-B)**

Type species: *Platycarenus nigroventris* Ruckes,1958 (by original designation).

Light brown to brown with brown punctures and maculae, ventrally black on median region; body oval. Head about as long as interocular width; margins of

mandibular plates strongly sinuous; anteocular processes present, acute. Eyes globose, pedunculated. Bucculae sinuous, barely elevated. Labium reaching abdominal segment VII; with pseudo-segment between segments I and II. Pronotum subtrapezoidal; anterolateral margins expanded, sometimes sinuous, expansion ending on middle of humeral angles. Scuttelum subtriangular, shorter than corium. Meso and metasternum furrowed and without carina; mesosternum laterally tumescent and metasternum hexagonal. Evaporatorium extended beyond half of meso and metapleurae; peritreme spout, scalpeliform. Hemelytral membrane with ramose or reticulated veins. Abdominal disc grooved; anterior margin of sternite VII wedge on males. Female genital plates: gonocoxites 8 subrectangular; laterotergites 8 with visible spiracle; gonocoxites 9 barely visible; laterotergites 9 hatchet shaped; segment X hidden; ring sclerites apart from thickening of vaginal intima, the last tubercular; capsula seminalis globose with projections. Male genitalia: pygophore subrectangular; dorsal rim sinuous; posterolateral angles projected; parameres lateral to segment X, overlapping ventral rim; phallotheca elongated; conjunctiva absent; vesica along with ductus seminis distalis, both shorther than phallotheca.

Remarks. *Grassatorama* is a new name for the original *Grassator* Ruckes, 1965. The genus has three species known only by the original description of Ruckes (1965).

***Harpagogaster* Kormilev, 1957 (Figs. 36A-B)**

Type species: *Harpagogaster willineri* Kormilev, 1957 (by original designation).

Light brown with brown punctures; body oval. Head shorter than interocular width; margins of mandibular plates strongly sinuous; anteocular processes present, acute. Eyes globose, pedunculated. Bucculae widened posteriorly, slightly elevated. Labium reaching abdominal segment IV. Pronotum subrectangular, anterolateral margins expanded; non-declivous. Scutellum subtriangular, shorter than corium. Meso and metasternum furrowed and without carina; metasternum hexagonal. Evaporatorium extended beyond half of meso and metapleurae; peritreme spout, troughed. Hemelytra short, leaving abdominal tergites partially visible. Abdominal disc grooved and anterior margin of sternites VI-VII wedge on males. Female genital plates: gonocoxites 8 subrectangular; laterotergites 8 with visible spiracle; laterotergites 9 truncated; segment X barely exposed; ring sclerites apart from thickening of vaginal intima, the last tubular; capsula seminalis globose with projections. Male genitalia: pygophore subquadrangular; dorsal rim sinuous, projected over base of segment X; posterolateral angles joint and

projected; parameres as long as posterolateral angles, lateral to segment X and parallel to ventral rim; phallotheca globose; conjunctiva present with 1+1 lateral lobes, short; vesica along with ductus seminis distalis, both shorther than phallotheca.

Remarks. *Harpagogaster* is another monotypic genus without recent works. Its species is known by the original description (Kormilev 1957) and additional specimens (Ruckes 1960; Pirán 1962). Rolston (1990) diagnosed the genus.

***Ischnopelta* Stål, 1868 (Figs. 12A-B)**

Type species: *Discocephala scutellata* Signoret, 1851 (by subsequent designation [Kirkaldy, 1909]).

Light brown to brown, coarsely punctured in brown; body elliptical. Head shorter than interocular distance; mandibular plates smoothly sinuous; anteocular processes absent. Eyes globose, pendunculated, bent down. Bucculae sinuous, barely elevated. Ventrally structured as horn, where: ocular peduncle, maxillary plates, gula and base of antennal tubercles are tumescent and mandibular plates flat. Labium reaching abdominal base. Pronotum subrectangular, non-declivous. Scutellum tongue shaped, as long as corium, almost reaching apex of abdomen. Mesosternum flat and not carinate. Metasternum lozenge, furrowed. Evaporatorium extended beyond half of meso and metapleurae; peritreme spout, scalpeliform. Anterior margin of abdominal sternite VII wedge on males, and posterior margin of sternite VII sometimes with 1+1 convex projections over genital plates on females. Female genital plates: gonocoxites 8 subrectangular; laterotergites 8 with spiracle sometimes hidden by projection of sternite VII; laterotergites 9 digitiform, separated by an exposed segment X; internally gonocoxites 9 superficially divided; ring sclerites juxtaposed with thickening of vaginal intima, the last tubercular; capsula seminalis globose with projections. Male genitalia: pygophore globose; posterolateral angles projected or truncated; segment X globose, pilose, covering the parameres; parameres ventral to segment X, parallel to ventral rim; phallotheca elongated; conjunctiva absent; vesica along with ductus seminis distalis, both subequal to phallotheca.

Remarks. *Ischnopelta* has three known species, and its most recent citation was the transference of *I. luteicornis* from *Discocephala* by Becker & Grazia (1992b). The genus was diagnosed by Rolston (1990). This is another genus with lots of material in museum collections, and requiring a revision.

***Lineostethus* Ruckes, 1966 (Figs. 43A-B)**

Type species: *Discocephala clypeatus* Stål, 1962 (by original designation).

Light brown with brown punctures and sometimes with brown or reddish maculae; body oval. Head shorter than interocular distance; mandibular plates smoothly sinuous; anteocular processes absent or present. Eyes globose, pendunculated, bent down. Bucculae sinuous, barely elevated. Ventrally structured as horn, where: ocular peduncle, maxillary plates, gula and base of antennal tubercles are tumescent and mandibular plates flat. Labium reaching abdominal base. Pronotum subhexagonal, non-declivous. Scutellum subtriangular, shorter than corium. Mesosternum laterally tumescent, medially furrowed with xyphus finely carinated. Metasternum lozenge, furrowed and carinated. Evaporatorium extended beyond half of meso and metapleurae; peritreme spout, scalpeliform. Female genital plates: gonocoxites 8 subretangular; laterotergites 8 with spiracles visible or hidden; gonocoxites 9 slightly visible, trapezoidal; laterotergites 9 digitiform, convergent, separated by an exposed segment X; ring sclerites apart from thickening of vaginal intima, the last subrectangular; capsula seminalis globose without projections. Male genitalia: pygophore globose; dorsal rim with 1+1 subtriangular to subrectangular projections covering partially or completely the genital cup; posterolateral angles truncated, not projected; parameres lateral to segment X and perpendicular to ventral rim; ventral rim sinuous with inferior layer projected, in posterior view M-shaped outline with tumescence and shape varying between species; phallotheca jar shaped; conjunctiva absent; vesica along with ductus seminis distalis, as a hood; ductus seminis distalis at least as long as phallotheca.
Remarks. Hildebrand & Becker (1982) described new species and made a study of genital structures of *Lineostethus,* without redescribing the genus or the previous three species, nor providing a key. Rolston (1990) diagnosed *Lineostethus*.

***Mecistorhinus* Dallas, 1851 (Figs. 54A-B)**

Type species: *Mecistorhinus rufescens* Dallas, 1851 (by monotypy).

Color extremely variable between species (straw colored, light brown to dark brown, reddish), puncutures usually brown to black; maculae, when present, brown to black; body oval, dorsally convex. Head longer than interocular distance; margins of mandibular plates smoothly sinuous; anteocular processes, when present, truncate. Eyes globose, pedunculated. Bucullae sinuous, barely elevated. Labium reaching at least abdominal segment VI. Pronotum subtrapezoidal, usually with minute denticle on

anterior angles; declivous on anterior half. Scutellum subtriangular, shorter than corium. Mesosternum flat to slightly furrowed, with a thin carina. Metasternum hexagonal, carinated. Evaporatorium extended beyond half of meso and metapleurae; peritreme spout, fingerform. Metatibiae sometimes with a ventral spatulate process, placed under first tarsi segment, this process usually more developed in females. Abdominal disc grooved; anterior margin of sternite VII wedge on males. Female genital plates: gonocoxites 8 subtriangular; laterotergites 8 with visible spiracles; laterotergites 9 digitiform, separated by an exposed segment X; ring sclerites apart from thickening of vaginal intima, the last circular; capsula seminalis globose without processes. Male genitalia: pygophore subrectangular; dorsal rim sinuous; posterolateral angles joint, projected, usually spatulate; parameres almost as long as posterolateral angles, lateral to segment X and overlapping ventral rim; phallotheca elongated; conjunctiva present, with 1+1 lateral lobes; vesica along with ductus seminis distalis, both as long as phallotheca.

Remarks. *Mecistorhinus* is one of the most numerous genera of discocephalines, with 11 species, and one of the genera requiring a review. This genus was never revised, and its species where described in a bunch of different papers. Ruckes (1961) diagnosed the genus and provided a comparative table to differentiate *Mecistorhinus* from *Antiteuchus* and *Callostethus*.

***Oncodochilus* Fieber, 1851 (Figs. 9A-B)**

Type species: *Oncodochilus aradiformis* Herrich-Schäeffer, 1844 (by monotypy).

Light brown to brown, coarsely punctured in brown; body oval. Head about as long as wide; margins of mandibular plates strongly sinuous; anteocular processes present, acute. Eyes globose, pedunculated. Bucculae subrectilinear, strongly elevated. Labium reaching abdominal base at most. Labrum large, lunate in silhouette. Pronotum subtrapezoidal; anterolateral margins expanded and usually sinuous; non-declivous. Scutellum subtriangular, subequal to corium. Hemelytral membrane with reticulated veins. Mesosternum furrowed. Metasternum hexagonal and flat. Evaporatorium extended beyond half of meso and metapleurae; peritreme spout, auricular. Meso and metacoxae farther apart from themselves transversely than from one another longitudinally. Tarsi two-segmented. Lateral margin of connexival segments straight to sinuous. Abdominal disc grooved. Female genital plates: gonocoxites 8 subtrapezoidal; laterotergites 8 with visible spiracles; laterotergites 9 digitiform, juxtaposed; segment X

hidden; ring sclerites juxtaposed to thickening of vaginal intima, the last tubular; capsula seminalis globose with projections. Male genitalia: pygophore subquadrangular; dorsal rim sinuous; posterolateral angles projected; parameres usually as long as posterolateral angles, lateral to segment X and parallel to ventral rim; phallotheca globose; conjunctiva absent; vesica along with ductus seminis distalis, both shorther than phallotheca.

Remarks. This is another genus that needs revision; it has five known species, four of them assigned in two subgenera, *Oncodochilus* and *Oncoeochilus*. The most recent citations for *Oncodochilus* were made by Kirkaldy (1909) and Breddin (1912 – *O. integer* description). We have found in entomological collections specimens probably belonging to new species.

***Opophylax* Bergroth, 1918 (Figs. 58A-B)**

Type species: *Opophylax extenebratus* Bergroth, 1918 (by position precedence).

Light brown to brown, with brown punctures and maculae; body oval. Head about as long as wide; margins of mandibular plates strongly sinuous; anteocular processes present, acute. Eyes globose, pedunculated. Bucculae sinuous, strongly elevated. Labium reaching abdominal base at most. Pronotum subtrapezoidal; anterior angles projected; anterolateral margins explanate and finely serrated; declivous on anterior half. Scutellum tongue shaped, subequal to corium. Mesosternum flat and carinated. Metasternum lozenge, furrowed and without carina. Evaporatorium reaching mesopleural margin at most and half of metapleurae width; peritreme spout, auricular. Female genital plates: gonocoxites 8 oval; laterotergites 8 with visible spiracles; laterotergites 9 digitiform, separated by an exposed segment X; ring sclerites apart from thickening of vaginal intima, the last subrectangular; capsula seminalis globose without projections. Male genitalia: pygophore subquadrangular; dorsal rim sinuous; posterolateral angles projected and usually explanate; parameres usually as long as posterolateral angles, placed lateral to segment X and overlapping ventral rim; ventral rim usually with 1+1 projections on base of posterolateral angles; segment X dilated at baseline; phallotheca elongated; conjunctiva present with 1+1 lateral lobes; vesica cup-like; ductus seminis distalis shorter than phallotheca.

Remarks. Known only from the original description by Bergroth (1918), *Opophylax* has two species. We have found specimens in entomological collections probably belonging to new species.

***Pandonotum* Ruckes, 1965 (Figs. 65A-B)**

Type species: *Pandonotum punctiventris* Ruckes, 1965 (by original designation).

Light brown to brown, with brown punctures and maculae; body oval. Head longer than interocular width; margins of mandibular plates strongly sinuous; anteocular processes present, acute. Segments of antennal pedicel dorsally flattened, furrowed or not. Eyes globose, pedunculated. Bucculae sinuous, with anterior angle triangular, strongly elevated. Labium reaching abdominal segments VI-VII; with pseudo-segment between segments I and II. Pronotum subrectangular; anterolateral marigns expanded, foliaceous; anterior angles projected; declivous on anterior half. Scutellum subtriangular, shorter than corium, apex with 1+1 lateral folds. Mesosternum furrowed; metasternum hexagonal, flat. Evaporatorium extended beyond half of meso and metapleurae; peritreme spout, grooved. Meso and metacoxae farther apart from themselves transversely than from one another longitudinally. Hemelytral membrane with reticulated veins. Abdominal disc grooved. Female genital plates: gonocoxites 8 subtriangular to subrectangular; laterotergites 8 with visible spiracles; laterotergites 9 oval, separated by an exposed segment X; ring sclerites apart from thickening of vaginal intima, the last tubular; capsula seminalis globose with projections. Male genitalia: pygophore subquadrangular; dorsal rim sinuous; posterolateral angles projected; parameres about as long as posterolateral angles, lateral to segment X, parallel to ventral rim; phallotheca globose; conjunctiva present, with 1+1 lateral lobes; vesica cup-like; ductus seminis distalis shorter than phallotheca.

Remarks. Described by Ruckes (1965), *Pandonotum* has two known species, the second one described by Becker (1967).

***Paralcippus* Becker & Grazia, 1986 (Figs. 38A-B)**

Type species: *Alcippus dimidiatus* Ruckes, 1959 (by original designation).

Light brown to brown, with brown punctures; body oval. Head longer than interocular width; margins of mandibular plates strongly sinuous; anteocular processes present, projected and digitiform. Eyes globose, pedunculated. Bucculae widened posteriorly, strongly elevated. Labium reaching abdominal segment IV. Pronotum subtrapezoidal, anterolateral margins foliaceous, expanded; declivous on anterior half. Scutellum subtriangular, shorter than corium; disc with a pair of tubercles; apex with 1+1 lateral folds. Meso and metasternum furrowed, not carinated; metasternum

hexagonal. Evaporatorium extended beyond half of meso and metapleurae; peritreme spout, troughed. Legs with setae longer than tibial diameter. Meso and metacoxae farther apart from themselves transversely than from one another longitudinally. Connexival segments broadly expanded. Abdominal disc grooved. Female genital plates: gonocoxites 8 subrectangular, expanded; laterotergites 8 with visible spiracles; gonocoxites 9 barely visible; laterotergites 9 digitiform, separated by an exposed segment X; ring sclerites apart from thickening of vaginal intima; the last tubular; capsula seminalis globose, with projections. Male genitalia: pygophore subquadrangular; dorsal rim convex; posterolateral angles long; parameres shorter than posterolateral angles, lateral to segment X and overlapping ventral rim; phallotheca globose; conjunctiva absent; vesica along with ductus seminis distalis, both shorter than phallotheca.

Remarks. *Paralcippus* is monotypic, and known only by its original description by Becker & Grazia (1986).

***Parantiteuchus* Ruckes, 1962 (Figs. 72A-B)**

Type species: *Parantiteuchus hemitolus* Ruckes, 1962 (by original designation).

Variegated in yellow and brown, coarsely punctured in dark drown; body oval and strongly convex dorsally. Head longer than interocular width; margins of mandibular plates smoothly sinuous; anteocular processes present and truncate. Eyes globose, pedunculated. Bucculae subrectilinear, strongly elevated. Labium reaching abdominal segment V. Pronotum subtrapezoidal, with minute denticle on anterior angles; declivous on anterior half. Scutellum tongue shaped, almost reaching apex of abdomen, shorter than corium; strongly humped on disc. Mesosternum medially with tumescent carina. Metasternum hexagonal, finely carinated. Evaporatorium extended beyond half of meso and metapleurae; peritreme spout, fingerform. Abdominal disc grooved; anterior margin of sternite VII wedge on males. Female genital plates: gonocoxites 8 subrectangular, expanded; laterotergites 8 with visible spiracles; laterotergites 9 elliptical, convergent, separated by an exposed segment X; ring sclerites apart from thickening of vaginal intima; the last subrectangular; capsula seminalis globose, without projections. Male genitalia: pygophore subrectangular; dorsal rim sinuous projecting over base of segment X; posterolateral angles long, joint; parameres as long as posterolateral angles, lateral to segment X and overlapping ventral rim;

phallotheca elongated; conjunctiva present, with 1+1 lateral lobes well developed; vesica along ductus seminis distalis, both shorter than phallotheca.

Remarks. *Parantiteuchus* is monotypic and known from the original description and subsequent description of male (Ruckes 1962; Fernandes & Grazia 2002).

***Parvamima* Ruckes, 1960 (Figs. 29A-B)**

Type species: *Parvamima bicolor* Ruckes, 1960 (by original designation).

Light brown to brown, head and anterior half of pronotum lighter than rest of the body; punctures brown; body oval. Head at least as wide as long; margins of mandibular plates slightly sinuous; anteocular processes present or not. Eyes globose, pedunculated. Bucculae widened posteriorly, slightly elevated. Labium not exceeding base of abdomen. Pronotum subtrapezoidal, with minute denticle on anterior angles; declivous on anterior half. Scutellum subtriangular, shorter than corium. Mesosternum medially with tumescent carina. Metasternum pentagonal, carina as a flat-topped plate. Evaporatorium extended beyond half of meso and metapleurae; peritreme spout, scalpeliform. Abdominal sternite III with median tubercle, truncated; posterior margin of tergite VII on males sinuous, with posterolateral angles projected and with a large median process; anterior margin of sternites VI-VII wedge on males. Female genital plates: gonocoxites 8 subtriangular; laterotergites 8 with visible spiracles; gonocoxites 9 barely visible, superficially divided; laterotergites 9 tumescent, subrectangular; segment X exposed; ring sclerites juxtaposed to thickening of vaginal intima, the last tubular; capsula seminalis globose without projections. Male genitalia: pygophore subrectangular, genital capsule distinctively long; dorsal rim sinuous; posterolateral angles joint, subrectangular; parameres as long as posterolateral angles, lateral to segment X and overlapping ventral rim; phallotheca elongated; conjunctiva present with 1+1 lateral processes; vesica cup-like; ductus seminis distalis shorter than vesica.

Remarks. *Parvamima* has two species known from their original descriptions (Ruckes 1960; Rolston 1987). Rolston (1987) made differential drawings of the males' genital structures of both species.

***Patronatus* Ruckes, 1965 (Figs. 53A-B)**

Type species: *Patronatus binotatus* Ruckes, 1965 (by original designation).

Brown with brown punctures and dark brown or black maculae; head and pronotum with median percurrent pale line; body oval and dorsally convex. Head longer

than interocular width; mandibular plates uniformly convex; anteocular processes present, truncated. Eyes globose, pedunculated. Bucculae sinuous, slightly elevated. Labium not exceeding middle of abdominal disc. Pronotum hexagonal, with minute denticle on anterior angles; declivous on anterior half. Scutellum subtriangular, shorter than corium. Mesosternum narrowed or not, with carinated xyphus. Metasternum hexagonal, flat and carinated. Evaporatorium extended beyond half of meso and metapleurae; peritreme spout, fingerform. Abdominal disc grooved; anterior margin of sternites VI-VII wedge on males. Female genitalia: gonocoxites 8 subtrapezoidal, expanded; laterotergites 8 with visible spiracles; laterotergites 9 tuncated; segment X barely exposed; ring sclerites apart from thickening of vaginal intima, the last tubular; capsula seminalis globose with projections. Male genitalia: pygophore subquadrangular; dorsal rim sinuous; posterolateral angles joint, flat expanded; parameres as long as posterolateral angles, lateral to segment X and overlapping ventral rim; phallotheca globose; conjunctiva present with 1+1 lateral processes; vesica cup-shaped; ductus seminis distalis shorter than phallotheca.

Remarks. *Patronatus* is known from three species, all of them known from the original descriptions by Ruckes (1965).

***Pelidnocoris* Stål, 1867 (Figs. 20A-B)**

Type species: *Pelidnocoris stalii* Haglund, 1868 (by subsequent designation [Haglund, 1868]).

Straw colored with brown punctures; body oval and flat. Head longer than interocular width; margins of mandibular plates strongly sinuate; anteocular processes present, acute, with variable length. Eyes globose, pedunculated. Bucculae widened posteriorly, strongly elevated. Labium reaching at least abdominal segment VI. Pronotum subtrapezoidal; anterior angles acutely projected, with variable length; anterolateral margins expanded and bilobed. Scutellum tongue shaped, longer than corium and extending to apex of abdomen or nearly so; 1+1 basal tubercles on disc. Mesosternum narrowed or not, without carina. Metasternum hexagonal, furrowed. Evaporatorium at most reaching midline of mesopleurae and extending beyond the half of metapleurae; peritreme spout, troughed. Meso and metacoxae farther apart from themselves transversely than from one another longitudinally. Connexival segments broadly expanded and serrated. Abdominal disc grooved. Female genital plates: gonocoxites 8 subrectangular, expanded to apex of abdomen and hiding completely the

plates of 9th and 10th segments; posterior margin of laterotergites 8 straight to sinuous, spiracles visible; plates of 9th and 10th segments reduced and fused into a campanulate piece along with gonapophysys 9; ring sclerites absent; thickening of vaginal intima tubular; capusla seminalis globose with projections. Male genitalia: pygophore subrectangular; dorsal rim convex; posterolateral angles expanded and flat; segment X greatly dilated laterally and apically, subtriangular in outline, anal opening visible; parameres ventral to segment X and parallel to ventral rim; phallotheca globose; conjunctiva absent; vesica along with ductus seminis distalis, both shorter than phallotheca.

Remarks. The genus was revised by Ruckes (1966a) and has three known species.

***Phineus* Stål, 1862 (Figs. 28A-B)**

Type species: *Phineus fusco-punctatus* Stål, 1862 (by monotypy).

Ligth brown with brown punctures, body elliptical. Head longer than interocular width; mandibular plates as long as clypeus; lateral margins strongly sinuate; anteocular processes present, subtriangular. Eyes globose, pedunculated. Bucculae sinuous, strongly elevated. Labium reaching base of abdomen. Pronotum reniform, non-sloping. Scutellum subtriangular, subequal to corium. Meso and metasternum flat and finely carinated, metasternum lozenge. Evaporatorium as a large band, short in length on mesopleurae, and extended beyond half of metapleurae; peritreme spout, auricular. Legs with sparse setae longer than tibial diameter. Abdominal sternite III with median acute tubercle. Female genital plates: gonocoxites 8 subrectangular; laterotergites 8 with spiracles barely visible; gonocoxites 9 exposed, superficially divided; laterotergites 9 digitiform, convergent, separated by a exposed segment X; ring sclerites apart from thickening of vaginal intima, the last circular; capsula seminalis globose with projections. Male genitalia: pygophore subrectangular; dorsal rim sinuous; posterolateral angles round, medially depressed; parameres lateral to segment X and parallel to ventral rim; phallotheca elongated with lateral spatulate projections; conjunctiva present without processes; vesica along with ductus seminis distalis, both ventrally curved and shorter than phallotheca.

Remarks. *Phineus* is monotypic, known only by its original description (Stål 1862), and the last genus to be included between the discocephalines by Rolston *et al.* (1980).

***Phoeacia* Stål, 1862 (Figs. 22A-B)**

Type species: *Discocephala lineaticeps* Stål, 1860 (by original designation).

Light brown with brown punctures and a variegated pattern of ferrugineus maculae; body elliptical. Head wider than long; margins of mandibular plates uniformly convex; anteocular process absent. Antennae four-segmented. Eyes globose, pedunculated, bending down. Bucculae sinuous, slightly elevated. Labium reaching base of abdomen. Pronotum hexagonal, sometimes with a minute denticle on anterior angle; non-sloping. Scutellum tongue-shaped, longer than corium and extending to apex of abdomen or nearly so. Mesosternum without furrow or carina. Metasternum lozenge, furrowed, without carina. Evaporatorium extented beyond the half of meso and metapleurae; peritreme spout, scalpeliform. Female genital plates: gonocoxites 8 subtrapezoidal, expanded over plates from 9th segment; laterotergites 8 with spiracles visible; laterotergites 9 subrectangular, medially juxtaposed; ring sclerites juxtaposed with thickening of vaginal intima, the last tubular; capsula seminalis globose with projections. Male genitalia: pygofore oval; dorsal rim sinuous; posterolateral angles strongly varying in shape and size, as well as the parameres; parameres usually lateral to segment X; phallotheca globose; conjunctiva present with 1+1 lateral lobes weakly developed; vesica along with ductus seminis distalis, the last shorter than phallotheca. **Remarks**. *Phoeacia* is known of three species, and its generic arrangement did not change after Kirkaldy (1909). After this, only Rolston (1990) diagnosed the genus. This genus has many undetermined specimens in scientific collections that probably belong to new species.

***Placidocoris* Ruckes, 1965 (Figs. 37A-B)**

Type species: *Placidocoris bivitattus* Ruckes, 1965 (by original designation).

Light brown with brown punctures; body elliptical and flat. Head wider than long; margin of mandibular plates sinuate; anteocular process present, truncated. Eyes globose, pedunculated. Bucculae widened posteriorly, slightly elevated. Labium reaching VI abdominal segment at most. Pronotum reniform; anterolateral margins expanded. Scutellum subtriangular, shorter than corium. Meso and metasternum furrowed and not carinated; metasternum hexagonal. Evaporatorium extented beyond the half of meso and metapleurae; peritreme spout, troughed. Hemelytrum short, leaving abdominal tergites partially visible. Anterior margin of abdominal sternites VI-VII wedge on males. Female genital plates: gonocoxites 8 subtriangular; laterotergites 8

with spiracles visible; laterotergites 9 tumescent and subrectangular; segment X exposed; ring sclerites apart from thickening of vaginal intima, the last tubular; capsula seminalis globose with projections. Male genitalia: pygophore subrectangular; dorsal rim projected onto segment X surface; posterolateral angles truncated, joint; parameres lateral to segment X, parallel to ventral rim; phallotheca globose; conjunctiva present with 1+1 lateral lobes weakly developed; vesica along with ductus seminis distalis, the last shorter than phallotheca.

Remarks. The genus is monotypic and known from its original description (Ruckes 1965) and Rolston (1990) diagnosed *Placidocoris*.

***Platycarenus* Fieber, 1860 (Figs. 32A-B)**

Type species: *Cydnus umbraculatus* Fabricius, 1803 (by monotypy).

Light brown with brown punctures; ventrally black on median region; body oval. Head wider than long; margin of mandibular plates sinuate; anteocular process present, truncated. Eyes elliptical, pedunculated, bending down. Bucculae sinuous, barely elevated. Ventrally structured as horn, where: ocular peduncle, maxillary plates, gula and base of antennal tubercles are tumescent and mandibular plates flat. Labium reaching base of adomen. Pronotum quadrangular with anterolateral margins subparallel, finely serrated; non-sloping. Scutellum tongue shaped, subequal to corium in length. Mesosternum laterally tumescent, furrowed and not carinated. Metasternum hexagonal, furrowed. Evaporatorium reaching on maximum midline of mesopleurae and extending beyond the half of metapleurae; peritreme spout, auricular. Anterior margin of abdominal sternite VII wedge on males. Female genital plates: gonocoxites 8 subtrapezoidal, expanded over laterotergites 9; laterotergites 8 with spiracles hidden; laterotergites 9 subrectangular, hiding segment X; gonocoxites 9 barely visible externally; ring sclerites apart from thickening of vaginal intima, the last subrectangular; capsula seminalis globose without projections. Male genitalia: pygophore subrectangular; dorsal rim acutely projected over genital cup laterally to segment X; posterolateral angles well developed, tumescent without joint; parameres lateral to segment X and overlapping ventral rim; phalltheca globose, with 1+1 apical tubercles; conjunctiva present, without lateral process; vesica along with ductus seminis distalis, with a process behind it; ductus seminis distalis shorther than phallotheca.

Remarks. Ruckes (1966b) revised the genus and transferred to other genera almost all the species, leaving *Platycarenus* as monotypic. Rolston (1990) diagnosed the genus.

***Priapismus* Distant, 1889 (Figs. 3A-B, 4A-B)**

Type species: *Priapismus foveatus* Distant, 1889 (by subsequent designation [Kirkaldy, 1909]).

Light brown to dark brown, glossy, with light brown or dark brown macules; punctures brown and deep; body oval. Head longer than interocular width, mandibular plates as long as clypeus; lateral margins slightly sinuate; anteocular processes absent. Eyes globose, pedunculated. Bucculae widened posteriorly, strongly elevated. Labium reaching half of abdomen. Labrum longer than labium, forming a loop before fitting on labium. Pronotum subtrapezoidal with a diminute denticle on anterior angle; non-sloping. Scutelum subtriangular, subequal to corium on length. Mesosternum without furrow and medially with tumescent carinae. Metasternum hexagonal, furrowed, not-carinated. Evaporatorium reaching on maximum midline of mesopleurae as a large band and extending to the half of metapleurae; peritreme spout, auricular. Meso and meta tibiae with dorsolateral and apical spines. Female genital plates: gonocoxites 8 subtriangular, not-expanded; laterotergites 8 without spiracles; gonocoxites 9 sometimes visible; laterotergites 9 digitiform, convergent, not reaching the tergite 8; segment X exposed; ring sclerites apart from thickening of vaginal intima, the last circular; capsula seminalis globose with projections. Male genitalia: pygophore globose; dorsal rim convex; posterolateral angles truncated, in line with or slightly surpassing inferior layer of ventral rim; parameres ventral to segment X, parallel to ventral rim and not surpassing it; phallotheca elongated with lateral spatulated projections; vesica along with ductus seminis distalis, the last shorter than phallotheca; conjunctiva present without lateral process.

Remarks. Rolston (1984) revised the genus and provided a key to its species, but after he described another species for the genus and did not updated the key (Rolston 1992b). *Priapismus* has five known species today.

***Psorus* Bergroth, 1914 (Figs. 17A-B)**

Type species: *Psorus cassidiformis* Bergroth, 1914 (by monotypy).

Variegated in yellow and brown, punctures dark drown to ferrigineous; body oval. Head longer than interocular width, mandibular plates medially elevated into crest above apex of clypeus; margins strongly sinuated; anteocular processes present, spatulated. Eyes globose, pedunculated. Bucculae subrectilinear, elevated, at least

reaching labium first segment height. Labium reaching metacoxae. Pronotum subreniform with a spatulate lobe on anterior angle; anterolateral margins expanded, expansion ending on middle of humeral angle; declivous on anterior half. Scutellum tongue shaped, with a median, obtuse tubercle on frenum level; almost reaching corium length, and both closer to abdomen apex. Mesosternum furrowed and not carinated. Metasternum hexagonal, flat, without furrow or carinae. Evaporatorium extented beyond the half of meso and metapleurae; peritreme spout, scalpeliform. Abdominal disc grooved. Female genital plates: gonocoxites 8 subtriangular, expanded; laterotergites 8 with visible spiracles; laterotergites 9 subtriangular, embracing laterally segment X broadly exposed; ring sclerites juxtaposed to thickening of vaginal intima, the last tubular; capsula seminlis globose with process. Male genitalia: pygphore quadrangular; dorsal rim convex; posterolateral angles elongated; parameres ventral to segment X and overlaping ventral rim; phallotheca pyriform; vesica along with ductus seminis distalis, the last shorter than phallotheca; conjunctiva absent.

Remarks. The genus was revised recently by Fernandes *et al.* (2008), and has three known species.

***Ruckesiocoris* Rider, 1998 (Figs. 7A-B)**

Type species: *Selenochilus nitidus* Ruckes, 1963 (by original designation).

Brown, glossy, with fine concolors punctures; body oval. Head longer than interocular width, mandibular plates longer than clypeus and separated by clypeus; lateral margins slightly sinuate; anteocular processes absent. Antennal segment VI furrowed. Eyes globose, not pedunculated. Bucculae subrectilinear, strongly elevated. Labium reaching base of abdomen. Labrum large, lunate in silhouette. Pronotum trapezoidal, with a minute round process on anterior angle, and anterolateral margins narrowly expanded, expansion ending on middle of humeral angle; declivous on anterior half. Scutellum subtriangular. Mesosternum laterally tumescent, medially with tumescent carina. Metasternum hexagonal, tumescent, posteriorly furrowed. Evaporatorium reaching on maximum midline of mesopleurae and extending beyond the half of metapleurae; peritreme spout, auricular. Meso and metacoxae farther apart from themselves transversely than from one another longitudinally. Tarsi two-segmented. Female genital plates: gonocoxites 8 subtriangular, not expanded; laterotergites 8 with visible spiracles; gonocoxites 9 exposed and apparently subdivided;

laterotergites 9 digitiform, medially excavated, convergent and separated by segment X broadly exposed; internal structures unknown. Male unknown.

Remarks. *Ruckesiocoris* is a new name for the original *Selenochilus* of Ruckes (1963). The genus is monotypic, known only by the original description and its female holotype.

***Sympiezorhincus* Spinola, 1837 (Figs. 63A-B)**

Type species: *Sympiezorhincus tristis* Spinola, 1837 (by monotypy).

Light brown to brown, with brown coarse punctures; body broadly oval. Head longer than interocular width, mandibular plates margins strongly sinuate, anteocular process presente, acute. Eyes globose, pedunculated. Bucculae sinuous, elevated, reaching at least labbium first segment height. Labbium reaching abdominal sternite VI. Pronotum subtrapezoidal, anterior angle expanded, reaching a line through middle of eyes, apex acute; declivous on anterior half. Scutellum tongue shaped with 1+1 lateral folds on apex; shorter than corium. Mesosternum without furrow, carinated just on xyphus. Metasternum hexagonal, flat, finely carinated. Evaporatorium extented beyond the half of meso and metapleurae; peritreme spout, scalpeliform. Third tarsi article of median and hind legs dorsaly plain. Abdominal disc grooved; anterior margin of sternite VII wedge on males. Sexual dimorphism on wings, where males have a longer corium with apical angle bent on apex of hemelytral membrane; membrane with transversal furrow and posterior margin of hemelytral membrane straight, with a thin-fringed band; thin veins and apical thickening juxtaposed to corium margin. Female genital plates: gonocoxites 8 subrectangular, not expanded; gonocoxites 8 with visible spiracles; laterotergites 9 digitiform and separated by segment X broadly exposed; ring sclerites apart from thickening of vaginal intima, the last subrectangular; capsula seminalis globose with processes. Male genitalia: pygophore subquadrangular; dorsal rim sinuous; posterolateral angles joint and well developed; parameres lateral to segment X, with expanded head overlapping inferior layer of ventral rim; phallotheca elongated; vesica cup like; conjunctiva with 1+1 lateral processes well developed; ductus seminis distalis longer than vesica.

Remarks. The genus was revised by Becker & Ruckes (1969) and has two known species.

***Tetragonotum* Ruckes, 1965 (Figs. 39A-B)**

Type species: *Tetragonotum megacehalum* Ruckes, 1965 (by original designation).

