

FACULDADE DE BIOCÊNCIAS  
PROGRAMA DE PÓS-GRADUAÇÃO EM ZOOLOGIA

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**ANÁLISE CLADÍSTICA E REVISÃO TAXONÔMICA DE *EUSTALA* SIMON, 1895 (ARANEAE:  
ARANEIDAE)**

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**Coorientador: Adalberto J. dos Santos**

**TESE DE DOUTORADO  
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Therefore, taxonomic changes and/or new names proposed here are not valid for nomenclatural or priority purposes.

***Ouch! There are spider genitalia in my mind!***

Herbert W. Levi

*Dedico aos meus pais Maria Vanir M. Poeta  
e Luiz Carlos Poeta e aos meus padrinhos  
Eda P. Ferreira e Sérgio Gilberto  
P. Ferreira, os quais sempre  
apoiaram e incentivaram o  
meu crescimento pessoal  
e profissional.*

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## RESUMO

O gênero de aranhas *Eustala* Simon, 1895, é composto por 86 espécies, com distribuição nas Regiões Neártica e Neotropical. Membros deste gênero são frequentemente coletados e reconhecidos pelas fêmeas com escapo dirigido anteriormente e machos pela apófise média branca voltada para o centro do bulbo. Além disso, espécies do gênero usualmente apresentam um padrão de colorido do abdôme, chamado fólio, o qual se assemelha aos líquens e musgos presentes no substrato aonde elas ocorrem (e.g. arbustos, troncos). Este é o único gênero Neotropical de Araneidae sem revisão taxonômica e as relações filogenéticas entre as espécies de *Eustala* é desconhecida. Dessa forma, o trabalho teve como objetivo estudar as relações filogenéticas entre as espécies de *Eustala* e revisar sua taxonomia. A hipótese filogenética foi obtida através da análise de evidências morfológicas, através da parcimônia, e os caracteres tratados com pesagem igual e implícita. Como resultado, a análise filogenética, baseada em uma matriz de dados com 179 caracteres discretos e 12 contínuos, codificados para 108 terminais, resgatou *Eustala* como grupo monofilético, tendo *Metazygia* F. O. Pickard-Cambridge, 1904 como grupo-irmão. Com base na observação de mais de 2500 exemplares e bibliografia, sete espécies foram declaradas como *nomina dubia*: *E. tridentata* (C. L. Koch, 1838), *E. tristis* (Blackwall, 1862), *E. essequibensis* (Hingston, 1932), *E. uncicurva* Franganillo, 1936, *E. nigerrima* Mello-Leitão, 1940, *E. albicans* Caporiacco, 1954 e *E. andina* Chamberlin, 1916. Além disso, as seguintes sinonímias são propostas: *Eustala conchlea* (McCook, 1888) foi considerada sinônimo sênior de *E. emertoni* (Banks, 1904); *E. guianensis* (Taczanowski, 1873) sinônimo sênior de *E. monticola* Chamberlin, 1916 e *E. bacelarae* Caporiacco, 1955; *E. bifida* F. O. Pickard-Cambridge, 1904 sinônimo sênior de *E. wiedenmeyeri* Schenkel, 1953 e *E. maxima* Chickering, 1955; *E. unimaculata* Franganillo, 1930 sinônimo sênior de *E. bisetosa* Bryant, 1945; *Metazygia isabelae* Levi, 1995 sinônimo sênior de *M. chenevo* Levi, 1995. Ainda, *Eustala E. venusta* Chickering, 1955 foi revalidada. Adicionalmente, 54 espécies foram redescritas e ilustradas: *E. fuscovittata* (Keyserling, 1864), *E. oblonga* Chickering, 1955, *E. saga* (Keyserling, 1893), *E. sagana* (Keyserling, 1893), *E. latebricola* (O. Pickard-Cambridge, 1889), *E. unimaculata*, *E. cazieri* Levi, 1977 *E. innoxia* Chickering, 1955, *E. tantula* Chickering, 1955, *E. exigua* Chickering, 1955, *E. devia* (Gertsch & Mulaik, 1936), *E. perdita* Bryant, 1945, *E. fragilis* (O. Pickard-Cambridge, 1889), *E. rubroguttulata* (Keyserling, 1879), *E. californiensis* (Keyserling, 1885), *E. minuscula* (Keyserling, 1892), *E. guianensis*, *E. guttata* F. O. Pickard-Cambridge, 1904, *E. ingenua* Chickering, 1955, *E. redundans* Chickering, 1955, *E. rustica* Chickering, 1955, *E. brevispina* Gertsch & Davis, 1936, *E. scitula* Chickering, 1955, *E. bifida*, *E. lata* Chickering, 1955, *E. conformans* Chamberlin, 1925, *E. cepina* (Walckenaer, 1841), *E. conchlea*, *E. anastera* (Walckenaer, 1841), *E. rosae* Chamberlin & Ivie, 1935, *E. delecta* Chickering, 1955, *E. banksi* Chickering, 1955, *E. mimica* Chickering, 1955, *E. trinitatis* (Hogg, 1918), *E. bucolica* Chickering, 1955, *E. montivaga* Chamberlin, 1916, *E. cameronensis* Gertsch & Davis, 1936, *E. scutigera* (O. Pickard-Cambridge, 1898), *E. eleuthera* Levi, 1977, *E. venusta* Chickering, 1955, *E. histrio* Mello-Leitão, 1948, *E. gonygaster* (C.L. Koch, 1838), *E. lunulifera* Mello-Leitão, 1939, *E. pallida* Mello-Leitão, 1940, *E. smaragdinea* Mello-Leitão, 1939, *E. clavisipina* (O. Pickard-Cambridge, 1889), *E. viridipedata* (Roewer, 1942), *E. vegeta* (Keyserling, 1865), *E. tribrachiata* Badcock, 1932, *E. novemmamillata* Mello-Leitão, 1941, *E. nasuta* Mello-Leitão, 1939, *E. sedula* Chickering, 1955, *E. semifoliata* (O. Pickard-Cambridge, 1899), e *E. inconstans* Chickering, 1955. Os registros de distribuição foram ampliados para 12 espécies: *E. nasuta* para a Costa Rica, *E. guttata* para a Guiana, *E. lata* para a Jamaica, *E. montivaga* para a Guatemala e República Dominicana, *E. mimica* para a Venezuela, *E. rustica* para o México, *E. scutigera*, *E. conformans*, *E. tribrachiata* e *E. lunulifera* para o Brasil, *E. minuscula* para a Argentina, e *E. smaragdinea* para o Paraguai.

Palavras-chave: Aranhas, Neotropical, Neártica.

## ABSTRACT

### A phylogenetic analysis and taxonomic review of the orb-weaver genus *Eustala* (Araneae: Araneidae)

The spider genus *Eustala* Simon, 1895 is composed of 86 species with Nearctic and Neotropical distribution. Members of this genus are frequently collected and are recognized by the females with scapus directed anteriorly and males with a white median apophysis hanging down laterally in the bulb. Additionally, species of the genus usually show a color-pattern on the abdomen dorsum, called folium, which seems to match with the lichens and mosses of the substrate that they occur (e.g. shrub, trunks). This is the only Neotropical araneid genus lacking a taxonomic review and, also, the phylogenetic relationships among its species is unknown. Thus, this work aimed to study the phylogenetic relations among *Eustala* species, and provide a taxonomic review of the genus. The morphological data was analysed using parcimony, and the characters were treated with equal and implied weight. As a result, the phylogenetic analysis, based on a dataset of 179 discrete and 12 continuous characters scored for 108 terminals revealed *Eustala* as monophyletic genus having *Metazygia* F. O. Pickard-Cambridge, 1904 as sister-group. Based on observation of more than 2500 specimens and bibliography, seven species were declared *nomina dubia*: *E. tridentata* (C. L. Koch, 1838), *E. tristis* (Blackwall, 1862), *E. essequibensis* (Hingston, 1932), *E. uncicurva* Franganillo, 1936, *E. nigerrima* Mello-Leitão, 1940, *E. albicans* Caporiacco, 1954 and *E. andina* Chamberlin, 1916. Also, the following synonymies are proposed: *Eustala conchlea* (McCook, 1888) is considered senior synonym of *E. emertoni* (Banks, 1904); *E. guianensis* (Taczanowski, 1873) as senior synonym of *E. monticola* Chamberlin, 1916 and *E. bacelarae* Caporiacco, 1955; *E. bifida* F. O. Pickard-Cambridge, 1904 as senior synonym of *E. wiedenmayeri* Schenkel, 1953 and *E. maxima* Chickering, 1955; *E. unimaculata* Franganillo, 1930 as senior synonym of *E. bisetosa* Bryant, 1945; and *Metazygia isabelae* Levi, 1995 as senior synonym of *M. chenevo* Levi, 1995. Yet, *E. venusta* Chickering, 1955 was revalidated. Additionally, 54 species are redescribed: *E. fuscovittata* (Keyserling, 1864), *E. oblonga* Chickering, 1955, *E. saga* (Keyserling, 1893), *E. sagana* (Keyserling, 1893), *E. latebricola* (O. Pickard-Cambridge, 1889), *E. unimaculata*, *E. cazieri* Levi, 1977, *E. innoxia* Chickering, 1955, *E. tantula* Chickering, 1955, *E. exigua* Chickering, 1955, *E. devia* (Gertsch & Mulaik, 1936), *E. perdita* Bryant, 1945, *E. fragilis* (O. Pickard-Cambridge, 1889), *E. rubroguttulata* (Keyserling, 1879), *E. californiensis* (Keyserling, 1885), *E. minuscula* (Keyserling, 1892), *E. guianensis*, *E. guttata* F. O. Pickard-Cambridge, 1904, *E. ingenua* Chickering, 1955, *E. redundans* Chickering, 1955, *E. rustica* Chickering, 1955, *E. brevispina* Gertsch & Davis, 1936, *E. scitula* Chickering, 1955, *E. bifida*, *E. lata* Chickering, 1955, *E. conformans* Chamberlin, 1925, *E. cepina* (Walckenaer, 1841), *E. conchlea*, *E. anastera* (Walckenaer, 1841), *E. rosae* Chamberlin & Ivie, 1935, *E. delecta* Chickering, 1955, *E. banksi* Chickering, 1955, *E. mimica* Chickering, 1955, *E. trinitatis* (Hogg, 1918), *E. bucolica* Chickering, 1955, *E. montivaga* Chamberlin, 1916, *E. cameronensis* Gertsch & Davis, 1936, *E. scutigera* (O. Pickard-Cambridge, 1898), *E. eleuthera* Levi, 1977, *E. venusta* Chickering, 1955, *E. histrio* Mello-Leitão, 1948, *E. gonygaster* (C.L. Koch, 1838), *E. lunulifera* Mello-Leitão, 1939, *E. pallida* Mello-Leitão, 1940, *E. smaragdinea* Mello-Leitão, 1939, *E. clavispina* (O. Pickard-Cambridge, 1889), *E. viridipedata* (Roewer, 1942), *E. vegeta* (Keyserling, 1865), *E. tribrachiata* Badcock, 1932, *E. novemmamillata* Mello-Leitão, 1941, *E. nasuta* Mello-Leitão, 1939, *E. sedula* Chickering, 1955, *E. semifoliata* (O. Pickard-Cambridge, 1899), and *E. inconstans* Chickering, 1955. New records expanded the distribution of 12 species: *E. nasuta* from Costa Rica, *E. guttata* from Guyana, *E. lata* from Jamaica, *E. montivaga* from Guatemala and Dominican Republic, *E. mimica* from Venezuela, *E. rustica* from Mexico, *E. scutigera*, *E. conformans*, *E. tribrachiata* and *E. lunulifera* from Brazil, *E. minuscula* from Argentina, and *E. smaragdinea* from Paraguay.

Key words: Spiders, Neotropical, Nearctic.

## PRESENTATION

The thesis is divided in two chapters, each formatted as manuscripts to be published to hereafter.

In the Chapter one, a phylogenetic analysis of the American araneid genus *Eustala* Simon, 1895 is provided for the first time. Thus, the monophyly of *Eustala* was tested and the evolutionary relationships between the species of the genus were evaluated. Our analyses were based on the cladistic analysis of a dataset with 191 morphological data (179 discrete and 12 continuous characters) scored for 108 terminals. The manuscript will be submitted to the *Invertebrate Systematics*.

The second chapter brings the taxonomic review of *Eustala* species based on phylogenetic analysis previously presented. This is the first revision that includes the South American species, *with* more than 50 species redescribed and illustrated, also six species were synonymized, and one was revalided. Yet, 12 species have its distribution records updated. The manuscript will be submitted to the *Zootaxa*.

Additionally, this thesis includes a paper already published in *Zootaxa* (Annex 1) that aimed to solve some taxonomic problems in *Eustala*. The paper brings the description of the male of *E. vellardi* Mello-Leitão, 1924 and the female of *E. delasmata* Bryant, 1945, besides seven species are considered as *nomina dubia*.

CHAPTER 1: Cladistic analysis of the orb-weaver spider genus *Eustala* (Araneae: Araneidae)\*

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Abstract.

The first cladistic analysis of the american araneid genus *Eustala* Simon, 1895, based on morphological characters, is provided. This work aimed to test the monophily and verify the interrelationships among the species of the genus based on morphological data. The analyses were based on a data matrix with 108 terminal taxa (81 species of *Eustala* and 27 exemplars from other araneid genera) scored for 179 discrete and 12 continuous characters, treated with equal and implied weighting. As result, both analyses indicated that *Eustala* is monophyletic, having *Metazygia* as its sister-group. Although the internal clades of *Eustala* were not fully recovered in both analyses, the implied weight consensus tree revealed four main clades: '*inconstans* clade' that includes only one species, known just by the male; '*fuscovittata* clade' with the species with elongated abdomen;

'*rubroguttulata* clade' with the species with smooth epigynum, and resemble some *Metazygia* species; and '*anastera* clade' that is composed by species with wrinkled scapus. Additionally, *Metazygia* emerged as a paraphyletic group, with *M. gregalis* O. Pickard-Cambridge, 1889 e *M. yobena* Levi, 1995 arising as *Eustala* sister-group.

Additional keywords: phylogeny, Neotropical, Nearctic, taxonomy, *Metazygia*.

## **Introduction**

Araneidae, also known as orb-weaver spiders, is the third largest spider family, based on number valid species (WSC 2017), and one of the most studied spiders as model for applied research (Herberstein and Hebets 2013). Most of these studies are related to silk features and its applications (e.g. Allmeling *et al.* 2013; Roloff *et al.*, 2014; dos Santos-Pinto *et al.* 2016; Bourzac 2015), synthesis and use of venom as biopesticides (e.g. Gimenez *et al.* 2014; Fachim *et al.* 2015, Liberato and dos Santos 2015), model test to drugs and chemical pesticides (e.g. Hesselberg and Vollrath 2004; Benamú *et al.* 2010), and even as inspiration to a model to building planning (e.g. Tinello *et al.* 2016; Yuan *et al.* 2017). So, such diversity in the use of araneids in applied research could be benefited by macroevolutionary knowledge, as stated by Cartan and Miyashita (2000).

Despite numerous studies testing orb-weaver evolution and phylogeny (e.g. Heberhard 1990; Coddington 1986; 1990a, b; Griswold *et al.* 1998; Hausdorf 1999; Kuntner *et al.* 2008; ÁlvarezPadilla *et al.* 2009; Blackledge *et al.* 2009; Álvarez- Padilla and Hormiga 2011; Bond *et al.* 2014; Fernandez *et al.* 2014, Griswald and Hormiga 2014; Wheeler *et al.* 2017; Dimitrov *et al.* 2016), there are scarce regarding the monophyly of the Araneidae genera. Currently, the cladistic analysis proposed by Scharff and Coddington (1997) remains as the most comprehensive cladistic work of the family. The

authors recognized seven subfamilies: Cyrtophorinae, Argiopinae, Cyrtarachninae, Arciinae, Gasteracanthinae, Micratheninae, and Araneinae. Dimitrov et al (2016) re-circumscribed Araneidae, including Nephilinae as subfamily based on molecular data. However, due the diversity on morphology of the group there is no morphological diagnosis to araneid subfamilies (Scharff and Coddington 1997, Dimitrov et al. 2016).

*Eustala* Simon (1895) is included in Araneinae (*sensu* Scharff and Coddington 1997) together with *Araneus* Clerck, 1757, *Cyclosa* Menge, 1866, *Eriophora* Simon, 1864, *Kaira* O. Pickard-Cambridge, 1889, *Acacesia* Simon, 1895 and according to the authors it is the most speciose subfamily of Araneidae. The genus was erected by Simon (1895) and diagnosed by the epigynum with a scapus directed forward and by the males with a white median apophysis that hangs down laterally, directed to the center of the bulb, and bubble-shaped subterminal apophysis (Levi 1977). *Eustala* is exclusive of the American continent and is considered the most specious Neotropical genus of Araneidae (Kuntner and Levi 2007). Also, these spiders present a huge intraspecific variation in its genitalia (Checkering 1955; Levi 1977; Poeta 2014), and in abdominal color pattern (Messas *et al.* 2014), which makes it difficult to associate coespecific males and females. The diversity of this genus and the lack of a taxonomic review may explain why its natural history remains obscure, besides the efforts of many authors (e.g. Ebehard 1975, 1985; Hesselberg and Triana 2010; Messas *et al.* 2014; Souza *et al.* 2015).

Levi (1995, 1988) and Levi and Santos (2013) hypotetized a phylogenetic relation between *Eustala* and *Metazygia* F.O. Pickard-Cambridge, 1904 based on the females with an anteriorly projecting scapus and by the male palp with median apophysis placed laterally in the bulb; presence of bubble-shaped subterminal apophysis (called “blister” at the time); and absence of paramedian apophysis. Controversially, the topology presented by Scharff and Coddington (1997) showed *Eustala* as sister-group of *Wixia* +

*Acacesia*, while *Metazygia* was related to a clade including (*Alpaida*+(*Bertrana*+*Enacrossoma*)) + (*Eustala* +(Wixia+*Acacesia*)) (see Scharff and Coddington 1997, figure 87).

Thus, the aim of this study was to present a cladistic analysis of *Eustala*, and test its monophyly and internal relationships. Some characters, commonly used to diagnose *Eustala* species, had its homology discussed and the four diagnosable clades were proposed.

## Material and Methods

### *Taxa choice*

The dataset includes 108 terminal taxa, of which 81 are ingroup species – all valid species of *Eustala* – and 27 outgroup species. The outgroup includes representative species of Araneinae based on Scharff and Coddington (1997). The main taxa selected were genera closely related to *Eustala* in the latter work, and other genera were sampled based on Levi (1988) hypothesis, i.e. *Araneus*, *Neoscona* Simon, 1864, *Larinia* Simon, 1874, *Mangora* O. Pickard-Cambridge, 1889, *Kaira* and *Metepeira* F. O. Pickard-Cambridge, 1903. The inclusion of species of *Cyclosa* and *Zygiella* aimed to embrace different Araneinae clades that were also included in recent phylogenetic analysis (e.g. Wheeler *et al.* 2016; Dimitrov *et al.* 2017). The choice of *Nephila* Leach, 1815 (Nephillinae) as the root was based on the hypothesis of Dimitrov *et al.* (2016) and Wheeler *et al.* (2017) and. Species were included according to specimen availability: *Zygiella*, *Kaira*, *Wixia*, *Metepeira*, *Bertrana* and *Enacrossoma* were represented by only one species each; *Mangora*, *Larinia*, *Araneus*, *Neoscona*, *Acacesia* and *Cyclosa* by two; *Alpaida* by three; and *Metazygia* by five species. The taxa used here and their respective institutions are listed hereinafter (Appendix 1).

### *Character coding and analytical procedures*

Copulatory features were treated whenever possible: the male palps were expanded with a saturated KOH solution and then washed in distilled water, while female genitalia were removed from the abdomen. All images were obtained as described in Poeta and Teixeira (2017).

Some characters were adapted from Chickering (1955), Levi (1971, 1977, 1993, 1995, 2002), Scharff and Coddington (1997) and Ramírez (2014), Benavites and Hormiga (2016), but more than 120 are newly proposed herein (Appendix 2). The character statement follows Sereno (2007). The species were scored based on observation and literature (when the available species were poorly preserved). The character matrix has 179 discrete and 12 continuous characters, for the 108 terminal taxa (Appendix 3). Most of the discrete characters regard copulatory features, 36 of female, 68 of males, and the remaining 75 represent non-copulatory features. Multistate characters were treated as unordered (Fitch 1971) and autapomorphies were excluded *a priori* (Bryant 1995). Also, some features that historically are scored as discrete characters – e.g. eye interdistances, and palpal and epiginal relative measurements – are treated as continuous characters herein. In order to minimize the phylogenetic implication due, the way of coding continuous characters (Mongiardino-Koch *et al.* 2015), we applied a normal function to standardize each continuous character to a 0–1 scale. Additionally, the criteria to apply homology on the sclerites of the male palp and its definitions are summarized in Suppl. 6.



### *Cladistic analysis*

The data matrix was built with Mesquite 3.04 (Maddison and Maddison 2015) (Suppl. 1). The heuristic analysis for most parsimonious trees was performed in TNT 1.5 (Goloboff *et al.* 2016), using two of character weighting approaches, equal (EW) and implied weighting (IW). The high number of missing data (?) may be explain by the elevated number of species know by just one sex, and innaplicable data (-) by the elevated number of characters based on the male and female genitalia.

Whereas some authors (e.g. Grant and Kluge 2005) claim equal weighting as the only way to reach parsimony, others (e.g. Wheeler 1995; Giribet 2003; Giribet and Wheeler 2007; Goloboff *et al.* 2008) advocate differential weighting as a necessary component for cladistics. Here, we use a multi-approach including both EW and IW analyses. This latter was performed using different weighting schemes based on Mirande (2009) approach and, also, providing different weights for continuous and discrete partitions of the matrix (Goloboff 2014). These partitions had the concavity constant (K) manually calculated, as summarized by Weiler *et al.* (2016), to adjust the average homoplasy in each partition to 50, 60, 70, 80 and 90% of distortion (Suppl. 2); and thus obtaining 25 different weighting schemes (Table 1).

The searches for optimal trees follows the same routine (commands in TNT are shown between brackets hereafter): (1) memory was set to keep up to 500,000 trees [hold500000]; (2) search start from a random tree [rseed\*]; (3) ratchet was set to perturb up to 5% of the characters, both down and up, and do 10 cycles of auto-constrains; (4) rearrangements was performed by random addition sequence (RAS) using tree bisection and reconnection (TBR) in cycles of sectorial search (including default parameters of consensus-based and random rearrangement), 1000 iterations of ratchet and 10 of tree fusing (Nixon 1999; Goloboff 1999) [xmult:ras css rss rat1000 fuse10]; (5) ending the

search, the resulting trees had branch-swapped with TBR [bb=tbr fill]. Once this routine was performed to EW and to each IW schemes, we incorporate a batch named “eustalaroutine.run” to make searches easy (Suppl. 3).

The IW tree was chosen by comparing the consensus topology of each IW scheme to each other, following Teixeira *et al.* (2014). Thereunto 1000 SPR replicates per pair of trees were done, and each one was expressed in a similarity index. To each IW scheme, all similarity indexes were summed, and the scheme with major average similarity was chosen as the “most congruent” IW tree. The selection between EW and IW “best” tree was based on the Wheeler *et al.* (2016) criteria to choose the best “spider tree of life”, i.e. major taxonomic stability on the highest support trees.

Branch supports were estimated through relative Bremer support (Goloboff and Farris 2001) and symmetric resampling (Goloboff *et al.* 2003), using a similar routine to that described by Teixeira *et al.* (2014). However, we here used only three additional steps to calculate Bremer and 10,000 trees were retained in both analyses; which were incorporated in a batch named “eustalасupport.run” (Suppl. 4).

## Results

The highest similarity index sum (Table 1), obtained after comparison of the IW trees, shown that four weighting schemes resulted in the same topologies. Therefore, these trees were considered to the most congruent trees under IW. Both equal and implied weighting analyses show *Eustala* as monophyletic and closely related to species of *Metazygia*. The EW scheme resulted in three most parsimonious trees (length 1471.126; consistency index (CI) = 0.14; retention index (RI) = 0.54), while IW resulted in two trees (best score = 203.83963; for analysis with 80% of distortion to continuous partition, and 70% to discrete) (Fig. 1).

In both weighting schemes the outgroup genera are mostly recovered as monophyletic groups, except *Metazygia*. However, genera interrelationships were usually different on EW and IW analysis, although both recovered *Neoscona* + *Araneus*, *Acacesia* + *Wixia*, and *Cyclosa* + *Alpaida*. The species of *Metazygia* emerged as paraphyletic. One redeems *M. regenhoferi* + (*M. wittfeldae* + *M. isabelae*), and the other, *M. gregalis* + *M. yobena*.

The *Eustala* clade, on strict consensus tree over IW hypothesis (Fig. 1), was divided into one monospecific lineage (represented by *E. inconstans*), and three major clades (*fuscovittata*, *rubroguttulata* and *anastera* clades). All of them had their sets of unambiguous homoplastic characters used to provide some taxonomic characterization. The *E. inconstans* lineage, includes one species, known only by males, has the palp with the basis of the embolus pale and the tegular inner border serrated (Character 176, Figs S18B-C). The *fuscovittata* clade includes species with elongated abdomen (Character 75, Fig. S7C). Species of the *rubroguttulata* clade includes males that usually have the palpal subterminal apophysis placed in an apical position, and the females present a smooth scapus and the epigynal median plate may cover the lateral plates (Character 113, Figs. S11A-B). The *anastera* clade contains species whose males have a hook-shaped embolus and females have the epigynum with wrinkled scapus (Character 94, Figs. S9D, G).

Although EW trees are presented here as “secondary” to the discussion, the clades identified to EW trees had similarities to the IW trees (Fig. 2). On EW hypothesis, one monospecific lineage represented by *E. unimaculata* (formerly part of the *rubroguttulata* clade) arises as sister-group of the remaining *Eustala* species. The *rubroguttulata* clade (except by *E. unimaculata*, *E. cazieri*, *E. albiventer* and *E. latebricola*) is related to the *anastera* clade, which in the EW trees also encloses the *fuscovittata* clade.

## Discussion

Despite recovering the monophyly of *Eustala* in all weighting schemes here presented, the topologies differ greatly from each other. The ‘taxonomic stability on the highly supported tree’ as criteria for choosing the “best tree” was not enough for an objective choice, because both analyses: (1) redeem the same outgroup genera as monophyletic; (2) have low branch supports; and (3) usually have few unambiguous characters on the ingroup (Suppl. 5). So, the choice for IW trees was purely pragmatic, based on Farris (1983) statement that “No one supposes, however, that characters in general all deserve the same weight”. Even that the “defense of homoplasy weighting must not be interpreted as a statement that it is the ideal form of weighting [Goloboff *et al.* 2008]”, we believe that implied weighting is the most objective way to weight transformations following the logical description of parsimony detailed by Giribet and Wheeler (2007).

Regardless the topology recovered here, one of the major obstacles to the suggestion of a well-founded *Eustala* phylogeny was the difficulty in mating recognized coespecific species that resulted in a dataset with many missing data. Another common hindrance was the broadly diverse genital shapes and general color patterns (i.e. polymorphism and polychromatism) displayed by most of the species (Suppl. 6), as already described by several authors (e.g. Comstock 1912; Bryant 1945; Levi 1977; Messas *et al.* 2014; Baert 2014; Souza *et al.* 2015).

## *Outgroup*

Our results share some similarities with Wheeler *et al.* (2016) propositions as: (1) the basal position of *Zygiella* in relation to the others araneids sampled, (2) *Mangora* as sister-group of the major Araneinae clades, and (3) *Araneus* as sister-group of *Neoscona*. On the other hand, many relations among the outgroup genera presented here differ from

those presented by Scharff and Coddington (1997), Dimitrov *et al.* (2016) and Wheeler *et al.* (2016), since the sampled dataset differs considerably. Therefore, few inferences concerning the outgroup will be suggested here, since there are significant differences between the data set used in these analyses.

The position of *Zygiella* in the Araneidae phylogeny has been quite different among the phylogenies presented hitherto. Sometimes it is recovered as sister-group of *Metepeira*+*Kaira*, all included in the “*Hypsosinga* clade” (Scharff and Coddington 1997), and in others it is related to Nephilinae (Dimitrov *et al.* 2016). According to Scharff and Coddington (1997), the clade including *Zygiella* and other “higher araneins” [parenthesis as the original], so-called “terminal apophysis clade”, shared the presence of terminal haematodocha (called “distal haematodocha” by the authors), terminal apophysis and the distance between the lateral and median eyes. However, the features here examined, as the presence of terminal apophysis appeared as a synapomorphy of *Mangora* plus the so-called “araneins remains”) (Character 168: 1, lost in *Metazygia gregalis* clade), aside *Zygiella* and *Nephila*. Four additional homoplasies support this group: PME with black borders (Character 16: 1), paracymbium perpendicular to the cymbium (Character 149: 1), presence of stipes (Character 153: 1), and presence of subterminal apophysis (Character 163: 1). The difference in character scoring is due to the homology hypothesis for the male palpal sclerites used here (Supplementary material 6).

For the first time *Metazygia* is presented as a paraphyletic group, since previous studies included only one representative of the genus. Therefore, *M. wittfeldae* clade (including the genus type-species) emerges as sister-group of *M. gregalis* clade + *Eustala* – topology recovered in both IW and EW analysis. One substantial difference between *M. wittfeldae* clade and *M. gregalis* clade is the epigynum with lobe in the first one (shared with *E. redundans*, Character 83: 1) and scapus in the second one (shared with

*Eustala* and other outgroup taxa, Character 82: 1). Although the terms “scapus” and “lobe” have been widely used in araneid reviews (e.g. Levi 1977, 2002) there is no clear definition of it. Herein we consider “lobe” a projection that arises exclusively from the median plate (e.g. *M. wittfeldae*, see Levi 1995 figures 1–3) and “scapus” as the projection formed by the median and lateral plates (e.g. *Araneus*, *Alpaida*, *Eustala*). The *gregalis* clade differs from other *Metazygia* sampled by many features, including the males lacking the terminal apophysis (Character 168: 0), endites without a tooth (Character 55: 0) and chelicerae with modified fangs (Character 25: 1, synapomorphy) and by the females with a scapus anteriorly projected (features extended to *M. benella*, not included in the analysis). Thus, we strongly recommend a phylogenetic review of *Metazygia*.

The clade with *M. wittfeldae* clade + (*M. gregalis* clade + *Eustala*) is supported by two homoplasies (Characters 103: 0; 139: 1) and one synapomorphy: paracymbium with head (Character 150: 0). Finally, the branch including “*gregalis* clade” + *Eustala* is supported by five homoplasies: distal and proximal portions of the scapus anteriorly oriented (Characters 88:0, 89:1); cymbium with inner ridge (shared with *C. conica*) (Character 129: 0); stipes rectangular-shaped (154:0); presence of tegular boss 2 (Character 179: 0). Thus, the scapus anteriorly oriented (Characters 88:0, 89:1), first proposed as a diagnostic feature to *Eustala* by Simon (1895), revealed to be shared with *M. gregalis* clade + *Eustala*, corroborating with H.W. Levi predictions on a close relationship between these genera (Levi 1995, Levi and Santos 2013). Also, our results differ from Scharff and Coddington (1997) hypothesis, which shows *Eustala* as sister-group of *Wixia*+*Acacesia*.

## *Ingroup*

*Eustala* was recovered as a monophyletic group supported by six homoplasies: lateral eyes horizontally side by side (Character 9: 0); conductor with scaly ventral surface (Character 121: 1); cymbium leaf-shaped (Character 130: 1); elongated median apophysis that hangs down laterally (Characters 138: 0, 140: 0); and one synapomorphy: surface of the basis of the embolus ornate (Character 135: 1). Thus, the median apophysis hanging down into the bulb (Characters 140: 0) proposed by Levi (1977) as diagnostic feature to *Eustala* is partially recovered here, being shared with *M. wittfeldae* and *M. isabelae*. The ballon-like subterminal apophysis (Character 164: 1) cited by Levi (1977) and Poeta (2014) shows up as one of the set of homoplasies that sustain *Eustala* (except *E. inconstans*) (lost in *E. guianensis* and relatives), being shared with other taxa (e.g. *M. wittfeldae* and *M. isabelae*).

To better discuss the relations between taxa, the main branches of *Eustala* were named as: ‘*inconstans* clade’, ‘*fuscovittata* clade’, ‘*rubroguttulata* clade’ and ‘*anastera* clade’.

*Eustala inconstans*, based on male, showed up at the basis of these clades, supported by three homoplasies: embolus basis pale (Character 133: 0), embolus tip offset from its basis (Character 136:1 – shared with several species of *Eustala*), and tegular inner border serrated (Character 176:1 – shared with *Neoscona* and other *Eustala*).