Light brown with fine punctures; body elliptical and flat. Head quadrangular, wider than long; mandibular plates broadly expanded, margins not sinuate; anteocular process absent. Eyes globose, pedunculated, bending down. Bucculae posteriorly wider, barely elevated. Ventrally structured as horn – where: ocular peduncle, maxillary plates, gula and base of antennal tubercles are tumescent and mandibular plates flat. Pronotum quadrangular with anterolateral margins subparallel. Scutellum subtriangular, shorter than corium. Meso and metasternum without furrow or carinae; metasternum hexagonal. Evaporatorium extended beyond half of metapleurae and reaching anterolateral angle of mesopleurae as a narrow band; peritreme spout, troughed. Connexivum segments broadly expanded. Female genital plates: gonocoxites 8 subquadrangular, expanded over plates of 9th segment leaving it partially visible; laterotergites 8 with visible spiracles; laterotergites 9 digitform, divergents; segment X exposed; gonocoxites 9 internally apparently subdivided; ring sclerites juxtaposed to thickening of vaginal intima, the last circular; capsula seminalis forked into two long tubes. Male unknown.

Remarks. The genus is monotypic and known by its original description (Ruckes 1965) and by diagnose made by Rolston (1990).

***Uncicrus* Ruckes, 1966 (Figs. 42A-B)**

Type species: *Discocephala kollarii* Fieber, 1851 (by original designation).

Light brown, body broadly oval. Head wider than long, mandibular plates margins slightly sinuate; anteocular processes present, not projected. Eyes globose and pedunculated. Bucculae sinuous, barely elevated. Pronotum trapezoidal with a minute denticle on anterior angle, and anterolateral margins narrowly expanded, expansion ending on midle of humeral angle. Scutellum subtriangular, shorter than corium. Mesosternum laterally tumescent, medially furrowed; carina as a thin line on xyphus. Metasternum hexagonal and furrowed. Evaporatorium extented beyond the half of meso and metapleurae; peritreme spout, scalpeliform. Hind femora subapically armed with a hook on inferior surface, projection reduced or absent in females. Abdominal tergite VII posterior margin with a large median process and sternites VI-VII with anterior margin wedge on males. Female genital plates: gonocoxites 8 subrectangular and widely expanded; laterotergites 9 with visible spiracles; laterotergites 9 narrowly visible;

segment X hidden; internal structures unknown. Male genitalia: pygophore oval; dorsal rim sinuous, with acute projections laterally to segment X; posterolateral angles and parameres well developed, longer than segment X; parameres laterally to segment X, overlapping inferior layer of ventral rim. Segment X subtriangular, dorsally membranous; internal structures unknown.

Remarks. *Uncicrus* is here synonymized with *Allinocoris* Ruckes, 1966. Ruckes (1966b) and Rolston (1990) compared the two genera stating the close relationship of both. The principal difference alleged is the absence of an anteapical uncinated processes on hind femur of *A. nubilus* holotype (female), processes that is known as less developed on females. We examined photos from holotypes of both species and other specimens belonging to new species of *Uncicrus* and decided to a new combination where *Allinocoris* is a junior synonymy of *Uncicrus*, and the genus has now two known species.

***Uncinala* Ruckes, 1965 (Figs. 50A-B)**

Type species: *Uncinala tau* Ruckes, 1965 (by original designation).

Light brown with black macules, body oval. Head longer than interocular width, mandibular plates margins slightly sinuate; anteocular process absent. Eyes globose, not pedunculated. Bucculae sinuous, with anterior angle triangular, barely elevated. Labium reaching abdominal segment V-VII. Pronotum trapezoidal with a minute denticle on anterior angle, and anterolateral margins narrowly expanded, expansion ending on middle of humeral angle; declivous on anterior half. Scutellum subtriangular, with 1+1 lateral folds on apex, shorter than corium. Mesosternum without furrow or carinae. Metasternum lozenge, furrowed. Evaporatorium extended beyond the half of meso and metapleurae; peritreme spout, scalpeliform. Median and hind tibiae with stridular pegs, more developed on males and principally on hind tibiae; stridular patches present on abdominal sternites V-VII just on males. Abdominal tergite VII posterior margin with a short subrectangular median process on males. Sexual dimorphism on wings, where males have a longer corium with apical angle bent on apex of hemelytral membrane; posterior margin of hemelytral membrane straight, with a medium T-shaped thickening, coarse veins and apical thickening juxtaposed to corium margin. Female genital plates: gonocoxites 8 smoothly arched, not expanded; laterotergites 8 with visible spiracles; laterotergites 9 digitiform; segment X visible; ring sclerites apart from thickening of vaginal intima, the last subrectangular; capsula

seminalis globose without processes . Male genitalia: pygophore globose; dorsal rim sinuous; posterolateral angles joint and well developed; parameres ornated, overlapping inferior layer of ventral rim; segment X with lateral projections; phallotheca elongated; vesical cup like; conjunctiva with 1+1 lateral processes well developed; ductus seminis distalis shorter than vesica.

Remarks. *Uncinala* is a monotypic genus fully revised and illustrated by Becker & Grazia (1995), the stridular structure was well detailed by Mcdonald (1979).

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All the curators of the listed collections and yours assistents, who provided access to specimens and/or images, are gratefully acknowledged. The financial support as scholarships from Coordenação de Aperfeiçoamento de Pessoal de Nível Superior - CAPES and Conselho Nacional de Desenvolvimento Científico e Tecnológico - CNPq to T.A.G. (CNPq 142448/2011-7; CAPES BEX5788-13-7), and CNPq fellowship L.A.C. (305367/2012-9) are also acknowledged.

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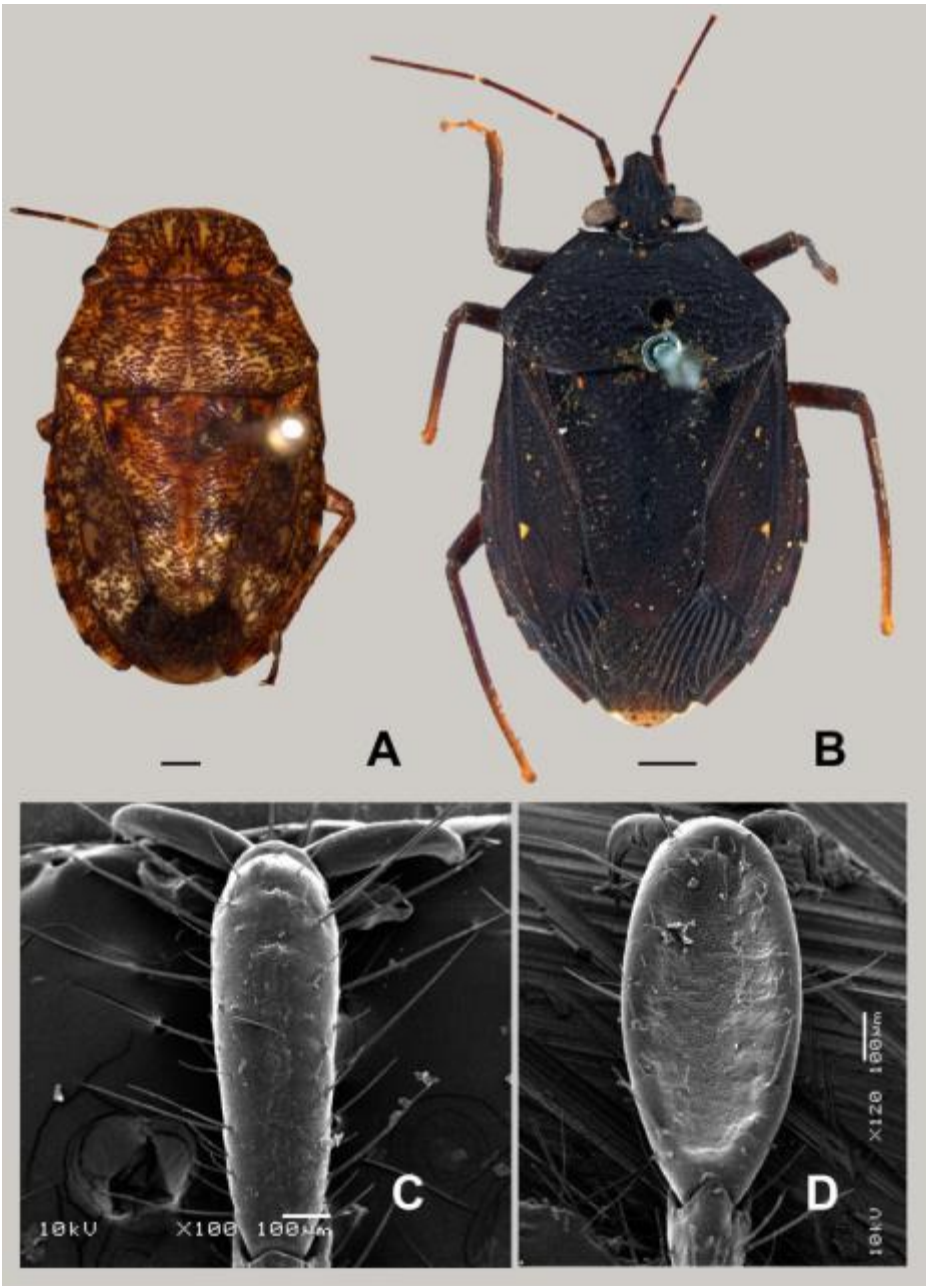

FIGURE 1. A, *Discocephala marmorea* Laporte (Discocephalini); B, *Ochlerus sgnoreti* Breddin (Ochlerini); dorsal surface of third tarsal segment of hind leg: C, *Antiteuchus tripterus* (Fabricius) (Discocephalini); D, *Schraderiellus cinctus* (Ruckes) (Ochlerini). [C and D by T. Roell]. Scale bars (A, B) = 1mm.

FIGURE 2. Scutellum range: A, *Abascantus lobatus* Stål, 1864; B, *Priapismus pini* Rolston, 1992. Abbrevations: co, corium; sc, scutellum; VI, connexivum segment VI. Scale bars = 1mm.

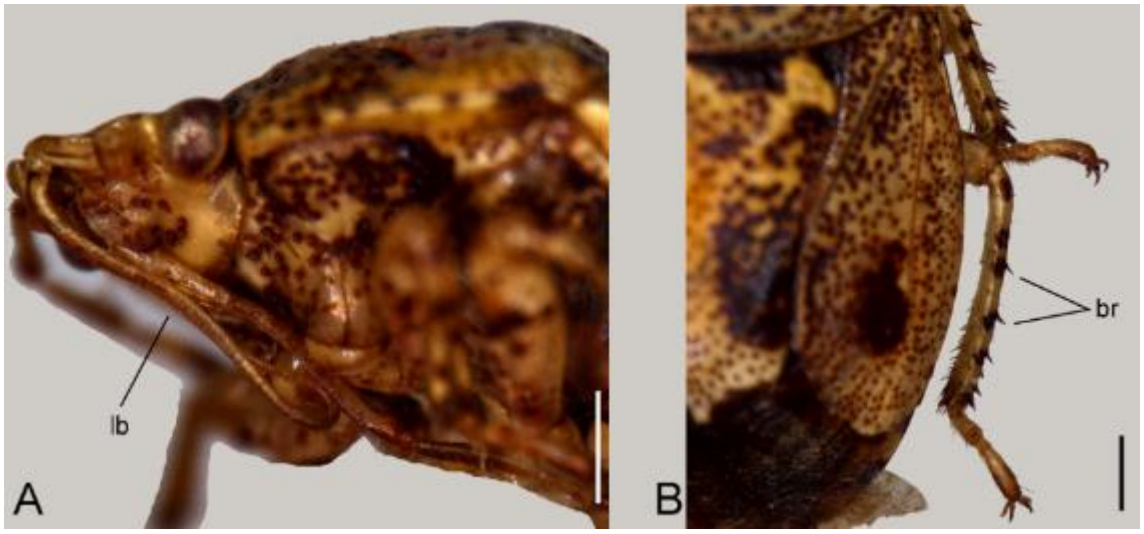

FIGURE 3. *Priapismus ecuadoriensis* Rolston, 1984. A, lateral view of head and thorax indicating the labrum loop; B, legs in dorsal view. Abbreviations: lb, labrum; br, thick bristles of legs. Scale bars = 1mm.

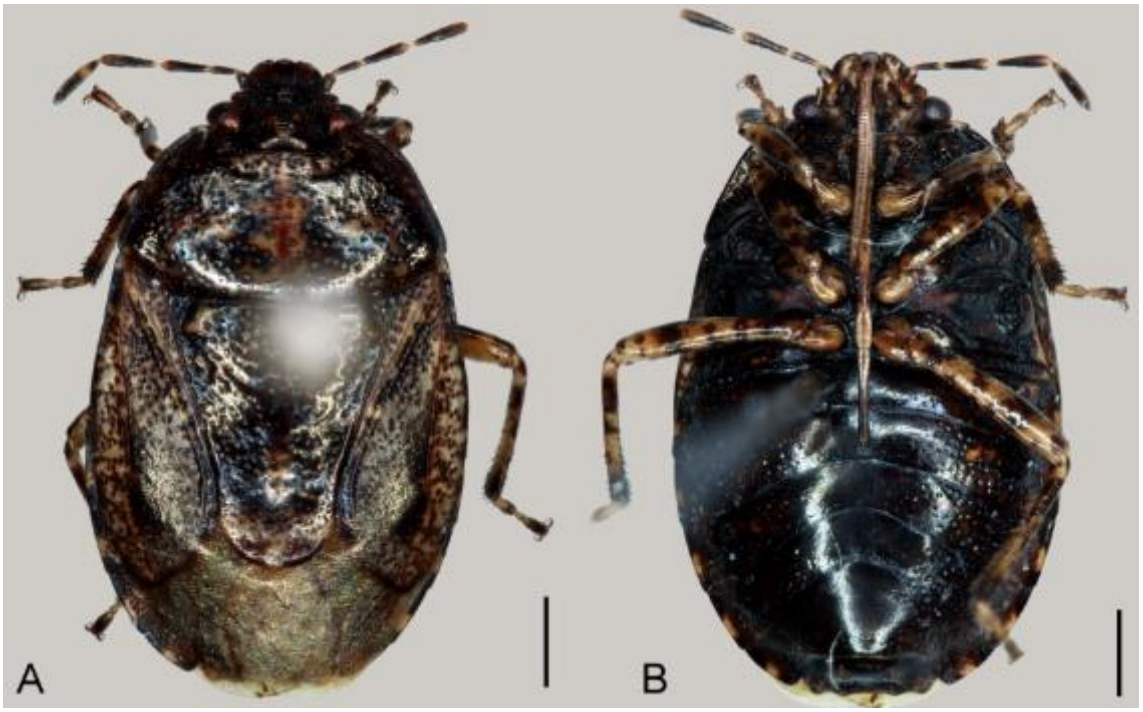

FIGURE 4. *Priapismus pini* Rolston, 1992. A, dorsal view; B, ventral view. Scale bars = 1mm.

FIGURE 5. Lateral view of head of *Oncodochilus aradiformis* (Herrich-Schäeffer, 1843). Abbreviation: lb, labrum. Scale bars = 1mm.

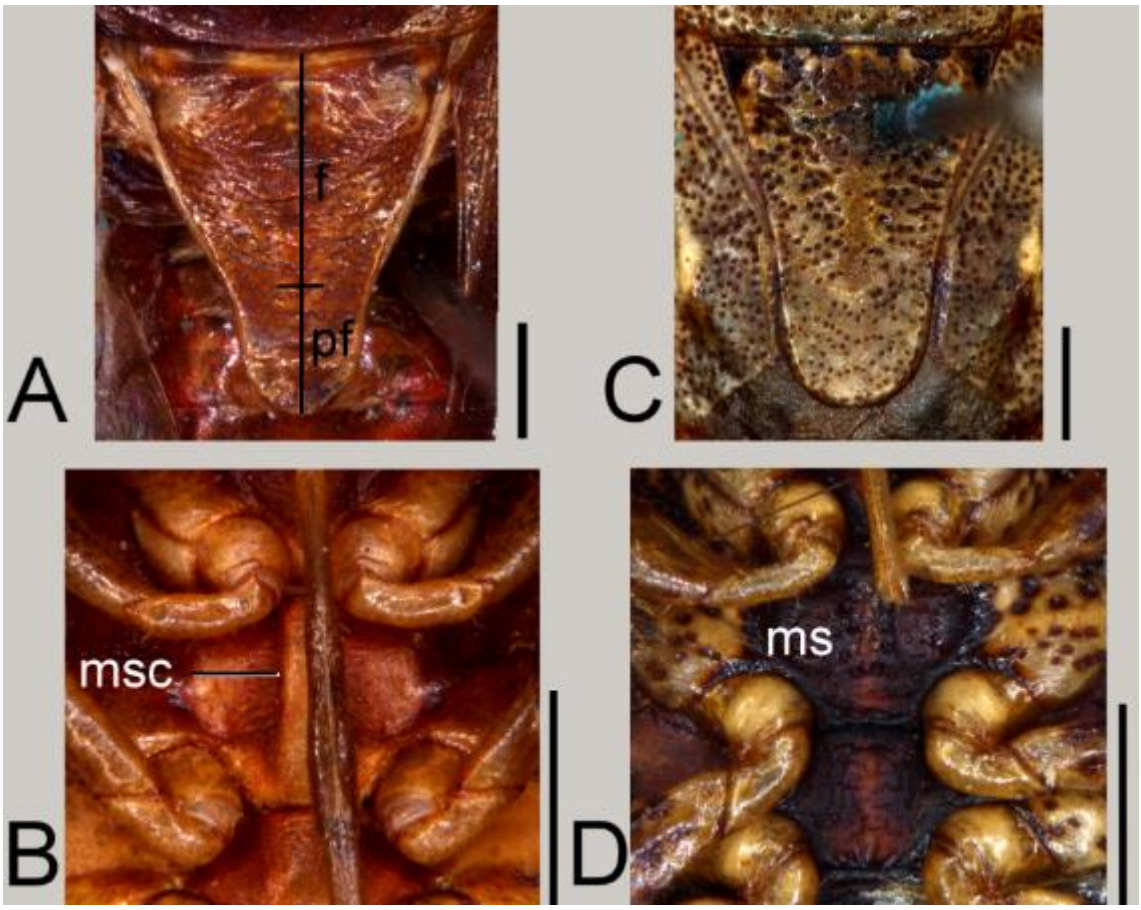

FIGURE 6. A–B, *Ruckesiocoris nitidus* (Ruckes, 1963); C–D, *Oncodochilus aradiformis* (Herrich-Schäeffer, 1843); A, C, scutellum; B, D, mesosternum. Abbreviations: f, frenal lobe; pf, post-frenal lobe; ms, mesosternum; msc, mesosternum carinae. Scale bars = 1mm.

FIGURE 7. *Ruckesiocoris nitidus* (Ruckes, 1963). A, dorsal view; B, ventral view. Scale bars = 1mm.

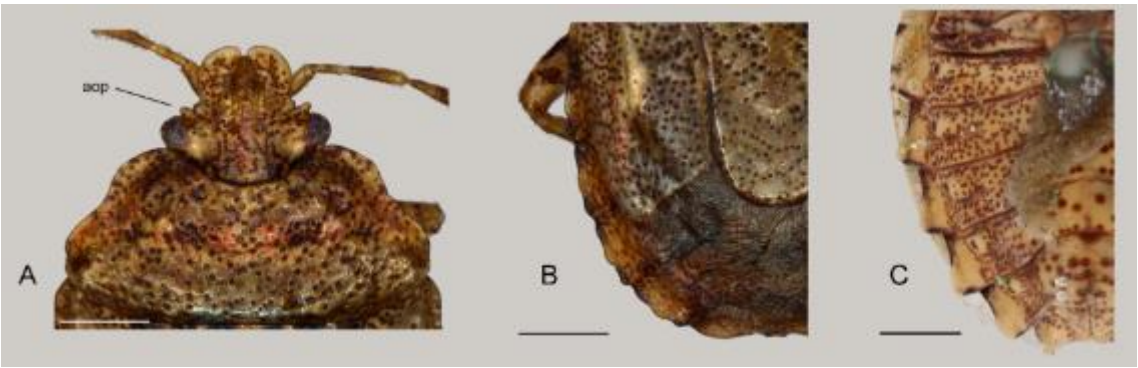

FIGURE 8. A–B, *Oncodochilus aradiformis* (Herrich-Schäeffer, 1843), dorsal view; C, *Glyphuchus sculpturatus* Stål, 1860, ventral view. A, Head and pronotum; B–C, connexivum segments. Abbreviations: aop, anteocular process. Scale bars = 1mm.

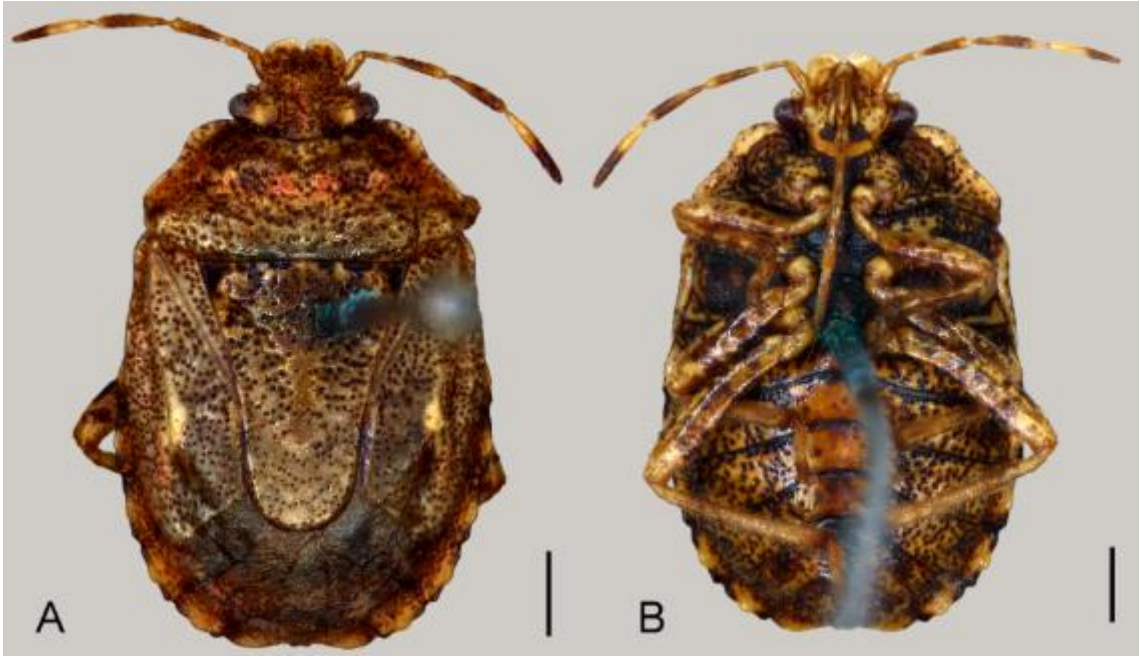

FIGURE 9. *Oncodochilus aradiformis* (Herrich-Schäeffer, 1843). A, dorsal view; B, ventral view. Scale bars = 1mm.

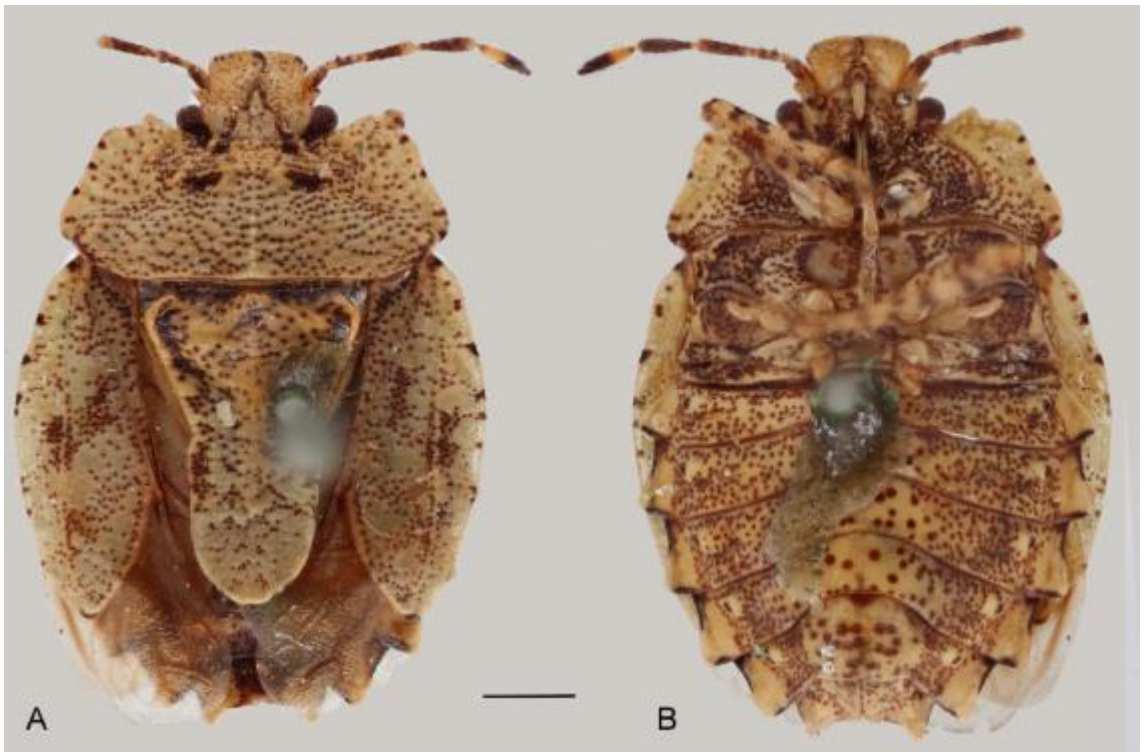

FIGURE 10. *Glyphuchus sculpturatus* Stål, 1860, female holotype. A, dorsal view; B, ventral view. Scale bars = 1mm. (Photos courtesy of Gunvi Lindberg from NHRS).

FIGURE 11. Head and pronotum dorsal view. A, *Ischnopelta luteicornis* (Walker, 1867); B, *Phoeacia* sp. Scale bars = 1mm.

FIGURE 12. *Ischnopelta luteicornis* (Walker, 1867). A, dorsal view; B, ventral view. Scale bars = 1mm.

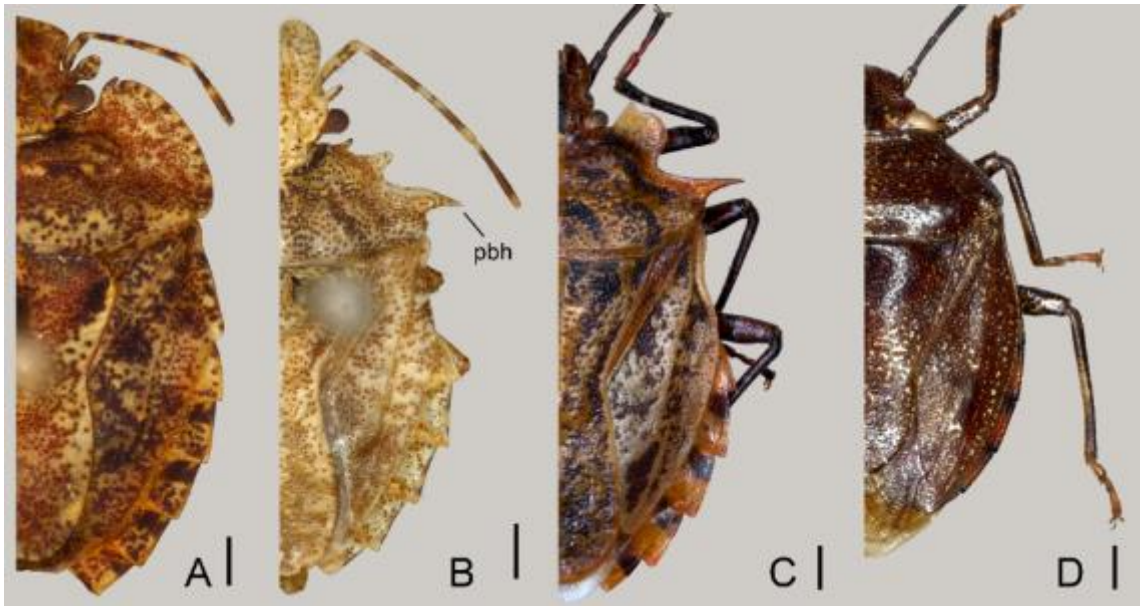

FIGURE 13. Half dorsal view: A, *Psorus paraensis* Fernandes et al., 2008; B, *Coriplatus depressus* White, 1842; C, *Abascantus lobatus* Stål, 1864; D, *Antiteuchus rideri* Rolston, 1993. Abbreviation: pbh, projection before humeri. Scale bars = 1mm.

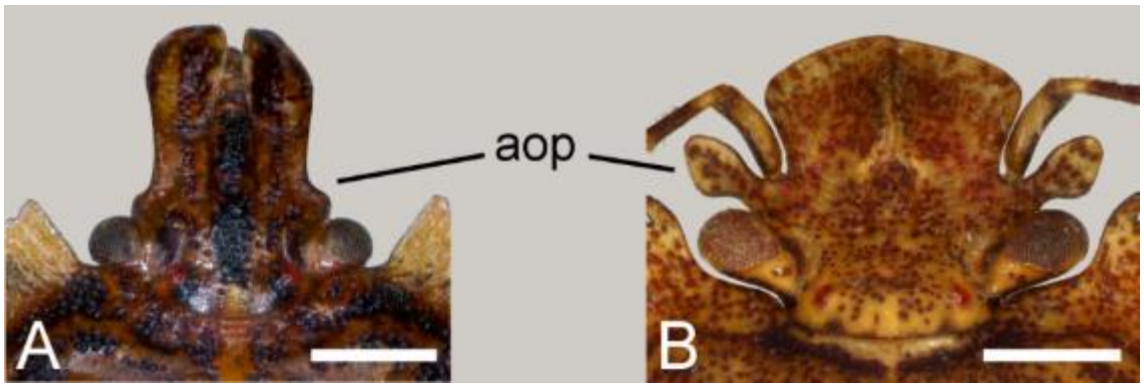

FIGURE 14. Head dorsal view: A, *Abascantus lobatus* Stål, 1864; B, *Psorus paraensis* Fernandes et al., 2008. Abbreviation: aop, anteocular process. Scale bars = 1mm.

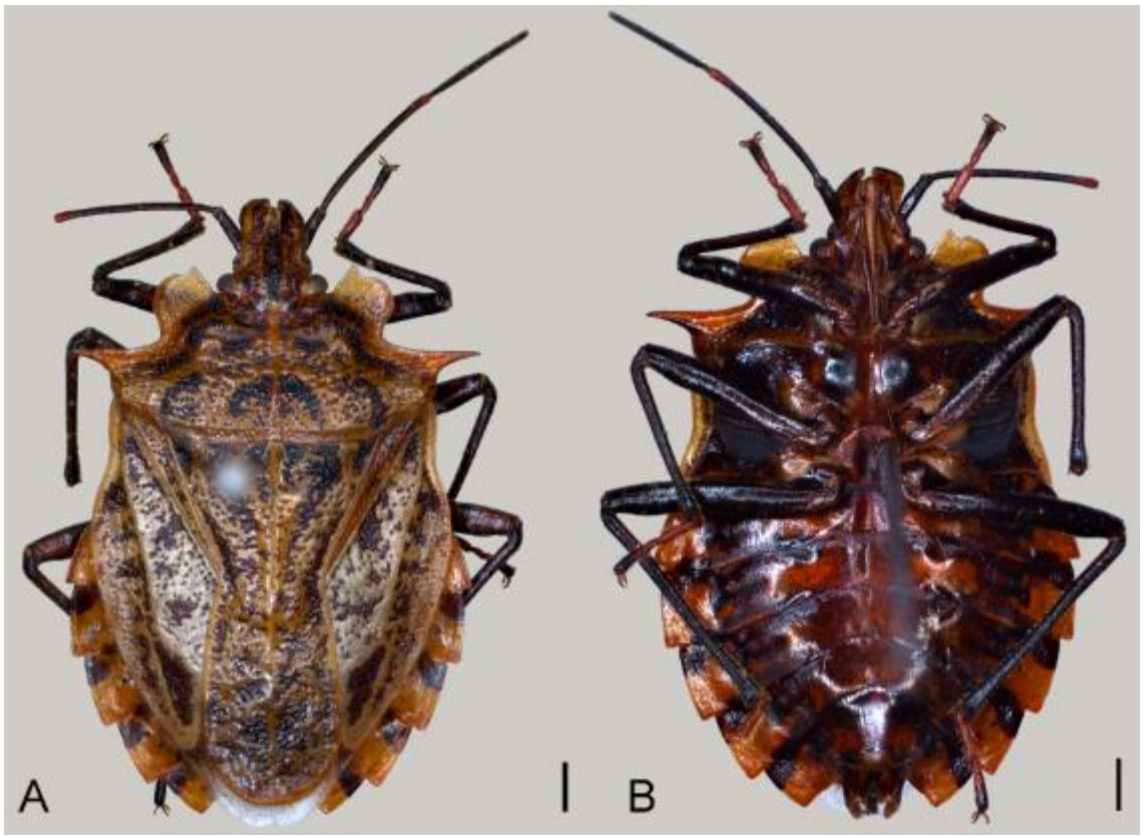

FIGURE 15. *Abascantus lobatus* Stål, 1864. A, dorsal view; B, ventral view. Scale bars = 1mm.

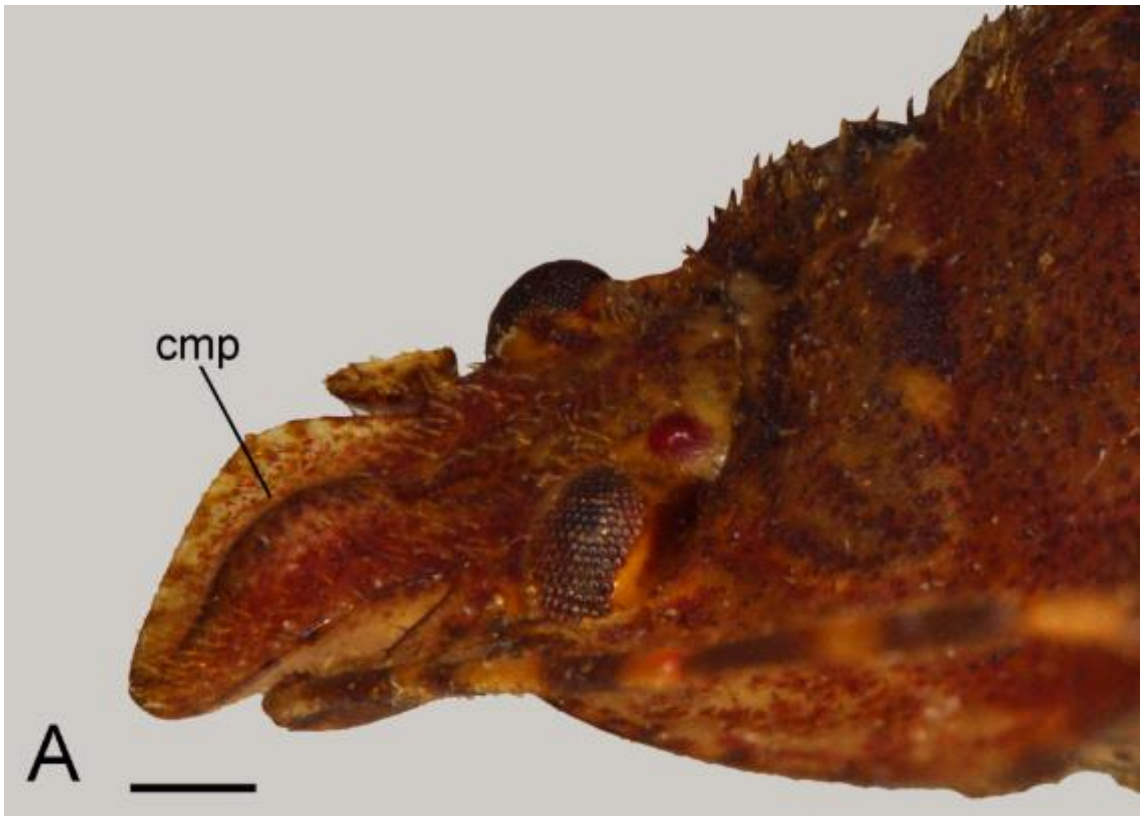

FIGURE 16. Lateral view of head of *Psorus paraensis* Fernandes, Grazia & Lobo, 2008. Abbreviation: cmp, crest of mandibular plates. Scale bar = 1mm.