The *fuscovittata* clade brings the *Eustala* known by its elongated abdomen and is supported by four synapomorphies, including the elongated abdomen (Character 75: 1) and male leg formula 1423 (Char. 42: 1, shared with *Alpaida* species and *E. perfida*, but lost in *E. saga*). The relation between some of these species was hipotetized by several authors (e.g. Chickering 1955; Poeta, Marques & Buckup. 2010a, b; Poeta and Texeira 2017) due to the abdomen shape and genital similarities. Also, *E. oblonga* and *E. illicita*

are considered related to each other by its mirmecophilic behavior (Garcia and Styrsky 2013, Styrsky 2014).

The ‘*rubroguttulata* clade’ includes 12 species, some previously considered as related to *Metazygia*, as *E. albiventer* and *E. perdita* (Mello-Leitão 1943; Bryant 1945), or similar to each other, as *E. devia*, *E. cazieri*, *E. fragilis*, *E. perdita*, *E. tantula*, *E. exigua* (Chickering 1955, Levi 1977, Levi and Santos 2013), especially by the females with smooth scapus. Although the smooth scapus (Character 94: 0) was not recovered by the analysis as a support to the clade, (since it is shared with other species, e.g. *E. vellardi* and outgroup taxa) the opposite condition supports the *E. anastera* clade (Character 94: 1). The same happens with the “embolus without a basal enlargement”, pointed out by Chickering (1955) to males of *E. exigua* and *E. tantula* (Character 131:0), and whose opposite condition supports the *anastera* clade (Character 131:1). However, Levi (1977) mentioned the similarity among males of *E. devia* and *E. perdita* due the palp with subterminal apophysis placed apically (Character 166: 1), which in our analysis emerged as one of the six homoplasies that support the clade composed by these species plus relatives. The ‘*rubroguttata* clade’ was partially recovered in the EW analysis, presenting changes in its composition (e.g. *E. unimaculata*, *E. cazieri*, *E. albiventer*, *E. latebricola*), and taking a plesiomorphic position in *Eustala* (Fig. 1).

The ‘*anastera* clade’ presents three main linages and it is supported by four homoplasies: males with the carapace not enlarged laterally (Character 8: 0), epigynum with the basal portion of the scapus wrinkled (Character 94: 1), male palp with a conductor with transversal section (ventral view) (Character 126: 1) and embolus with its median portion elevated (Character 131: 1). The wrinkled (Character 94: 1) anteriorly projected scapus was mentioned by several authors (e.g. Chamberlin 1925; Chickering 1955; Levi 1977), once it corresponds to scapus seen on the type-species, *E. anastera*,



and most known *Eustala* species. However, the wrinkled scapus itself is a feature shared with many other taxa (e.g. *E. fuscovittata*, *Araneus diadematus*, and other outgroup taxa) as previously demonstrate by Scharff and Coddington (1997) (char. 31). The “hook-shaped” embolus was previously mention in taxonomic studies (e.g. Chickering 1955; Levi 1977; Poeta 2014) and was also recovered in this clade (Character 131: 1).

Despite the wide variation along the lineages of *anastera* clade, herein we highlight the North American species, related with the type-species *E. anastera* (*E. cepina*, *E. conchlea* and *E. rosae*, plus *E. mucronatella*), which emerged unsolved in both analyses, probably due to the significant similarity between these species. The phylogenetic proximity of these species is also noticeable in taxonomic works (Levi 1977; Dondale *et al.* 2003) and explains the difficulty to diagnose these species and the many taxonomic changes implied along the years (WSC 2017). For example, Levi (1977) distinguished them based on their color pattern, shape, and size, and also occurrence area. Nevertheless, the author emphasized the existence of intraspecific variation through their localities (see Levi 1977, figures 280–318). This was confirmed here and by analyzing as much material as possible from USA and Canada.

The low values of branch support (Suppl. 5) seems mainly result of the high number of the homoplastic characters on the matrix. While some of these homoplasies could be a misinterpretation on reach homology of some complex features (as Nixon and Carpenter 2011 interpreted), also it seems common that some characters were scored from features high adaptative, as folium on abdomen or general body shape (see Kuntner and Lise, 2007; Messas *et al.* 2014).

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## Tables

**Table 1:** Summary of the similarity index (SI) to different schemes of weighting, i.e., a sum of all SI calculated pairwise between topologies redeem with the different implied weighting schemes. Each cell in the table indicates a different scheme that includes the weight to continuous characters (lines) and to discrete characters (columns). See supplementary material (Suppl. 2) for a detailed sheet with the SI pairwise. The lesser values are shown in red while the higher ones are printed in blue.

Sets		Cont				
		50c	60c	70c	80c	90c
Discretes	50	13.829	15.305	15.953	15.953	15.200
	60	15.438	16.029	16.905	16.905	16.905
	70	17.486	17.486	17.486	17.486	17.305
	80	15.238	15.238	14.705	16.524	16.524
	90	12.724	14.629	15.171	15.171	14.629



Figures

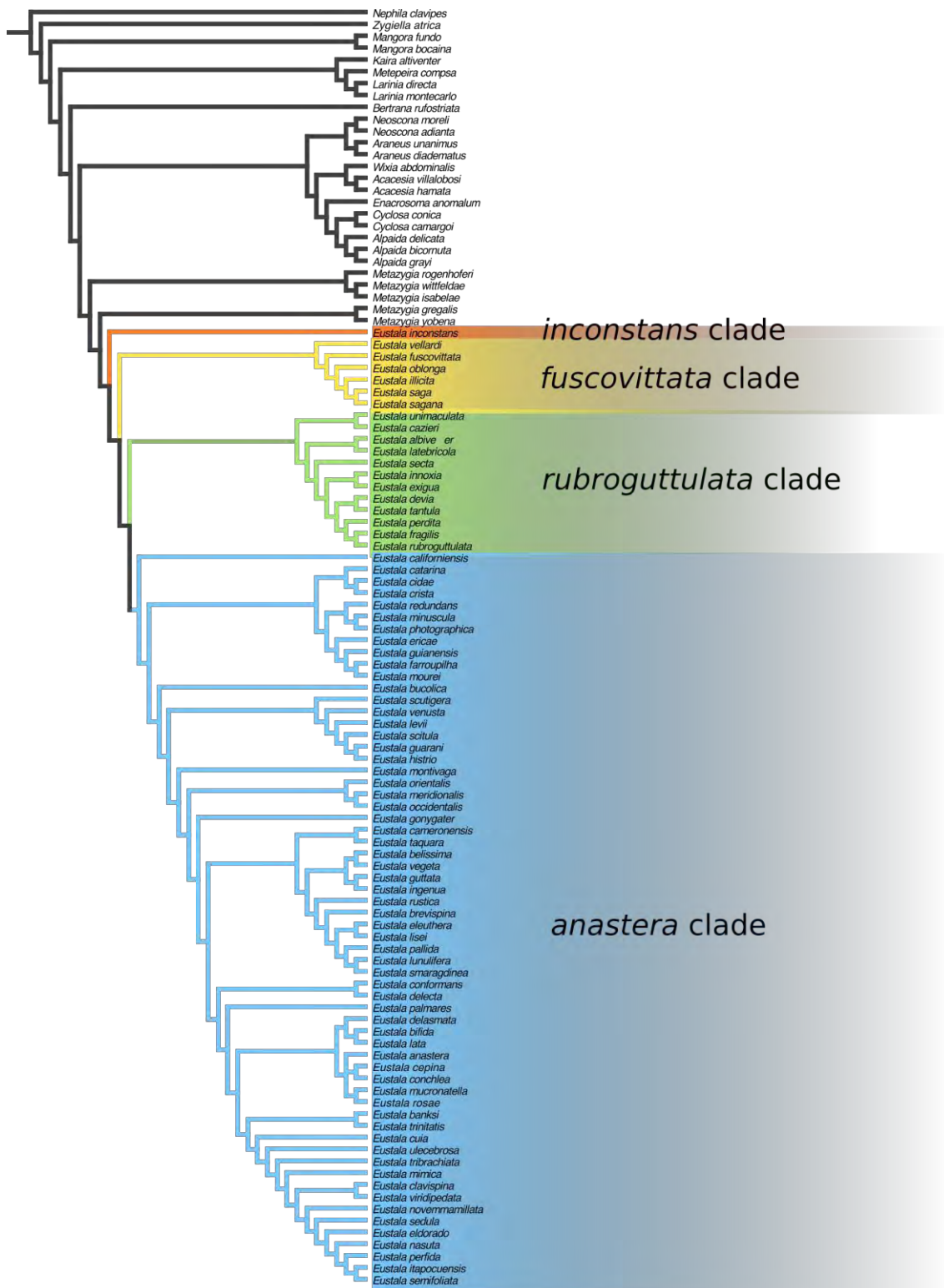


Fig. 1. Strict consensus of the three most parsimonious trees obtained under parsimony analyses with implied weight (continuous  $k = 22.0485$ ; discrete  $k = 14.6841$ ; fit = 203.83963). Colored branches indicate *Eustala* groups.

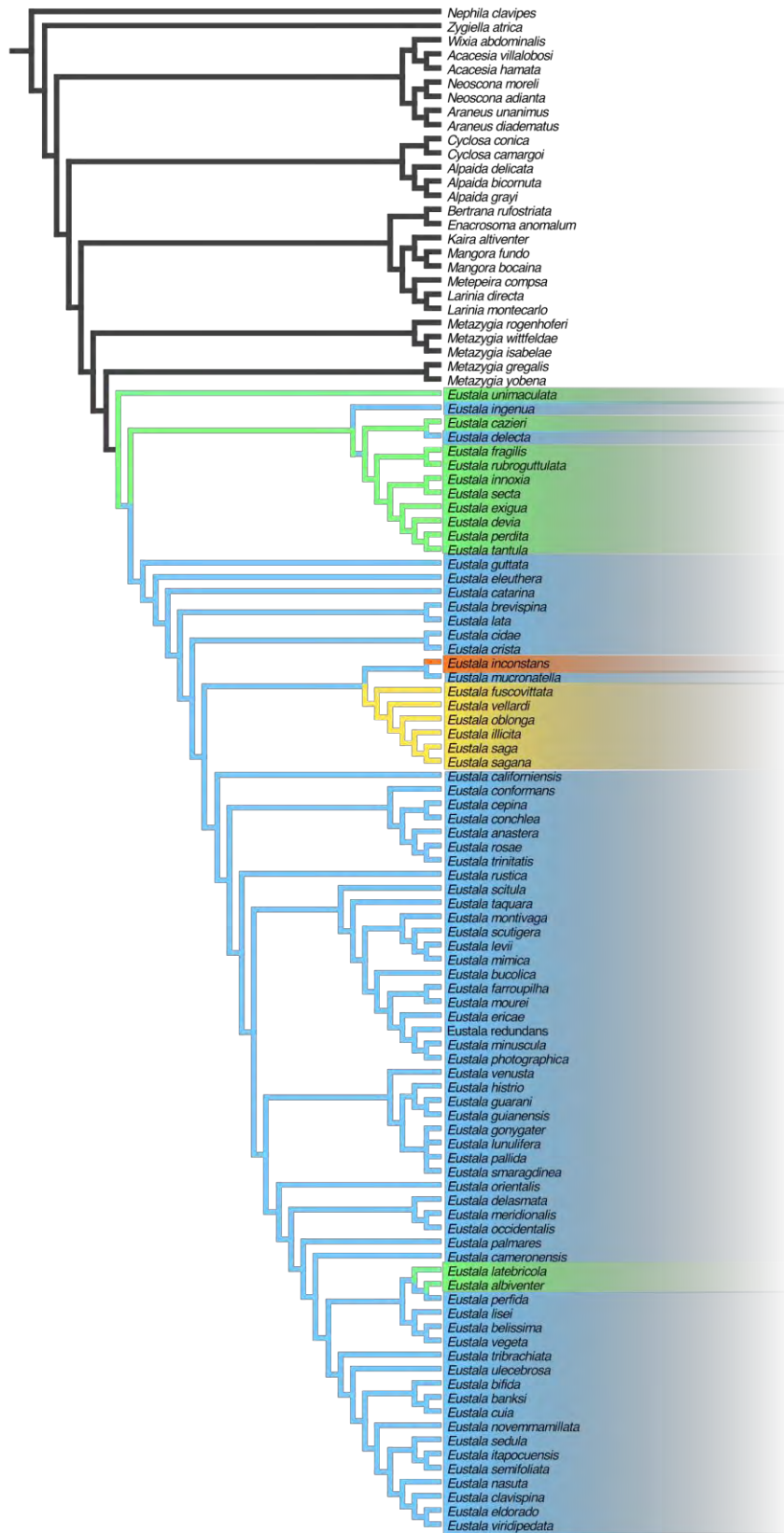


Fig. 2. Strict consensus of the two most parsimonious trees under equally weighted analysis (length: 286 steps; consistency index (CI) = 32; retention index (RI) = 64). Colored branches indicate *Eustala* clades named in the IW consensus tree (orange, *inconstans* clade; yellow, *fuscovittata* clade; green, *rubroguttulata* clade; blue, *anastera* clade).

## **Appendix 1.** List of examined material.

More than 2500 specimens were examined, all of them belong to following institutions: American Museum of Natural History, New York (AMNH, L. Prendini); The Natural History Museum, London (BMNH, J. Beccaloni); Instituto Butantan, São Paulo (IBSP, A.D. Brescovit); Museu de Ciências Naturais da Fundação Zoobotânica do Rio Grande do Sul, Porto Alegre (MCN, R. Ott); Museu de Ciências e Tecnologia da Pontifícia Universidade Católica do Rio Grande do Sul, Porto Alegre (MCTP, R.A. Teixeira); Museum of Comparative Zoology, Harvard University, Cambridge (MCZ, G. Gibret); Museu de História Natural Capão da Imbuia, Curitiba (MHNCI, O.L. Lopes); Muséum d'Histoire Naturelle de Genève, Geneva (MHNG, P.J. Schwendinger); Museum and Institute of Zoology, Polish Academy of Sciences, Warsaw (MZPW, W. Wawer); Museo de La Plata, La Plata (MLP, L.A. Pereira); Museu Nacional, Universidade Federal do Rio de Janeiro, Rio de Janeiro (MNRJ, A.B. Kury); Museo Zoologico "La Specola", Firenze (MZUF, L. Bartolozzi); MPEG, Museu Paraense Emílio Goeldi, Belém (A.B. Bonaldo); Museu de Zoologia da Universidade de São Paulo, São Paulo (MZSP, R. Pinto da Rocha); Naturhistorisches Museum Basel, Basel (NHMB, A. Hänggi); Naturhistorisches Museum Wien, Wien (NHMW, C. Hörweg); Royal Belgian Institute of Natural Sciences (RBINS, L. Baert) Zoological Museum, Natural History Museum of Denmark, Copenhagen (ZMUC, N. Scharff).

### **Outgroup**

#### **Araneidae**

1. *Nephila clavipes* (Linnaeus, 1767). Brazil: Santa Catarina (Chapecó, Quebra Queixos), #m, #f, 26, 27.II.2002, M. Kammers (MCTP 12916).
2. *Zygiella atrica* (C. L. Koch, 1845). Scharff and Coddington images (zB39S05).
3. *Kaira altiventer* O. Pickard-Cambridge, 1889. Brazil: Rio Grande do Sul (Viamão), #m, 1997, A.A. Lise (MCTP 9220); (São Borja, Reserva Biológica São Donato) #f, 26.XI.2012, M. Machado (MCTP 38149).
4. *Metepeira compsa* (Chamberlin, 1916). Brazil: Paraíba (Santa Luzia), #m, 24.X.1978, P.F.L. Duarte (MCN 25672). Rio Grande do Sul (São Borja, Reserva Biológica São Donato) #f, 21. I.2012, M. Machado (MCTP 34833).
5. *Cyclosa conica* (Pallas, 1772). Scharff and Coddington images (SV5353).