FIGURE 17. *Psorus paraensis* Fernandes, Grazia & Lobo, 2008. A, dorsal view; B, ventral view. Scale bars = 1mm.

FIGURE 18. Frontal view of *Coriplatus depressus* White, 1842. Abbreviation: tu, transumeral tubercles. Scale bar = 1mm.

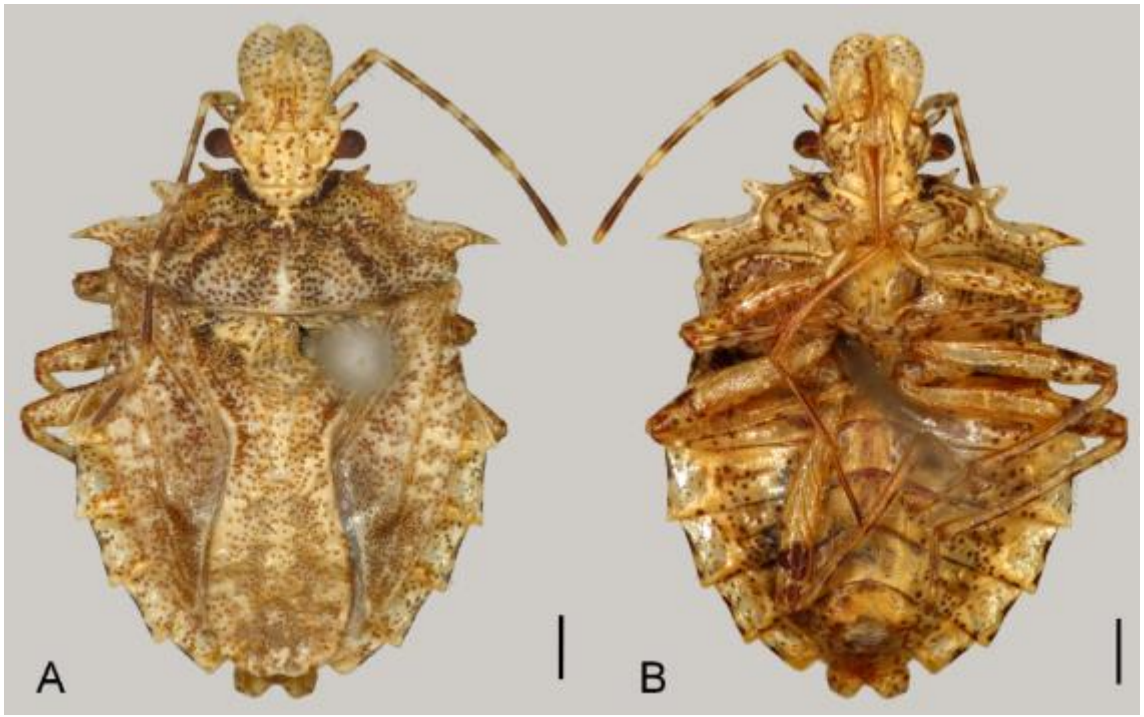

FIGURE 19. *Coriplatus depressus* White, 1842. A, dorsal view; B, ventral view. Scale bars = 1mm.

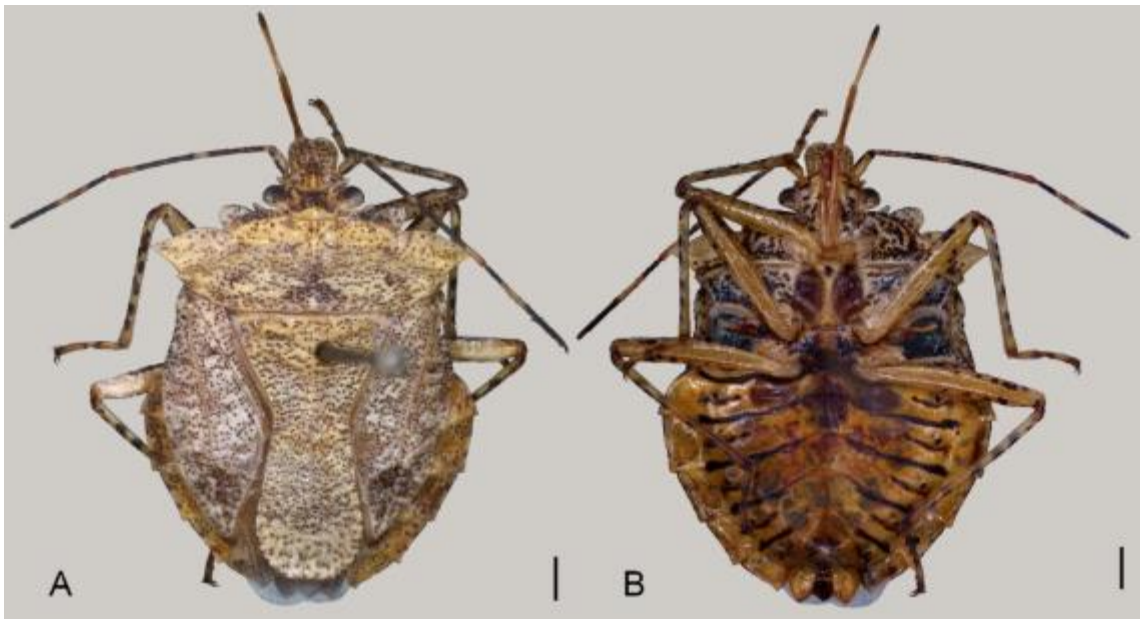

FIGURE 20. *Pelidnocoris stalii* Haglund, 1868. A, dorsal view; B, ventral view. Scale bars = 1mm.

FIGURE 21. Apex of scutellum and corium. A, *Phoeacia* sp.; B, *Cataulax froeschneri* Grazia, Campos & Becker, 2000; C, *Antiteuchus rideri* Rolston, 1993. Scale bars = 1mm.

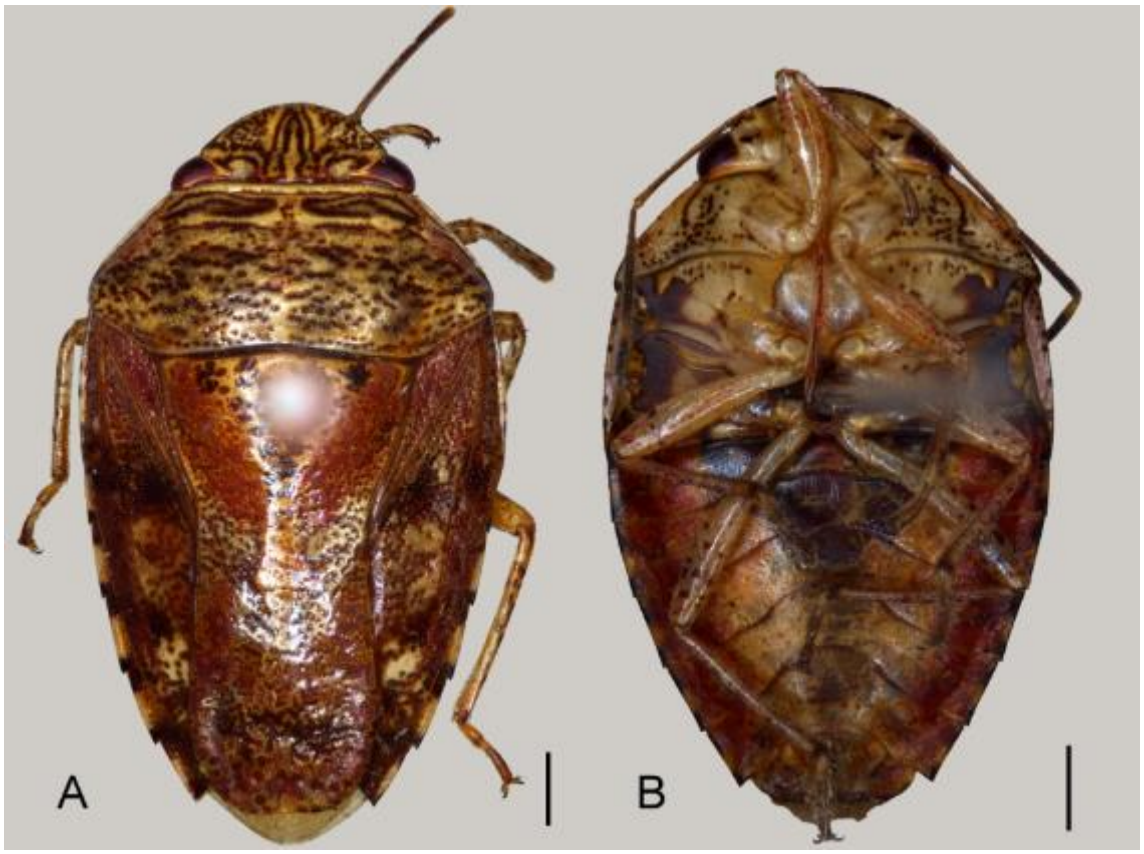

FIGURE 22. *Phoeacia* sp. A, dorsal view; B, ventral view. Scale bars = 1mm.

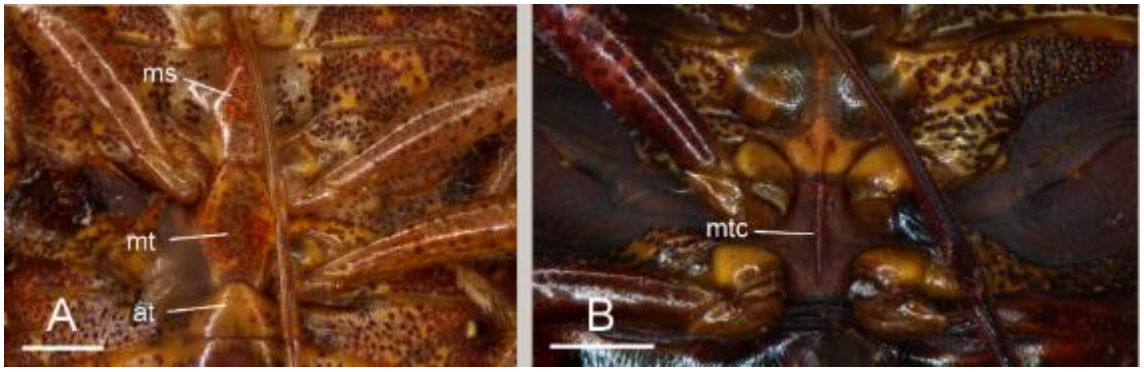

FIGURE 23. Meso and metasternum, and abdominal base, ventral view. A, *Cataulax froeschneri* Grazia, Campos & Becker, 2000, B, *Antiteuchus mixtus* (Fabricius, 1787). Abbreviations: at, abdominal tubercle; ms, mesosternum; mt, metasternum; mtc, metasternum carinae. Scale bars = 1mm.

FIGURE 24. *Cataulax* spp. A–B, *Cataulax froeschneri* Grazia, Campos & Becker, Campos & Becker, 2000; A, C, dorsal view; B, D, ventral view. Scale bars = 1mm.

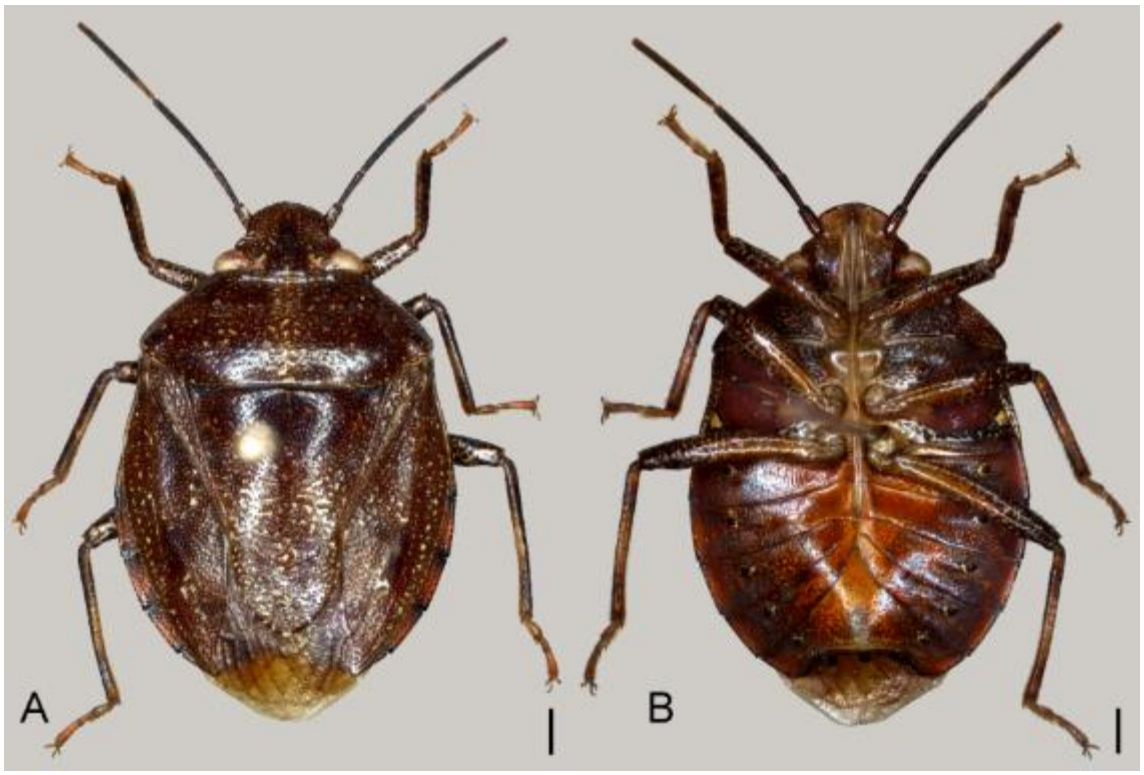

FIGURE 25. *Antiteuchus rideri* Rolston, 1993. A, dorsal view; B, ventral view. Scale bars = 1mm.

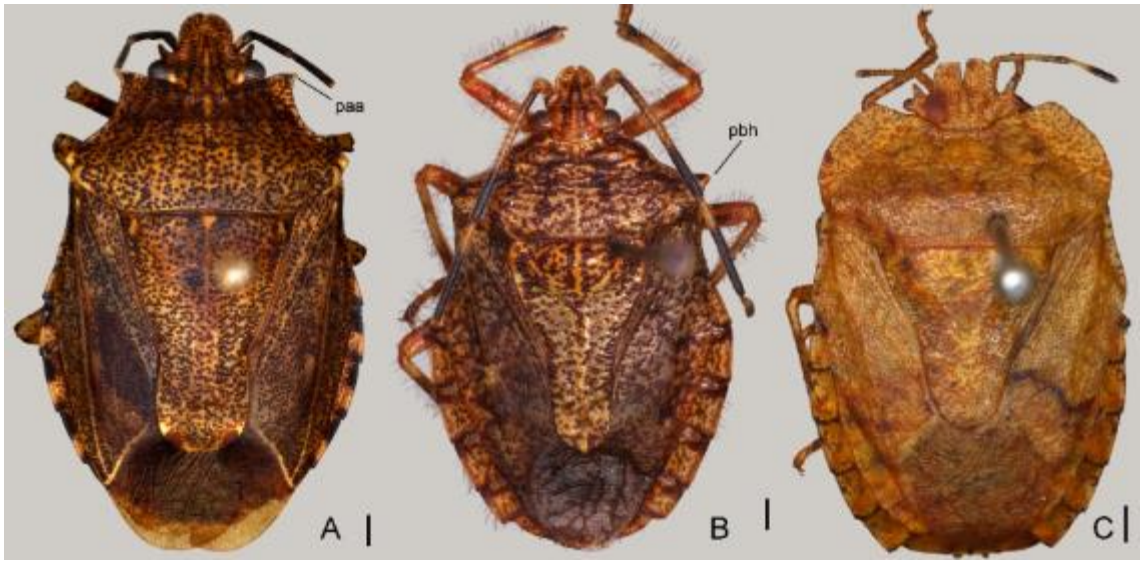

FIGURE 26. Dorsal views. A, *Sympiezorhincus punctipes* Dallas, 1851; B, *Dinocoris* (*Dinocoris*) *gibbosus* (Fallou, 1889); C, *Dryptocephala lurida* (Erinchson, 1848). Abbreviations: paa, projection anterior angle of pronotum; pbh, projection before humeri. Scale bars = 1mm.

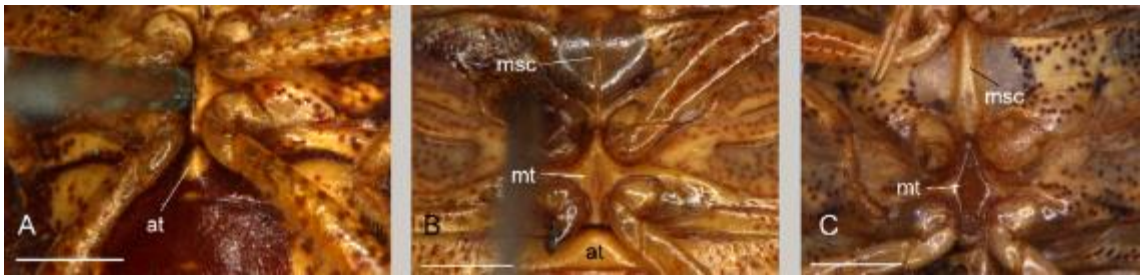

FIGURE 27. Meso and metasternum, and abdominal base, ventral view. A, *Phineus fusco-punctatus* Stål, 1862; B, *Alveostethus politus* (Signoret, 1851); C, *Parvamima bicolor* Ruckes, 1960. Abbreviations: at, abdominal tubercle; msc, mesosternum carinae; mt, metasternum. Scale bars = 1mm.

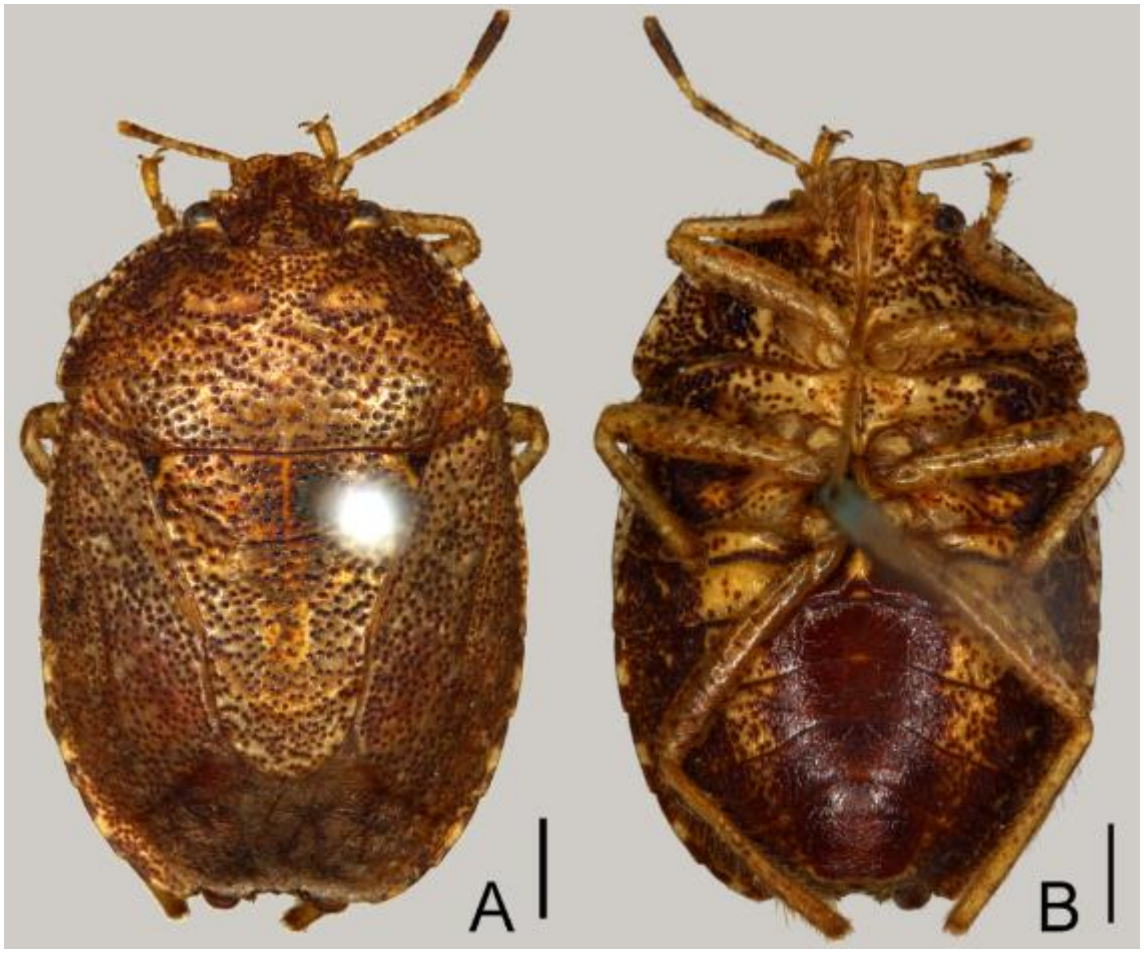

FIGURE 28. *Phineus fusco-punctatus* Stål, 1862. A, dorsal view; B, ventral view. Scale bars = 1mm.

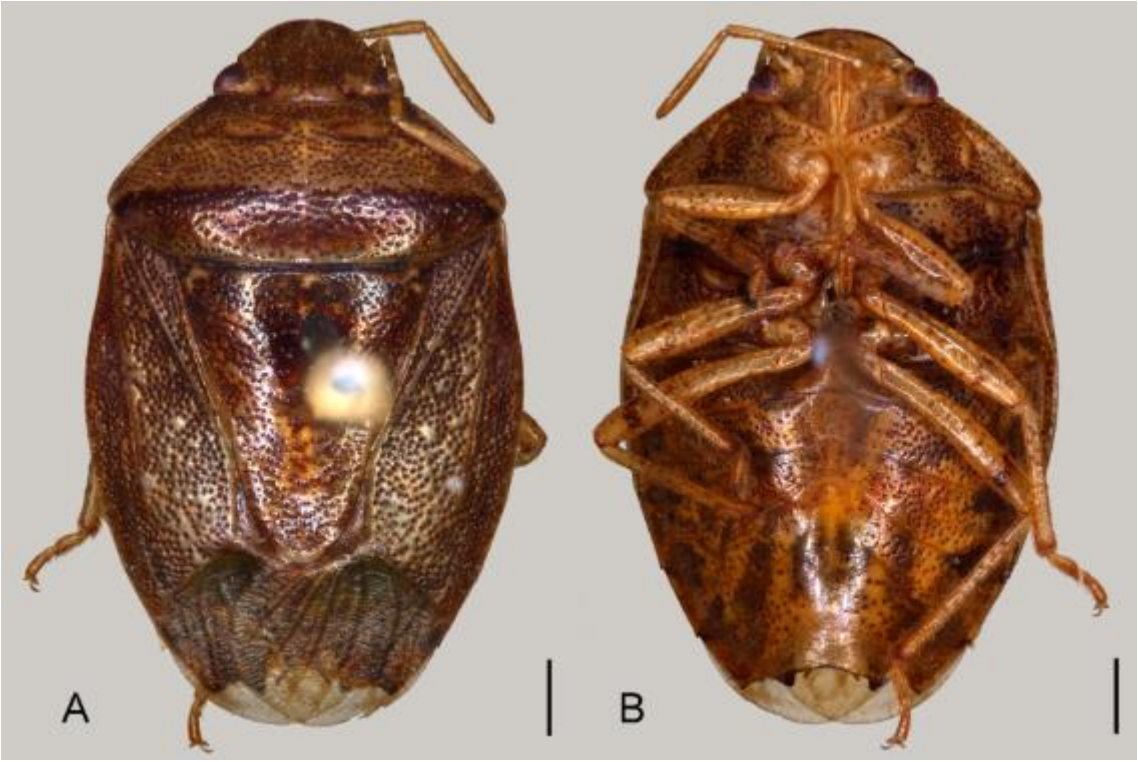

FIGURE 29. *Parvamima bicolor* Ruckes, 1960. A, dorsal view; B, ventral view. Scale bars = 1mm.

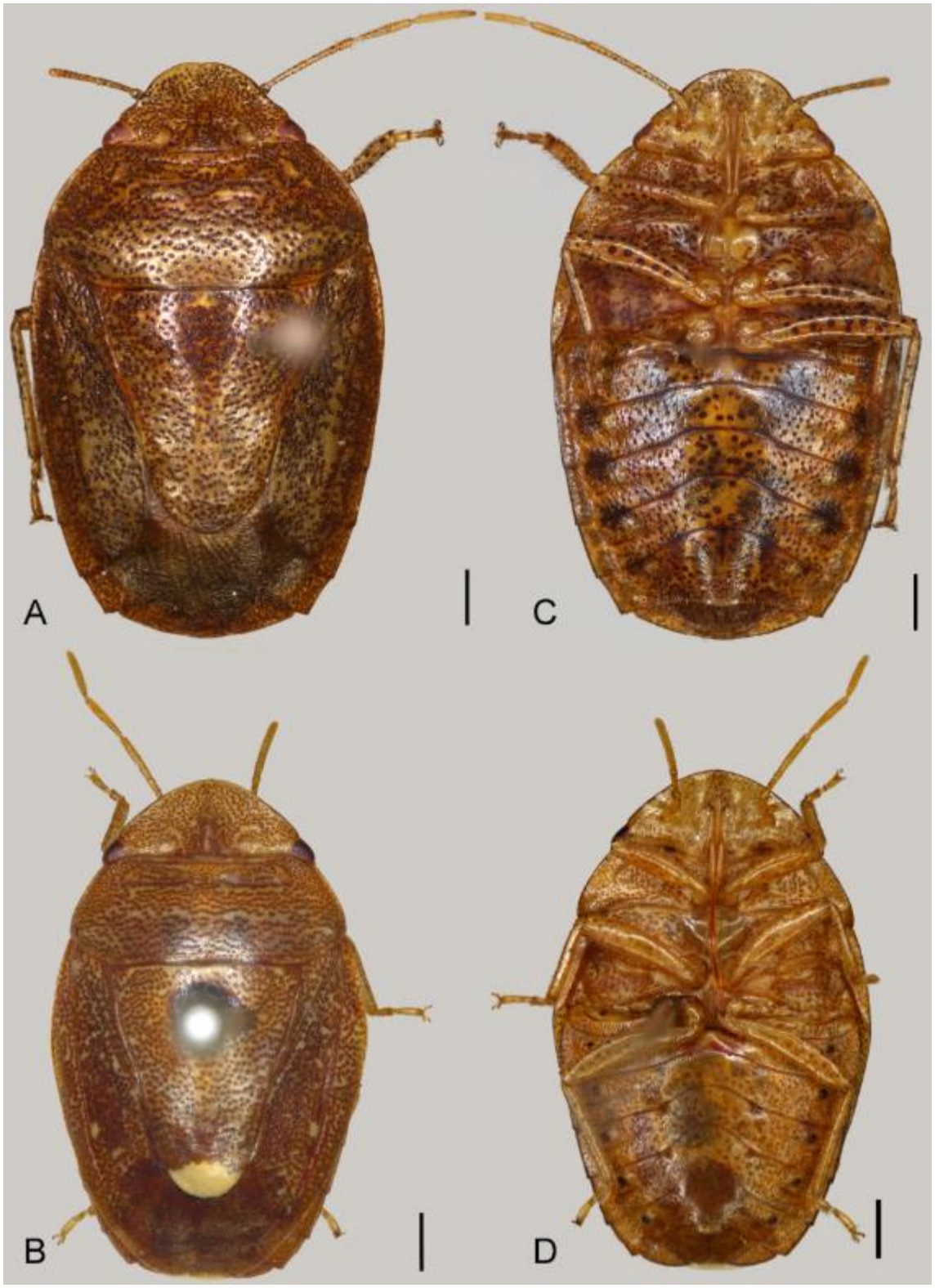

FIGURE 30. *Alveostethus* spp. A, C, *Alveostethus latifrons* (Dallas, 1851); B, D, *Alveostethus politus* (Signoret, 1851); A–B, dorsal view; C–D, ventral view. Scale bars = 1mm.

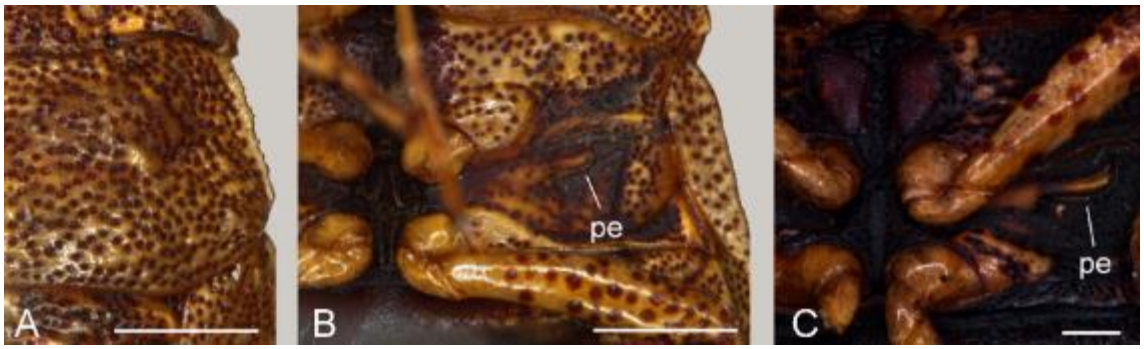

FIGURE 31. A, Anterolateral margins of pronotum; B–C, metathorax ventral view; A–B, *Platycarenus umbraculatus* (Fabricius, 1803); C, *Grassatorama nigroventris* (Ruckes, 1965). Abbreviation: pe, peritreme. Scale bars = 1mm.

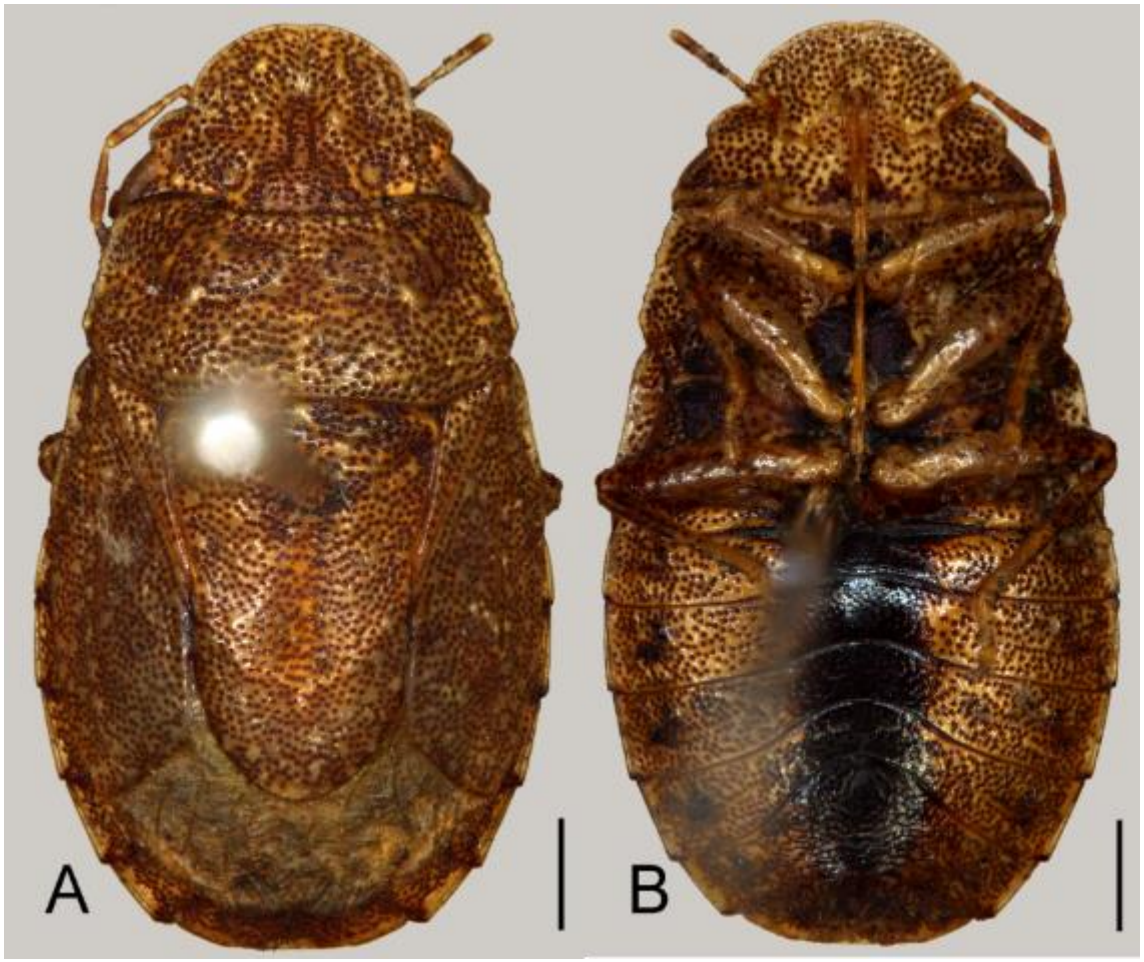

FIGURE 32. *Platycarenus umbraculatus* (Fabricius, 1803). A, dorsal view; B, ventral view. Scale bars = 1mm.

FIGURE 33. *Grassatorama nigroventris* (Ruckes, 1965). A, dorsal view; B, ventral view. Scale bars = 1mm.

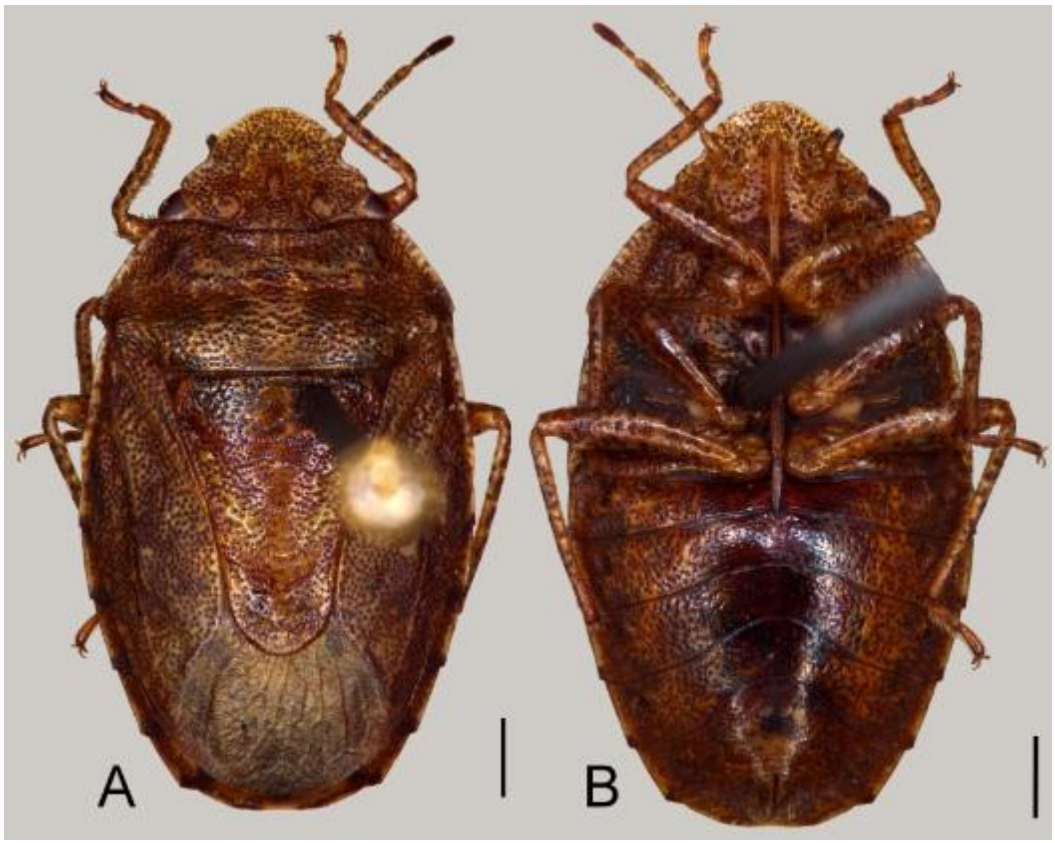

FIGURE 34. *Discocephalessa andina* (Breddin, 1904). A, dorsal view; B, ventral view. Scale bars = 1mm.