6. *Neoscona moreli* (Vinson, 1863). Brazil: Rio Grande do Sul (Capão da Canoa-Capão Novo), #m, #f, 17–18.IV.1993, A.A. Lise (MCTP 3141).
7. *Neoscona adianta* (Walckenaer, 1802). Scharff & Coddington images.
8. *Larinia directa* (Hentz, 1847). Brazil: Pará (Melgaço, Floresta Nacional de Caxiuanã), #m, #f, 11.VIII.1996, A.A. Lise et al. (MCTP 9375).
9. *Larinia montecarlo* (Levi, 1988). Brazil: Santa Catarina (Rancho Queimado), 1 3 #m, 09–13.X.1995, Braul and Silveira (MCTP 7019). Rio Grande do Sul (Alto das Casemiras), #f, 14.xi.1993, R. Buss (MCTP 3460).
10. *Araneus unanimus* (Keyserling, 1879). Brazil: Rio Grande do Sul (Santa Maria), #m, XII.1993, E.C. Costa (MCTP 38291); (Silveira Martins) #f, 29.I.1993, Eq. Zoologia (MCTP 38300).
11. *Araneus diadematus* Clerck, 1757. Scharff & Coddington images.
12. *Mangora fundo* Levi, 2007. Brazil: Rio Grande do Sul (Itaara), #m, 14.VII.2004, A.A. Lise (MCTP 20753); (Viamão) #f, A.A. Lise (MCTP 19.VIII.1994), A.A. Lise (MCTP 5299).
13. *Mangora bocaina* Levi, 2007. Brazil: Rio Grande do Sul (Torres, Colônia São Pedro), #m, 09.V.1992, A. Braul (MCTP 1983); (Guaíba) #f, 29.X.1994, A.A. Lise et al. (MCTP 5299).
14. *Metazygia wittfeldae* (McCook, 1894). Scharff and Coddington images.
15. *Metazygia gregalis* (O. Pickard-Cambridge, 1889). Brazil: Rio Grande do Sul (Cachoeira do Sul), 1 #f, 27.IV.1993, R. Buss (MCTP 3683); (Marcelino Ramos) #f, II.1989, A. Braul (MCTP 19782).
16. *Metazygia yobena* Levi, 1995. Brazil: Amazonas (Manaus), #m, #f, 25.IX.1997, R. Ott (MCTP 10203).
17. *Metazygia isabelae* Levi, 1995. Brazil: Mato Grosso (Porto Cercado), #m, 02.VIII.1992, A. Braul and A.A. Lise (MCTP 2454); #f (MCTP 2505).
18. *Metazygia rogenhoferi* (Keyserling, 1878). Brazil: Rio Grande do Sul (Viamão), #m, #f, 20.V.1994, A.A. Lise (MCTP 4775).
19. *Alpaida delicata* (Keyserling, 1892). Brazil: Amazonas (Maturacá), #m, #f, 13.X.1990, H.W. Levi (MCTP 1343).
20. *Alpaida bicornuta* (Taczanowski, 1878). Brazil: Mato Grosso, #f, 21.I.2002, A.A. Lise and A. Braul (MCTP 12923); (Pantanal) #m, 04–10.VIII.1992, A.A. Lise and A. Braul (MCTP 2308).

21. *Alpaida grayi* (Blackwall, 1863). Brazil: Rio Grande do Sul (Cambará do Sul), #m, #f, 16.XII.1990, A.A. Lise (MCTP 66).
22. *Bertrana rufostriata* Simon, 1893. Brazil: Rio Grande do Sul (São Francisco de Paula), #m, #f, 12–14.XI.1998, A.A. Lise (MCTP 15746).
23. *Enacrosoma anomalum* (Taczanowski, 1873). Brazil: Roraima (Uraricoera, Ilha de Maracá), #m, #f, 31.I.–14.II.1992, A.B. Bonaldo, #m, #f (MCTP 1886).
24. *Wixia abdominalis* O. Pickard-Cambridge, 1882. Brazil: Mato Grosso do Sul (Diamantina, Alto do rio Arinos), #m, #f, X.1983, E.H. Buckup (MCN 24039).
25. *Acacesia villalobosi* Glueck, 1994. Brazil: Rio Grande do Sul (São Francisco de Paula), #m, XII.2001, L.A. Bertonecello et al. (MCTP 22910); #f, 09–12.I.1997, A.A. Lise et al. (MCTP 10863).
26. *Acacesia hamata* (Hentz, 1847). Brazil: Rio Grande do Sul (Marcelino Ramos), #m, #f, II.1989, A. Bräul (MCTP 19781).

### **Ingroup**

1. *Eustala albiventer* (Keyserling, 1884). Brazil: Rio Grande do Sul (Cachoeira do Sul), #m, #f, 26.VII.1992, R.G. Buss (MCTP 32558).
2. *Eustala anastera* (Walckenaer, 1891). United States of America: Texas (Cameron County, Rangerville), 4 #m, #f, 15.IX.1935, M. Welch and K. Lamb (AMNH)
3. *Eustala banksi* Chickering, 1955. Costa Rica: Santa Clara (Humburg Farm), 2 #m, VII.1931, Nevermann (NHMW).
4. *Eustala belissima* Poeta, Marques and Buckup, 2010b. Brazil: Rio Grande do Sul (São Francisco de Paula), #m, 19.IV.1999, A.A. Lise (MCTP 31925); #f, 22.IV.2005, E.L.C. Silva (MCTP 17096).
5. *Eustala bifida* F.O. Pickard-Cambridge, 1904. Panamá: Barro Colorado island, #m, 20.VIII.1954, A.M. Chickering (MCZ 73369). Venezuela: Falcon (Pozo), #f female lectotype (NMB 1780A).
6. *Eustala brevispina* Gertsch and Davis, 1936. United States of America: Texas (Brownsville), #f paratype, 08.VI.1934, J.N. Knull (MCZ 73413).
7. *Eustala bucolica* Chickering, 1955. Panamá: Chiriquí (Boquete) #m paratypes (MCZ 24514, 24515); (Cerro Punta), #f, III.1936 (AMNH).

8. *Eustala californiensis* (Keyserling, 1885). Mexico: San Luis Potosí (Ciudad Valles), 7 #m, 15 #f, VII.1959 (AMNH).
9. *Eustala cameronensis* Gertsch and Davis, 1936. United States of America: Texas (Edinburg), #m, 03.IX.1953, S. Mulaik (AMNH).
10. *Eustala catarina* Poeta, 2014. Brazil: Santa Catarina (Rio Uruguay), #m, #f, 02.IX.2010, R.C. Francisco (MCTP 35518).
11. *Eustala cazieri* Levi, 1977. Bahamas: Bimini (South Bimini), #m, 2 #f, paratypes, V.1951, M.Z. Cazier and W.J. Gertsch (MCZ 23938).
12. *Eustala cepina* (Walckenaer, 1841). United States of America: Kansas (Meade State Park), 3 #m, 4 #f, 22.VIII.1961, H.S. Fitch (AMNH).
13. *Eustala cidae* Poeta, 2014. Brazil: Rio Grande do Sul (São Francisco de Paula, Usina Passo do Inferno), #f, 16.XI.2006, A.A. Lise (MCTP 20341); (São Leopoldo) #m, holotype, 01.IX.1986, C.J. Becker (MCTP 334).
14. *Eustala clavispina* (O. Pickard-Cambridge, 1889). United States of America: Texas (Edinburg) 3 #m, 3 #f, XII.1939, D. and S. Mulaik (AMNH).
15. *Eustala conchlea* (McCook, 1888). United States of America: Pennsylvania (Horseshoe Bend, Neshaminy Cr.), 4 #m, #f, N.E. of Jamilson, V.1955 (AMNH).
16. *Eustala conformans* Chamberlain, 1925. Panamá: Barro Colorado Island (Canal Zone), #m holotype, VI.1950 (MCZ 21453); #f, 21.V.1946, T.C. Schneirla (AMNH).
17. *Eustala crista* Poeta, Marques and Buckup., 2010b. Brazil: Rio Grande do Sul (São Jerônimo), #m, #f, 25.VI.2005, A.P. Santos (MCTP 17046).
18. *Eustala cuia* Poeta, 2014. Brazil: Rio Grande do Sul (Capão do Leão, Hortobotânico Irmão Teodoro Luis), #m, #f, 25.V.2001, E.N.L. Rodrigues (MCN 49062).
19. *Eustala delasmata* Bryant, 1945. Dominican Republic: San José de las Matas, 3 #m, holotype and paratypes, VI.1938, P.J. Darlington Jr. (MCZ 21031); Sabana del Mar (near Hato Mayor), 1 #f, 20.VII.1935, W.G. Hassler (AMNH).
20. *Eustala delecta* Chickering, 1955. Panamá: Barro Colorado Island (Canal Zone), #m, VII.1950 (AMNH).

21. *Eustala devia* (Gertsch and Mulaik, 1936). Bahamas: South Bimini, #m, #f, VI.1951, M.A. Cazier (AMNH).
22. *Eustala eldorado* Poeta, 2014. Brazil: Rio Grande do Sul (Cachoeira do Sul), #m paratype, 02.XII.1992, R.G. Buss (MCTP 3674).
23. *Eustala eleuthera* Levi, 1977. Bahamas: Crooked Island (Landrail Point), #m paratype, 05.III.1953, G. Rabb (AMNH). Jamaica: Holland Bay, 2 #f paratypes, 15.III.1955, A.M. Nadler (AMNH).
24. *Eustala ericae* Poeta, 2014. Brazil: Rio Grande do Sul (São Francisco de Paula), #m holotype, XII.1996, A.A. Lise (MCTP 14139); (Cambará do Sul) #f, II.2006 (MCTP 33344).
25. *Eustala exigua* Chickering, 1955. Panamá: Barro Colorado Island (Canal Zone), 4 #m paratypes, VII–VIII.1936, A.M. Chickering (MCZ 24479).
26. *Eustala farroupilha* Poeta, 2014. Brazil: Santa Catarina (Florianópolis, Reserva Biológica Marinha do Arvoredo), #f, 05, 06.X.1995, A.A. Lise et al. (MCTP 7448). Rio Grande do Sul (Guaíba), #m, 26.VIII.1994, A.A. Lise (MCTP 7979).
27. *Eustala fragilis* (O. Pickard-Cambridge, 1889). Panamá: Chiriquí Province, Bugaba, #f paratype, Champion (NHM).
28. *Eustala fuscovittata* (Keyserling, 1864). Mexico: Tabasco (Teapa), 6 #m, 11 #f (NHM). Brazil: Pará (Oriximiná), #f, 11.VI.2011, E.L.C. Silva (MCTP 31935).
29. *Eustala gonygaster* (C. L. Koch, 1838). Guyana: Tumatumari (Potaro-Siparuni), #m, 21.VII.1936 ((MZUF 1942).
30. *Eustala guarani* Poeta, 2014. Brazil: Rio Grande do Sul (São Borja, Reserva Biológica São Donato), #f, 31.I.2012, M. Machado (MCTP 34895); (Rio Jacutinga, BR-283) #f, XII.1988, Equipe Itá-Machadinho (MCTP 821).
31. *Eustala guianensis* (Taczanowski, 1873). Peru: Junin (Amable Maria, Tarma Province), #m, 2 #f, 1871–1882, K. Jelski and J. Sztolcman (MZPW 188399–188401).
32. *Eustala guttata* F. O. Pickard-Cambridge, 1904. Panamá: Chiriquí Province, Bugaba, #f lectotype, #m paralectotype, 28.IV.1905, Champion (Godman and

- Salvin collection, NHM 021-3035); Barro Colorado Island, 4 #f, VIII.1950 (MCZ 24545).
33. *Eustala histrio* Mello-Leitão, 1948. Guyana: Cattle Trail Survey, #f holotype, A.A. Abraham (NHM).
  34. *Eustala illicita* (O. Pickard-Cambridge, 1889). Guatemala: Guatemala City (Los Amantes), #m, 1908, Dr. Kellerman (MCZ 73067); #m, 2 #f, XI.1983, S. Heimer (MNHG).
  35. *Eustala inconstans* Chickering, 1955. Panamá: Barro Colorado Island #m, holotype, A.M. Chickering (MCZ 21628).
  36. *Eustala ingenua* Chickering, 1955. Panamá: Arraijan, #m paratype, VII.1950 (MCZ 24545); Summit (Canal Zone), #f holotype, VII.1950, A.M. Chickering (MCZ 21645).
  37. *Eustala innoxia* Chickering, 1955. Panamá: Forest Reserve (Canal Zone), #f paratype, VIII.1939, A.M. Chickering (MCZ 24522).
  38. *Eustala itapocuensis* Strand, 1916. Brazil: Santa Catarina (Rancho Queimado), #f, 09–13.X.1999, A.A. Lise et al., female (MCTP 6998); Rio Grande do Sul (Caxias do Sul), #m, 11–12.XI.1995, A.A. Lise et al. (MCTP 31989).
  39. *Eustala lata* Chickering, 1955. Panamá: Barro Colorado, #f holotype, VIII.1950, A.M. Chickering (MCZ 21787).
  40. *Eustala latebricola* (O. Pickard-Cambridge, 1889). Panamá: Chiriquí Province, Bugaba, #f paratype, Godman and Salvin (NHM).
  41. *Eustala levii* Poeta, Marques and Buckup., 2010a. Brazil: Rio Grande do Sul (Cachoeira do Sul), #m, 10.X.1992, R.G. Buss, male (MCTP 3433); (Campo Bom) 19.X.1987, #f, C.L. Becker (MCTP 131).
  42. *Eustala lisei* Poeta, 2014. Brazil: Mato Grosso (Pantanal), #f, 04.–10.VIII.1992, A.A. Lise and A. Braul (MCTP 2304); Rio Grande do Sul (Capão do Leão, Hortobotânico Irmão Teodoro Luís), #m, E.N.L. Rodrigues (MCN 46400).
  43. *Eustala lunulifera* Mello-Leitão, 1939. Brazil: Pará, #f, S. Reimoser (NHMW).
  44. *Eustala meridionalis* Baert, 2014. Equador: Galapagos Islands (Isla Floreana, Cerro Pajas), #f holotype, 3 #m paratypes, 20.II.1977, W.G. Reeder (RBINS).



45. *Eustala mimica* Chickering, 1955. Panamá: Barro Colorado (Canal Zone), 2 #m paratypes, P. Rau (MCZ 24529).
46. *Eustala minuscula* (Keyserling, 1892). Brazil: Santa Catarina (Rio Uruguai), #m, 02.IX.2012, R.C. Francisco (MCTP 34474). Rio Grande do Sul (São Francisco de Paula), #f, I.1999, A.A. Lise (MCTP 32627); (Santo Antonio da Patrulha) #m, 27.VIII.1994, C.L. Koch (MCTP 31978).
47. *Eustala montivaga* Chickering, 1955. Panamá: El Volcán, #f holotype, VIII.1950, A.M. Chickering (MCZ 22200). No data, 3 #m (NHM).
48. *Eustala mourei* Mello-Leitão, 1947. Brazil: Rio Grande do Sul (São Borja, Reserva Biológica São Donato), #m, 21.I.2012 M. Machado (MCTP 34836); #f, 14.III.2013 (MCTP 37039).
49. *Eustala nasuta* Mello-Leitão, 1939. Panamá: Summit (Canal Zone), #f holotype, VIII.1950 (MCZ 23372). Brazil: Santa Catarina – Rio Grande do Sul (Rio Uruguay), #m, 02.IX.2012, R.C. Francisco (MCTP 34477).
50. *Eustala novemmamillata* Mello-Leitão, 1941. Argentina: Salta (El Rabón), #f holotype, M. Mirabém (MLP 15120).
51. *Eustala oblonga* Chickering, 1955. Panamá: Barro Colorado Island, #m holotype, VII.1950, A.M. Chickering (MCZ 22350); #f allotype, VII.1936, A.M. Chickering (MCZ 24511).
52. *Eustala occidentalis* Baert, 2014. Equador: Galápagos Islands (Isla Santa Cruz), #m, II.1986 (RBINS B.86/0124); #m, #f, 01.III.1986 (RBINS B.86/046).
53. *Eustala orientalis* Baert, 2014. Equador: Galápagos Islands (Isla Española, Bahía Gardner, Playa blanca), 1 #m, 27.V.1991 Baert, Maelfait and Desender (RBINS B.91/0742); (Bahía Manzanilla, Caleta) 3 #f, 21.III.2009 (RBINS B.09/014-15).
54. *Eustala pallida* Mello-Leitão, 1940. Brazil: Rio Grande do Sul (São Francisco de Paula), #f, 26–28.X.2012, M.R.M. Poeta (MCTP 35515).
55. *Eustala palmares* Poeta, Marques and Buckup., 2010a. Brazil: Santa Catarina (Porto Belo, Ilha João da Cunha), #m, #f, 07.XII.1992, R.G. Buss (MCTP 3116).
56. *Eustala perdita* Bryant, 1945. Haiti: Port-au-prince, #m holotype, VII.1941, A. Audant (MCZ 22601); 5 #f paratypes (MCZ 73069).

57. *Eustala perfida* Mello-Leitão, 1947. Brazil: Rio Grande do Sul (Fazenda Souza), #m, #f, 11, 12.XI.1995, Lab. Aracnologia PUCRS (MCTP 7367).
58. *Eustala photographica* Mello-Leitão, 1944. Brazil: Rio Grande do Sul (Erval Grande), #f, 17–20.IV.1992, A. Braul (MCTP 32534).
59. *Eustala redundans* Chickering, 1955. Panamá: Madden Dam Forest (Canal Zone), #f holotype, A.M. Chickering (MCZ 22873).
60. *Eustala rosae* Chamberlin and Ivie, 1935. United States of America: California (The Willos, San Diego County), #m, 14.VI.1957, Schick and Hoge (AMNH); (Taulumne Co.), 2 #f, 8.vii.1958 (AMNH).
61. *Eustala rubroguttulata* (Keyserling, 1879). Peru: Amable Maria (Junin), #f holotype, K. Jelski (MZPW).
62. *Eustala rustica* Chickering, 1955. Panamá: El valle, #m holotype, #f allotype, VII.1936, A.M. Chickering (MCZ 22955).
63. *Eustala saga* (Keyserling, 1893). Brazil: Rio Grande do Sul (Viamão), #m, #f, 12.V.1995, A.A. Lise (MCTP 7815).
64. *Eustala sagana* (Keyserling, 1893). Brazil: Santa Catarina (Chapecó), #m, #f, X.2012, R.C. Francisco (MCTP 34475).
65. *Eustala secta* Mello-Leitão, 1945. Brazil: Rio Grande do Sul (Derrubadas, Parque Estadual do Turvo), #m, #f, 28-31.X.2003, R. Ott et al. col. (MCN 37613).
66. *Eustala scitula* Chickering, 1955. Panamá: Barro Colorado Island, #m holotype, 12.III.1936, W.J. Gertsh (AMNH 360312G).
67. *Eustala scutigera* (O. Pickard-Cambridge, 1898). Mexico: Chiapas (Ocosingo), 1 #m, 25.VI.1950, C. and M. Goodnight and L.J. Stannard (AMNH); Veracruz (Cerro Azul), #f, 23.III.1945, E.K. Waering (AMNH).
68. *Eustala sedula* Chickering, 1955. Mexico: Yucatan (Chichen-Itzá), #f paratype, VI.1948, Goodnight (AMNH).
69. *Eustala semifoliata* (O. Pickard-Cambridge, 1899). Panamá: Barro Colorado Island, 1 #f, 1928, A.M. Chickering (AMNH).
70. *Eustala smaragdinea* (Taczanowski, 1878). Peru: Amable Maria (Junin), 4 #f syntypes, K. Jelski (MZPW 225744–225747).

71. *Eustala tantula* Chickering, 1955. Panamá: Canal Zone, #m paratype from, VII.1936 (NHM); Colón, Gamboa, Panamá #f, IV.1983, S. Heimer (MNHG).
72. *Eustala taquara* (Keyserling, 1892). Brazil: Rio Grande do Sul (São Francisco de Paula), #f, 26–28.X.2012, M.R.M. Poeta (MCTP 35511); #m, #f, 05–08.XII.1996, A.A., Lise (MCTP 14136).
73. *Eustala tribrachiata* Badcock, 1932. Brazil: Rio Grande do Sul (São Borja, Reserva Biológica São Donato), #f, 18.III.2013, M. Machado (MCTP 36718).
74. *Eustala trinitatis* (Hogg, 1918). Brazil: Espírito Santo (Trinidad Island, Praia dos Portugueses), #f, IV–V.1993, M.R. Rocha (MCTP 1674).
75. *Euslata ulecebrosa* (Keyserling, 1892). Brazil: Paraná (Ibituruna), #f, 1935, Stawiarski (MNRJ 6492).
76. *Eustala unimaculata* Franganillo, 1930. Cuba: Santiago de Cuba (Gran Piedra Oriente), 1 #m, 29.VI.1955, A.F. Archer (AMNH); San Cristobal Prvince (Loma de los Pinos, Colonia Ramfis, T. Valdéz, 2400–3000m), 1 #f, 07.VIII.1956, A.F. Archer and E.B. Moya (AMNH).
77. *Eustala vegeta* (Keyserling, 1865). Mexico: Orizaba, 1 #m paralectotype, H.H. Smith (NHM); Taumalipas (Santa Gracia), 1 #f, 05.VII.1940, Phil Rau (MCZ 73072/ 2405).
78. *Eustala vellardi* Mello-Leitão, 1924. Brazil: Pará (Itaituba, Com. Santo Antônio), #f, 07.VII.2003, J.G. Frota (MCTP 14735); 3 #m, 1 #f, 02.VIII.1993, A.A. Lise and A. Braul Jr. (MCTP 2608).
79. *Eustala venusta* Chickering, 1955. Panamá: Barro Colorado Island, #f holotype (NHM).
80. *Eustala viridipedata* (Roewer, 1942). Peru: Amable Maria, #f lectotype, K. Jelski (MZPW 225791–225793).

## Appendix 2. Character list and figures relative to character description.

Characters are given in *italic*; numbers given in regular font in parentheses refer to character states.

- (1) *Carapace, antero-lateral, margin*: (0) concave (Fig. 1A); (1) straight (Fig. 1B). The antero-lateral border of the carapace, which faces the palp, may be concave (e.g. *E. guianensis*, *E. viridipedata*, *E. venusta*, *E. tribrachiata*, score 0) or straight (e.g. *E. conformans*, *E. sedula*, *E. semifoliata*, score 1)
- (2) *Carapace, cephalic area, boundary with thoracic area white pigmented*: (0) absent (Fig. 1C); (1) present (Fig. 1D). The limit of the thoracic and cephalic area may present white pigment, that may be V-shaped or vestigial in some species (e.g. *E. bellissima*, see Poeta et al. 2010b, figure 9)
- (3) *Carapace, cephalic area, setae, lateral surface, branch*: (0) absent (Fig. 1F); (1) present (Fig. 1G). The setae present on the cephalic area may have its lateral uniforme (score 0) or serrated, as a branch.
- (4) *Carapace, cephalic area, setae, median keel*: (0) absent (Figs 1G, H); 1 present (Fig. 1F). The setae present on the cephalic may have a smooth surface (score 0) or be provided with a median keel
- (5) *Carapace, cephalic area, setae, tip*: (0) obtuse (Fig. 1H); (1) acute (Fig. 1G).
- (6) *Carapace, clypeus, height (only female) (adapted from Levi 1996, 2002)*: (0) low (when it is equal or less than the AME's diameter) (Fig. 2C); (1) high (when it is bigger than the AME's diameter) (Fig. 2D).
- (7) *Carapace, clypeus, margin*: (0) concave (Fig. 2E); 1 wavy (Fig. 2C).
- (8) *Carapace, lateral, enlarged border (only male) (from Levi 1995)*: (0) absent; (1) present (Fig. 2F). In males, the antero-lateral border of the cephalothorax, which faces the coxae I, may be enlarged, overlapping coxae I (e.g. *Neoscona moreli*, *Metazygia gregalis*, *Acacesia vilallobosi*, score 1). Levi (1995) called this feature as "cephalothorax lobed near leg I" (see Levi 1995 figures 384, 390).
- (9) *Carapace, lateral eyes, position*: (0) parallel (when it is placed horizontally side by side from each other) (Fig. 3A); (1) ~45° angled to the longitudinal axis (when the posterior lateral eye is ~45° angled to the longitudinal axis) (Fig. 3B).
- (10) *Carapace, lateral view, outline (only male) (adapted from Ramirez 2014: character 3)*: (0) domed (Fig. 3C); (1) flat (when the thoracic and cephalic area are equally high) (Fig. 3D). It is modified from Ramirez (2014: char. 3) that use to score taxa

very flat (e.g. gnaphosoids and selenopids). This condition is better noticed in males.

- (11) *Carapace, median ocular area, conical projection*: (0) absent; (1) present (Fig. 3E). Some species may have a conical projection, placed between the median eyes (e.g. *E. nasuta*, *E. itapocuensis*). This feature is shared by males and females.
- (12) *Carapace, median ocular area, projected*: (0) absent; (1) present (when the MOA is elevated compared with the cephalic area) (Fig. 3E).
- (13) *Carapace, median ocular area, stout setae*: (0) absent; (1) present (Fig. 2D).
- (14) *Carapace, pleura, coloration*: (0) pale; (1) dark (Fig. 2E).
- (15) *Carapace, posterior border (adapted from Ramírez 2014): character 4*: (0) not reflexed; (1) reflexed (Fig. 1E). Ramírez (2014: char. 4) use "0 Narrow or not reflexed and "1 Wide reflexed border" but here we choose to score it as absent and present.
- (16) *Carapace, posterior median eyes, black border (from Levi 1995)*: (0) absent; (1) present (Fig. 3F). Commonly araneids present the PME black bordered (score 1), which is absent in species as *Wixia abdominalis*, *Acacesia vilallobosi* and *Kaira altiventer* (score 0).
- (17) *Carapace, surface, scaly cells, enclose small*: (0) absent (Fig. 1F); (1) present (Fig. 2B). The main portion of the scale may be smooth (e.g. *A. bicornuta*, *E. albiventer*, score 0) or it may be covered by small cone-shaped projections (e.g. *E. saga*, *E. tribrachiata*, *E. taquara*, *E. morei*, score 1)
- (18) *Carapace, surface, scaly cells, framed*: (0) absent (Fig. 1H); (1) present (Figs 1F, G). All the studied taxa present its surface with scales. However, in *Metazygia* and *Alpaida* the scales do not present a well demarcated border (score 0).
- (19) *Carapace, surface, scaly cells, ornated border*: (0) absent (Fig. 1F); (1) present (Fig. 3A).
- (20) *Carapace, thoracic area, dots line (from Levi 1995)*: (0) absent (Fig. 1C); (1) present (Fig. 1D). The thoracic area may present a transversal line of brown dots (score 1).
- (21) *Carapace, thoracic fovea, disposition (female) (adapted from Ramírez 2014: character 1)*: (0) transversal (Fig. 3F); (1) longitudinal (Fig. 1E). Ramírez (2014: char. 1), scored it as: "0 Wide depression; 1 Deep pit; 2 Narrow dark longitudinal line", but we adapt the states of character to the studied taxa, calling "transversal", what may look like a depression (e.g. *Araneus*, score 0).

- (22) *Carapace, thoracic fovea, disposition* (male) (adapted from Ramírez 2014: character 1): (0) transversal; (1) longitudinal.
- (23) *Chelicerae, apical, glands, organization* (adapted from Benavides and Hormiga 2016): (0) circular (Fig. 4A); (1) elongate (Fig. 4B). At the middle the part of the chelicerae, where the fangs repose, there are a group of small holes, called as "cheliceral glands" by Benavides and Hormiga (2016) with unknown function. In *Nephila clavipes* it seems absent.
- (24) *Chelicerae, apical, inner portion, dark*: (0) absent; (1) present (Fig. 2D). The apex of the chelicerae may have its inner portion much darker when compared with the chelicerae general color.
- (25) *Chelicerae, fangs, sinuous (only male)* (from Levi 1995): (0) absent (Fig. 4C); (1) present (Fig. 4D).
- (26) *Chelicerae, furrow, orifices*: (0) absent (Fig. 4E); (1) present (Fig. 3F). The furrow of the chelicerae is covered with small teeth and, in some species it may also have small orifices.
- (27) *Chelicerae, promargin, teeth*: (0) three; (1) four (Fig. 4E); (2) five. Chickering (1955), observed that species of *Eustala* commonly present the chelicerae promargin with four teeth, the second and fourth being more developed. However, in some species this character may be polymorphic, varying in the same specimen (e.g. *E. itapocuensis* score 1/2; *Alpaida delicata* score 2; *A. bicornuta* may present five or six teeth, being the presence of six teeth an autapomorphy to this species).
- (28) *Chelicerae, retromargin, teeth*: (0) two; (1) three (Fig. 4E); (2) four.
- (29) *Chelicerae, retromargin, teeth, size by comparison*: (0) subequals; (1) different sizes. The chelicerae retromarginal teeth may have similar sizes (score 0) or they may have a conspicuous size difference (score 1)
- (30) *Legs I, coxae, dorsal, tubercle (only male)*: (0) absent; (1) present (Fig. 2F). The dorsum of the coxae I may or may not present a minute tubercle, which faces the edge of the carapace, being total or partially covered by it.
- (31) *Legs I, coxae, ventral, hook (only male)* (from Scharff and Coddington 1997: character 33): (0) absent; (1) present (Fig. 5A).
- (32) *Legs II, tibiae, venter, field of stout setae (only male)*: (0) absent; (1) present (see Levi 1993: figs 9, 13, 17, 21, 25).
- (33) *Legs II, tibiae, venter, spur (only male)* (from Levi 1995): (0) absent; 1 present (see Levi 1976: fig. 87).

- (34) *Legs IV, coxae, ventral, stout macrosetae (only male) (adapted from Scharff and Coddington 1977: character 32)*: (0) absent; (1) present (see Levi 1976: fig. 86). The coxae IV may be provided with a short stout macroseta (score 1), these species also present a stout macrosetae in trochanter IV. The absence of this macrosetae on trochanter IV seems to be an autapomorphy of *Cyclosa conica*.
- (35) *Legs, banded (Levi 1971)*: (0) absent; (1) present.
- (36) *Legs II, femur, venter, setae row (only males) (characters 36–40 adapted from Levi 1977)*: (0) absent; (1) present (Fig. 5A). Males may have the ventral surface of the femura provided with a row of 3-5 setae.
- (37) *Legs III, femur, venter, setae rows (only males)*: 0 absent; 1 present.
- (38) *Legs III, femur, venter, setae rows, number (only males)*: (0) one row (1) two rows. Males may have the ventral surface of the femura provided with a row of 3-5 setae disposed in one or two rows.
- (39) *Legs IV, femur, venter, setae rows (only males)*: (0) absent; (1) present.
- (40) *Legs IV, femur, venter, setae rows, number (only males)*: (0) one row (1) two rows.
- (41) *Legs, formula (only female)*: (0) 1243; (1) 1423; (2) 1,2=4,3. Usually the leg formula is 1243, where the leg II is longer than leg IV (score 0). However, in some species the leg IV is longer than the leg II (score 1) or they present similar length (score 2).
- (42) *Legs, formula (only male)*: (0) 1243; (1) 1423; (2) 1,2=4,3.
- (43) *Legs, setae, shape*: (0) spine (Fig. 5B); (1) clava (Fig. 5C).
- (44) *Legs II, tibiae, dorsal, two longitudinal lines*: (0) absent; (1) present (Fig. 5D). The dorsal surface of tibiae II may present a pair of longitudinal lines, which correspond to an area where the scales of the tegument are compressed (e.g. *E. perfida* and *E. itapocuensis*, score 1).
- (45) *Legs, tibiae, tricobothrium, distal plate (characters 45 and 46 adapted from Ramírez 2014: character 176)*: (0) exposed (Fig. 5F); (1) covered (Fig. 5G). The distal plate of the tricobothrium may be covered or partially covered by a cuticle. Ramírez (2014: character 176) originally used three ordered states (0 well differentiated; 1 not well differentiated, 2 homogeneous), but here we choose to score the proximal and the distal plate as two distinct characters.
- (46) *Legs, tibiae, tricobothrium, proximal plate*: (0) absent (Fig. 5F); (1) present (Fig. 5G). The proximal plate of the tricobothrium may be covered or partially covered by a cuticle (score 1).

- (47) *Legs II, tibiae, dorsal, blaze shaped setae*: (0) absent (Fig. 5E); (1) present (Fig. 5D). The tibiae dorsal surface may be provided with groupments of white flattened blaze-shaped setae (e.g. *E. perfida*, *E. semifoliata*, *E. tribrachiata*, and *E. itapocuensis*, score 1).
- (48) *Legs II, tibiae, scales, border*: (0) keel (Fig. 6A); (1) framed (Fig. 6B); (2) toothed (Fig. 6C).
- (49) *Legs II, tibiae, scaly, enclose small cones*: (0) absent (Fig. 6B); (1) present (Fig. 6A).
- (50) *Legs II, tibiae, scaly, framed (only female)*: (0) absent (Fig. 6B); (1) present (Fig. 6A).
- (51) *Legs I, tibia longer than femur (only females)*: (0) longer; (1) shorter. Usually, the femur is the longest leg sclerit (e.g. *E. belissima*, *Acacesia hamata*, *Wixia abdominalis*, *Enacrossoma anomalum*, *Alpaida bicornuta*), but some some species have the tibia I longer then femura I (e.g. *E. sagana*, *Larinia directa*). In males the femura I are always longer than tibiae I.
- (52) *Palp, tibia, shape (only males) (from Levi 2002)*: (0) wide (Fig. 15F); (1) elongated (see Levi 2002: fig. 215).
- (53) *Palp, claw, size*: (0) longer (Fig. 12A); (1) shorter than apical teeth (Fig. 12B). The claw of the female pedipalp may be longer (score 0) or shorter then the its teeth (score 1).
- (54) *Palp, endite, shape (only female)*: (0) square (Fig. 5E); (1) triangular (Fig. 6D). The endite may have a wide basis, being as long as wide, resembling a square (e.g. *Mangora*, *Zygiella*, score 0) or it may have a short basis, being e longer then wide, resembling a triangle (e.g. *Eustala*, score 1). The width is taken from the endite's basal border.
- (55) *Palp, endite, tooth (only male) (from Scharff and Coddington 1997: character 45)*: (0) absent; (1) present (Fig. 5A).
- (56) *Palp, patella, macrosetae (from Scharff and Coddington 1997: character 4)*: (0) absent; (1) present (Figs 15F, H).
- (57) *Palp, patella, macrosetae, number (from Levi 2002)*: (0) one (Fig. 15F); (1) two (Fig. 15H).
- (58) *Labium, ratio length/width (only females)*: (0) as long as wide (Fig. 5E); (1) wider than long (Fig. 5D).
- (59) *Sternum, anterior bord (only female)*: (0) concave (Fig. 5D); (1) straight (Fig. 5E).