FIGURE 35. Head dorsal view. A, *Tetragonotum megacephalum* Ruckes, 1965; B, *Colpocarena complanata* (Burmeister, 1835); C, *Eurystethus* (*Eurystethus*) *ellipsoidalis* Ruckes, 1958. Scale bars = 1mm.

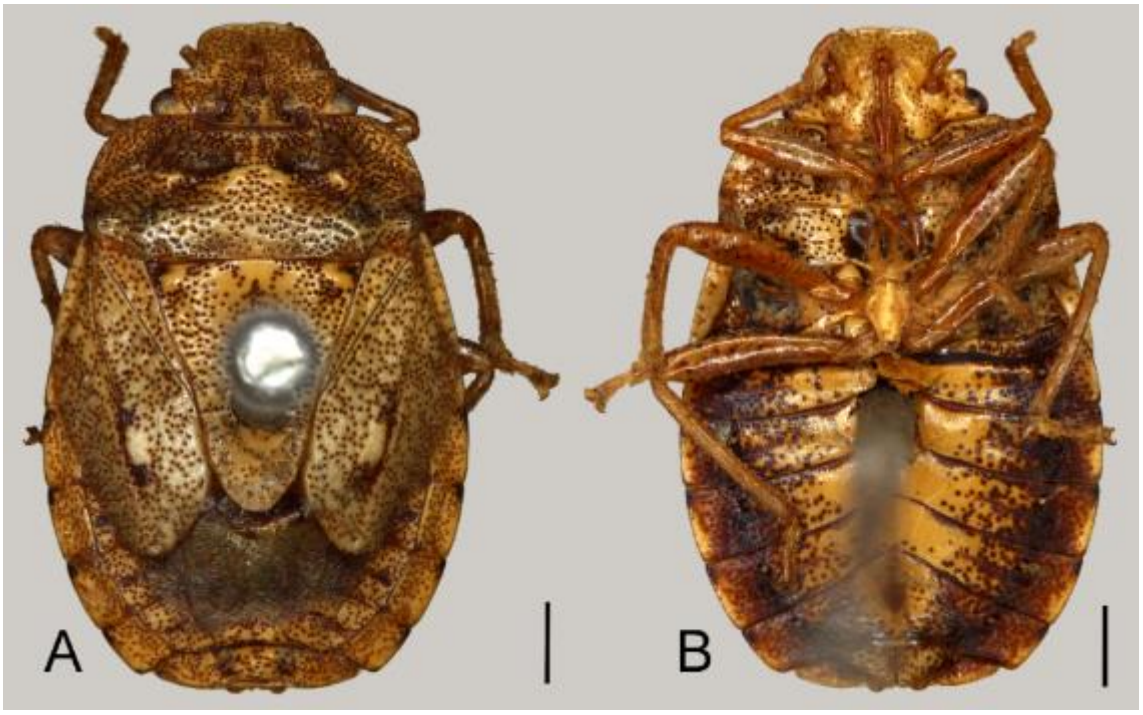

FIGURE 36. *Harpagogaster willineri* Kormilev, 1957. A, dorsal view; B, ventral view. Scale bars = 1mm.

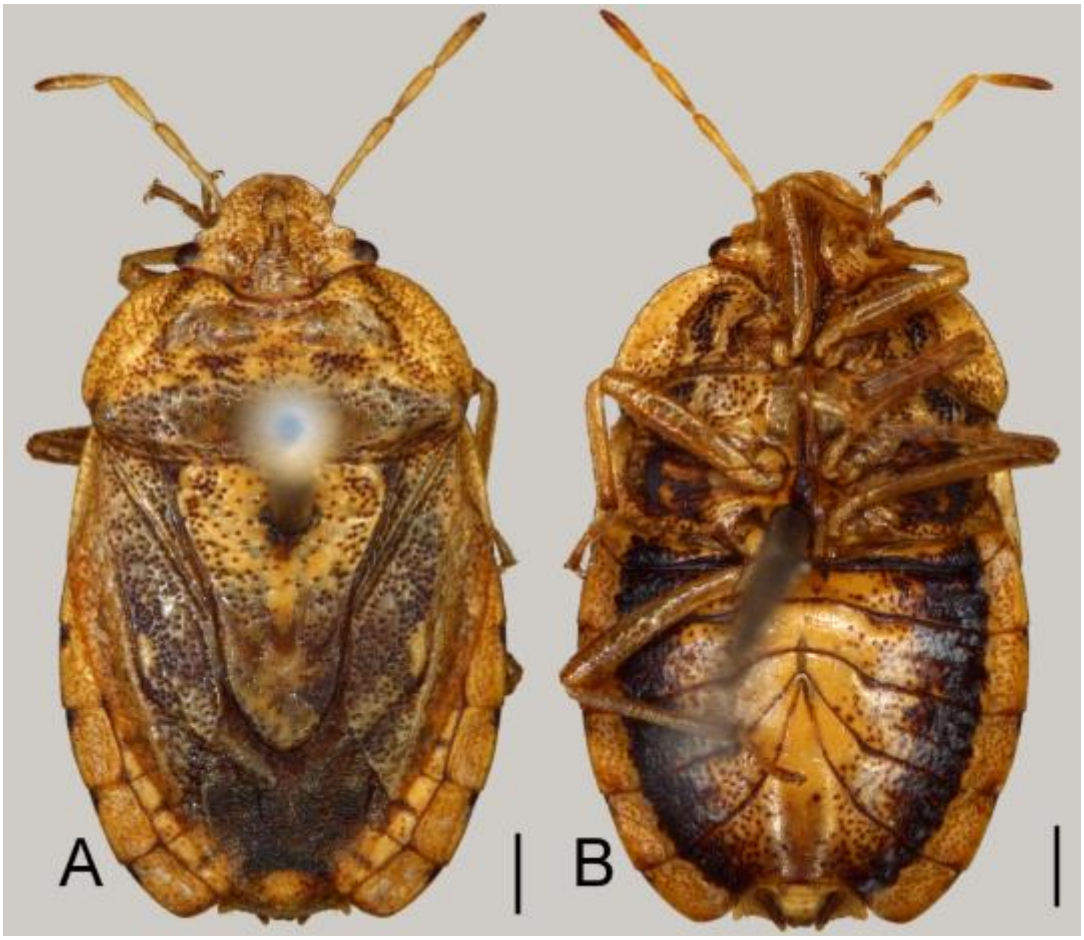

FIGURE 37. *Placidocoris bivitatus* Ruckes, 1965. A, dorsal view; B, ventral view. Scale bars = 1mm.

FIGURE 38. Scutellum. *Tetragonotum megacephalum* Ruckes, 1965; B, *Discocephala marmorea* Laporte, 1832. Abbreviations: f, frenal lobe; pf, post-frenal lobe. Scale bars = 1mm.

FIGURE 39. *Tetragonotum megacephalum* Ruckes, 1965. A, dorsal view; B, ventral view. Scale bars = 1mm.

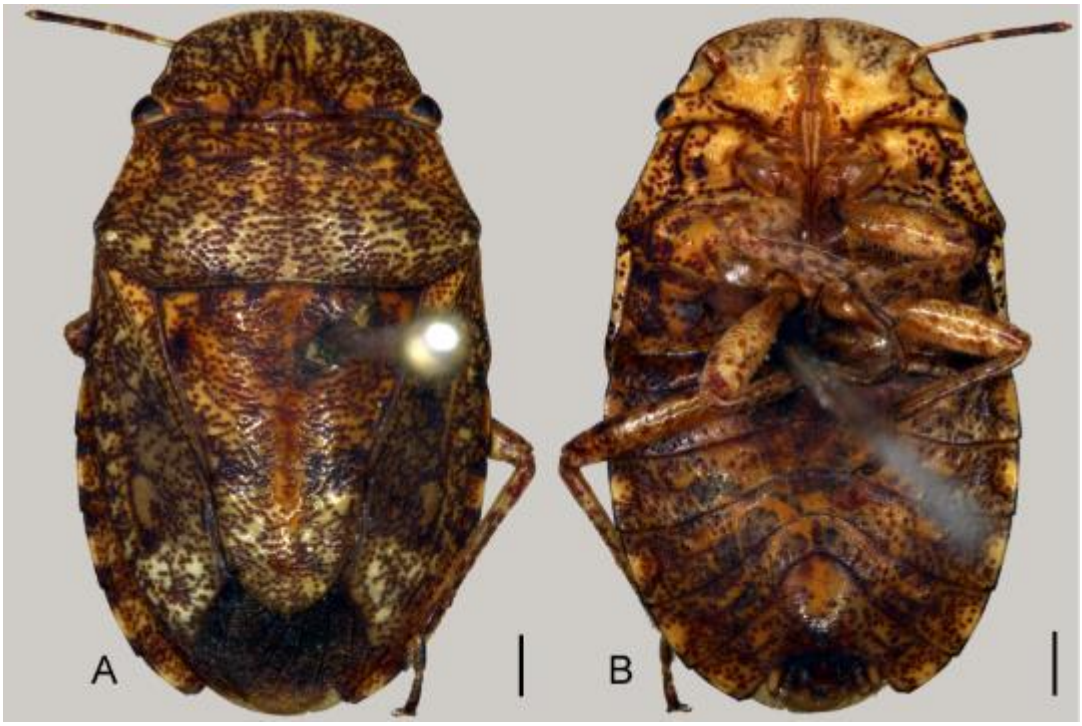

FIGURE 40. *Discocephala marmorea* Laporte, 1832. A, dorsal view; B, ventral view. Scale bars = 1mm.

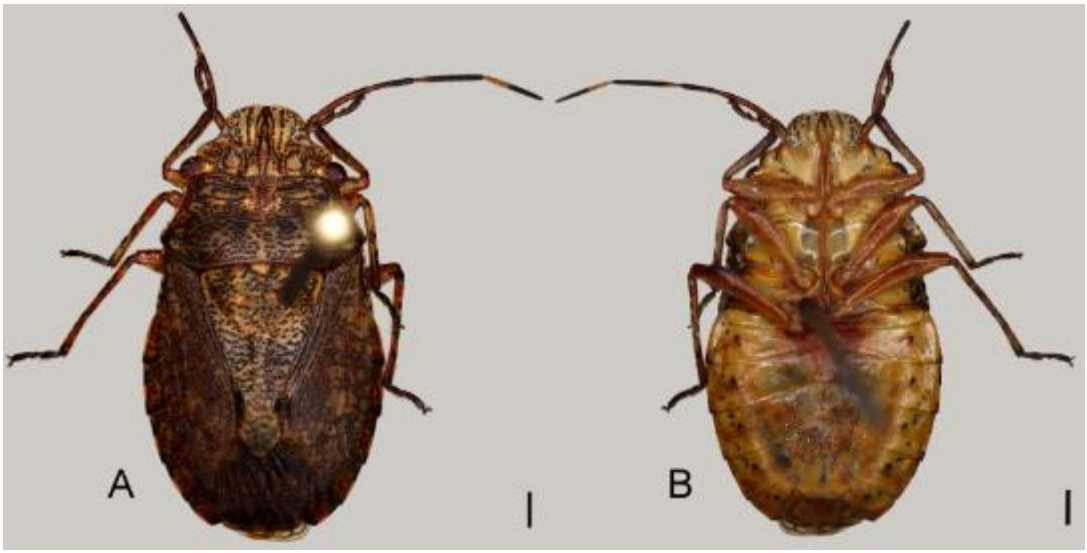

FIGURE 41. *Colpocarena complanata* (Burmeister, 1835). A, dorsal view; B, ventral view. Scale bars = 1mm.

FIGURE 42. *Uncicrus* sp. A, dorsal view; B, ventral view. Scale bars = 1mm.

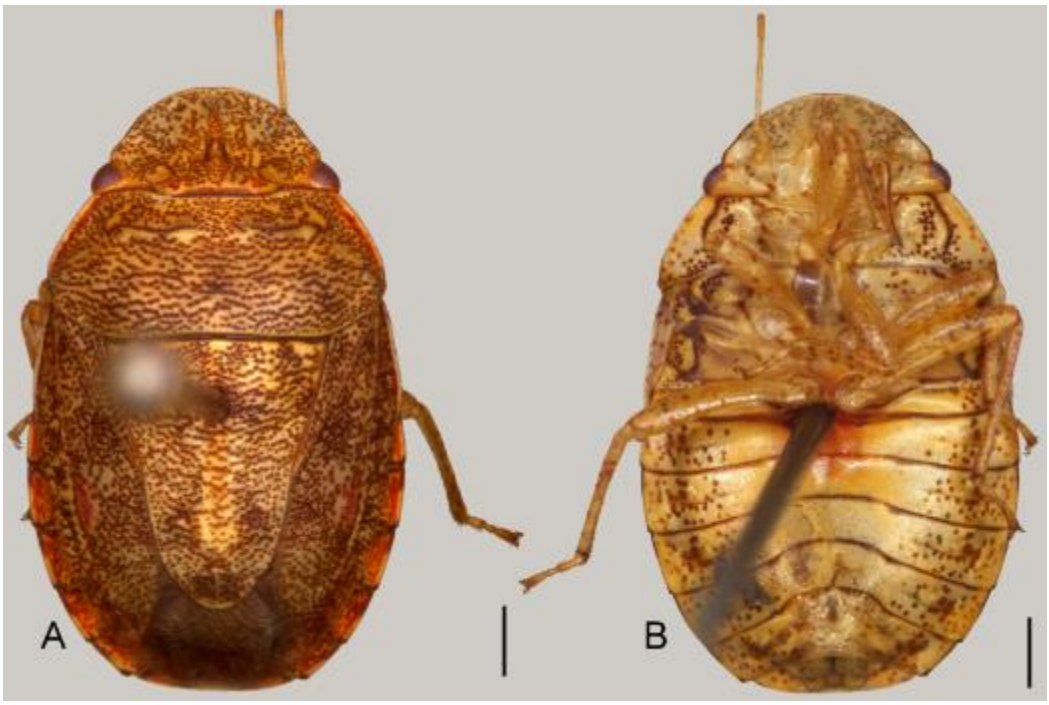

FIGURE 43. *Lineostethus clypeatus* (Stål, 1862). A, dorsal view; B, ventral view. Scale bars = 1mm.

FIGURE 44. *Acclivilamna vicina* (Signoret, 1851). A, dorsal view; B, ventral view. Scale bars = 1mm.

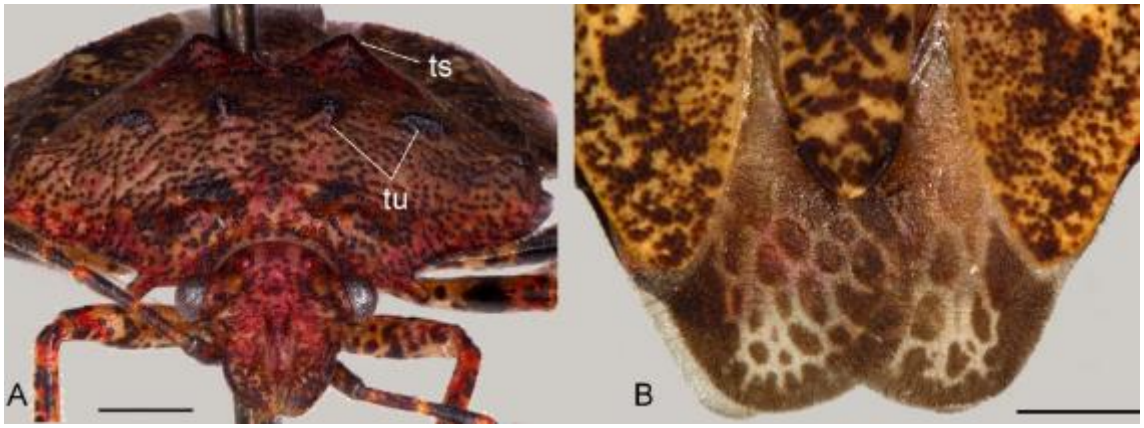

FIGURE 45. *Eurystethus* (*Hispisoma*) *microlobatus* Ruckes, 1966. A, frontal view; B, apex of scutellum and hemelytrum. Abbreviation: ts, scutellar tubercles; tu, transumeral tubercles. Scale bar = 1mm.

FIGURE 46. *Eurystethus* (*Hispisoma*) *microlobatus* Ruckes, 1966. A, dorsal view; B, ventral view. Scale bars = 1mm.

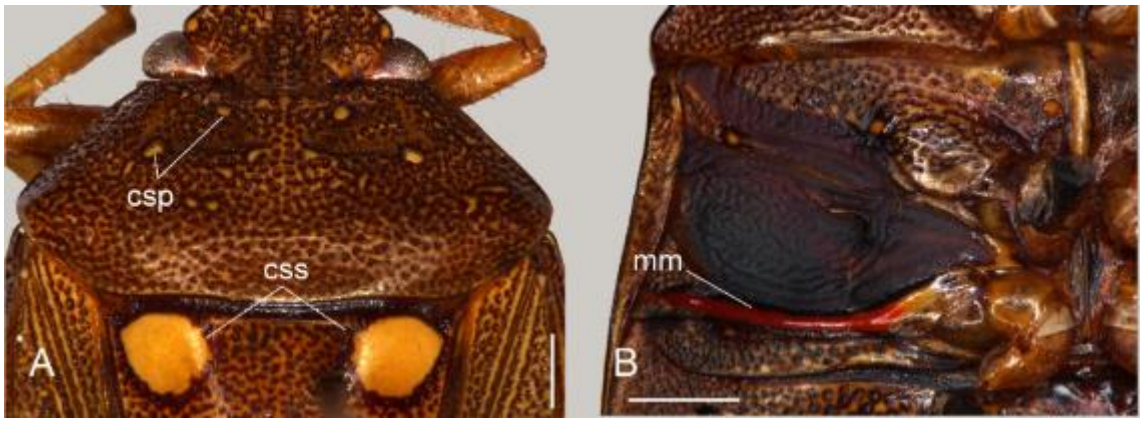

FIGURE 47. *Callostethus guttatopunctatus* (Fabricius, 1803). A, pronotum and base of scutellum, dorsal view; B, meso and metathorax, ventral view. Abbreviations: csp, calloused spots of pronotum; css, calloused spots of scutellum; mm, margin of metapleura. Scale bars = 1mm.

FIGURE 48. *Callostethus guttatopunctatus* (Fabricius, 1803). A, dorsal view; B, ventral view. Scale bars = 1mm.

FIGURE 49. *Uncinala tau* Ruckes, 1965. A, hemelytral membrane and apex of hind tibiae; B, thoracic efferent system; C, lateral margins of abdominal sternites V-VI. Abbreviations: ev, evaporatorium; pe, peritreme; plc, plectrum; str, stridulatory apparatus. Scale bars = 1mm.

FIGURE 50. *Uncinala tau* Ruckes, 1965. A, dorsal view; B, ventral view. Scale bars = 1mm.

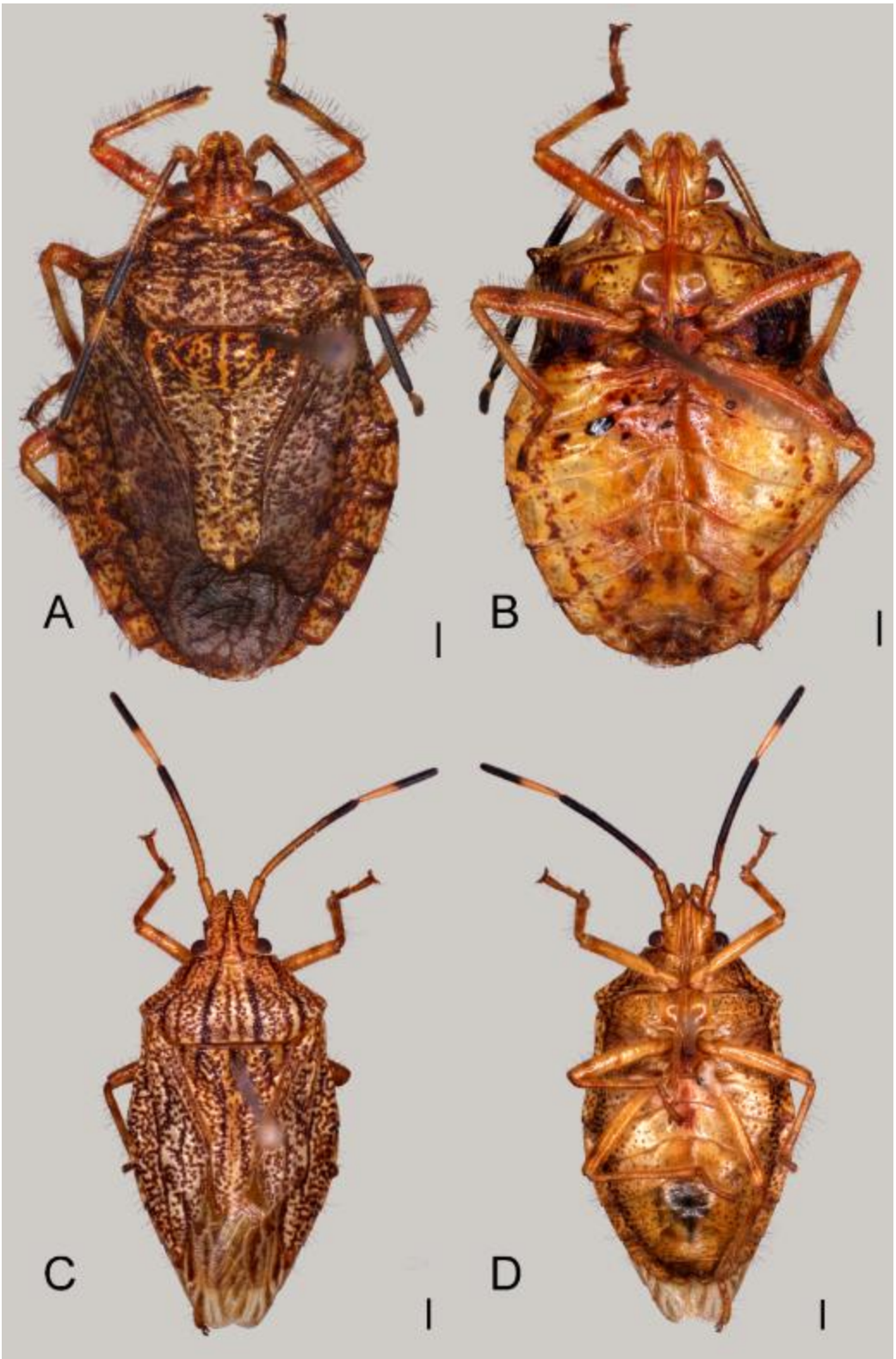

FIGURE 51. *Dinocoris* spp. A–B, *Dinocoris* (*Dinocoris*) *gibbosus* (Fallou, 1889); C–D, *Dinocoris* (*Praedinocoris*) *lineatus* (Dallas, 1852); A, C, dorsal view; B, D, ventral view.

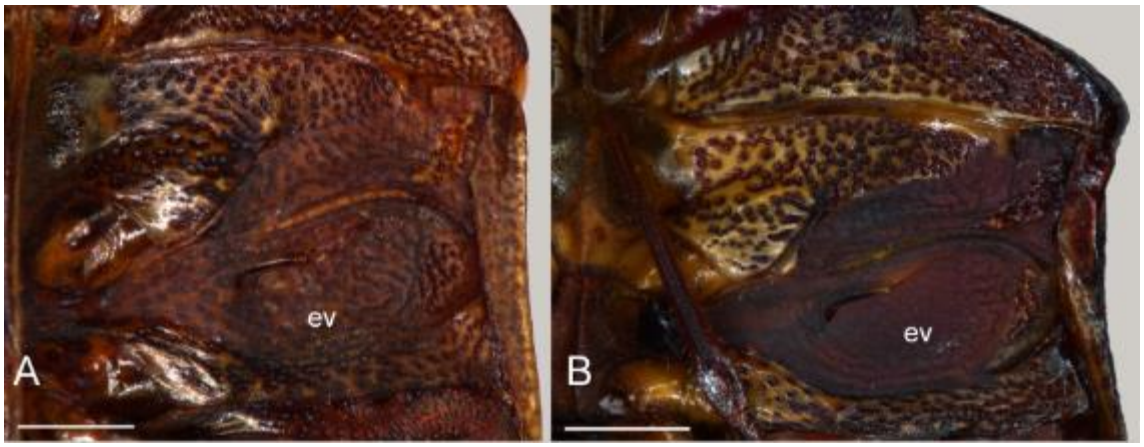

FIGURE 52. Thoracic efferent system. A, *Patronatus binotatus* Ruckes, 1965; B, *Antiteuchus mixtus* (Fabricius, 1787). Abbreviation: ev, evaporatorium. Scale bars = 1mm.

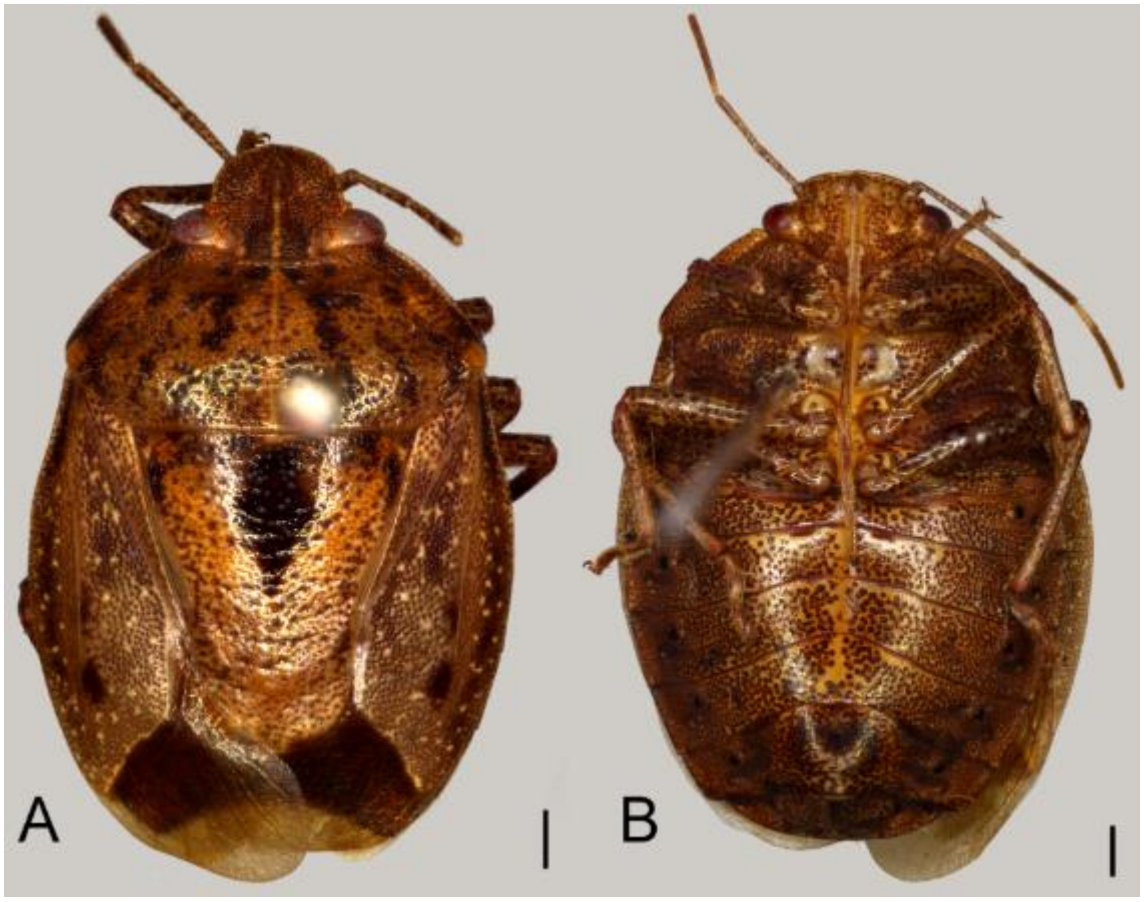

FIGURE 53. *Patronatus binotatus* Ruckes, 1965. A, dorsal view; B, ventral view. Scale bars = 1mm.

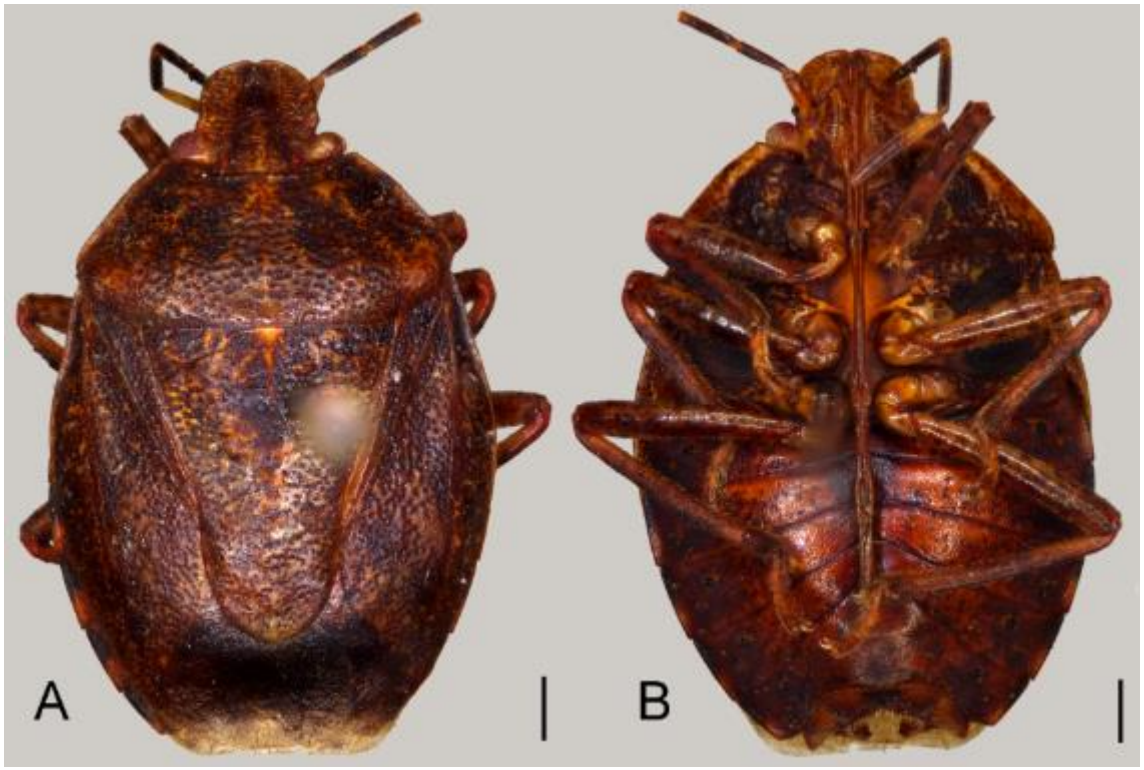

FIGURE 54. *Mecistorhinus obscurus* (Dallas, 1851). A, dorsal view; B, ventral view. Scale bars = 1mm.

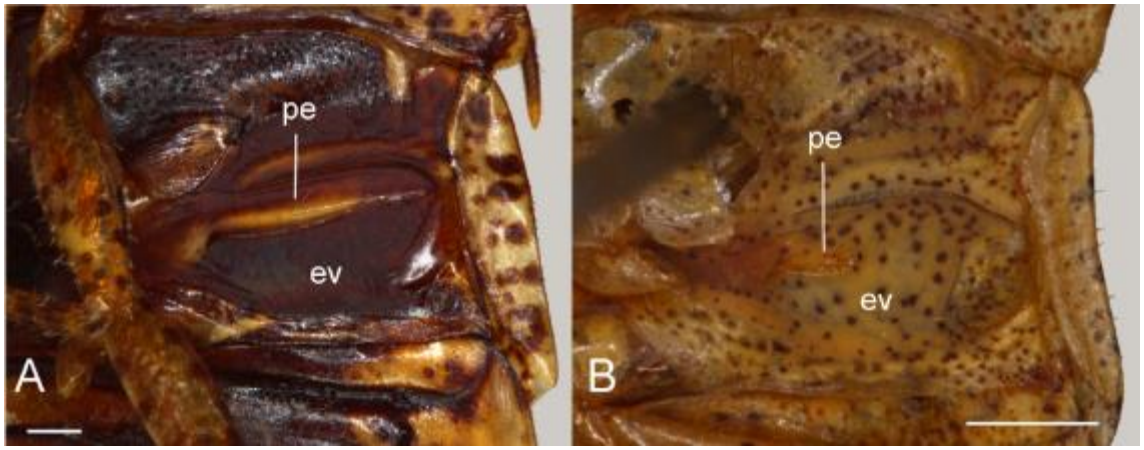

FIGURE 55. Thoracic efferent system. A, *Psorus paraensis* Fernandes, Grazia & Lobo, 2008; B, *Dryptocephala lurida* (Erinchson, 1848). Abbreviations: ev, evaporatorium; pe, peritreme. Scale bars = 1mm.

FIGURE 56. *Dryptocephala lurida* (Erinchson, 1848). A, dorsal view; B, ventral view. Scale bars = 1mm.

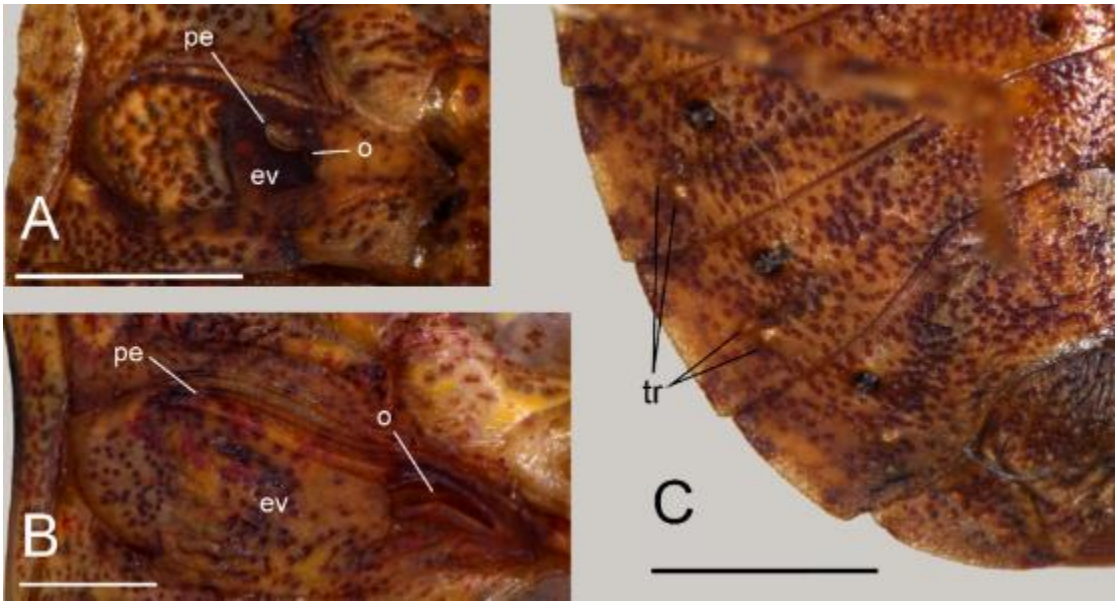

FIGURE 57. A–B, Thoracic efferent system; C, abdominal sternites V-VII; A, C, *Opophylax extenebratus* Bergroth, 1918; B, *Ablaptus costaricensis* Grazia & Zwetsch, 2000. Abbreviations: ev, evaporatorium; o, ostiole; pe, peritreme; tr, trichobothria. Scale bars = 1mm.