- (60) *Sternum, anterior border, lateral protusion (only female)*: (0) absent (Fig. 5D); (1) present (Fig. 5E). The anterior border of the sternum may be provided with lateral projections, next to the labium.
- (61) *Sternum, anterior border, lateral protusion (only male)*: (0) absent; (1) present.
- (62) *Sternum, anterior border (only male)*: (0) concave; (1) straight.
- (63) *Sternum, lateral border, coloration*: (0) pale; (1) dark (Fig. 5D).
- (64) *Sternum, posterior border, outline*: (0) concave (Fig. 6G); (1) straight (Fig. 6F). The outline of the posterior border of the sternum, next to coxae IV, may be concave (score 0) or straight (e.g. *E. devia*, score 1).
- (65) *Sternum, posterior border, tip*: (0) simple (Fig. 6F); (1) trifurcate (Fig. 6G); (2) bifurcate (Fig. 6H).
- (66) *Abdomen, lateral, humps (only female)*: (0) absent (Fig. 7B, F); (1) present (Fig. 6A). The posterior portion of the abdomen may present lateral humps (e.g. *E. nasuta*, score 1). Males and females seemed to share this feature although it may be inconspicuous in males.
- (67) *Abdomen, anterior, cone-shaped projection*: (0) absent; (1) present (see Levi (1988): figs 46, 47). The abdomen may have an anterior cone-shaped projection (e.g. *Alpaida grayi*, score 1), which overlaps the carapace. Males and females seemed to share this feature, although it may be less conspicuous in males.
- (68) *Abdomen, dorsum, posterior half, folium (adapted from Levi 1971b; 1995; 2002)*: (0) absent (Fig. 7A); (1) present (Fig. 7B). By the wide diversity and intraespecific variation it is very hard to score color patterns. Thus, we coded the absence and presence of folium that seems to be a constant in most species and related with its habitats (Messas et al. 2014)
- (69) *Abdomen, antero-lateral, shoulders (only female) (Character 69 and 71 adapted from Levi 1971a)*: (0) absent (Fig. 7D); (1) present (Fig. 7A). The anterior portion of the abdomen may be provided with a pair of protusions, called shoulders (score 1). It may be modified with spines (e.g. *Alpaida bicornuta*, *Kaira altiventer*) or other projections (e.g. *Enacrosoma anomalum*).
- (70) *Abdomen, epiandrum, spigot*: (0) large cluster (Figs 7G, H); (1) small cluster (Figs 6I, J). The epiandrum usually bear spigots, which may be distributed in 3-4 large clusters along the epigastric furrow (e.g. *Cyclosa conica*, *Zygiella atrica*, *E. cazieri*, score 0) or it may in many small clusters with just a few spigots (3-6 spigots) (e.g. *Neoscona adianta*, and most *Eustala*, score 1).

- (71) *Abdomen, antero-lateral, shoulders (only male)*: (0) absent; (1) present.
- (72) *Abdomen, posterior, median portion, terminal protrusion, number (only female)*: (0) one (Fig. 7D); (1) two (Fig. 7E); (2) three (Fig. 7F).
- (73) *Abdomen, posterior, median portion, terminal protrusion (only female)*: (0) absent; (1) present (Fig. 7F). The distal tip of the abdomen may or may not have a terminal protrusion. Males and females seemed to share this features although it may be inconspicuous in males.
- (74) *Abdomen, posterior, median portion, terminal protrusion (only male)*: (0) absent; (1) present.
- (75) *Abdomen, shape, elongated (only female) (adapted from Scharff and Coddington 1997: character 60)*: (0) absent; (1) present (Fig. 7C). Most araneids present a subtriangular to spherical abdomen (e.g. *Bertrana*, *Zygiella*, score 0), but some species present an elongated abdomen (e.g. *Larinia* sp., *E. fuscovittata*, score 1). Males usually have an elliptical abdomen.
- (76) *Abdomen, venter, median white spot*: (0) absent (Fig. 8A); (1) present (Fig. 8B). The venter of the abdomen may or may not present a central white spot. This feature is usually inconspicuous in males
- (77) *Abdomen, venter, median white spot, shape*: (0) circular (Fig. 8B); (1) elongated (Fig. 8C).
- (78) *Abdomen, venter, pair of lateral white spots*: (0) absent; (1) present (Fig. 8D). The venter of the abdomen may or may not present a pair of white spots. This feature is usually inconspicuous in males
- (79) *Abdomen, venter, pair of lateral white spots, shape*: (0) circular (Fig. 8D); (1) elongated.
- (80) *Abdomen, ventral, anterior portion, sclerotized plate (only female)*: (0) absent; (1) present (Fig. 8D). Females may present a sclerotized plate on the abdomen, placed above the epigynum (e.g. *Alpaida bicornuta*, score 1).
- (81) *Epigynum (adapted from Levi 2002)*: (0) flatten (Fig. 9A); (1) bulged (Figs 9B–G). The epigynum may be closely related to the female abdomen, having the median and lateral plates compressed (e.g. *Nephila clavipes*, score 0) or its plates may be developed, forming a bulge.
- (82) *Epigynum, scapus (from Scharff and Coddington 1997: character 28)*: (0) absent (Fig. 9A); (1) present (Figs 9B–G). The projection formed by the lateral and median plates is called here as “scapus” (e.g. *Araneus*, *Alpaida*, *Eustala*), and the projection

that arises exclusively from the median plate is called here as “lobe” (e.g. *M. wittfeladae*, see Levi 1995 figures 1–3).

- (83) *Epigynum, lobe (adapted from Levi 1995)*: (0) absent; (1) present (projection exclusively arised from the median plate) (see Levi 1995: figs 1–4).
- (84) *Epigynum, lobe, compressed lateraly*: (0) absent; (1) present.
- (85) *Epigynum, scapus, coloration (adapted from Levi 2002)*: (0) pale; (1) dark (Fig. 9B).
- (86) *Epigynum, scapus, dorsal, setae*: (0) absent; (1) present (Fig. 10A).
- (87) *Epigynum, scapus, connection with the epigynum*: (0) continuous (Fig. 8E); (1) with constriction (Fig. 8F).
- (88) *Epigynum, scapus, distal portion, orientation (adapted from Levi 2002)*: (0) anteriorly (Fig. 9D); (1) posteriorly (Fig. 9C).
- (89) *Epigynum, scapus, proximal portion, orientation*: (0) posteriorly; (1) anteriorly (Fig. 9D).
- (90) *Epigynum, scapus, dorsal, pocket near tip (from Scharff and Coddington 1997: character 30)*: (0) absent; (1) present (Fig. 10B).
- (91) *Epigynum, scapus ventral, pocket*: (0) absent; (1) present (Fig. 9C).
- (92) *Epigynum, scapus, basal portion reduced (characters 92 and 93 try to define aspects on the general shape of the scapus. Since it is a complex feature we considered it as having a basal and an apical portion. The basal portion is connected with the epigynum itself and it is commonly wrinkled. The apical portion is the distal tip of the scapus, usually smooth and cilyndrical. In most Eustala the basal portion is much elongated than the its apex, gradually geting narrow, as a pyramid (score 0). However, the scapus of some species may present the basal portion reduced (score 1), so the scapus general shape seems as a rod)*: (0) absent (Fig. 9E, F); (1) present (Fig. 9G).
- (93) *Epigynum, scapus, basal portion, compressed laterally*: (0) absent; (1) present (Fig. 11H).
- (94) *Epigynum, scapus, basal portion, surface wrinkled (adapted from Scharff and Coddington 1997: character 31)*: (0) absent (Fig. 9B); (1) present (Figs 9D, E).
- (95) *Epigynum, scapus, apical portion, surface wrinkled*: (0) absent (Fig. 9G); (1) present (Fig. 9D).
- (96) *Epigynum, scapus, lateral view*: (0) narrower (Fig. 11H); (1) as wide as the lateral plate (Fig. 11G). In lateral view, when the scapus is less then half of the width of

the lateral plate it is considered narrow (e.g. *E. ingenua*, *E. eleuthera*, score 0), and when it is larger than half the width of the lateral plate it is considered wide (score 1).

- (97) *Epigynum, scapus, apical portion, lateral constriction*: (0) absent; (1) present (Fig. 11H). Laterally, the scapus may be compressed on its both sides.
- (98) *Epigynum, scapus, proximal portion, overlapping the median plate*: (0) absent; (1) present (Fig. 9D). The basal portion of the scapus may or may not cover partially the apical part of the MP. It is usually a waved portion, e.g. *E. levii* (see Poeta et al. 2010, figure 10, score 1). Taxa that have the basal portion of the scapus projected posteriorly score as inapplicable here.
- (99) *Epigynum, copulatory openings, entrance*: (0) top to bottom (Fig. 8E); (1) upwards (Fig. 8F). The entrance of the copulatory openings may lead the embolus from the top to the bottom (e.g. *E. trinitatis*, score 0), or it enters upwards (e.g. *E. saga*, score 1).
- (100) *Epigynum, copulatory openings, into a rounded depression*: (0) absent; (1) present (Fig. 8G). The copulatory openings are placed in between the median plate and lateral plates, which may be provided with a deep rounded depression (score 1).
- (101) *Epigynum, lateral appendage*: (0) absent; (1) present (Fig. 8I). Some species present a pair of a sclerotized structure of each side of the epigynum that has no connection with the genitalia (e.g. *Eustala conformans*, *E. belissima*, score 1).
- (102) *Epigynum, lateral plate, anterior, membranous median area*: (0) absent (Fig. 10A); (1) present (Fig. 10B). Commonly the epigynum is fully sclerotized (e.g. *E. fuscovitatta*, *E. taquara*, score 0), but some present the anterior portion of the lateral plate with a longitudinal membranaceous area (e.g. *Alpaida bicornuta*, *Acacesia hamata*, score 1).
- (103) *Epigynum, lateral plate, anterior, setae*: (0) absent (Fig. 10A); (1) present (Fig. 11B). The anterior portion of the lateral plates, closely related with the abdomen, usually lack setae (score 0), but it is present in some species (score 1).
- (104) *Epigynum, lateral plate, shoulders*: (0) absent; (1) present (Fig. 10F). The portion of the lateral plates that surrounded the copulatory openings may be developed, resembling shoulders (e.g. *E. guttata*, score 1).
- (105) *Epigynum, lateral plate, wrinkled*: (0) absent (Fig. 11D); (1) present (Fig. 10C). The epigynal lateral plates may be smooth (e.g. *Alpaida*, *Mangora*, *E. devia*, score

0), or may be wrinkled (e.g. *E. anastera*, score 1). The wrinkled LP (score 1) seems to allow some flexibility to the genitalia during copula, once it can easily be exposed from the abdomen without detached it completely.

- (106) *Epigynum, lateral view, lateral plate, basal border, enlarged*: (0) absent (Fig. 10D); (1) present (Fig. 10E).
- (107) *Epigynum, lateral view, median plate, projected*: (0) absent (Fig. 11G); (1) present (when it transpass the lateral plates, in lateral view) (Fig. 11H).
- (108) *Epigynum, posterior view, lateral plate, external borders, constriction (adapted from Levi 1977)*: (0) absent; (1) present (Figs 8H, 11E). The external borders of the may have a median constriction, rhaving a sand-clock shape, in posterior view (e.g. *E. californiensis*, score 1).
- (109) *Epigynum, posterior view, lateral plate, external borders, fold (adapted from Levi 1977)*: (0) absent; (1) present (Fig. 11C).
- (110) *Epigynum, posterior view, lateral plate, inner borders (from the anterior to posterior outline)*: (0) parallel (Fig. 11C); (1) convergent (Figs 11B, D); (2) divergent, from each other (Fig. 11E).
- (111) *Epigynum, posterior view, median plate, pair of rounded depressions*: (0) absent (Fig. 11E); (1) present (Fig. 11F).
- (112) *Epigynum, ventral view, median plate*: (0) concave (Fig. 9G); (1) sinuous (Fig. 9E); (2) invaginated (Fig. 9B, F).
- (113) *Epigynum, ventral view, median plate, covering the lateral plates*: (0) absent; (1) present (Fig. 11A, B).
- (114) *Epigynum, median plate, surface wrinkled*: (0) absent (Fig. 9G); (1) present (Fig. 9E).
- (115) *Epigynum, ventral view, lateral plate, enlarged*: (0) absent (Fig. 9C); (1) present (Fig. 10D, E).
- (116) *Epigynum, spermatechae, placement*: (0) inside the abdomen (Fig. 9A); (1) encapsulated by epyginum (Fig. 10D).
- (117) *Palp, embolus, tip, cap (from Scharff and Coddington, 1997: character 23)*: (0) absent; (1) present (Fig. 15A).
- (118) *Palp, conductor, apex, hyaline boss*: (0) absent; (1) present (Fig. 13A). The conductor apex may be provided with a conspicuous hyaline projection.

- (119) *Palp, conductor, apical projection*: (0) absent; (1) present (Fig. 13B). The conductor may have conspicuous elongated apical projection (e.g. *E. saga*, *E. sagana*, *E. oblonga* and *E. illicita*, score 1).
- (120) *Palp, conductor, placement (adapted from Levi 1993, 1996)*: (0) edge (Fig. 12C); (1) center (Fig. 12D). According to Levi (1993, pq 53, 1995, pg 69) the conductor may be placed on the edge of the bulb (eg. *Larinia* sp., *Eustala* sp.) or it may be placed on the center of the bulb (e.g. *Ocrepeira*, *Alpaida*, *Enacrossoma anomalum*).
- (121) *Palp, conductor, ventral, surface*: (0) scaly (Fig. 12E); (1) smooth (Fig. 11F). The ventral surface of the conductor may be scaly (fully or partially) (e.g. *Eustala taquara*, *Alpaida bicornuta*). Species with membranous conductor score as inapplicable (e.g. *E. exigua*).
- (122) *Palp, conductor, paramedian apophysis (adapted from Scharff and Coddington 1997: character 8 – the author termed “conductor lobe” what actually corresponds to the paramedian apophysis)*: (0) absent; (1) present (Fig. 12D). The paramedian apophysis is an elongated projection that arises from the basal portion of the conductor, and contours the embolus (e.g. *Eustala anastera*, *Acacesia hamata*, score 1).
- (123) *Palp, conductor, paramedian apophysis, apex (adapted from Levi 2002)*: (0) acute (Fig. 13C, E); (1) with lobe (Fig. 13F).
- (124) *Palp, conductor, paramedian apophysis, apex, surface*: (0) smooth (Fig. 13E); (1) spiny (Fig. 13C).
- (125) *Palp, conductor, ventral, apex, sclerotized*: (0) absent (when it is whitish or membranous); (1) present (Fig. 14E).
- (126) *Palp, conductor, ventral, transversal section*: (0) absent (Fig. 14D); (1) present (Fig. 11E).
- (127) *Palp, conductor, ventral, longitudinal section*: (0) absent (Fig. 14D); (1) present (Fig. 14F).
- (128) *Palp, cymbium, dorsal, hollow on*: (0) absent; (1) present (Fig. 14C).
- (129) *Palp, cymbium, inner ridge*: (0) absent; (1) present (Fig. 15G).
- (130) *Palp, cymbium, shape*: (0) rectangular (Fig. 14A); (1) leaf (Fig. 14B). The cymbium may be wide, rectangular-shaped (e.g. *Larinia*, *Metazygia wittfeldae*, *Mangora fundo* and *Eustala devia* score 0) or it may have a median constriction, being narrow near the apex, resembling a leaf (e.g. *E. saga*, score 1).