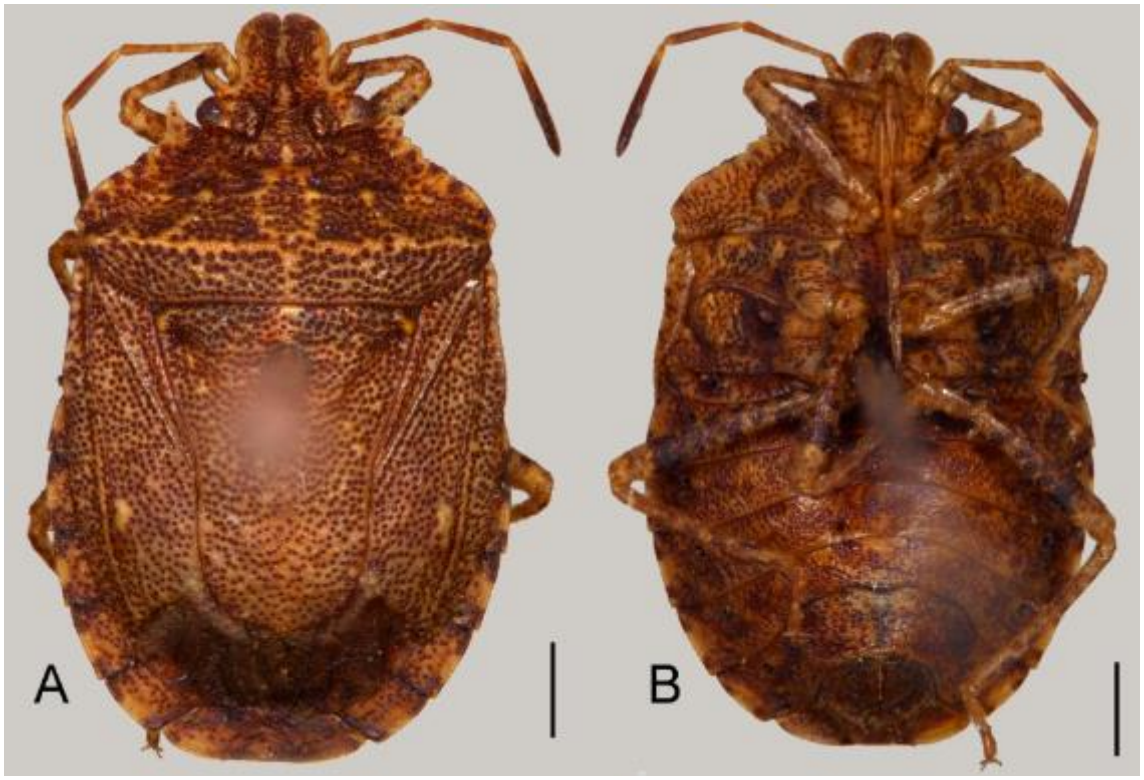

FIGURE 58. *Opophylax extenebratus* Bergroth, 1918. A, dorsal view; B, ventral view. Scale bars = 1mm.

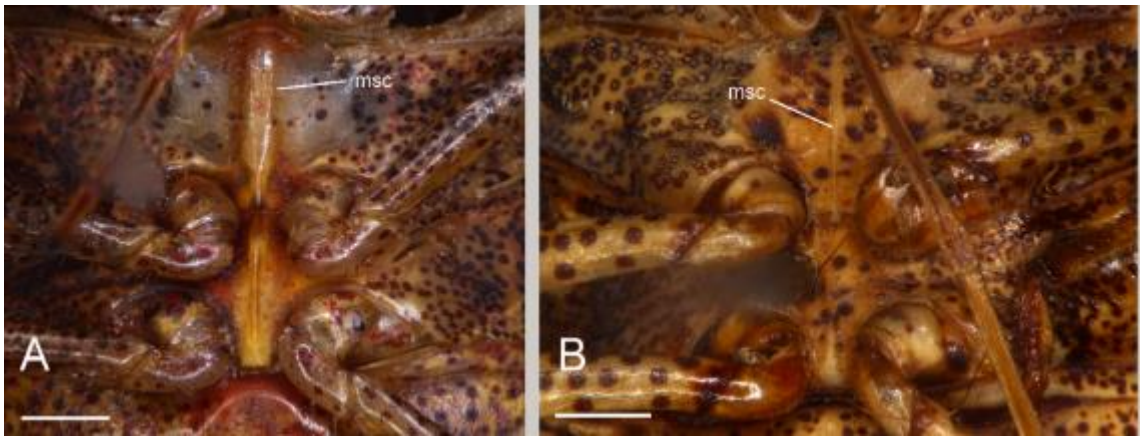

FIGURE 59. Meso and metasternum. A, *Ablaptus costaricensis* Grazia & Zwetsch, 2000; B, *Sympiezorhincus punctipes* Dallas, 1851. Abbreviation: msc, mesosternum carinae. Scale bars = 1mm.

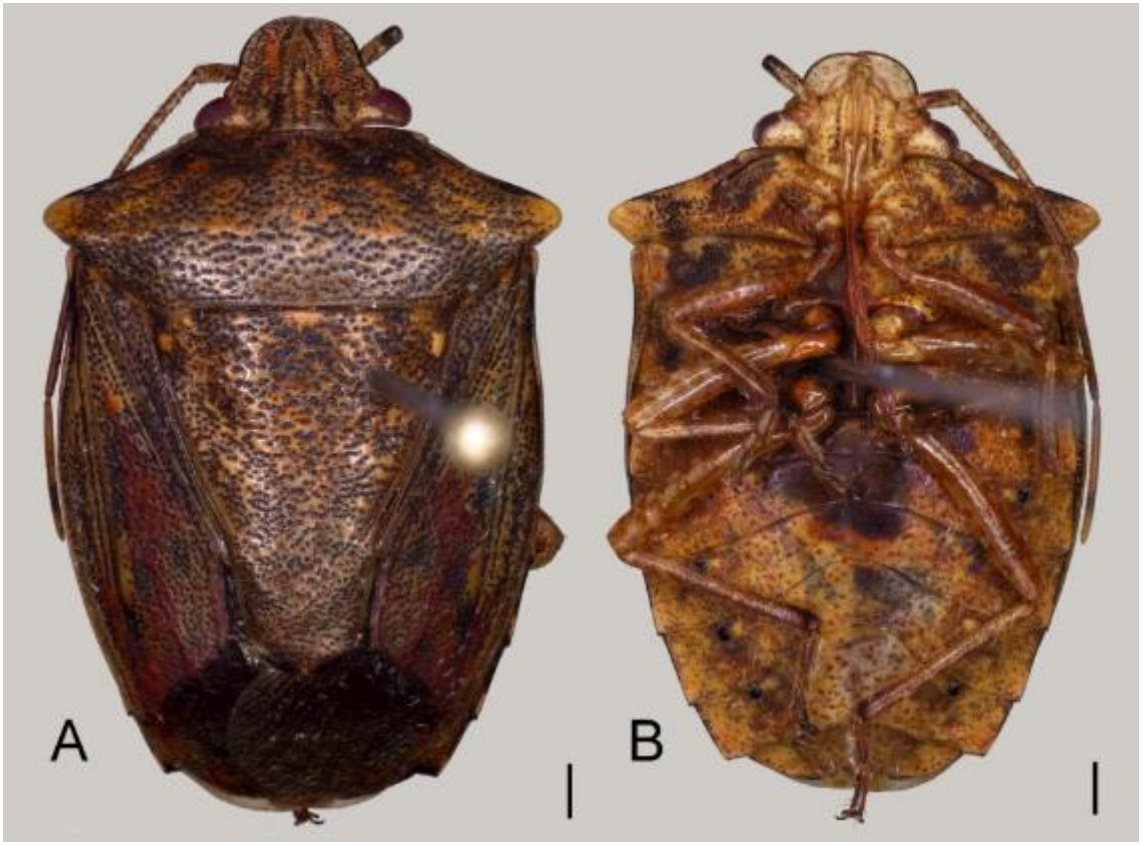

FIGURE 60. *Ablaptus costaricensis* Grazia & Zwetsch, 2000. A, dorsal view; B, ventral view. Scale bars = 1mm.

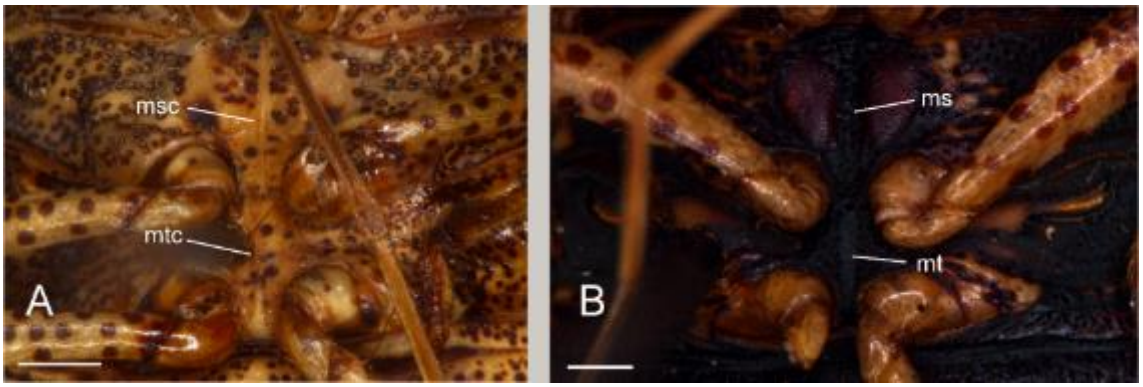

FIGURE 61. Meso and metasternum. A, *Sympiezorhincus punctipes* Dallas, 1851; B, *Grassatorama nigroventris* (Ruckes, 1965). Abbreviations: ms, mesosternum; msc, mesosternum carinae; mt, metasternum; mtc, metasternum carinae. Scale bars = 1mm.

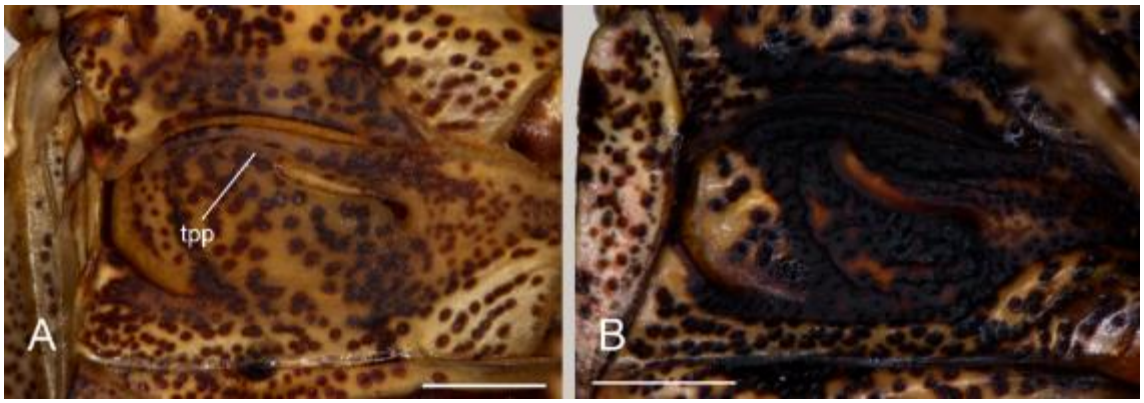

FIGURE 62. Thoracic efferent system. A, *Sympiezorhincus punctipes* Dallas, 1851; B, *Pandonotum bergroth* Becker, 1967. Abbreviation: tpp, thick projection of peritreme. Scale bars = 1mm.

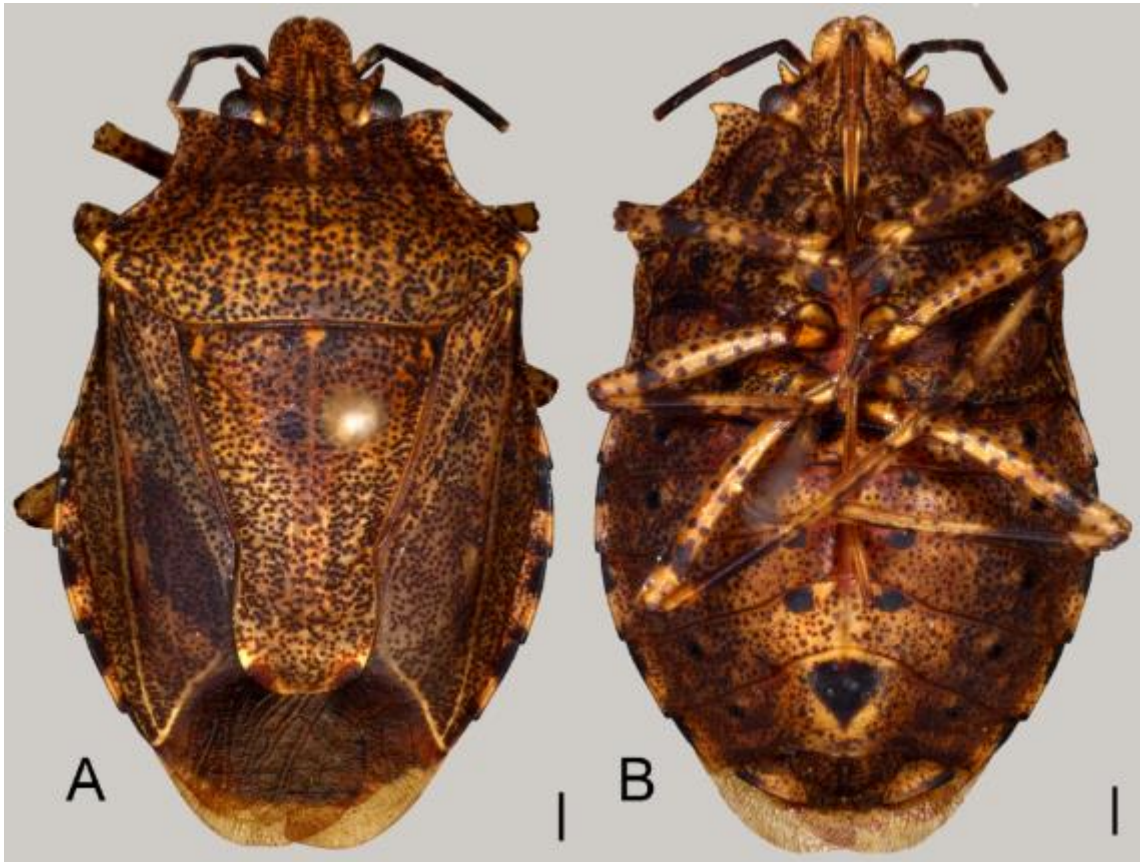

FIGURE 63. *Sympiezorhincus punctipes* Dallas, 1851. A, dorsal view; B, ventral view. Scale bars = 1mm.

FIGURE 64. Apex of scutellum, lateral view. *Pandonotum bergroth* Becker, 1967. Scale bar = 1mm.

FIGURE 65. *Pandonotum bergroth* Becker, 1967. A, dorsal view; B, ventral view. Scale bars = 1mm.

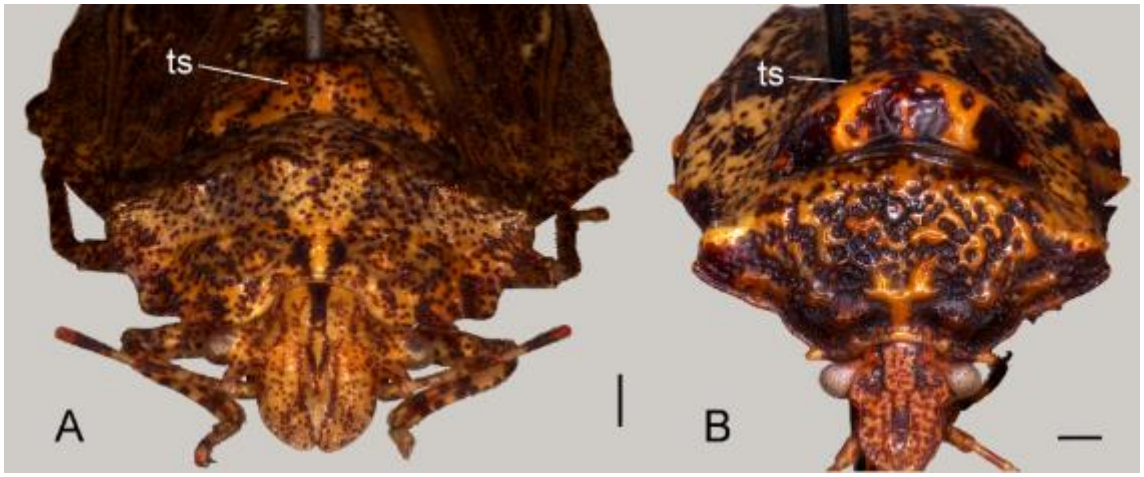

FIGURE 66. Frontal view. A, *Alcippus reticulatus* Stål, 1864; B, *Parantiteuchus hemitholus* Ruckes, 1962. Abbreviation: ts, tubercle of scutellum. Scale bars = 1mm.

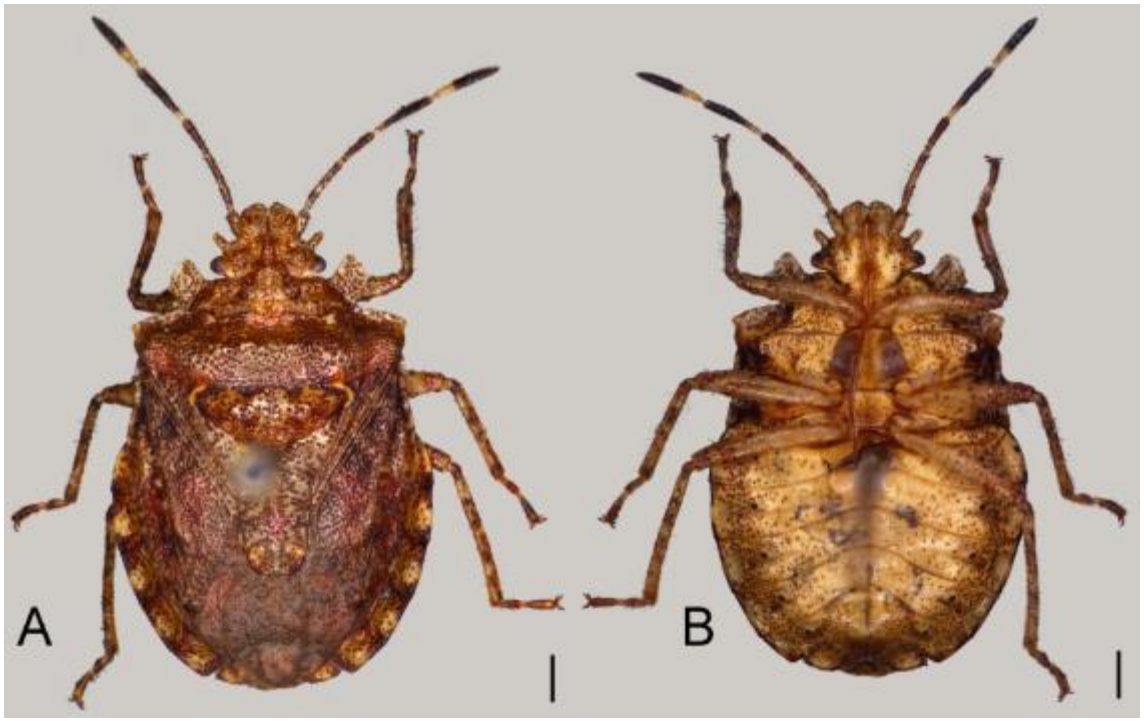

FIGURE 67. *Paralcippus dimidiatus* (Ruckes, 1959). A, dorsal view; B, ventral view. Scale bars = 1mm.

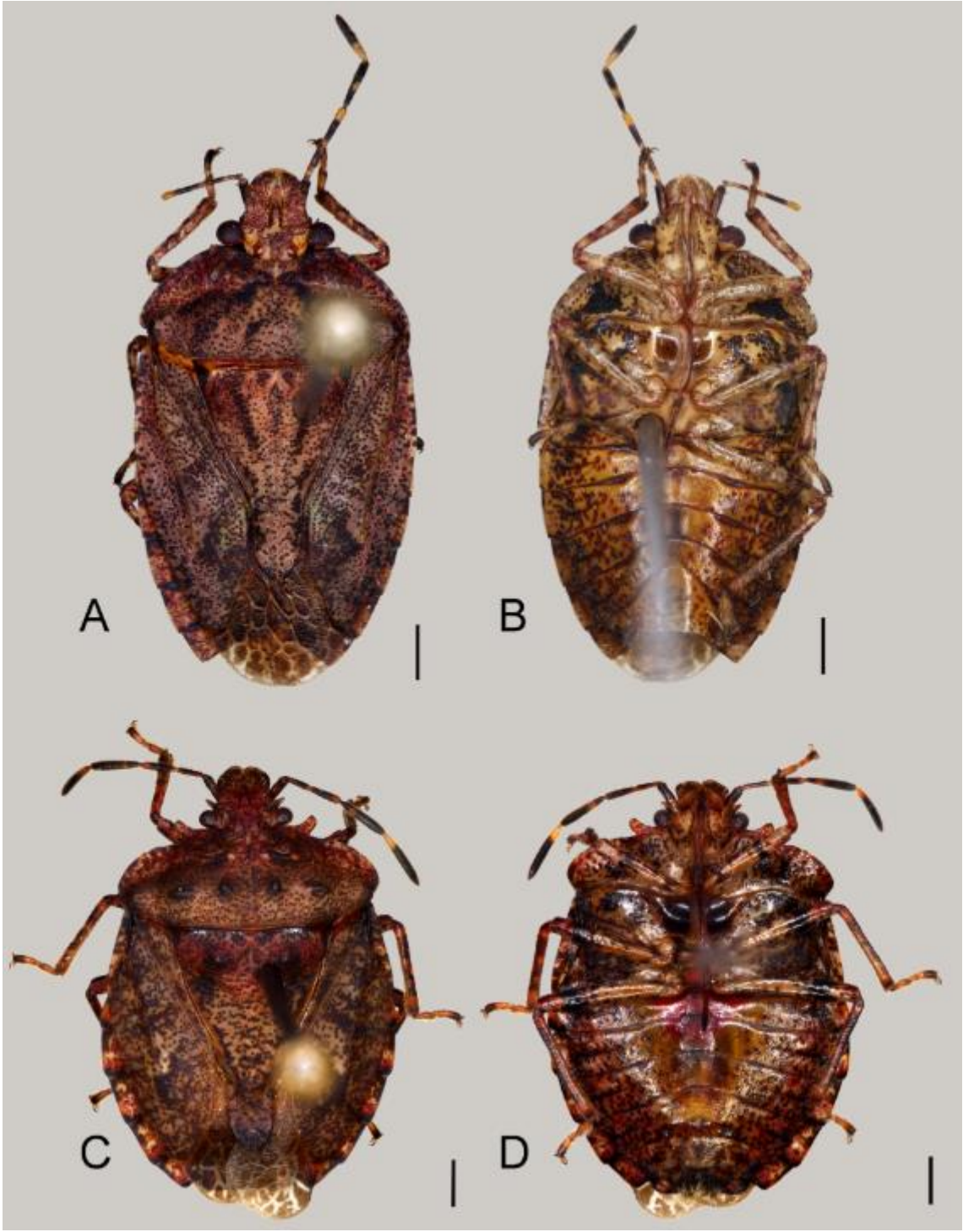

FIGURE 68. *Eurystethus* spp. A–B, *Eurystethus* (*Eurystethus*) *ellipsoidalis* Ruckes, 1958; C–D, *Eurystethus* (*Hispisoma*) *microlobatus* Ruckes, 1966; A, C, dorsal view; B, D, ventral view. Scale bars = 1mm.

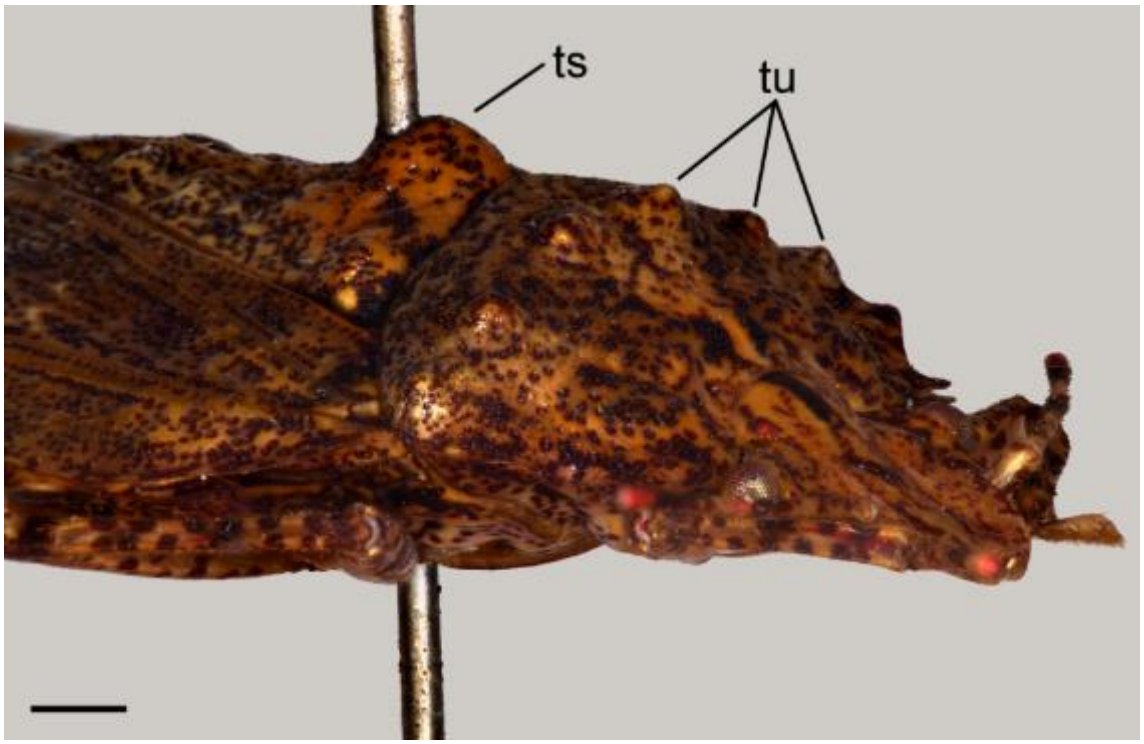

FIGURE 69. *Alcippus reticulatus* Stål, 1864, lateral view. Abbreviation: ts, tubercle of scutellum; tu, transumeral tubercles. Scale bars = 1mm.

FIGURE 70. *Alcippus reticulatus* Stål, 1864. A, dorsal view; B, ventral view. Scale bars = 1mm.

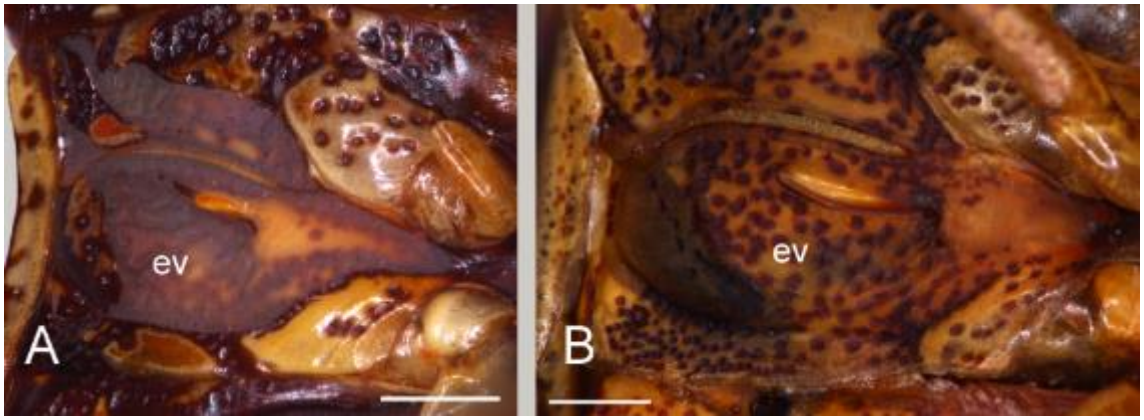

FIGURE 71. Thoracic efferent system. A, *Parantiteuchus hemitholus* Ruckes, 1962; B, *Agaclitus fallenii* Stål, 1864. Abbreviation: ev, evaporatorium. Scale bars = 1mm.

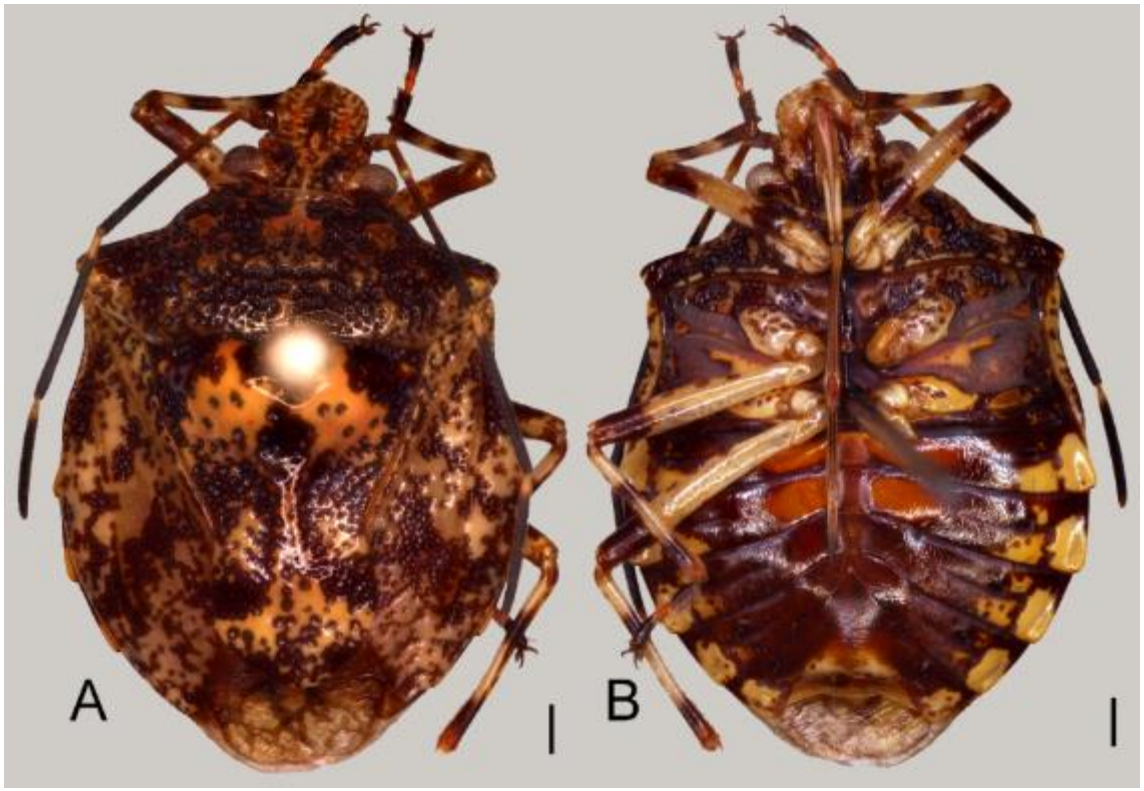

FIGURE 72. *Parantiteuchus hemitholus* Ruckes, 1962. A, dorsal view; B, ventral view. Scale bars = 1mm.

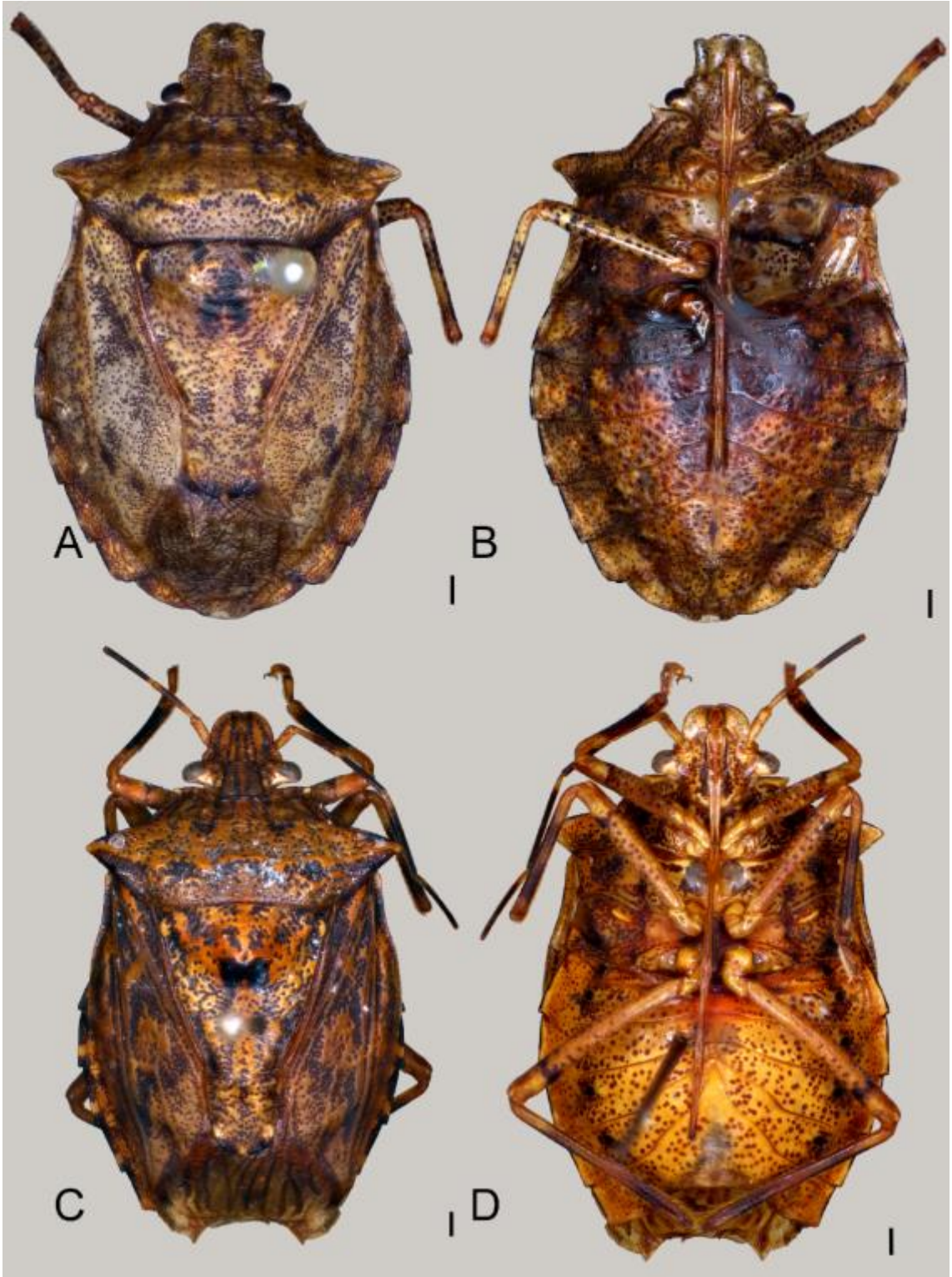

FIGURE 73. *Agaclitus* spp. A–B, *Agaclitus australis* Becker & Grazia, 1992; C–D, *Agaclitus fallenii* Stål, 1864; A, C, dorsal view; B, D, ventral view. Scale bars = 1mm.

CAPÍTULO 3

Normas editoriais: *Zoological Journal of the Linnean Society* (Anexo 1).
Situação: Em preparação.

Phylogeny of the Neotropical tribe Discocephalini (Heteroptera: Pentatomidae: Discocephalinae) with reflections on its classification.

THEREZA DE A. GARBELOTTO[1*], JOCELIA GRAZIA[2] & LUIZ ALEXANDRE CAMPOS[3]

Programa de Pós-Graduação em Biologia Animal & Departamento de Zoologia, Universidade Federal do Rio Grande do Sul – Av. Bento Gonçalves 9500, 91501-970, Prédio 43435, Porto Alegre RS, Brazil.

[1*] *therezagarbelotto@hotmail.com* – corresponding author

[2] *jocelia@ufgrs.br*

[3] *luiz.campos@ufrgs.br*

Phylogeny of Discocephalini (Pentatomidae)

ABSTRACT.

The Discocephalini Fieber (Dicocephalinae) was erected when Ochlerini was proposed, and although the former tribe includes today 42 genera a diagnosis has never been proposed. Recently the monophyletic status of the group was challenged when the paraphyly for the tribe was stated. Due to doubts about the monophyly of Discocephalini and the absence of a diagnosis that should permit its undoubtful recognition, here a phylogeny for the genera of Discocephalini is presented. Two data sets were analyzed, with 62 and 61 taxa respectively and 138 characters. The analysis were conducted on TNT with heuristic searches using TBR. In both analysis, the monophyly of both Discocephalini and Discocephalinae has no support, and although the two analyses had returned different consensus topology, the major clades remained in both. The main clade gathered 90% of the Discocephalini genera and its internal nodes grouped some genera treated in classical literature as probably related. We discuss the characters treated as diagnostic for the subfamily and tribal genera groups, and a new proposal for genera arrangement.

ADDITIONAL KEYWORDS: Ochlerini – Systematics – Taxonomy

INTRODUCTION

The Discocephalinae is one of the nine subfamilies in Pentatomidae (Grazia, Schuh & Wheeler, 2008) restricted to the Neotropical region. Proposed by Fieber (1861) as a family group in Heteroptera, the most notable changes in its systematics occurred when Kirkaldy (1909) included in Discocephalini almost all of the genera treated in the group nowadays and later when it was erected to subfamily status and diagnosed by Rolston & McDonald (1979); and by the two tribes arrangement proposed by Rolston (1981).

The Discocephalinae has about 76 genera classified in Dicocephalini (42 genera) and Ochlerini (33 genera). Members of the subfamily are generally recognized by the labium insertion, usually on or posteriorly to a line crossing the head on anterior margin of the eyes, and by the placement of abdominal trichobothria, usually laterally to the spiracles. A formal diagnosis was published only for Ochlerini (Rolston, 1981, 1992) that also had its monophyly supported after a phylogenetic analysis (Campos & Grazia, 2006). When Ochlerini was proposed, and Discocephalini erected, nothing was said about the diagnostic features of the nominal tribe except for Rolston's (1981) comment: "*...the remaining genera of discocephalines, which constitute the nominate tribe, are brown, often mottled with black or shiny black*".

Discocephalini includes today 42 genera and 169 species, including one monotypic fossil genus (for an up to date species list see Grazia *et al.*, in press), but almost nothing is known about the relationships between Discocephalini genera. Campos & Grazia (2006) recognized Discocephalini as sister group of Ochlerini, and Roell & Campos (in press) questioned the monophyly of the former tribe. Due to the absence of a diagnosis that permits undoubtful regognizing Discocephalini, along with the lack of a phylogenetic hypothesis for this tribe, and the doubts pointed about its monophyly, here we are presenting a phylogeny for Discocephalini genera. Some characters treated in previous publications as diagnostic for the subfamily and for groups of genera are evaluated, and a new proposal for genera arrangement is discussed.

MATERIAL AND METHODS

TAXON SAMPLING

A total of 62 taxa were included in the matrix. The ingroup corresponds to 49 taxa, representing at least one species of each Discocephalini genus. For genera including subgenera we selected one species of each subgenus (except for *Oncodochilus* Fieber because of the lack of identified material for one subgenus), and for some genera two species were included due to the morphological variation. The outgroup includes species from different subfamilies of Pentatomidae (Cyrtocorinae, Asopinae, Edessinae, Pentatominae), and species of Ochlerini (Discocephalinae), totaling 12 terminals (Table A1). *Cyrtocoris egeris* Packauskas & Schaefer, 1998 was used for character polarization and rooting of cladograms, since Cyrtocorinae was recovered as sister-group to the remaining Pentatomidae by Grazia et al. (2008).

The specimens used in this study belong to the following collections (curators names are available between parenthesis): AMNH – American Museum of Natural History, New York, USA (Randall Schuh); BPBM – Bishop Museum, Honolulu, USA (Shepherd P. Myers); BMNH – The Natural History Museum, London, England (Mick Webb); CAS – California Academy of Sciences, San Francisco, USA (Norman Penny); DCMP – Universidade Federal do Paraná, Curitiba, Brazil (Rodney Cavichioli); DARC – David A. Rider Collection, Fargo, USA (David Rider); FIOC – Fundação Instituto Oswaldo Cruz, Rio de Janeiro, Brazil (Jane Costa); INPA – Instituto Nacional de Pesquisas da Amazonia, Manaus, Brazil (José Albertino Rafael); JEE – Joseph E. Eger Collection, Tampa, USA (Joseph Eger); MCNZ – Museu de Ciências Naturais da Fundação Zoobotanica do Rio Grande do Sul, Porto Alegre, Brazil (Aline Barcellos); MIZA – Museo del Instituto de Zoología Agrícola, Maracay, Venezuela (Marco Giani); MLPA – Museo de La Plata, La Plata, Argentina (Maria Del Carmen Coscarón); MNHN – Muséum Nationale d'Histoire Naturelle, Paris, France (Eric Guilbert); MNRJ – Museu Nacional, São Cristovão, Brazil (Gabriel Mejdalani); MPEG – Museu Paraense Emilio Goeldi, Belém, Brazil (Orlando Silveira); NHMW – Naturhistorisches Museum Wien, Wien, Austria (Herbert Zettel); NHRS – Naturhistoriska riksmuseet, Stockholm, Sweden (Gunvi Lindberg); NMPC – National Museum, Prague, Czech Republic (Petr Kment); UCRC – Entomology Research Museum, University of California Riverside, USA; UEMA – Universidade Estadual do Maranhão, São Luís, Brazil (Francisco Oliveira); UFRG – Departamento de Zoologia da Universidade Federal do Rio Grande do Sul, Porto Alegre, Brazil (Jocelia Grazia);

USNM – National Museum of Natural History, Washington D.C., USA (Thomas Henry).

CHARACTER SAMPLING

Morphological evaluations were made under light stereomicroscope. Internal genital structures (phallus and female ectodermal ducts) were studied after boiling in KOH 10% and staining in Congo red. Photographs were taken using a Nikon AZ100M stereomicroscope and pictures stacked with the software Nikon NIS-Elements Air Microscope Imaging Software. The images were digitally processed with Photoshop CS4.

The terminologies followed: Baker (1931), Dupuis (1970), and Garbelotto, Campos & Grazia (2013) for general morphology of genitalia; Becker (1977a) and Becker & Grazia (1995) for structures found in Discocephalini; Kment & Vilimová (2010) and Barão *et al.* (unpubl. data) for structures of the thoracic scent efferent system (treated as TSES in the following sections); and Ruckes (1964, 1966a) for morphology of thorax of the Discocephalini. Description of characters and states follows Sereno (2007), and polarization followed the outgroup method (Nixon & Carpenter, 1993).

The data set is composed by 138 characters where: 97 characters are of general morphology, three exclusive for females and 13 for males; 19 of male genitalia, and 20 of female genitalia (Appendix 2 – full character list). The characters were treated as discrete and unordered. The symbols "?" and '-' were used for unobserved and noncomparable data, respectively.

CLADISTIC ANALYSIS

The character matrix was built using Mesquite (Maddison & Maddison, 2015), and analyses were run using TNT (Goloboff, Farris & Nixon, 2008) through parsimony by heuristic searches with TBR (tree bisection reconnection), 599 replications and 100 trees saved per replication (for a space of 59999 trees on memory). Strict consensus, Bremer support (Bremer, 1994) and Jackknife support were calculated with TNT. Absolute Bremer support was calculated for suboptimal trees with 10 extra steps, and Jackknife resampling was calculated with 1000 replications, 36% of character removal probability and collapsing branches with absolute frequency below 50. Visualization of cladograms and descriptive indices (tree length, consistency and retention index) were performed on WinClada 1.00.08 (Nixon, 2002).

Two searches were performed, one with the complete dataset and another excluding a terminal from Thailand (unidentified species). This is a specimen of Pentatominae showing some morphological similarity with the Discocephalini, however we had only one female specimen, resulting in a large number of missing entries for this terminal on matrix, and we discuss its influence in the dataset. All the discussion is made using the strict consensus cladogram, and in the images, we coded the nodes with letters, and used the same letter for nodes that gather the same taxa between the two analyses.

RESULTS AND DISCUSSION

The analysis with the complete data set resulted in four equally parsimonious trees with 1075 steps, consistency index (CI) = 0.15 and retention index (RI) = 0.52. The strict consensus of these four trees presents 1090 steps, CI=0.15 and RI=0.51. This analysis recovered a clade for Discocephalinae (Figure 1 – *black arrow*) including the Thailand specimen as sister group to *Opophylax* Bergroth (Discocephalini) in the clade *b'*. Clade *b'* is sister-group to clade *b"* that recovers the Ochlerini as monophyletic inside Discocephalinae (Figure 1 – *clade B*). Nearly 90% of the genera today included in Discocephalini were recovered as clade *C*, placed in two main clades (Figure 1 – *clades D and E*). The remaining genera included in the tribe appear at the base of Discocephalinae (Figure 1 – *black arrow*), stating the polyphyly of Discocephalini. Jackknife support are almost all below the 50 absolute frequency, whereas Bremer support are relatively good for some clades, e.g. for clade *C* (Figure 1).

The analysis without the Thailand terminal resulted in 84 equally parsimonious trees with 1059 steps, CI=0.15 and RI=0.52. For this analysis the strict consensus tree presents 1185 steps, CI=0.13 and RI=0.45 (Figure 4). This analysis did not recover a clade for Discocephalinae, i.e. black arrow in Figure 1, and clades *B* and *A* in Figure 1 are collapsed in a basal polytomy with all outgroup taxa and the three basal discocephalines from Figure 1 (Figure 4 – *black arrow*). Several of the internal clades found in the first analysis are also not recovered here, particularly within clade G, but there are two main clades that keep the same topology, clade *b"* (Ochlerini) and clade *C* (Discocephalini *stricto sensu*) (Figure 4 – *clades b" and C*), which also states the polyphyly of the Discocephalini. Topology of clade *K* was also the same between the

two analyses. As discussed for the first analysis the Jackknife and Bremer support values are pretty similar to those found with the complete data set (Figures 1 and 4).

The non-monophyly of the Discocephalini was indicated by Roell & Campos (in press) after an analysis where *Priapismus* Distant appeared as basal to the clade including Ochlerini and Discocephalini taxa. In our complete data set analysis (Figure 1), *Priapismus* appear with a similar relation as found by Roell & Campos (in press).

Clade *C* is supported by eight homoplastic synapomorphies in the complete dataset analysis, and eighteen homoplastic and one exclusive synapomorphy (character 48) in the data set without the Thailand specimen (Figures 1 and 4). Between both analysis and its synapomorphies, one of the eight in the first analysis is not present as homoplasy in the second analysis and its exclusive synapomorphy is one of the eight homoplasies in the first. None of these homoplasies is shared with just one of the out groups and constantly inside clade *C*.

Character 48(1) regards to differences on the length of the mesosternum carinae, and even it appear as synapomorphy for clade *C*, this character cannot be treated as a diagnostic for the Discocephalini. The majority of the taxa gathered in clade *C* does not have mesosternum carina; but when present, the carina extending only on xyphus is exclusive to taxa of Discocephalini *strictu sensu* (Figures 1 and 4 – *clade C*).

Among the other homoplasies that support the clade *C* we can point three that we understand as important to these arrangement. All the Discocephalinae included in the analysis have a spout peritreme (except for *Ablaptus* Stål – see character 63.1) but there are four different conditions of spout, and these variations are treated in character 64. The latter character helps not only to define clade *C* but also some of its internal resolution, particularly on the complete data set analysis. Shared with two other outgroup terminals and with some internal reversals, the relative length of first and third tarsal segments (character 74) also helps to establish clade *C*. The genital structures varies strongly between the Discocephalini, and this result in lots of homoplasies among the genital characters. The long length of the gonocoxites 8 (character 85) causing its expansion over the other genital plates between the taxa analyzed occur only in some Discocephalinae and the majority are grouped in the clade *C*.

GENERIC GROUPS IN DISCOCEPHALINI STRICTO SENSU

Some of the clades recovered inside clade *C* grouped genera classically treated as related by alpha taxonomists, independently of the data set analyzed. Among the genera grouped in the clade *F* (Figures 1-2 and 4-5), *Harpagogaster* Kormilev and *Placidocoris* Ruckes were individually related to *Dryptocephala* Laporte but never treated as related to each other (Kormilev, 1957; Ruckes, 1960). *Glyphuchus* Stål was related to *Oncodochillus* Fieber and *Ruckesiocoris* Rider because of the labrum shape (also present in other groups, see Kment & Garbelotto, unpubl. data), and by two segmented tarsi (characters 23 and 73); we recovered those characters as homoplastic in both analysis. Yet, Barreiro, Schwertner & Garbelotto (unpubl. data) recovered *Harpagogaster* as sister-group to *Dryptocephala* using implied weighting. Clade *F* is supported by one exclusive synapomorphy in our two analyses, the short hemelytra, leaving the abdominal tergites partially visible (Figures 2 and 5 – character 38).

Clade *G* present two main internal nodes, one represented by the sister-taxa *Alcippus* Stål and *Pandonotum* Ruckes is supported by four homoplastic synapomorphies in both analysis (characters 34, 41, 69 and 113); and the second represented by clade *H* with two different topologies between the two data sets (Figures 1-2 and 4-5). Some of the genera gathered in clade *H* presents sexual dimorphism on wings, structures for communication (as stridulatory), and some kind of parental care is known for other genera (Becker & Grazia, 1989, 1992a, 1995; Grazia *et al.*, in press). Little is known about the natural history of Discocephalini, but parental care behavior and presence of structures for communication are unknown for taxa from other clades. Between the two data sets analyzed, in the cladogram recovered from the analysis without Thailand specimen, just the sister-group relation of *Antiteuchus* Dallas and *Callostethus* Ruckes remains in the consensus cladogram, except for the sister-group relation among species from the same genera (Figures 4 and 5 – *clade H*). Moreover, the complete data set analysis recovered two internal clades in clade *H* (Figure 1 and 2 – *clades I and J*) supported by one exclusive synapomorphy each. Clade *I* is supported by the presence of a transversal furrow in males hemelytral membrane (character 108). Except for the absence of *Ablaptus* and presence of *Parvamima* Ruckes, the genera that were previously grouped by the sexual wings dimorphism are gathered in our analyses (Becker & Grazia, 1989; Grazia, Campos & Becker, 2000). However, Ruckes (1960) cited *Parvamima* as having a phylogenetic placement closer to *Cataulax* Spinola. Clade *J* is supported by the spout peritreme fingerform (character 64) and here are gathered

genera mentioned by different authors as related to *Antiteuchus* (e.g. Ruckes, 1961, 1962; Fernandes & Grazia, 2006) except by the presence of *Ablaptus*.

Clade *K* is the only one keeping the same topology between the two analyses (Figures 1, 3-4 and 6), and is supported by homoplastic synapomorphies, three of them common between the two analyses (characters 98, 117, 126). The internal clades *L* and *M* partially recovered some important relationships treated by previous authors. Supported by four homoplastic synapomorphies (characters 11, 21, 32 and 89), clade *L* recovered the relationship between *Eurystethus* Mayr, *Abascantus* Stål, *Coriplatus* White, and *Pelidnocoris* Stål (Figures 3 and 6). Notwithstanding, these four genera were related to other five in the literature (*Alcippus* Stål, *Opophylax*, *Pandonotum*, *Paralcippus* Becker & Grazia and *Psorus* Bergroth), especially by the broad metasternum, and the distance between the mesocoxae (character 66) (Ruckes, 1966b; Becker & Grazia, 1986; Fernandes & Grazia, 2008) a character also found e.g. in *Ruckesiocoris*. Within clade *L* the node (*Coriplatus*, *Abascantus* and *Pelidnocoris*) is the only one supported by two exclusive synapomorphies from female genitalia (characters 86 and 90), and the possible relationship between the three genera was indicated by Ruckes & Becker (1970) and Becker (1977b).

Eight homoplastic and one exclusive synapomorphy supported clade *M* (Figures 3 and 6). Here the majority of the taxa with interocular width greater than head length (character 5) are gathered, but the exclusive synapomorphy is the ventral structure of the head with the appearance of horns (character 12), which has three internal reversions. In this clade, almost all of the genera treated as "broadheaded discocephalines" are grouped (Ruckes, 1966a; Becker, 1977a; Rolston, 1990; Vicentini, Garbelotto & Campos, unpubl. data). The exceptions are *Harpagogaster* and *Placidocoris* that grouped in clade *F* (see above), and *Grassatorama* Rider that was not related to these genera before. Ruckes (1965) said that when he described the type species of *Grassatorama* he placed it in *Platycarenus* Fieber believing in its relationship with *Platycarenus* and *Discocephalessa* Kirkaldy (which we partially recovered here – clade *P*); but then he compared the new genus to *Mecistorhinus* Dallas. The other two internal clades (*N* and *O*) recovered relationships between taxa already stated in literature (Ruckes, 1965, 1966a; Rolston, 1990; Becker & Grazia, 1992b).

Among the four genera previously placed in Discocephalini that did not group in clade *C* (*Opophylax*, *Phineus*, *Priapismus*, and *Ruckesiocoris*) only *Priapismus* was never mentioned as close related to other genera, but our results raise doubts about

their placement in Discocephalini. Even largely supported by homoplasies and consequently with weak support values, our results put to the test the validity of the subfamily Discocephalinae and the better placement for these four genera, once they appear outside clade *C* (Figures 1 and 4).

CLASSIC DIAGNOSTIC CHARACTERS

The classic diagnostic characters of the Discocephalinae were here tested and none was recovered as exclusive synapomorphies. Rolston & McDonald (1979) described the labial insertion as "*on or posterior to a line transecting the head on the anterior limit of eyes*", this probably positioning the specimen in ventral view and ignoring the head declivity, which sometimes hampers visualization of the labium insertion. Campos & Grazia (2006) noticed that and used this character to evaluate the phylogenetic status of Ochlerini, but positioning the longitudinal axis of the head parallel to the observer, this way allowing a full visualization of both its ventral surface and labium insertion, which makes about half of the ochlerines to be coded with the labium insertion anterior to the eyes. Here we used this character following Campos & Grazia (2006) and as the authors, we did not recover this as a synapomorphy (character 17). Recently Kment & Garbelotto (unpubl. data) described a new African genus resembling the Discocephalini, having the labium insertion anterior to the anterior margin of eyes, but also not close to the head apex. Yet, the condition of the labium insertion on or posterior to the anterior margin of the eyes is present in the specimen from Thailand, and also in the Cyrtocorinae (a Neotropical group), indicating that the evolution of this condition may be more related to some adaptive condition than to a regional group of genera.

We tentatively followed Roell (2015) comparing the labium insertion with the bucculae length (character 18). The visualization is similar to the previous character, with the head positioned ventrally, but here there is an influence of the head length, since the bucculae are a bent of the maxillary plates (Spooner, 1938) and its length seems to be related to the head length. The hypothesis of primary homology was that the discocephalines have the labium on or posteriorly to the half of the bucculae length. We found for the apomorphic state basically the same ochlerines with the labium anterior to the eyes anterior margin, and three Discocephalini genera out from the clade *C* also have the labium anterior to half of the bucculae; nevertheless this character

appear as an exclusive synapomorphy to the *Priapismus* node on consensus tree of the complete data set (Figure 1).

The relative placement of the trichobothria to the spiracular opening, was described by Rolston & McDonald (1979) as the "*trichobothria of the sternite VII usually laterad to the band connecting spiracles and projected caudate*", but the illustration provided by the authors depicts the sternite IV, causing confusion. We compared the trichobothria with the spiracles in all sternites (character 80), but again the supposed diagnostic condition is present in Cyrtocorinae and *Janeirona* Distant, and absent in the Thailand specimen. Campos & Grazia (2006) used the distance between the spiracular oppening and the trichobothria on sternites IV and V, an attempt to differentiate the outgroups with trichobothria laterad to spiracles (character 79). Here we used the two approaches and notice that for both characters internal reversals can be present and as much outgroups we include the chance to find the same condition in other regions is increased, e.g. the tribes Myrocheini, Sciocorini and Triplatygini (Pentatominae) seems to have a similar trichobothrial pattern lateral to the spiracles (Kment, pers. com.).

Usually used to differentiate Ochlerini and Discocephalini, the dorsal surface of the last tarsomere plain or depressed (characters 83 and 111), was recover by Campos & Grazia (2006) as a synapomorphy for Ochlerini. Here we found terminals of Pentatominae (*C. tucuruiensis, J. bergi* and the Thayland specimen) as well as Discocephalini terminals (*Dryptocephala* spp., *Opophylax* spp. and *S. puncticeps*) with some flatness or depression on its tarsi dorsal surface. Even so, Ochlerini still recovered as a clade supported by other characters, a similar result was found by Roell & Campos (in press).

CONCLUSIONS

Our results allow questioning the monophyly of Discocephalinae and indicate the need for a new arrangement for the tribe Discocephalini, as about 90% of the taxa are gathered in the clade *C* in the two data sets analyzed (Figures 1 and 4), even these results have weak support values. The calculation of the trees indexes and the support values are primarily based on exclusive synapomorphies (or simply, synapomorphies), and on homoplastic synapomorphies (or homoplasies), and we recovered few exclusive synapomorphies. Node supports of our trees are based on

homoplastic synapomorphies, which consequently results in low support values. We assume that our characters are not enough to solve the polytomies on the base of the tree, and because of this, we choose to make the major observations and proposals on the tree without the Thailand specimen (Figures 4-6). It is a less resolved consensus tree but it also represents the mess in the Pentatomidae tribal classification (Rider 2000; Gapon & Baena 2005; Rider & Brailovsky 2014). The relation of the Thailand specimen with the discocephalines in the full data set analysis (Figure 1) shows that similar *facies* can be found in species from different biogeographic regions, and that probably the characters we are using or the way we are looking to them to unveil the evolutionary relationships within Pentatomidae, needs review. There are many characters to use, but when looking to different groups of taxa they show a reticulate pattern throughout Pentatomidae and hamper polarization (Kment & Garbelotto, unpubl. data), resulting in supports made by homoplasies.

Historically the taxonomists in Pentatomidae worked primarily with their regional fauna, which resulted in the regionalized and fragmented classification we have today. This is probably one of the major problems in our analysis, the lack of more specimens from different biogeographic regions, and because of that, we choose to not make changes to the current classification of Discocephalini or Discocephalinae. Four genera included in Discocephalini appear to be not part of the tribe (*Opophylax, Phineus, Priapismus* and *Ruckesiocoris*), but if we transfer they to some of the tribes of Pentatominae (which apparently could be the choice) we would be transferring a problem, as we have no support even for Discocephalinae.

Finally, those genera grouped in clade *C* (Figure 4) form which is the Discocephalini *stricto sensu*, and probably has a tribal status. In the absence of an exclusive synapomorphy to this group we present here a tentatively diagnosis. The genera of Discocephalini *stricto sensu* are in majority straw colored or brown to dark brown, rarely black; punctures and maculae, when present, are usually brown. Body usually flatted when anterolateral margins of pronotum are expanded; and dorsally convex when anterolateral margins of pronotum are not expanded. Mandibular plates longer than clypeus, convergent and mostly overlapping on its apex; labium insertion posterior to the middle of the bucculae, and first segment usually reaching the prosternum plate or its anterior margin; antennae four- or five-segmented, with pedicel and first flagellomere usually flatted, the last sometimes furrowed. Mesosternum carina, when present, extending for all mesosternum length or just on xyphus; meso and

metapleural evaporatorium well developed, mostly surpassing half of each pleurae; peritreme spout, with different shapes among the genera; third tarsal segment usually longer than first. Female gonocoxites 8 usually projected over laterotergites 9, the latter usually small and barely visible; spiracles of laterotergites 8 present.

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APPENDIX 1

Table A1 List of examined species, indicating dissections. *Just photographs available; **Specimens of the indicated sex unavailable, characters by literature.

Subfamily	Species	Sex	Dissection of genitalia	
			Male	Female
Cyrtocorinae	*Cyrtocoris egeris* Packauskas & Schaefer, 1998	♂♀	X	X
Asopinae	*Podisus* sp.	♂♀	X	-
Edessinae	*Pantochlora vivida* Stål, 1870	♂♀	X	X
Pentatominae	*Cloropepla tucuruisensis* Grazia & Teradaira, 1980	♀	**	X
	Janeirona bergi (Kormilev, 1956)	♂♀	X	X
	Thayland sp.	♀	-	-
Discocephalinae				
Ochlerini	*Eritrachys bituberculata* Ruckes, 1959	♂♀	X	X
	Macropygium reticulare (Fabricius, 1803)	♂♀	X	X
	Miopygium grossa Ruckes, 1958	♂♀	X	X
	Ochlerus handlirsh Breddin, 1910	♂♀	X	X
	Ochlerus profanus Breddin, 1910	♀	-	X
	Xynocoris recavus Garbelotto & Campos, 2014	♂♀	X	X
Discocephalini	*Abascantus lobatus* Stål, 1864	♂♀	X	X
	Ablaptus costaricensis Grazia & Zwetch, 2002	♀	-	X
	Acclivilamna vicina (Signoret, 1851)	♂♀	X	X
	Agaclitus australis Becker & Grazia, 1992	♀	-	X
	Agaclitus falenii Stål, 1864	♂	X	**
	Alcippus reticulatus Stål, 1864	♂♀	X	X
	Alveostethus latifrons (Dallas, 1851)	♂♀	X	X
	Alveostethus politus (Signoret, 1851)	♂♀	X	X
	Antiteuchus mixtus (Fabricius, 1787)	♂♀	X	X
	Callostethus guttatopunctatus (Fabricius, 1803)	♂♀	X	X
	Cataulax froeshneri Grazia *et al.*, 2000	♂♀	X	X
	Cataulax radians Grazia *et al.*, 2000	♂♀	X	X
	Colpocarena complanata (Burmeister, 1835)	♂♀	X	X
	Coriplatus depressus White, 1842	♂♀	X	X
	Dinocoris (Dinocoris) gibbosus (Fallou, 1889)	♂♀	X	X
	Dinocoris (Praedinocoris) lineatus (Dallas, 1852)	♂♀	X	X
	Discocephala marmorea Laporte, 1832	♂♀	X	X
	Discocephalessa andina (Breddin, 18904)	♂♀	X	X
	Dryptocephala lurida (Erinchson, 1848)	♂♀	X	X
	Dryptocephala spinosa Mayr, 1864	♂♀	X	X
	Eurystethus (Eurystethus) ellipsoidalis Ruckes, 1958	♂♀	X	X
	Eurystethus (Hispidisoma) microlobatus Ruckes, 1966	♂♀	X	X
	Glyphuchus sculpturatus Stål, 1860	♀*	-	-
	Grassatorama nigroventris (Ruckes, 1965)	♂♀	X	X
	Harpagogaster willineri Kormilev, 1957	♂♀	X	X
	Ischnopelta luteicornis (Walker, 1867)	♂♀	X	X
	Ischnopelta sp. 08	♀	-	X
	Lineostethus sp. 03	♂♀	X	X
	Mecistorhinus obscurus (Dallas, 1851)	♂♀	X	X
	Oncodochilus sp. A	♂♀	X	X
	Opophylax extenebratus Bergroth, 1918	♂♀	X	X
	Opophylax sp. C	♂	X	-

Pandonotum bergroth Becker, 1967	♂♀	X	X
Paralcippus dimidiatus (Ruckes, 1959)	♂♀	X	X
Parantiteuchus hemitholus Ruckes, 1962	♂♀	X	X
Parvamima bicolor Ruckes,1960	♂♀	X	X
Patronatus binotatus Ruckes, 1965	♂♀	X	X
Pelidnocoris stalii Haglund, 1868	♂♀	X	X
Phineus fusco-punctatus Stål, 1862	♂♀	X	X
Phoeacia sp. 20	♂♀	X	X
Placidocoris bivitatus Ruckes, 1965	♂♀	X	X
Platycarenus umbraculatus (Fabricius, 1803)	♂♀	X	X
Platycarenus sp. 01	♂♀	X	-
Priapismus pini Rolston, 1992	♂♀	X	X
Psorus paraensis Fernandes *et al.*, 2008	♂♀	X	X
Ruckesiocoris nitidus (Ruckes, 1964)	♀	-	-
Sympiezorhinchus puncticeps (Dallas, 1851)	♂♀	X	X
Tetragonotum megacephalum Ruckes, 1965	♀	-	X
Uncicrus sp.	♂♀	-	-
Uncinala tau (Fieber, 1851)	♂♀	X	X

APPENDIX 2

CHARACTER LIST

Non-sexual characters

Head

1. Mandibular plates, apex: (0) convergent; (1) parallel.

The condition of mandibular plates apex is related with its margins. In the apomorfic condition the mandibular plates apex is always separated by clypeus, but in the plesimorfic condition there are few species where the mandibular plates is convergent but not enough to touch or overlap each other.

2. Mandibular plates, length anterior to clypeus versus head total length: (0) less than 1/3 of head length; (1) 1/3 or more of head length (Figure 7A – *mpl, hl*).

3. Mandibular plates, basal width in relation to anterior width: (0) equivalent; (1) base about 1.5x wider than apex; (2) base about twice wider than apex (Figure 7B – *mpb, mpa*).

4. Clypeus, length versus head length: (0) less than half of the head length; (1) 1/2 or more of the head length (Figure 7A – *cl, hl*).

5. Interocular width: (0) greater than head length; (1) at most equivalent to the head length. (Figure 7A-B – *iow, hl*)

6. Eye, inner margin, distance from ocellus: (0) equal or greater than half of the diameter of ocellus; (1) almost absent (modified from Campos & Grazia, 2006 – character 7, fig. 12).

7. Eye, posterior margin, distance from ocellus: (0) at least equal to ocellus diameter; (1) almost absent (modified from Campos & Grazia, 2006 – character 8, fig. 12)

8. Eye, posterior margin, relative position to the posterior margin of the ocellus: (0) parallel; (1) towards, reaching or surpassing an imaginary line on posterior margin of ocellus (Figure 7B – *om*).

9. Eyes, posterior longitudinal ridge: (0) absent; (1) present (modified from Campos & Grazia, 2006 – character 6, figs. 13-14).

10. Anteocular process: (0) absent; (1) present (modified from Campos & Grazia, 2006 – character 4, figs. 9-12).

11. Ocular peduncle: (0) present; (1) absent (modified from Campos & Grazia, 2006 – character 5, figs. 13-14).

12. Ventral structure: (0) swollen; (1) horn like (Figure 7C).

The ventral structure "horn like" is a condition where the mandibular plates are flattened and strongly expanded forward the maxillary plates. The maxillary plates along with the ocular peduncle are tumescent and give the appearance of horns in the head in ventral view.

13. Bucculae, height: (0) at least equivalent to labium first segment height; (1) not reaching labium first segment height.

14. Bucculae, outline: (0) subrectilinear (Figure 7E); (1) bilobed (Figure 7F); (2) sickle-shaped (Figure 7C).

15. Bucculae, anterior angle, shape: (0) rounded; (1) triangular (Roell & Campos, in press – character 12).

16. Bucculae, distal portion: (0) subparallel; (1) convergent.

17. Labium, first segment, insertion: (0) posterior to the eye line; (1) anterior to the eyes line (modified from Campos & Grazia, 2006 – character 12, figs. 18-20).

18. Labium, first segment, insertion: (0) before middle of bucculae; (1) on or after middle of bucculae (Roell, 2015 – character 13).

19. Labium, first segment, range: (0) at most touching the anterior margin of prosternum; (1) reaching prosternum plate (Campos & Grazia, 2006 – character 13, figs. 18-20).

20. Labium, pseudo-segment between segments I and II: (0) absent; (1) present (Campos & Grazia, 2006 – character 14, figs. 18-20).

The articular segment, intercalary unit or pseudo-segment in the labium is a condition probably homoplastic within the Pentatomidae. In Ochlerini it is present in a group of genera not represented in this analysis. Within the Discocephalini few genera present this character and it is more developed in *Eurystethus* for which Ruckes (1966b) described three shapes of the pseudo-segment.

21. Labium, 4th segment, range: (0) maximum reaching posterior margin of abdominal segment III; (1) surpassing half of abdominal segment IV (Campos & Grazia, 2006 – character 16, figs. 7-8).

22. Labrum, insertion: (0) at most on midline between anterior margin of eyes and apex of mandibular plates; (1) before the midline between anterior margin of eyes and apex of mandibular plates, closer to its apex (modified from Barreiro *et al.*, unpubl. data – character 12, fig. 13).

Barreiro *et al.* (unpubl. data) related the labrum insertion only to the anterior line of the eyes, but looking to more taxa the biggest difference is among those taxa where the labrum is inserted on head apex or more closer to the eyes (reaching at most the midline between anterior margin of eyes and apex of mandibular plates).

23. Labrum, shape: (0) slender; (1) lunate in silhouette, proportionally large (Figure 7D, *lb*).

24. Antennae, pedicel, form: (0) cylindrical; (1) flattened.

25. Antennae, first flagellomere, form: (0) cylindrical; (1) flattened.

Thorax

26. Pronotum, transhumeral tubercles: (0) absent; (1) present (Figure 8A – *pt*).

27. Pronotum, anterior to humeral angles, slope: (0) sloping; (1) non-sloping (Campos & Grazia, 2006 – character 20, figs. 25-26).

28. Scutellum, general shape: (0) tongue shaped (Figure 8C); (1) subtriangular (Figure 8D).

In a scutellum “tongue shaped” the frenal constriction is not strong and the lateral margins of the post-frenal lobe are subparallel, sometimes the middle width of the post-frenal lobe is wider than the frenal constriction; apex of scutellum broadly convex.