- (131) *Palp, embolus, median portion, elevated*: (0) absent; (1) present (Fig. 14I). The embolus may have a projection in its median portion, which may confer to it hook-shaped (e.g. xxxx, score 1.)
- (132) *Palp, embolus, anterior margin, denticles*: (0) absent; (1) present (Fig. 14G). The anterior margin of the embolus may be provided with denticles (e.g. *E. saga*, *E. perfida* and *E. illicita*, score 1).
- (133) *Palp, embolus, basis, coloration*: (0) pale (Fig. 15G); (1) dark (Fig. 15A, C).
- (134) *Palp, embolus, lamella (from Levi 1995)*: 0 absent; (1) present (Fig. 16C). The embolus usually is a simple pointed sclerite (score 0) but it may be provided with a basal lamella (e.g. *E. secta*, score 1).
- (135) *Palp, embolus, mesal, surface*: (0) smooth (Fig. 14G); (1) ornated (Figs 14H, I).
- (136) *Palp, embolus, tip, orientation (adapted from Levi 1977)*: (0) same orientation, or (Fig. 15B); (1) offset from the base (Fig. 15C). The embolus tip may follow the same orientation of its basis (score 0) or it may be offset of the basis, facing the inner bulbus.
- (137) *Palp, embolus, tip, cylindrical*: (0) absent (Fig. 14B); (1) present (Fig. 14C). The tip of the embolus may be cylindrical (score 1) or compressed, as a ribbon (score 0).
- (138) *Palp, median apophysis, length (adapted from Levi 1993)*: (0) long (Fig. 13E); (1) short.
- (139) *Palp, median apophysis, placement (adapted from Levi 1995, 2002)*: (0) central (Fig. 13E); (1) lateral, on the bulbus (Fig. 13A). The median apophysis may arise from the center of the bulb, near the cymbium, or from its edge.
- (140) *Palp, median apophysis, orientation (adapted from Levi 1995)*: (0) hanging down (Fig. 12C); (1) hanging up (Fig. 14D). Most araneids present the tip of the median apophysis pointing up, being oriented posteriorly or perpendicularly when compared to the cymbium (e.g. *Alpaida*, score 1). However, in some species the tip of the median apophysis hangs down to the bulb (oriented anteriorly) (e.g. *Eustala*, *M. wittfeldae*, see Levi 1995, figures 6, 13, score 0).
- (141) *Palp, median apophysis, coloration (adapted from Levi 2002)*: (0) dark (Fig. 12D, 15H); (1) hyaline (Figs 12C, 15G).
- (142) *Palp, median apophysis, proximal portion, anterior projection*: (0) absent; (1) present (Fig. 15E). The proximal portion of the median apophysis may be provided with an anterior projection (e.g. *Eustala fuscovittata*, *Araneus diadematus*, score 1).

- (143) Palp, median apophysis, basis, spine (Scharff and Coddington 1997: character 11): (0) absent; (1) present (Fig. 13D).
- (144) *Pediapalp, median apophysis, proximal portion, offset*: (0) absent (Fig. 15F); (1) present (Fig. 15D).
- (145) *Palp, median apophysis, basis*: (0) absent; (1) present (Figs 15D, E).
- (146) *Palp, median apophysis, base concavity, type*: (0) groove (Fig. 15D); (1) slit (Fig. 15E).
- (147) *Palp, median apophysis, apical elbow (adapted from Levi 1977)*: (0) absent; (1) present (Fig. 15G).
- (148) *Palp, median apophysis, tip (adapted from Scharff and Coddington 1997: chars 14, 15)*: (0) single (Fig. 13B); (1) bifurcated (Fig. 13E); (2) multiple spines (Fig. 13D). The tip of the median apophysis may be single (e.g. *Eustala* sp., *Metazygia* sp., score 0); bifurcated (e.g. *Acacesia* sp., score 1); or it may have multiple spines (e.g. *Kaira altiventer*, *Metepaira compsa*, score 2).
- (149) *Palp, paracymbium, position*: (0) perpendicular (Figs 15D, G); (1) parallel, relative to cymbium (see Levi 1974: figs 5, 14).
- (150) *Palp, paracymbium, tip, head*: (0) present (Figs 15D, G, 14D); (1) absent (Fig. 13B). The paracymbium is a projection that arises from the basis of the cymbium, which may be just an elongated prong (e.g. *Mangora fundo*, *Eustala saga*, score 0) or it may be provided with two subequal tips, resembling an arrow (e.g. *E. ericae*, score 1). This feature is observed in mesal view.
- (151) *Palp, radix, position*: (0) parallel (Fig. 12D); (1) perpendicular, relative to cymbium (Fig. 12C). The radix may be almost parallel to the cymbium (e.g. *Alpaida* sp., score 0), or it may be perpendicular to the cymbium (e.g. *Eustala*, score 1).
- (152) *Palp, radix, with a membranous area on the middle*: (0) absent; (1) present (Figs 12C, D). In some species the radix consists in two sclerotized portions with a membranous in-between that leads the sperm ducts in its way to the embolus (e.g. *Eustala* sp., *Acacesia* sp., *Mangora* sp., score 1). Or it may have a tubular portion where the ducts travels (e.g. *Neoscona moreli*).
- (153) *Palp, stipes (Scharff and Coddington, 1997: character 19)*: (0) absent; (1) present (Figs 13A, D). Here we consider stipes an elongated portion that leads the ejaculatory duct to the embolus, and it may be partially or completely fused with the embolus. Also, when there are terminal sclerites they arise from it. Additionally, this sclerite may be very complex, being provided with a ectal portions called here



- as "stalk". Taxa that do not present stipes (score 0), score as inaplicable (-) in characteres related to the terminal sclerits and its apophysis (stalk, subterminal apophys, distal haematodocha)
- (154) *Palp, stipes, shape*: (0) retangular-like (Fig. 16A); (1) triangular-like (Figs 12D, E).
- (155) *Palp, stipes, connexion with the embolus*: (0) fused (Fig. 16D); (1) by membrane (Fig. 16E).
- (156) *Palp, stipes, proximal portion, lobe*: (0) absent; (1) present (Fig. 16A). The proximal portion of the stipes, related with the radix, may be provided with a basal lobe (e.g. *E. photographica*, Poeta *et al.* 2010, fig. 30, score 1).
- (157) *Palp, stipes and radix, fused (adapted from Levi 1993)*: (0) free; (1) fused: (0) absent; (1) present (see Berman and Levi (1971): fig. 4).
- (158) *Palp, terminal hematodocha* (adapted from Scharff and Coddington 1997: character 18): (0) absent; (1) present (Fig. 16A). It is a membranous portion that is placed in between the stipes and terminal sclerits, when the palp is expanded. *Neoscona moreli*, *Eustala cidae*, and *E. inconstans* present a very reduced terminal hematodocha, but still score 1. Taxa that do not present stipes score as inaplicable here)
- (159) *Palp, stalk*: (0) absent; (1) present (Figs 16A, B). The stalks arise from the the meso-distal portion of the stipes (near the embolus) and it is closely related to the distal hematodochae. In many species it is just observed in the expanded palpus.)
- (160) *Palp, stalk, distal portion overlapping the embolus*: (0) absent; (1) present (Fig. 16C). The stalk may be very developed and partially overlap basis of the embolus.
- (161) *Palp, stalk, ectal projection*: (0) absent (Fig. 16A); (1) present (Fig. 16B). The stalk "ectal projecton" is a sclerotized portion placed ectally, and it is close related to the distal hematodochae (just noticeable in the expanded palpus). This was named by Comstock (1910) as "mesal subterminal apophysis" and "lateral subterminal apophysis" (what is the same structure in different views) (see Comstock 1910, figures 105, 106, 113). We considered it homologous to the "subterminal apophysis" pointed by Levi in some genera (e.g. *Araneus*, see Levi 1991, figure 3; *Ocrepeira*, see Levi 1993, figures 32, 33; *Larinia*, see Levi 1975, figure 3).
- (162) *Palp, subtegulum, shape*: (0) discoid (Fig. 17A); (1) D-like (Fig. 17B). The subtegulum usually is a discoid sclerotized portion positioned ectally, which together with the median hematodocha, may cover the sclerits in ectal view (e.g.

- Eustala mimica*, score 0). It also may be D-like, looking reduced in some species (e.g. *Mangora fundo*, *Mangora bocaina*, *E. devia*, score 1).
- (163) *Palp, subterminal apophysis (adapted from Scharff and Coddington 1997: char 20)*: (0) absent (Fig. 17E); (1) present (Figs 16B, 17D). The subterminal apophysis is the basis of the terminal apophysis.
- (164) *Palp, subterminal apophysis, bubble-shaped (adapted from Scharff and Coddington 1997: char 21)*: (0) absent (Fig. 17E); (1) present (Figs 16B, 17D). The subterminal apophysis may look as an inflated bubble (e.g. *Eustala anastera*, *Metazygia wittfeldae*, score 1), or it may be just a sclerotized portion, as the so-called "nulled" subterminal apophysis by Poeta (2014) (e.g. *E. minuscula*, *E. ericae*, score 0).
- (165) *Palp, subterminal apophysis, acute projection*: (0) absent (Fig. 17C); (1) present (Fig. 17E, D). The bubble-shaped subterminal apophysis may present an acute projection on its ventral portion (e.g. *E. albiventer*, *Metazygia wittfeldae*, score 1).
- (166) *Palp, subterminal apophysis, position (adapted from Levi 1977)*: (0) basal (Fig. 15E); (1) apical, in relation to terminal apophysis (Fig. 15D). Usually the terminal apophysis is the most apical sclerite, being sclerotized and pointed, which may be provided with developed basis called subterminal apophysis (e.g. *Eustala levii*, see Poeta et al. 2010a, figures 8, 9, score 0). However, in some species it seemed to have suffered a rotation, thus, the subterminal apophysis takes an apical place, and the terminal apophysis end up in a basal position (e.g. *Eustala devia*, see Chickering 1955, figures; *Metazygia isabelae*, score 1). Levi (1977) called this as "Subterminal apophysis apical".
- (167) *Palp, subterminal apophysis, surface*: (0) smooth (Fig. 17F); (1) ornated (Fig. 17G). SEM images revealed that species present a smooth subterminal apophysis (e.g. *E. taquara*, *E. orientalis*, score 0), or it may be covered with ornaments, as lines and small projections (e.g. *E. perfida*, *E. cidae*, score 2).
- (168) *Palp, terminal apophysis (Scharff and Coddington 1997: character 22)*: (0) absent; (1) present (Fig. 16B).
- (169) *Palp, terminal apophysis, curvature*: (0) curved (Fig. 18E); (1) straight (Fig. 18D).
- (170) *Palp, terminal apophysis, gutter-shape*: (0) absent (Fig. 15E); (1) present (Fig. 15D, 18E). The terminal apophysis may have a laminar or globose-shape (e.g. *E. saga*, *E. bisetosa*, score 0) or it may present a median gutter (e.g. *E. anastera*, score 1), splitting it in two parts.

- (171) *Palp, terminal apophysis, surface*: (0) pores (Fig. 18F); (1) smooth (Fig. 18G); (2) ornaments (Fig. 18H). SEM images revealed that some species present a smooth terminal apophysis (e.g. *E. farroupilha*, score 1), or it may be covered with small depressions, called here as “porous” (e.g. *E. belissima*, *E. banksi*, score 0), or yet it may present grooves or lines, called here as “ornaments” (e.g. *E. cazieri*, *E. californiensis*, score 2).
- (172) *Palp, terminal apophysis, tip*: (0) acute (Fig. 16B); (1) obtuse (Fig. 16D, E).
- (173) *Palp, terminal apophysis, tip, pointed up*: (0) absent (Fig. 15E); (1) present (Fig. 15D). Commonly the tip of the terminal apophysis pointed down to the bulb or straight (perpendicular to the cymbium) (e.g. *E. anastera*, score 0), but in some species, it is pointing up (e.g. *Eustala exigua*, score 1.)
- (174) *Palp, terminal apophysis, tip wider than its neck (adapted from Levi 1977)*: (0) absent; (1) present (Fig. 18D). The terminal apophysis may or may not have its tip enlarged (e.g. *E. orientalis*, see Baert 2014, figure 6c, score 1).
- (175) *Palp, terminal sclerites, proportionally reduced regarding of the bulb*: (0) absent; (1) present (Fig. 16F). The terminal sclerites (terminal and subterminal apophysis) may have a proportional size comparing with the bulb, covering half of the bulb (e.g. *E. taquara*, score 0) or it may be drastically reduced, smaller than the third part of the bulb (e.g. *E. crista*, see Poeta et al. 2010b figure 10, score 1).
- (176) *Palp, tegulum, anterior portion, inner border*: (0) smooth (Fig. 18A); (1) serrated (Fig. 18B, C). The inner border of the tegulum with the palpus rim may be smooth in some species (e.g. *E. guarani*, see Poeta 2014, figure 2, score 0) or it may have a serrated border (e.g. *E. palmares*, see Poeta et al. 2010, figure 15, score 1).
- (177) *Palp, tegulum, border, projection*: (0) absent (Fig. 18C); (1) present (Fig. 18B). The tegular border may or may not present a median projection on its edge, which surrounds the conductor apex.
- (178) *Palp, tegulum, apical boss 1*: (0) absent; (1) present (Fig. 17C). The tegular boss I refers to the projection placed near the cymbium, and may be noticeable in mesal view (e.g. *E. minuscula*; *E. photographica*, score 1).
- (179) *Palp, tegulum, apical boss 2*: (0) absent; (1) present (refers to the tegular boss placed in opposition to the cymbium) (Figs 17C, 18B). The so-called tegular boss II (that may be one or two) is placed in opposition to the cymbium, noticeable in ventral view.

### **Continuous characters**

- (1) *Carapace, ratio of the diameter of the posterior median eyes and anterior median eyes (PME diameter/AME diameter) (only male) (Fig. 19A).*
- (2) *Carapace, ratio of the diameter of the posterior median eyes and anterior median eyes (PME diameter/AME diameter) (only female) (Fig. 19A).*
- (3) *Carapace, ratio of the posterior median eyes interdistances and posterior median eyes diameter (PME interdistance/PME diameter) (only male) (Fig. 19A).*
- (4) *Carapace, ratio of the posterior median eyes interdistances and posterior median eyes diameter (PME interdistance/PME diameter) (only female) (Fig. 19A).*
- (5) *Carapace, ratio of the lateral eyes interdistances and lateral eye diameter (LE interdistance/LE diameter) (only male) (Fig. 19C).*
- (6) *Carapace, ratio of the lateral eyes interdistance and lateral eye diameter (LE interdistance/LE diameter) (only female) (Fig. 19C).*
- (7) *Carapace, ratio of the posterior median eyes distance and anterior median eyes distance (PME distance/AME distance) (only male) (Fig. 19B).*
- (8) *Carapace, ratio of the posterior median eyes distance and anterior median eyes distance (PME distance/AME distance) (only female) (Fig. 19B).*
- (9) *Palp, ratio of the conductor and cymbium (C/Y) (Fig. 19D).*
- (10) *Palp, ratio of the radix and cymbium (r/Y) (Fig. 19D).*
- (11) *Palp, ratio of the median apophysis and cymbium (M/Y) (Fig. 19D).*
- (12) *Epigynum, ratio of the scapus length and scapus basis (Fig. 19E).*