29. Scutellum, dorsal surface: (0) flat to concave; (1) convex.

30. Scutellum, dorsal surface: (0) spine-form; (1) not spine-form.

31. Scutellum, basal surface: (0) concave; (1) humped (Figure 8B – *sh*)

32. Scutellum, base, tubercles: (0) absent; (1) present, paired (Figure 8A – *st*)

33. Scutellum, range relative to corium: (0) do not reaching corium apex; (1) surpassing corium apex; (2) subequal with corium apex (modified from Campos & Grazia, 2006 – character 27, figs. 31-33).

34. Scutellum, total length versus length of frenal lobe: (0) at least twice longer than frenal lobe; (1) almost 1.5x longer than frenal lobe. (Figure 8D – *sl, fll*).

35. Scutellum, basal width versus width on frenal constriction level: (0) about 1.5x wider than frenal constriction; (1) at least twice wider than frenal constriction. (Figure 8C – *sb, fc*)

36. Scutellum, range relative to connexivum: (0) reaching or surpassing mid of connexivum segment VI; (1) do not reaching mid of connexivum segment VI.

37. Scutellum, apex, shape: (0) uniformly convex; (1) with 1+1 lateral folds (Figure 12A – *e, lf*).

38. Hemelitrum, size: (0) fully covering abdominal tergites; (1) leaving abdominal tergites partially visible.

39. Hemelitrum, corium, lateral margin, basal 1/4, shape: (0) straight to convex (Figure 8D – *cb*); (1) concave. (Figure 8C – *cb*).

40. Hemelitrum, membrane, color: (0) smoked; (1) colorless.

41. Hemelitrum, membrane, veins, shape: (0) not reticulated; (1) reticulated.

42. Prosternum, anterior margin, shape: (0) depressed; (1) not depressed.

43. Prosternum, punctures: (0) absent; (1) present.

44. Mesosternum, punctures: (0) absent; (1) present.

45. Mesosternum, furrow: (0) present; (1) absent.

46. Mesosternum, carina: (0) absent; (1) present.

47. Mesosternum, carina, shape: (0) as a thin line (Figure 9B – *msc*); (1) as a median plate. (Figure 9A – *msc*).

48. Mesosternum, carina, range: (0) the entire length; (1) only on xyphus (Figure 9B – *msc*).

The mesosternum carinae when present vary in form and extension on mesosternum plate (characters 46-48). To classify this extension Ruckes (1966a) was followed and the definition of xyphus used is that provided by Ruckes (1964).

49. Metasternum, punctures: (0) absent; (1) present.

50. Metasternum, furrow: (0) present; (1) absent.

51. Metasternum, height: (0) equal to pleurae; (1) upper than pleurae (modified from Campos & Grazia, 2006 – character 25).

52. Metasternum, carina: (0) present; (1) absent (modified from Campos & Grazia, 2006 – character 26).

53. Metasternum, shape: (0) lozenge; (1) hexagonal; (2) pentagonal.

To classify the shape of the metasternum we followed Ruckes (1966a) description of the metasternum structure.

54. Metasternum, posterior margin, shape: (0) subrectilinear; (1) V-cut.

55. Metathoracic spiracle, shape: (0) narrow; (1) wide (Barão *et al*., unpubl. data – character 18).

56. TSES, mesopleura, posterolateral angle, evaporatorium: (0) absent; (1) present (modified from Barão *et al*., unpubl. data – character 7).

57. TSES, mesopleura, outer margin, evaporatorium: (0) absent; (1) present (modified from Barão *et al*., unpubl. data – character 8).

58. TSES, mesopleura, evaporatorium, extension: (0) reaching at most midline; (1) reaching anterolateral angle (Figure 9A – *mse*).

59. TSES, metapleura, evaporatorium, punctures: (0) absent; (1) present (modified from Barão *et al*., unpubl. data. – character 15).

60. TSES, metapleura, evaporatorium, range: (0) 1/2 of metapleura width; (1) 2/3 or more of metapleura width (Campos & Grazia, 2006 – character 22).

61. TSES, metapleura, evaporatorium, outer margin, shape: (0) convex; (1) sigmoid; (2) concave; (3) straight (modified from Barão *et al*. unpubl. data. – character 11).

62. TSES, metapleura, ostiole, opening orientation: (0) ventrolaterally; (1) laterally; (2) ventroposteriorlly (modified from Barão *et al*. unpubl. data. – character 3)

63. TSES, metapleura, peritreme, shape: (0) disc; (1) lobes; (2) spout; (3) ruga; (4) groove (modified from Barão *et al*. unpubl. data. – character 5).

The states added followed Kment & Vilimova terminology (2010).

64. TSES, metapleura, peritreme, spout variation shape: (0) fingerform (Figure 9A – *pe*); (1) scalpeliform (Figure 9F – *pe*); (2) ear shaped (Figure 9E – *pe*); (3) trough shaped (Figure 9C – *pe*).

65. TSES, metapleura, peritreme, median furrow, range: (0) evanescent on apex of peritreme; (1) evanescent on half of peritreme; (2) superficial.

To classify the extension of the furrow we followed Ruckes (1966a) description of peritreme sulcus.

66. Legs, distance between meso and metacoxae: (0) mesocoxae reaching at least 2x the distance from each other than from metacoxae (Figure 9B – *ms, mt*); (1) mesocoxae reaching a maximum distance of 1.5x from each other than from metacoxae (Figure 9D – *ms, mt*).

The spacing between mesocoxae is a consequence of a broadly hexagonal metasternum and was discussed as grouping five genera of Discocephalini in literature (Ruckes, 1966b; Ruckes & Becker, 1970; Becker & Grazia, 1986).

67. Legs, profemur, outline, shape: (0) subrectilinear; (1) sinuous.

68. Legs, tibiae, setae, length: (0) shorter than tibial diameter; (1) greater than tibial diameter.

Ruckes (1964) classified the setose condition of legs and antennae in *Antiteuchus* in setulae, setae and hairs. In this character we are dealing with the legs where the apomorfic state is the hairs of Ruckes (1964) and in the plesiomorfic state the setae. Not only *Antiteuchus* presents these long setae on legs, and between the genera that present it, the density can vary.

69. Legs, tibiae, lateral groove: (0) absent; (1) present.

70. Legs, tibiae, dorsal groove: (0) absent; (1) present.

71. Legs, tibiae, dorsal groove, range: (0) long; (1) short (modified from Barreiro *et al*., unpubl. data – character 25, fig. 14)

72. Legs, fore tibiae, inner surface, apical process: (0) absent; (1) present

This apical process is caused by a depression on tibial fossula along with an ellongation of the tibial comb, which develops this apical process.

73. Legs, tarsal segments, number: (0) two; (1) three (modified from Grazia *et al*., 2008 – character 29).

74. Legs, tarsal segments, length: (0) 1st and 3rd tarsomeres subequal; (1) 3rd the longest.

<u>Abdomen</u>

75. Abdomen, connexivum segments, posterolateral angle: (0) projected; (1) non-projected.

76. Abdomen, base, tubercle: (0) absent; (1) present (modified from Campos & Grazia, 2006 – character 31, fig. 40-41).

77. Abdomen, longitudinal median region: (0) convex; (1) grooved (modified from Campos & Grazia, 2006 – character 32).

78. Abdomen, spiracles, shape: (0) circular (Figure 10C – *sp*); (1) elliptical (Figure 10B – *sp*).

79. Abdomen, sternites IV and V, trichobothria, distance from spiracles: (0) equal to spiracle width; (1) equal to two times or more spiracle width (modified from Campos & Grazia, 2006 – character 33, figs. 42-43).

80. Abdomen, trichobothria, position: (0) tangent or lateral to the lateral margin of spiracles; (1) in line with the spiracles.

The trichobothria position is used to classify Discocephalinae since Rolston & McDonald (1979), when the authors proposed the trichobothria laterally to spiracle on sternite VII as a diagnostic character to the subfamily. Campos & Grazia (2006) used just the distance between spiracles and trichobothria (character 79) because some other genera in other subfamily have the trichobothria lateral to the spiracles too, and the position of visualization changes its relative position. Here we decided to use also the position relative to the spiracles, but in relation to all the sternites, not just the 7th as described by Rolston & McDonald (1979), and the position where the spiracular opening is ventral, with the specimen almost laterally inclined.

81. Abdomen, trichobothria, position: (0) longitudinal; (1) transversal (Figure 10A – *tr*); (2) diagonal.

Sexual characters

Female general morphology

82. Hemelitrum, corium, range: (0) reaching, at most, half of connexivum segment VI; (1) reaching, at least, anterior margin of connexivum segment VII.

Some of the Discocephalini genera are known by having a sexual dimorphism on anterior wings. One of these differences is the length of corium that is different in males and females; here we are coding its length in females.

83. Legs, hind legs, last tarsomere, dorsal surface: (0) convex; (1) plain (2) depressed. (modified from Campos & Grazia, 2006 – character 30, figs. 37-39).

84. Abdomen, tergite VIII, posterior margin, shape: (0) convex; (1) sinuous; (2) straight.

Female Genitalia

85. Genital plates, gonocoxites 8, length: (0) not expanded; (1) expanded over plates from 9th and 10th segments. (Figure 11A, D – *gc8*).

86. Genital plates, gonocoxites 8, expanded variation shape: (0) expanded over plates from 9th and 10th, covering it partially (Figure 11B – *gc8*); (1) expanded over plates from 9th and 10th, covering it completely (Figure 11C – *gc8*).

There are few genera in Discocephalini that have the gonocoxites 8 in the most general pattern between the Pentatomidae, with all plates visible and the laterotergites 9 not touching each other in its middle length. Between the majorities of the Discocephalini the gonocoxites 8 extends over the plates from the 9th and 10th abdominal segments covering it partially or completely.

87. Genital plates, gonocoxites 8, size: (0) longer than wide; (1) wider than long; (2) sub-equal.

88. Genital plates, laterotergites 8, spiracle: (0) present; (1) absent (Roell & Campos in press – character 30).

89. Genital plates, laterotergites 8, spiracle: (0) hidden; (1) visible.

90. Genital plates, 9th and 10th's plates: (0) individualized; (1) fused and reduced.

Three Discocephalini genera (*Abascantus, Coriplatus, Pelidnocoris*) have the genital plates equivalent to the 9th and 10th abdominal segments reduced and fused. Ruckes & Becker (1970) and Becker (1977b) did not mention the plate from the segment X, they just describe the laterotergites 9 as not developed and indistinguishable as individual plates, and the gonocoxites 9 and gonapophyses 9 constituting a compound piece, with the component parts not distinguishable. We notice all these structures (gonocoxites 9, laterotergites 9 and gonapophyses 9) along with the segment X not developed and consist in a unique piece, where the structures are indistinguishable as individual structures. Because of this fusion, these genera cannot be coded to the following characters (91-94) as they are dealing with gonocoxites 9, laterotergites 9 and segment X individually.

91. Genital plates, gonocoxites 9, shape: (0) superficially divided (Figure 11D – *gc9*); (1) completely fused.

92. Genital plates, laterotergites 9, direction: (0) sub-parallel; (1) convergent; (2) divergent.

93. Genital plates, laterotergites 9, range: (0) reaching or surpassing tergite 8; (1) not reaching tergite 8.

94. Genital plates, segment X: (0) exposed; (1) hidden by laterotergites 9 (modified from Campos & Grazia, 2006 – character 46, figs. 56-58).

95. Receptaculum seminis, gonaphopyses 9, conical microsculptures: (0) absent; (1) present (modified from Campos & Grazia, 2006 – character 47, fig. 61)

96. Receptaculum seminis, thickening of vaginal intima: (0) circular; (1) tubular; (2) subrectangular; (3) tubercular.

97. Receptaculum seminis, ring sclerites: (0) absent; (1) present. (modified from Campos & Grazia, 2006 – character 48)

98. Receptaculum seminis, ring sclerites, position: (0) apart from thickening of vaginal intima; (1) juxtaposed with thickening of vaginal intima.

99. Receptaculum seminis, ductus receptaculi, median duct: (0) uniformly cilindrical; (1) wider at the base (modified from Garbelotto *et al*., 2013 – character 71, figs. 6E-F, 10E-F).

100. Receptaculum seminis, ductus receptaculi, median duct: (0) together with vesicular area; (1) projecting into ductus proximal.

The median duct of the vesicular area of the ductus receptaculi extends into the proximal part of the ductus seminis distalis.

101. Receptaculum seminis, ductus receptaculi, inner duct, corrugation on base: (0) absent; (1) present.

102. Receptaculum seminis, ductus receptaculi, distal region, lenght of tubular portion: (0) less than half of vesicular area; (1) at least half of vesicular area (modified from Garbelotto *et al*., 2013 – character 73).

103. Receptaculum seminis, ductus receptaculi, distal region: (0) narrower than proximal region; (1) wider than proximal region; (2) as wide as proximal region.

104. Receptaculum seminis, capsula seminalis, shape: (0) tubular; (1) forked; (2) globose.

105. Receptaculum seminis, capsula seminalis, projections: (0) absent; (1) present.

<u>Male general morphology</u>

106. Hemelitrum, corium, range: (0) reaching, at most, half of connexivum segment VI; (1) reaching, at least, anterior margin of connexivum segment VII.

Some of the Discocephalini genera are known by having a sexual dimorphism on anterior wings. One of these differences is the length of corium that is different in males and females; here we are coding its length in males. Males have other differences on its anterior wing that are treated in the following characters (107-110).

107. Hemelitrum, membrane, apical margin shape: (0) convex; (1) subrectilinear (Figure 12A – *me*).

Between the genera with sexual dimorphism on wings, the hemelytra membrane can present some differences. The posterior margin of the membrane can be convex and longer than corium apex, or subrectilinear and subequal to corium in length. This subrectilinear margin sometimes was treated as truncate in classical papers.

108. Hemelitrum, membrane, transversal furrow: (0) absent; (1) present (Figure 12B – *mtf*).

Becker & Grazia (1989) described the transversal furrow and it is placed subapically on hemelytral membrane and it cause an interruption on longitudinal membrane veins length. Becker & Ruckes (1969) called this furrow as crossbar.

109. Hemelitrum, membrane, veins: (0) thin; (1) coarse.

110. Hemelitrum, membrame, apical thickening: (0) absent; (1) present, juxtaposed to corium margin (Figure 12A – *mat*).

The apical thickening is placed juxtaposed to the apical angles of corium (Becker & Grazia, 1989)

111. Legs, hind legs, last tarsomere, dorsal surface: (0) convex; (1) plain (modified from Campos & Grazia, 2006 – character 29, figs. 37, 39).

112. Abdomen, tergite VII, dorsal surface, median process: (0) absent; (1) present.

This process rise from median region of the dorsal surface of abdominal tergite VII, its extension is variable but it is a well sclerotized and narrow process. Ruckes (1964) discussed the probably function of this process during the copulatory activity.

113. Abdomen, tergite VII, posterior margin, process: (0) absent; (1) present.

This process rise from the posterior margin of the abdominal tergite VII, and its size and sclerotization its variable. Usually when the process is not well sclerotized, and somewhat translucid.

114. Abdomen, tergite VII, articular membrane: (0) absent; (1) present (modified from Campos & Grazia, 2006 – character 40).

115. Abdomen, tergite VII, articular membrane, shape: (0) subrectilinear; (1) convex; (2) projected medially (modified from Campos & Grazia, 2006 – character 40, figs. 52-53).

116. Abdomen, sternite VI, anterior margin, shape: (0) convex; (1) wedge (Figure 12C – *VI).*

117. Abdomen, sternite VII, posterior margin, shape: (0) convex; (1) sucrectangular; (2) rectilinear.

118. Abdomen, sternite VII, anterior margin, shape: (0) convex, at maximum reaching the spiracle of urosternite V; (1) wedge, surpassing the spiracle of urosternite V (Figure 12C – *VII* and *white bar*).

<u>Male genitalia</u>

119. Pygophore, genital cup, length: (0) longer than the genital capsule; (1) sub-equal to the genital capsule; (2) shorter than the genital capsule.

To measure the genital cup and genital capsule we used the dorsal rim margin as limit (ignoring the projections if it is present). We consider the genital capsule from the base of pygophore to the dorsal rim margin, and the genital cup to the dorsal rim margin to apex of posterolateral angles.

120. Pygophore, dorsal rim, subrectangular projection: (0) absent; (1) present, in pair (Figure 12F – *srp*).

121. Pygophore, dorsal rim, lateral of segment X, acute projection: (0) absent; (1) present, in pair of short projections (Figure 12G – *acp*).

122. Pygophore, dorsal rim, projections texture: (0) smooth; (1) reticulated (Figure 12D - *re*).

123. Pygophore, superior ridge, length: (0) as long as dorsal rim; (1) projected over segment X base.

124. Pygophore, posterolateral angle, shape: (0) flat (Figure 12E – *pla*); (1) tumescent (Figure 12G – *pla*).

125. Pygophore, posterolateral angle, joint: (0) absent; (1) present (Figure 12E – *jo*)

126. Pygophore, segment X, dorsal surface: (0) sclerotized; (1) membranous at least on basal third (modified from Campos & Grazia, 2006 – character 37 figs. 44-45)

127. Pygophore, parameres, insertion: (0) ventral to segment X; (1) lateral to segment X.

128. Pygophore, parameres, head, position: (0) parallel to ventral rim; (1) overlapping ventral rim; (2) perpendicular to ventral rim (modified from Garbelotto *et al*., 2013 – character 47, figs 4B, D; 9A, D, F).

129. Phallus, phallotheca, shape: (0) elongated; (1) globose.

130. Phallus, phallotheca, lateral spatulate projections: (0) absent; (1) present (modified from Garbelotto *et al*., 2013 – character 79, figs. 5D, 11A, E).

131. Phallus, conjunctiva: (0) present; (1) absent.

132. Phallus, conjunctiva, lateral process: (0) absent; (1) present.

The presence of a conjunctiva in Discocephalinae is contradictory, Rolston&McDonald (1979) and Schuh & Slater (1995) say that when present the conjunctival process are heavily sclerotized, fused to the phallotheca margin and permanently exserted. For Konstantinov & Gapon (2005) the phallus of Discocephalinae is strongly modified and the vesica and conjunctiva are undifferentiated and strongly sclerotized, because of this

modifications the authors call endosoma this apical part of the phallus. We notice that the condition of a vesica and conjunctiva undifferentiated (*sensu* Konstantinov & Gapon, 2005) occur in Ochlerini but is not true for all the Discocephalini. In Discocephalini the conjunctiva can be present as a discreet membrane without lateral process, or present with lateral process and these can be reduced as small lateral discoid lobes (*Antiteuchus mixtus*; *Dryptocephala* spp.) or well developed lateral lobes almost hatchet-shaped (eg. *Parantiteuchus hemitholus*; *Uncinala tau*).

133. Phallus, vesica, shape: (0) cup-shaped; (1) along with ductus seminis distalis.

134. Phallus, vesica, ventral process of ductus seminis distalis: (0) absent; (1) present.

135. Phallus, vesica, dorsal process of ductus seminis distalis: (0) absent; (1) present.

136. Phallus, ductus seminis distalis, length: (0) sub-equal to phallotheca; (1) longer than phallotheca; (2) shorter than phallotheca (modified from Garbelotto *et al*., 2013 – character 85).

137. Phallus, ductus seminis distalis, ventral curvature: (0) absent; (1) present.

The ductus seminis distalis can curvate directly dorsal or its curvature is ventral. When the ductus seminis distalis curves ventral the opening of the secondary gonopore can be ventral too (eg. *Colpocarena complanata*), usually occur with a short ductus; or the opening is dorsal, because the ductus curves ventral and then bents dorsal, this usually occur in species with a long ductus (eg. *Antiteuchus mixtus*).

138. Phallus, dusctus seminis distalis, secondary gonopore, shape: (0) circular; (1) jagged.

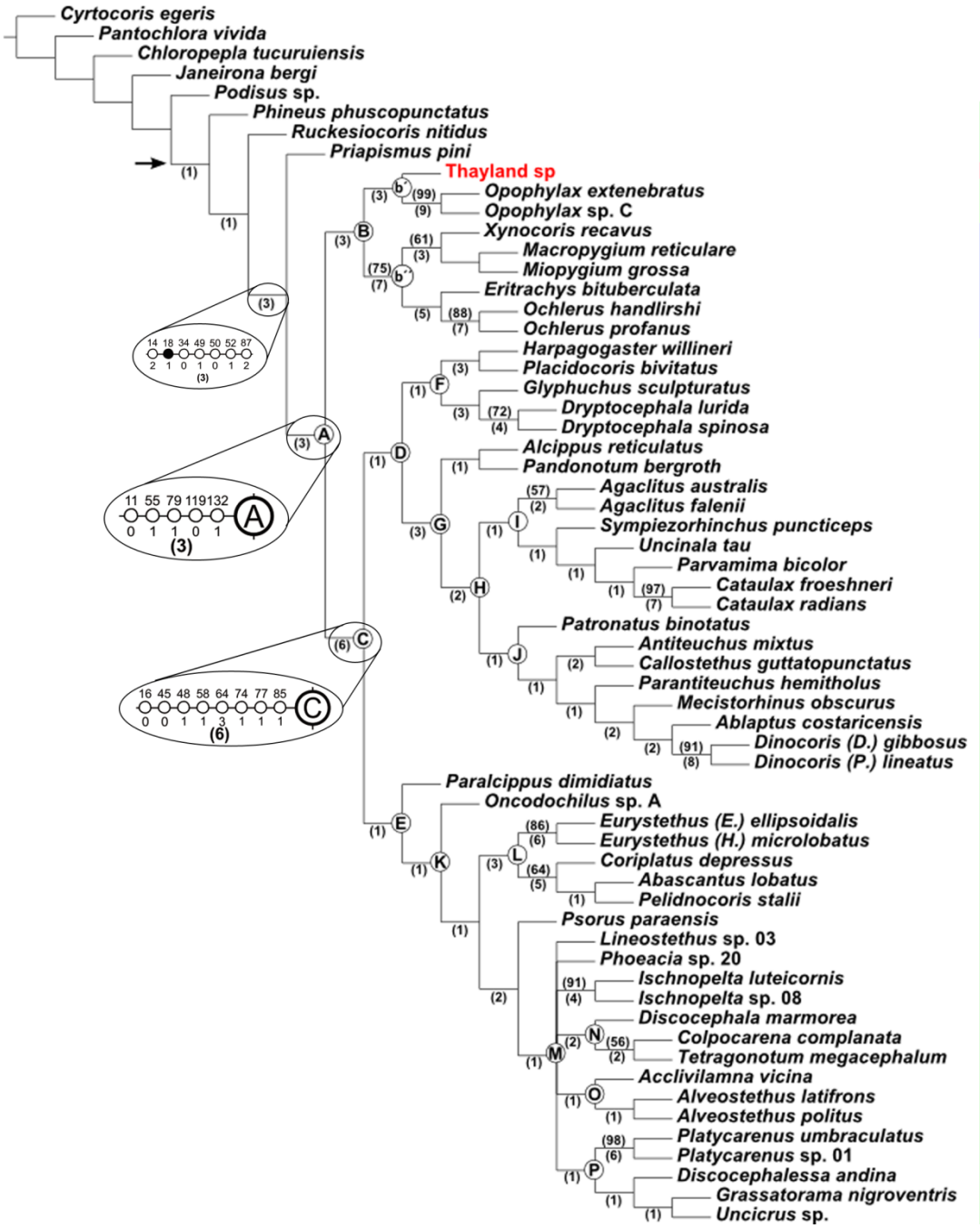

Figure 1. Strict consensus cladogram of four most parsimonious trees resulted from the analysis with the complete data set of Discocephalini (1075 steps; CI=0.15; RI=0.52). (● = exclusive synapomorphy; ○ = homoplastic synapomorphy; capital and non-capital letters inside circles indicate the target clades; for these, numbers in parentheses above and below branches indicate jackknife and bremer support, respectively; black arrow (→) = Discocephalinae).

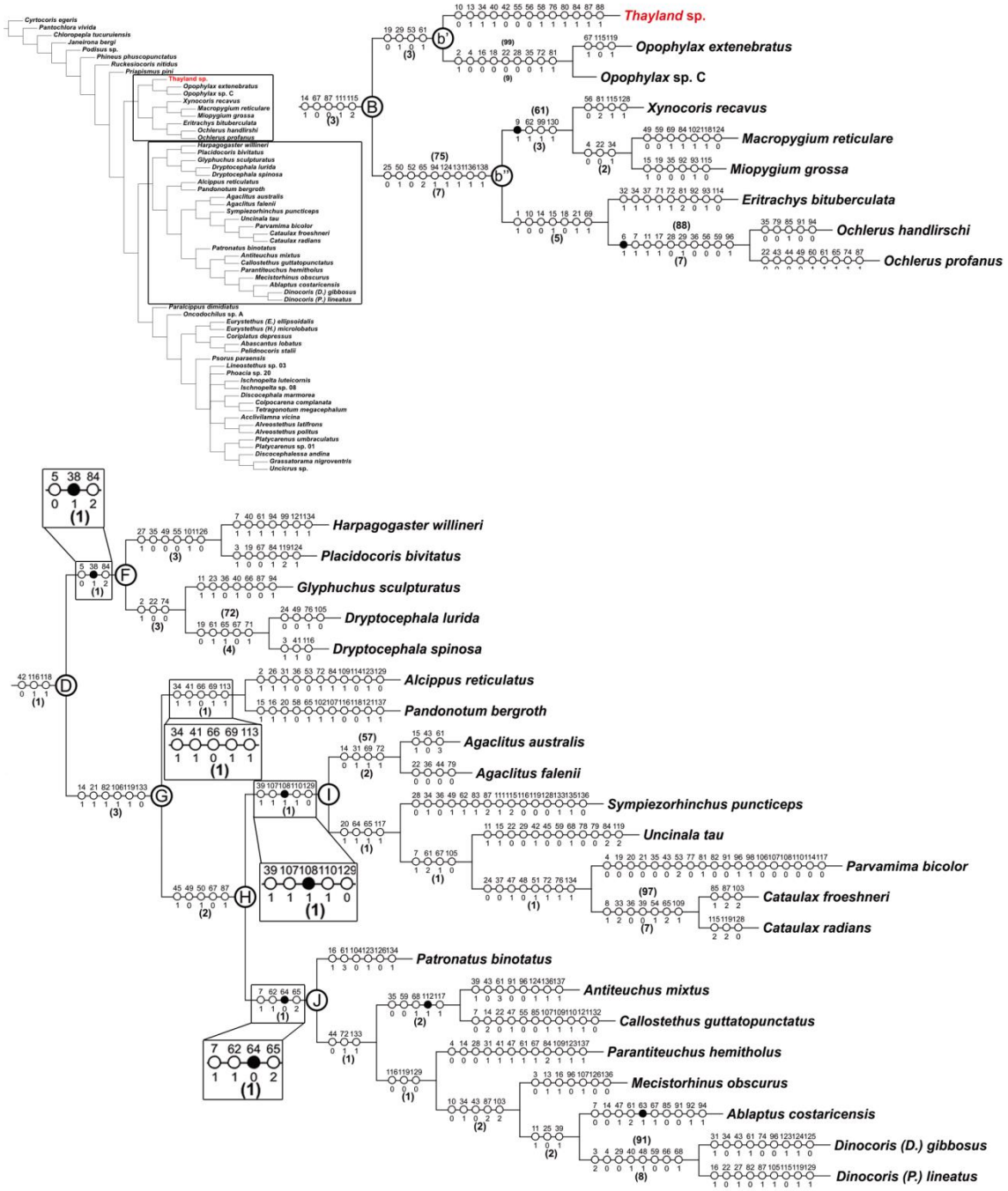

Figure 2. Clades *B* and *D* of the strict consensus cladogram of four most parsimonious trees resulted from the analysis with the complete data set of Discocephalini, in detail (● = exclusive synapomorphy; ○ = homoplastic synapomorphy; capital and non-capital letters inside circles indicate the target clades; for these, numbers in parentheses above and below branches indicate jackknife and bremer support, respectively).

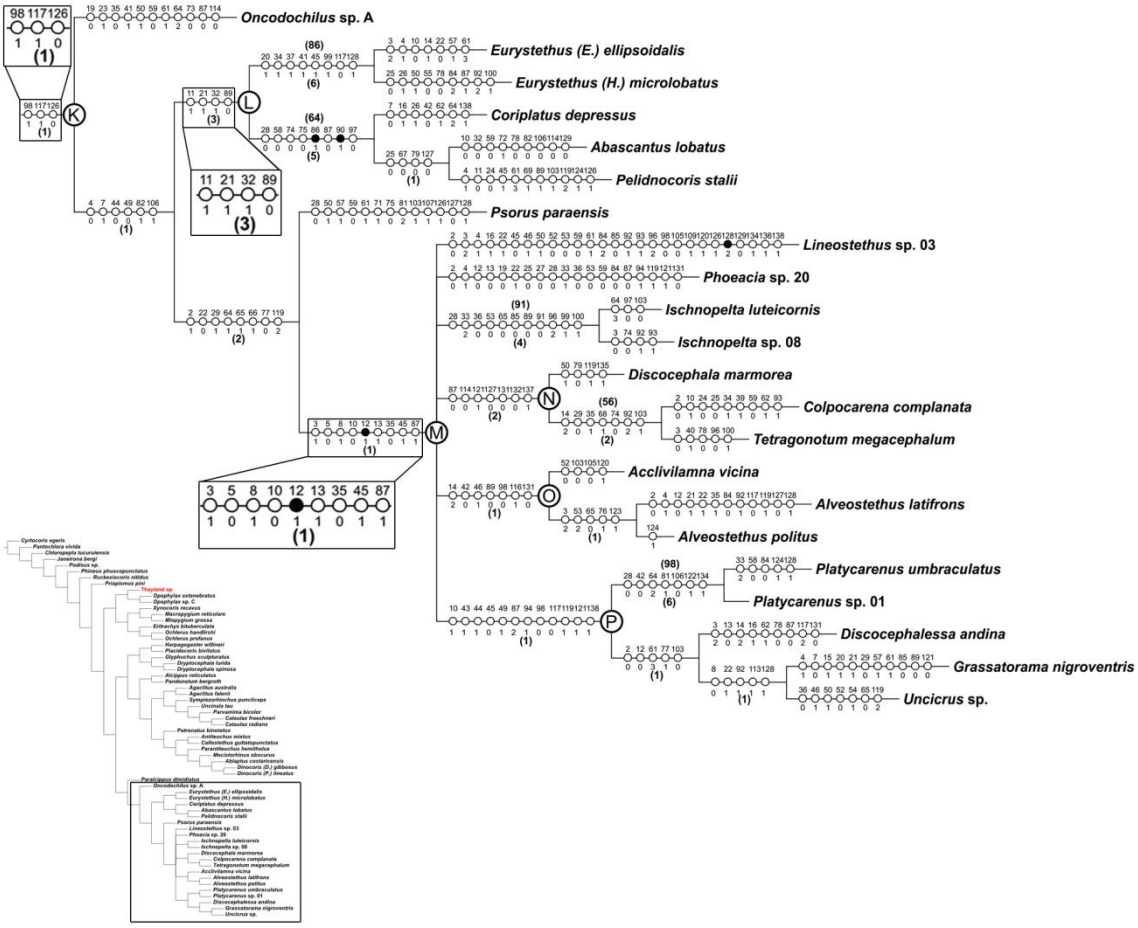

Figure 3. Clade *K* of the strict consensus cladogram of four most parsimonious trees resulted from the analysis with the complete data set of Discocephalini, in detail (● = exclusive synapomorphy; ○ = homoplastic synapomorphy; capital and non-capital letters inside circles indicate the target clades; for these, numbers in parentheses above and below branches indicate jackknife and bremer support, respectively).

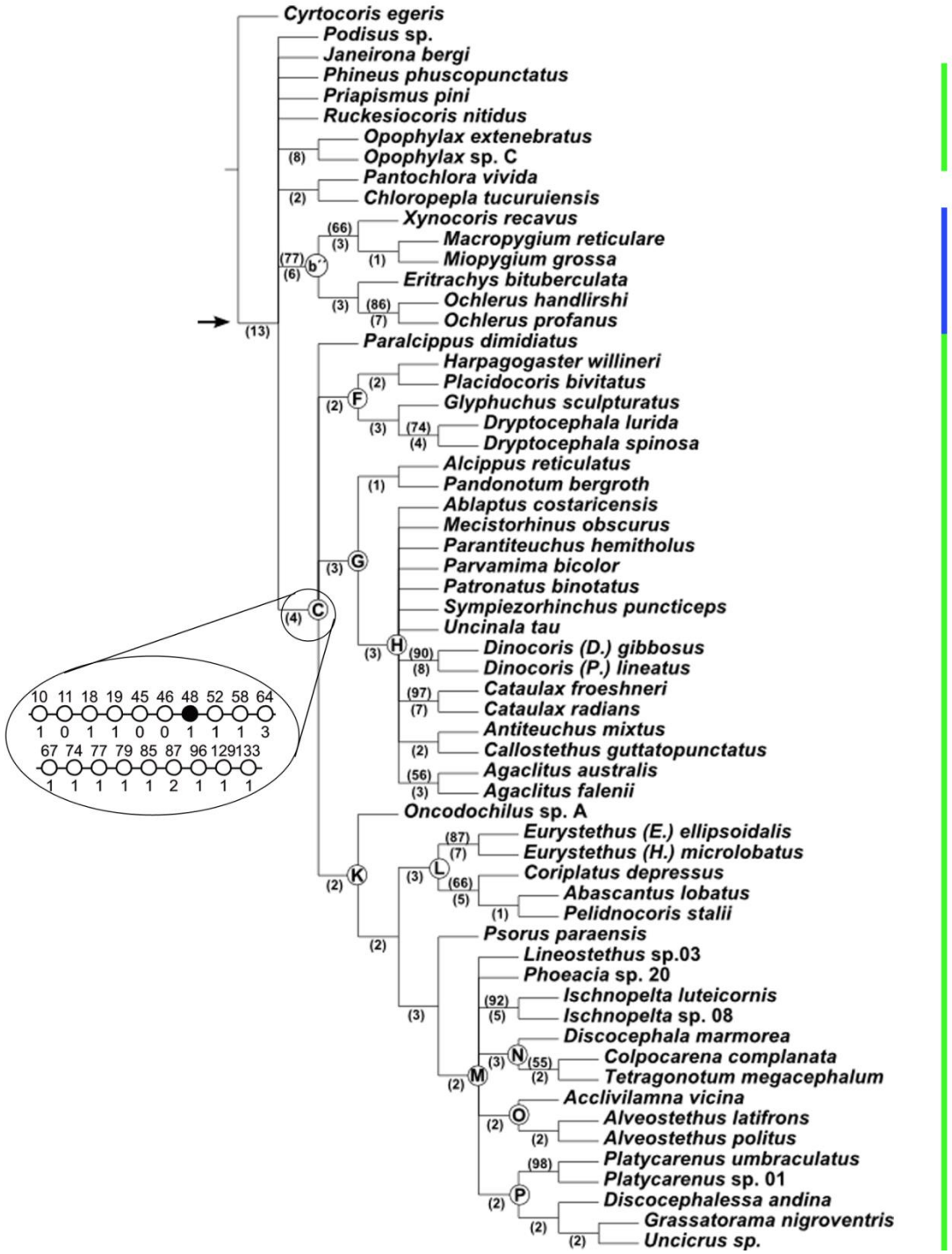

Figure 4. Strict consensus cladogram of 84 most parsimonious trees resulted from the analysis with the data set without the Thayland specimen of Discocephalini (1059 steps; CI=0.15; RI=0.52). (● = exclusive synapomorphy; ○ = homoplastic synapomorphy; capital and non-capital letters inside circles indicate the target clades; for these, numbers in parentheses above and below branches indicate jackknife and bremer support, respectively; black arrow (→) = basal polytomy).

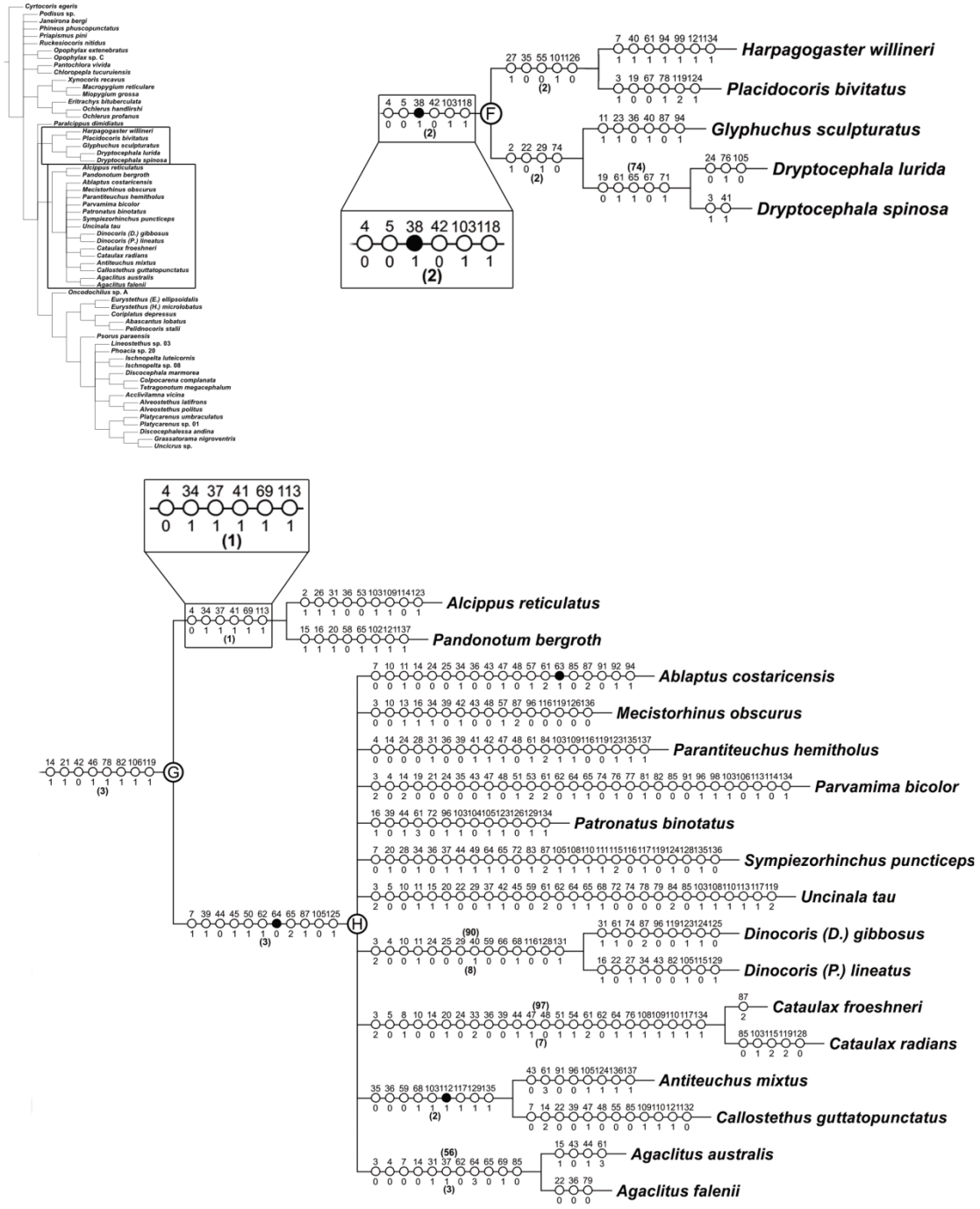

Figure 5. Clades *F* and *G* of the strict consensus cladogram of 84 most parsimonious trees resulted from the analysis with the data set without the Thayland specimen of Discocephalini, in detail (● = exclusive synapomorphy; ○ = homoplastic synapomorphy; capital and non-capital letters inside circles indicate the target clades; for these, numbers in parentheses above and below branches indicate jackknife and bremer support, respectively).

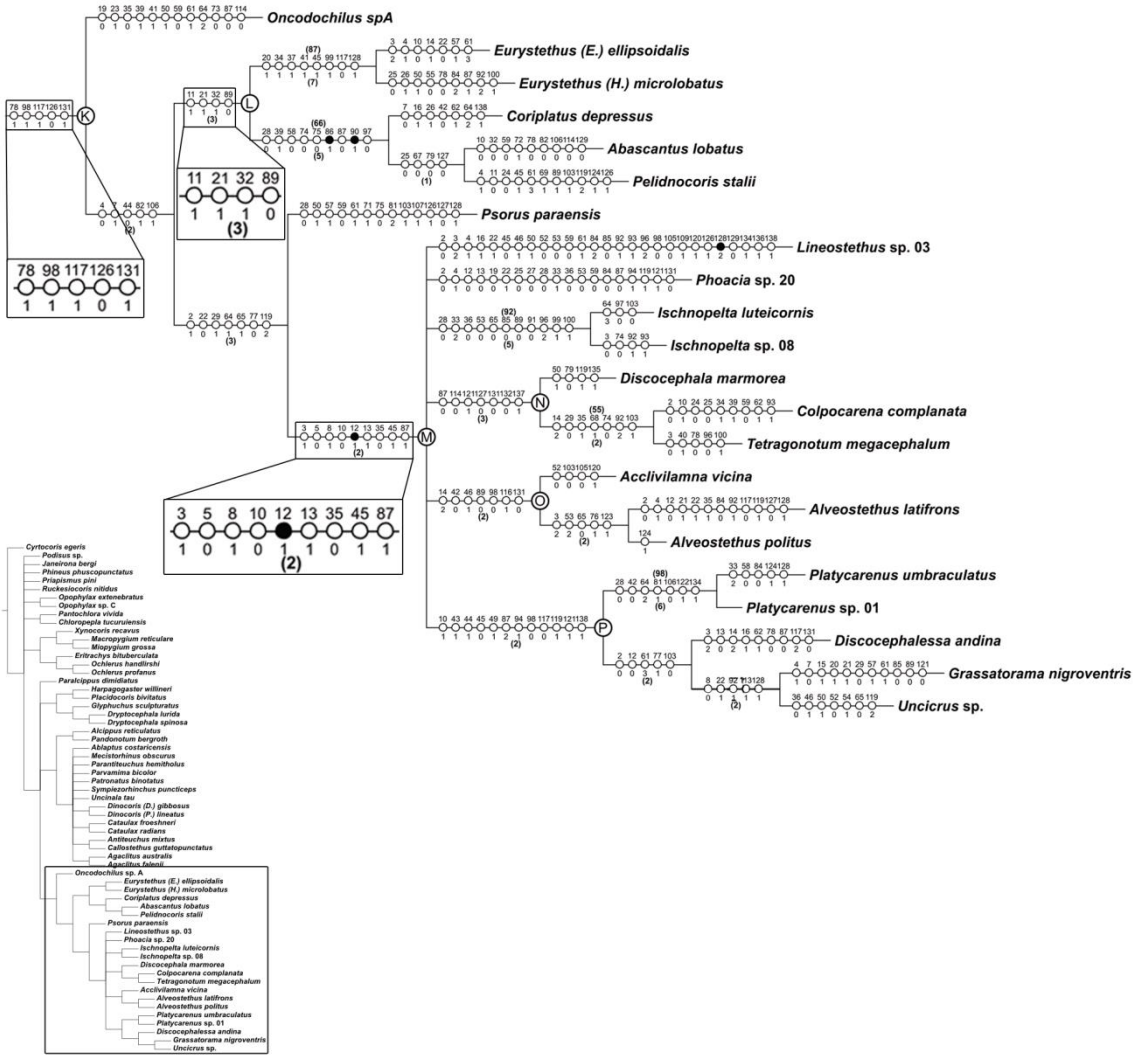

Figure 6. Clade *K* of the strict consensus cladogram of 84 most parsimonious trees resulted from the analysis with the data set without the Thayland specimen of Discocephalini, in detail (● = exclusive synapomorphy; ○ = homoplastic synapomorphy; capital and non-capital letters inside circles indicate the target clades; for these, numbers in parentheses above and below branches indicate jackknife and bremer support, respectively).

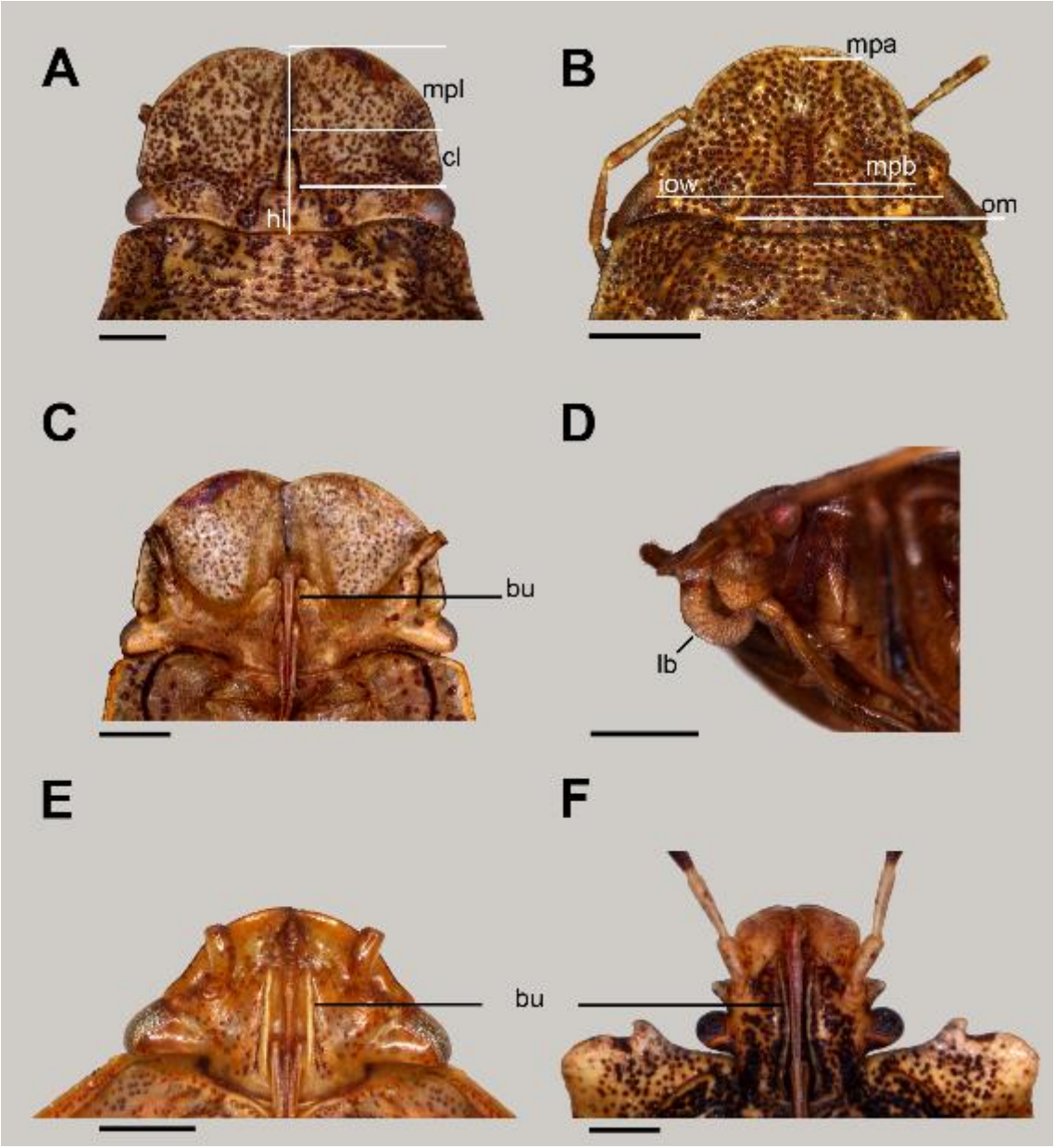

Figure 7. A-B, head dorsal view; C, E-F, head ventral view; D, head lateral-frontal view. A, C, *Tetragonotum megacephalum* Ruckes; B, *Platycarenus umbraculatus* (Fabricius); D, *Ruckesiocoris nitidus* (Ruckes); E, *Cataulax radians* Grazia, Campos & Becker; F, *Pandonotum bergroth* Becker. Abbreviations: *bu*, bucculae; *cl*, clypeus length; *hl*, head length; *iow*, interocular width; *lb*, labrum; *mpa*, mandibular plates anterior width; *mpb*, mandibular plates basal width; *mpl*, mandibular plates length; *om*, ocellus posterior margin. Scale: 1mm.

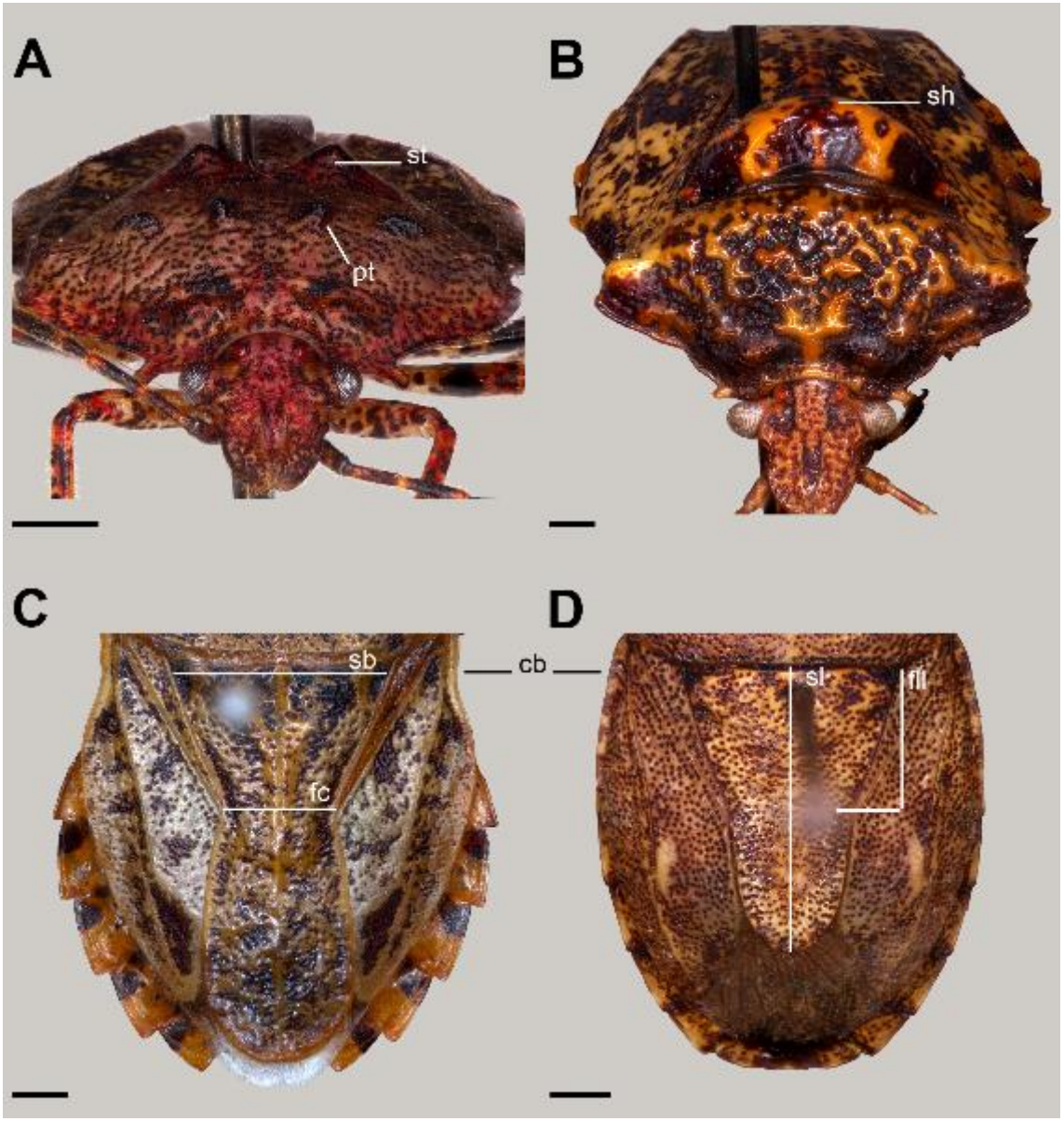

Figure 8. A-B, pronotum and scutellum frontal view; C-D, scutellum and corium dorsal view. A, *Eurystethus* (*H.*) *microlobatus* Ruckes; B, *Parantiteuchus hemitholus* Ruckes; C, *Abascantus lobatus* Stål; D, *Grassatorama nigroventris* (Ruckes). Abbreviations: *fc*, frenal constriction; *fll*, frenal lobe length; *pt*, pronotal tubercles; *sb*, scutellar basal width; *sh*, scutellar hump; *sl*, scutellar length; *st*, scutellar tubercles. Scale: 1mm.

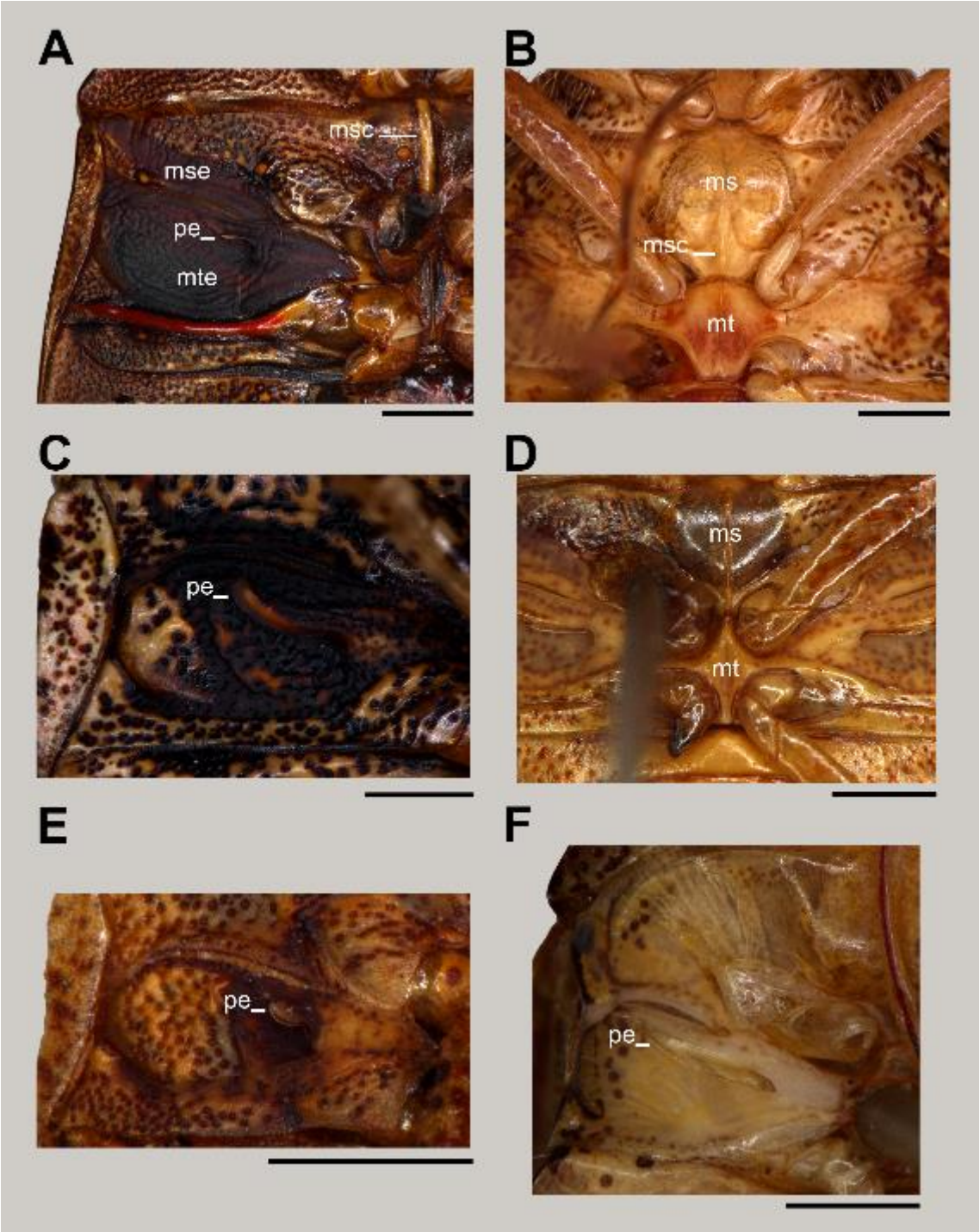

Figure 9. A-F, meso and metathorax ventral view. A, *Callostethus guttatopunctatus* (Fabricius); B, *Dinocoris* (*P.*) *lineatus* (Dallas); C, *Pandototum bergroth* Becker; D, *Alveostethus politus* (Signoret); E, *Opophylax extenebratus* Bergroth; F, *Colpocarena complanata* (Burmeister). Abbreviations: *ms*, mesosternum; *msc*, mesosternum carinae; *mse*, mesopleural evaporatorium; *mt*, metasternum; *mte*, metapleural evaporatorium; *pe*, peritreme. Scale: 1mm.

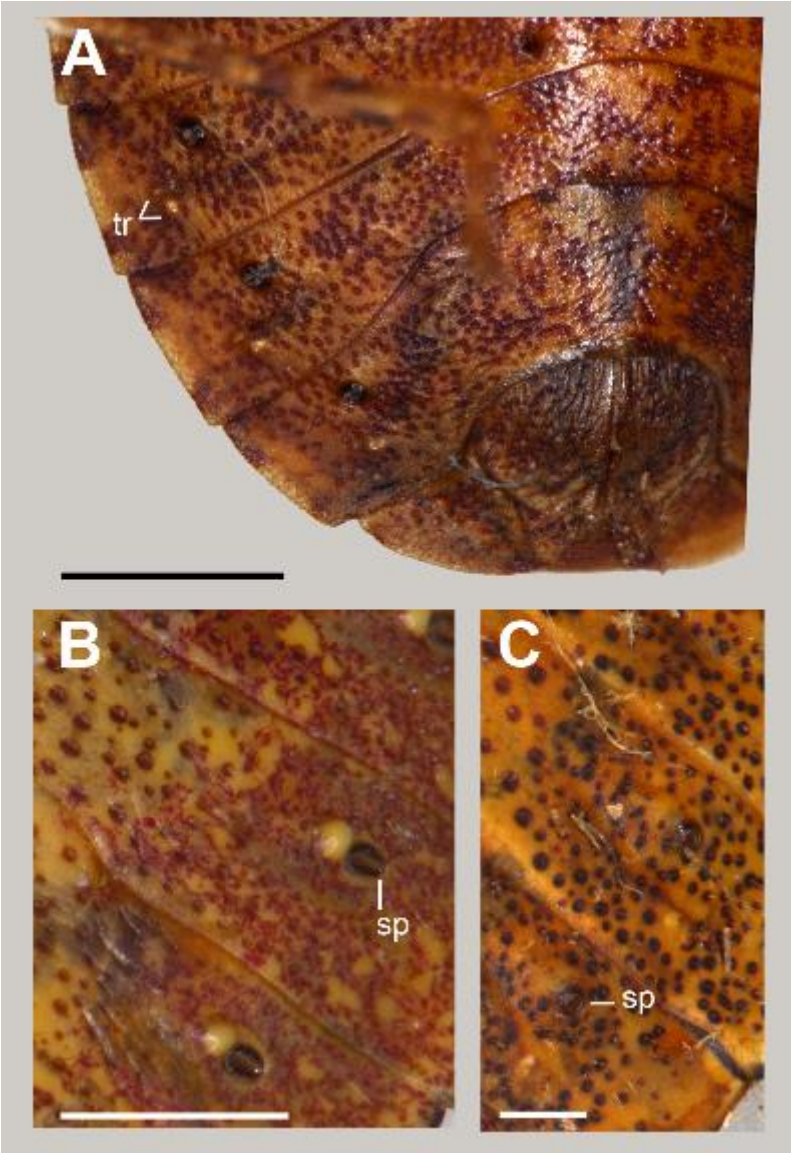

Figure 10. A-C, abdominal sternites. A, *Opophylax extenebratus* Bergroth; B, *Cataulax froeshneri* Grazia, Campos & Becker; C, *Dryptocephala spinosa* Mayr. Abbreviations: *sp*, spiracles; *tr*, trichobothria. Scale: 1mm.

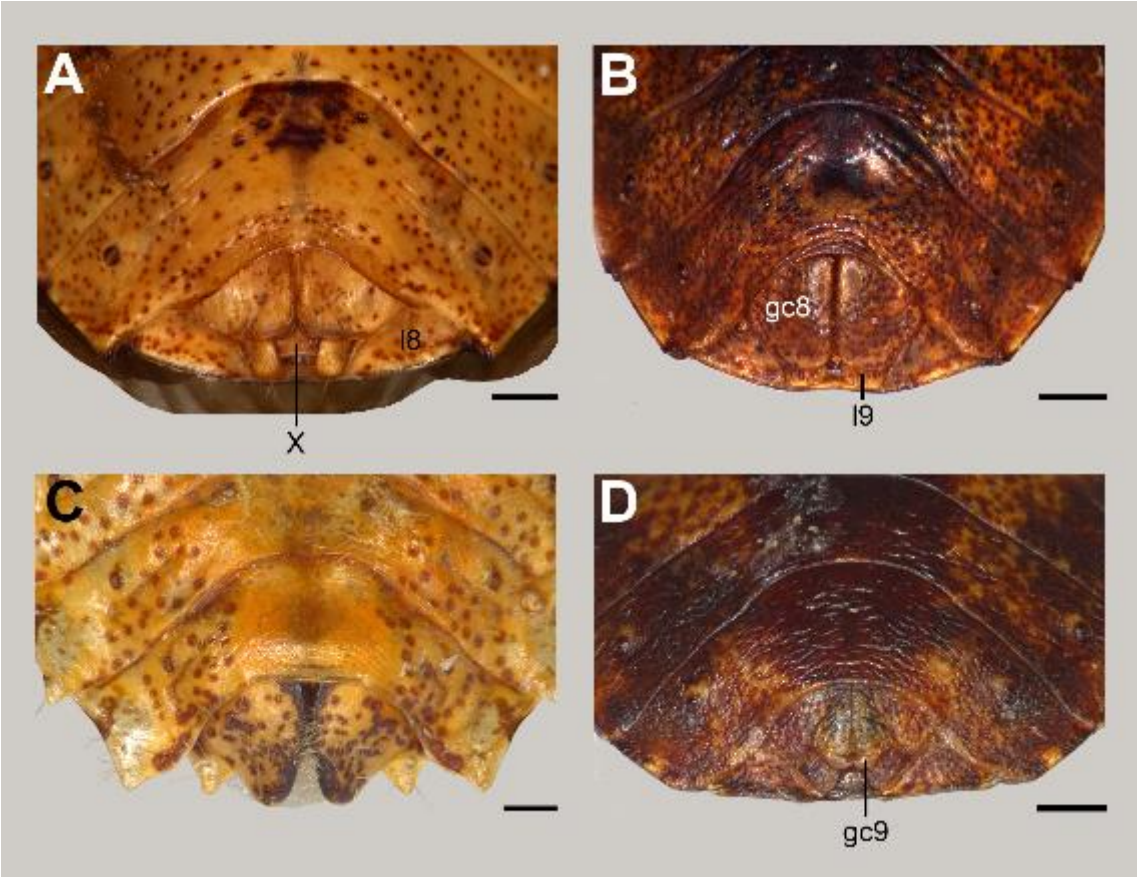

Figure 11. Female genital plates A-D, ventroposterior view; E, vetral view. A, *Parvamima bicolor* Ruckes; B, *Discocephalessa andina* (Breddin); C, *Coriplatus depressus* White; D, *Phineus fusco-punctatus* Stål. Abbreviations: *gc8,* gonocoxites 8; *gc9,* gonocoxites 9; *l8,* laterotergites 8; *l9,* laterotergites 9; X, segment X. Scale: 1mm.

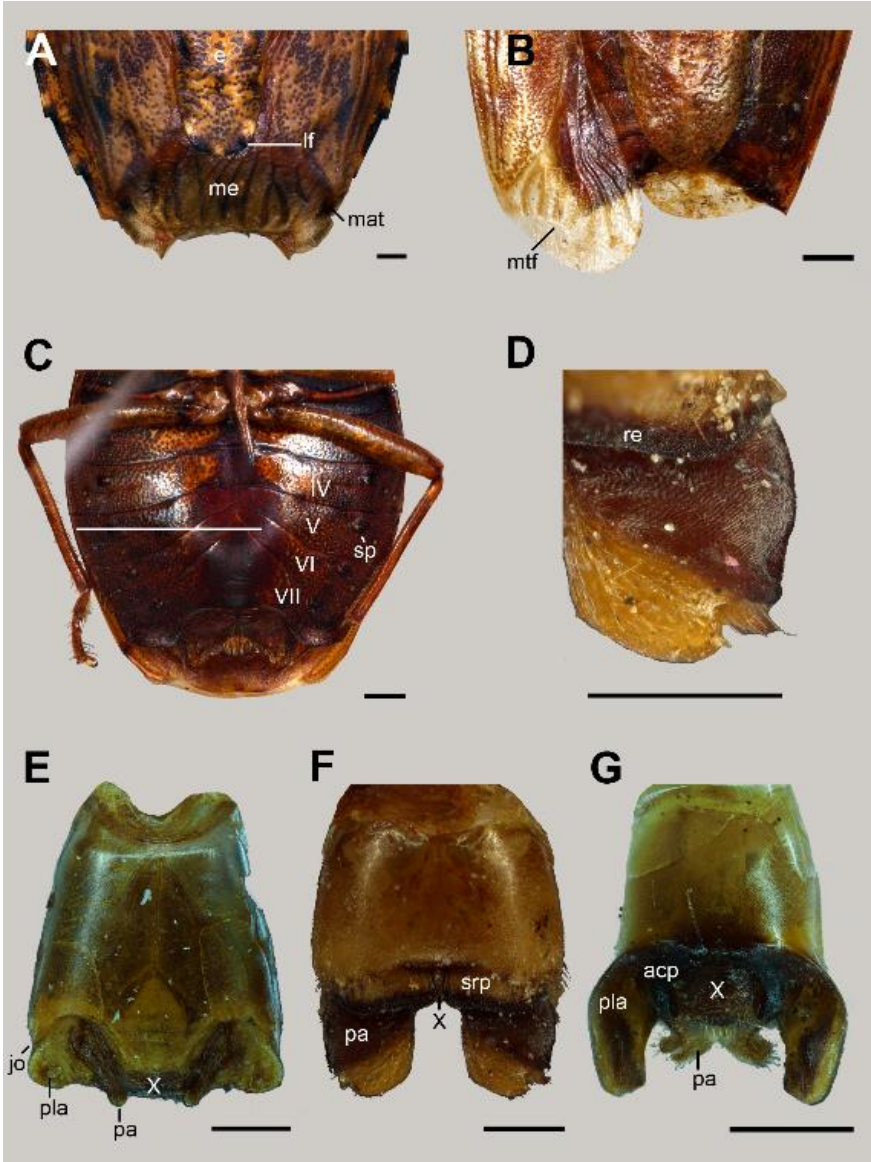

Figure 12. Male. A-B, scutellar and hemelytral apex, dorsal view; C, abdomen, ventral view; D, detail of dorsal rim projections, dorsalm view; E-G, pygophore, dorsal view. A, *Agaclitus fallenii* Stål; B, *Cataulax froeshneri* Grazia, Campos & Becker; C, *Callostethus guttatopunctatus* (Fabricius); D, F, *Acclivilamna vicina* (Signoret); E, *Placidocoris bivitatus* Ruckes; G, *Platycarenus umbraculatus* (Fabricius). Abbreviations: *acp*, acute projection of dorsal rim of pygophore; *e*, scutellum; *jo*, joint of posterolateral angles of pygophore; *lf*, lateral folds of scutellum apex; *me*, membrane; *mat*, membrane apical thickening; *mtf*, membrane tranverse furrow; *pa*, parameres; *pla*, posterolateral angles of pygophore; *re*, reticulations; *sp*, spiracle; *srp*, subrectangular projections of dorsal rim of pygophore; *IV*, urosternite IV; *V*, urosternite V; *VI*, urosternite VI; *VII*, urosternite VII; *X*, segment X; *white bar*, level of spiracle of sternite V. Scale: A-C, 1mm; D-G, 0.5mm.

CONCLUSÕES GERAIS

A observação dos espécimes provenientes de diferentes coleções científicas nacionais e estrangeiras (*in situ* ou por fotografias) permitiu além do reconhecimento de novos táxons, a transferência de gêneros de Discocephalini para outros grupos supra-genéricos e a sinonímia de gêneros da tribo. Este tipo de ajuste permite um aperfeiçoamento na sistemática de Pentatomidae em grupos muitas vezes pouco representados em coleções científicas (tanto quali quanto quantitativamente) e que historicamente receberam pouca atenção de taxonomistas.

Dentro de Discocephalini estão reunidos vários gêneros raros, e pouco se conhece a respeito da história natural do grupo. Muitos dos gêneros incluídos na tribo eram conhecidos apenas de suas descrições originais, muitas vezes antigas e compostas de três a cinco linhas que tratam de caracteres gerais que podem ser reconhecidos em quase que a totalidade dos gêneros. Ainda, muitos destes são gêneros monotípicos e conhecidos apenas do holótipo ou série de síntipos. Neste quesito a proposição de uma chave de identificação para estes gêneros, ilustrada passo-a-passo, associada a diagnoses para os gêneros e fotos do aspecto geral (dorsal e ventral) de pelo menos uma das espécies de cada gênero incrementa o conhecimento acerca dos discocefalíneos e outros grupos Neotropicais. Outro aspecto relevante é o de promover o reconhecimento deste grupo, que na maioria das vezes apresenta muitos materiais não determinados em coleções científicas.

O teste de monofilia da tribo contesta não só a validade de Discocephalini como também a classificação da subfamília (Discocephalinae). Dos gêneros de Discocephalini aproximadamente 90% foram agrupados no mesmo clado e neste, algumas das relações internas resgatam hipóteses de taxonomistas que trabalharam no grupo anteriormente. Os baixos índices e valores de suporte, associados ao excesso de homoplasias, tornou necessária a decisão de não alterar a atual classificação de Discocephalini, uma vez que os resultados também contestam a monofilia de Discocephalinae e a robustez dos caracteres classicamente tratados como diagnósticos para os grupos.

Historicamente taxonomistas em Pentatomidae trabalharam primariamente com as faunas de suas regiões, à exceção dos poucos que trabalharam em grandes museus estrangeiros com o hábito de realizar expedições de coleta em outros

continentes. No entanto essa regionalização dos taxonomistas resultou em uma sistemática relativamente regionalizada e fragmentada, sendo este um ponto primordial a ser corrigido. É cada vez mais necessária a inclusão de táxons de diferentes regiões nas análises, além do estabelecimento de colaboração com pesquisadores situados em outras regiões, permitindo assim uma troca maior não só de material científico, mas principalmente de conhecimento adquirido. Dessa forma será possível aumentar as chances de tentar mudar a condição de caos que recebeu a classificação de Pentatomidae (Rider 2000; Gapon & Baena 2005; Rider & Brailovsky 2014).

ANEXO I - Normas aos autores

Capítulos 1 e 2: ZOOTAXA

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Rider, David (david.rider@ndsu.edu) **Hemiptera: Heteroptera**
Department of Entomology, 1300 Albrecht Blvd., 202 Hultz Hall, Fargo, ND 58102, USA

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