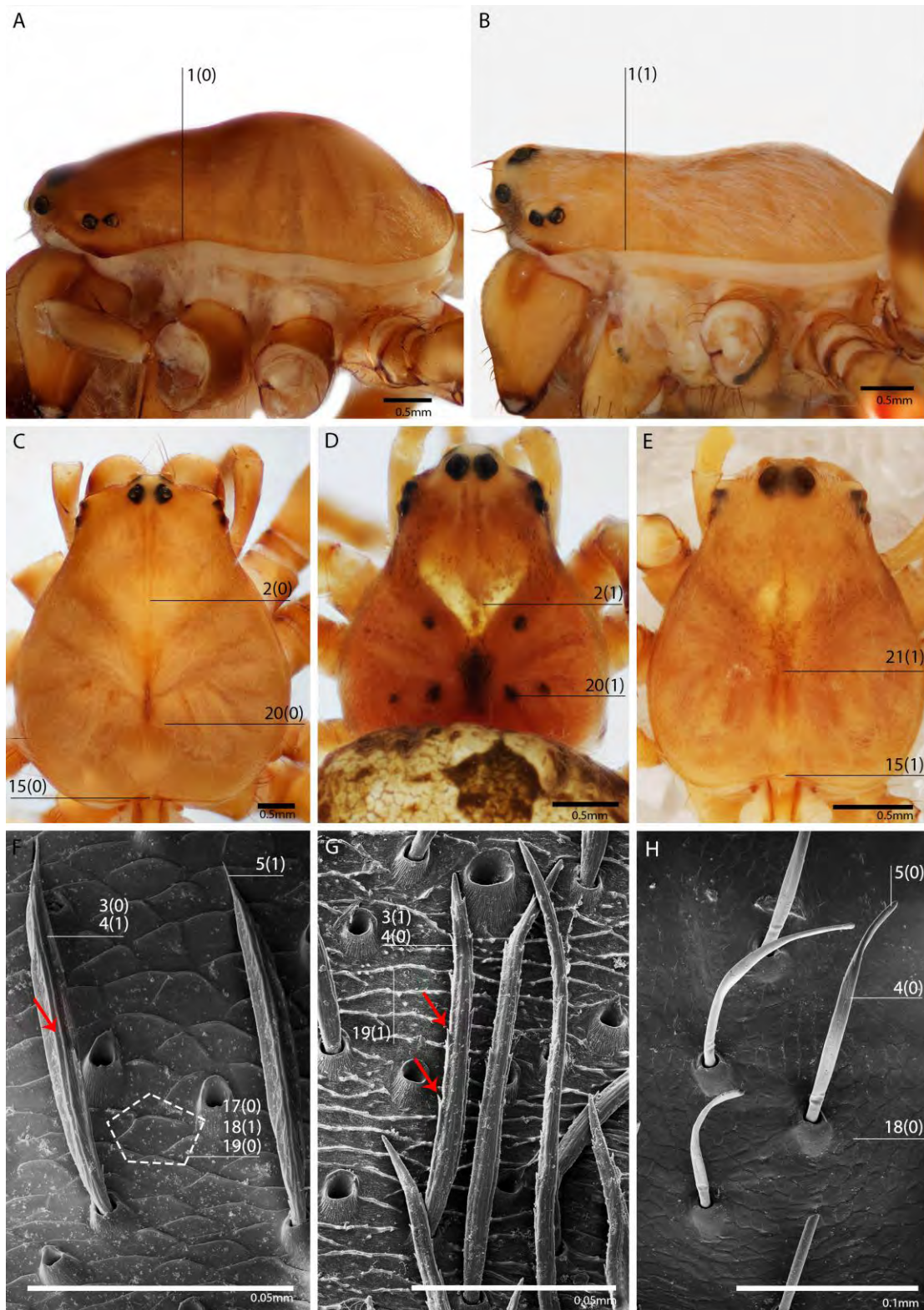


Fig. 1. (A, B) Carapace, lateral (female): (A) *Eustala bifida* F. O. Pickard-Cambridge, 1904, (B) *E. sedula* Chickering, 1955. (C–E) Carapace, dorsal (female): (C) *E. bifida*; (D) *E. bucolica* Chickering, 1955, (E) *E. eleuthera* Levi, 1977. (F–H) Carapace, dorsal, setae (female): (F) *E. mourei* Mello-Leitão, 1947, (G) *E. tribrachiata* Badcock, 1932, (H) *Alpaida bicornuta* (Taczanowski, 1878). (F, arrow: setae median keel; G, arrow: setae, lateral surface as a “branch”).

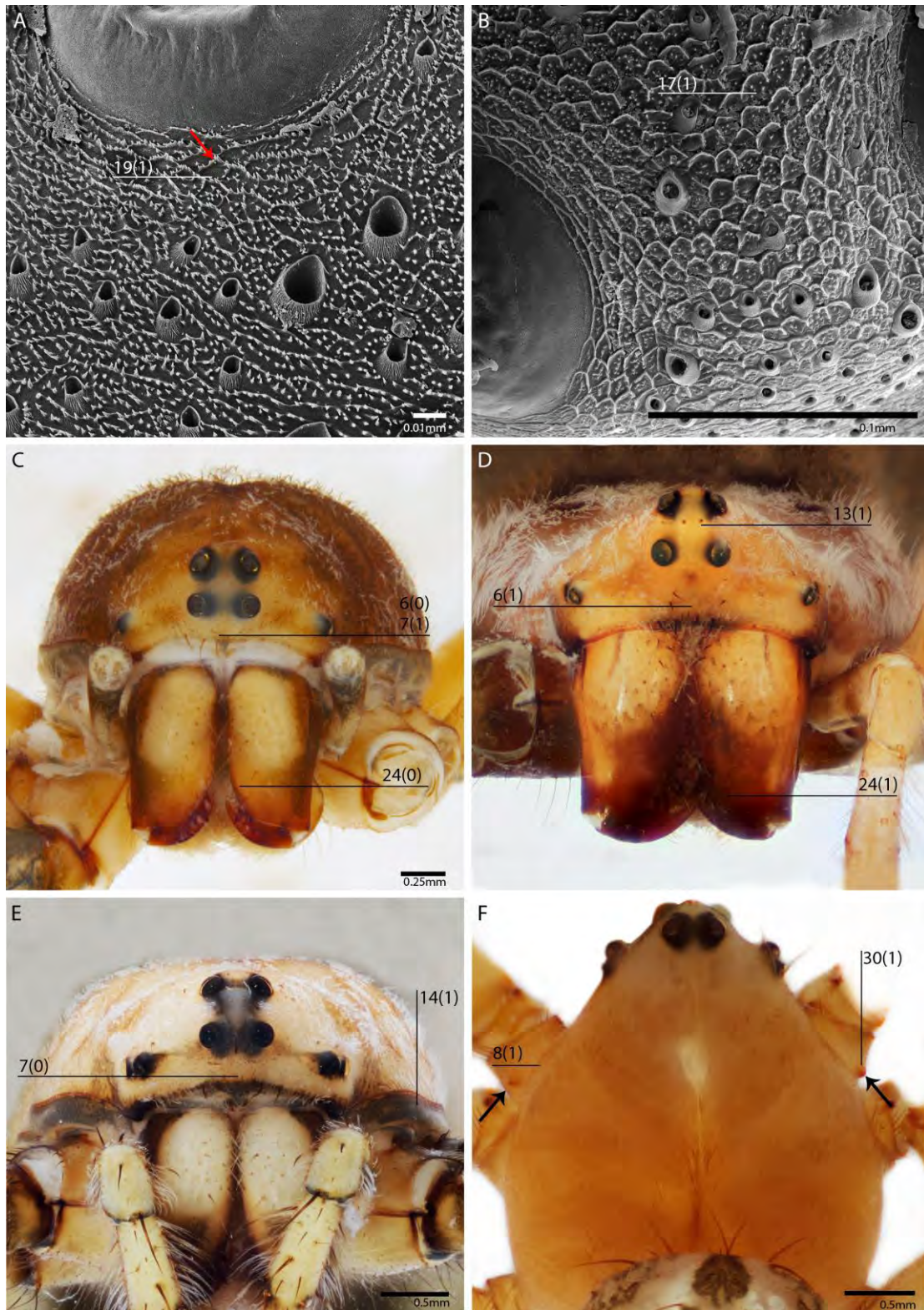


Fig. 2. (A, B) Carapace, ocular area, surface (female): (A) *Eustala cameronensis* Gertsch and Davis, 1936, (B) *E. bellissima* Poeta, Marques and Buckup. 2010b. (C–E) Carapace, frontal (female): (C) *E. brevispina* Gertsch and Davis, 1936, (D) *E. semifoliata* (O. Pickard-Cambridge, 1899), (E) *E. tribrachiata* Badcock, 1932. (F) Carapace, dorsal (male): *E. banksi* Chickering, 1955. (A, arrow: scale, ornate border).



Fig. 3. (A, B, E) Carapace, lateral (female): (A) *Eustala conformans* Chamberlin, 1925, (B) *Alpaida bicornuta* (Taczanowski, 1878), (E) *E. nasuta* Mello-Leitão, 1939. (C, D) Carapace, lateral (male): (C) *E. delasmata* Bryant, 1945, (D) *E. conformans*. (F) Carapace, dorsal (female): *A. bicornuta*.

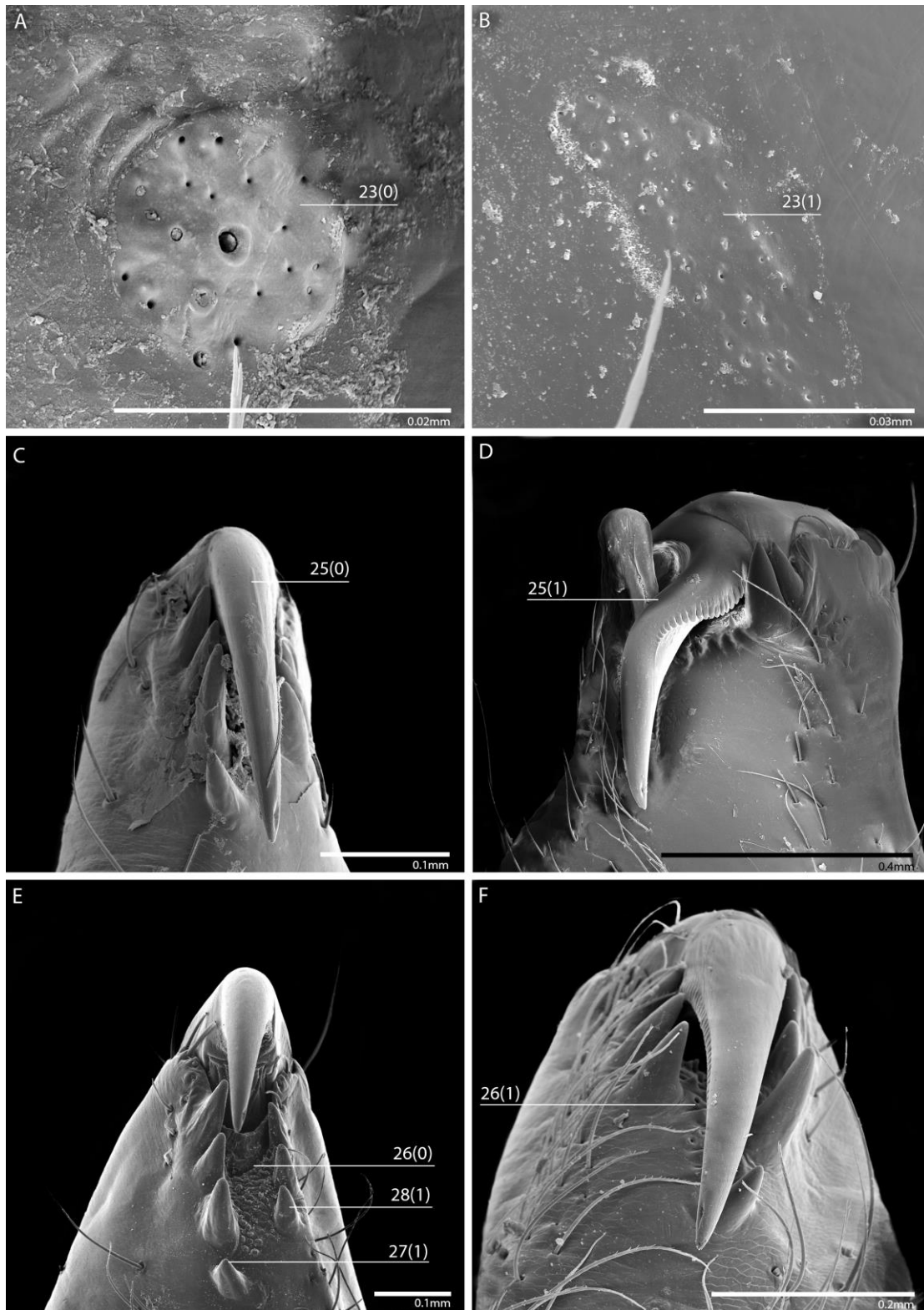


Fig. 4. (A, B) Cheliceral glands (female): (A) *Eustala mourei* Mello-Leitão, 1947, (B) *E. fuscovittata* (Keyserling, 1864). (C, D) Chelicerae (male): (C) *E. saga* (Keyserling, 1893), (D) *Metazygia gregalis*, (O. Pickard-Cambridge, 1889). (E, F) Chelicerae (female): (E) *E. clavispina* (O. Pickard-Cambridge, 1889); (D) *E. perfida* Mello-Leitão, 1947.



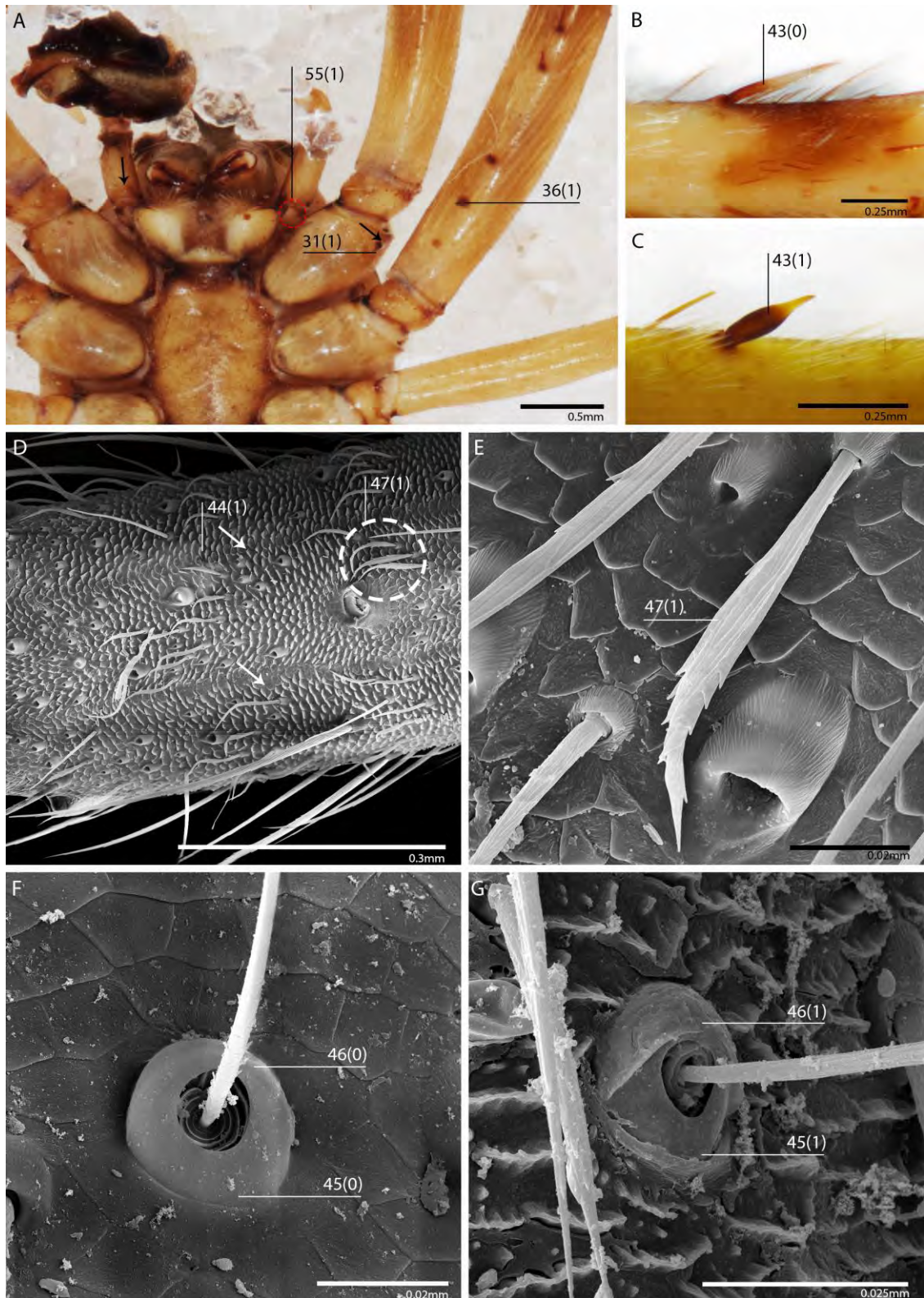


Fig 5. (A) Sternum (male): *Eustala fuscovittata* (Keyserling, 1864). (B–G) Tibiae II, dorsal (female): (B) *E. viridipedata*, setae detail (Roewer, 1942), (C) *E. histrio* Mello-Leitão, 1948. (D, E) Tibia II, dorsal (female), *E. perfida* Mello-Leitão, 1947: (D) surface (white circle: blaze shaped setae), (E) same, detail. (F, G) Trichobotria: (F) *Metazygia laticeps* (O. Pickard-Cambridge, 1889), (G) *E. bellissima* Poeta, Marques and Buckup. 2010b. (A, setae: palpal femur projection; red circle: endite tooth).

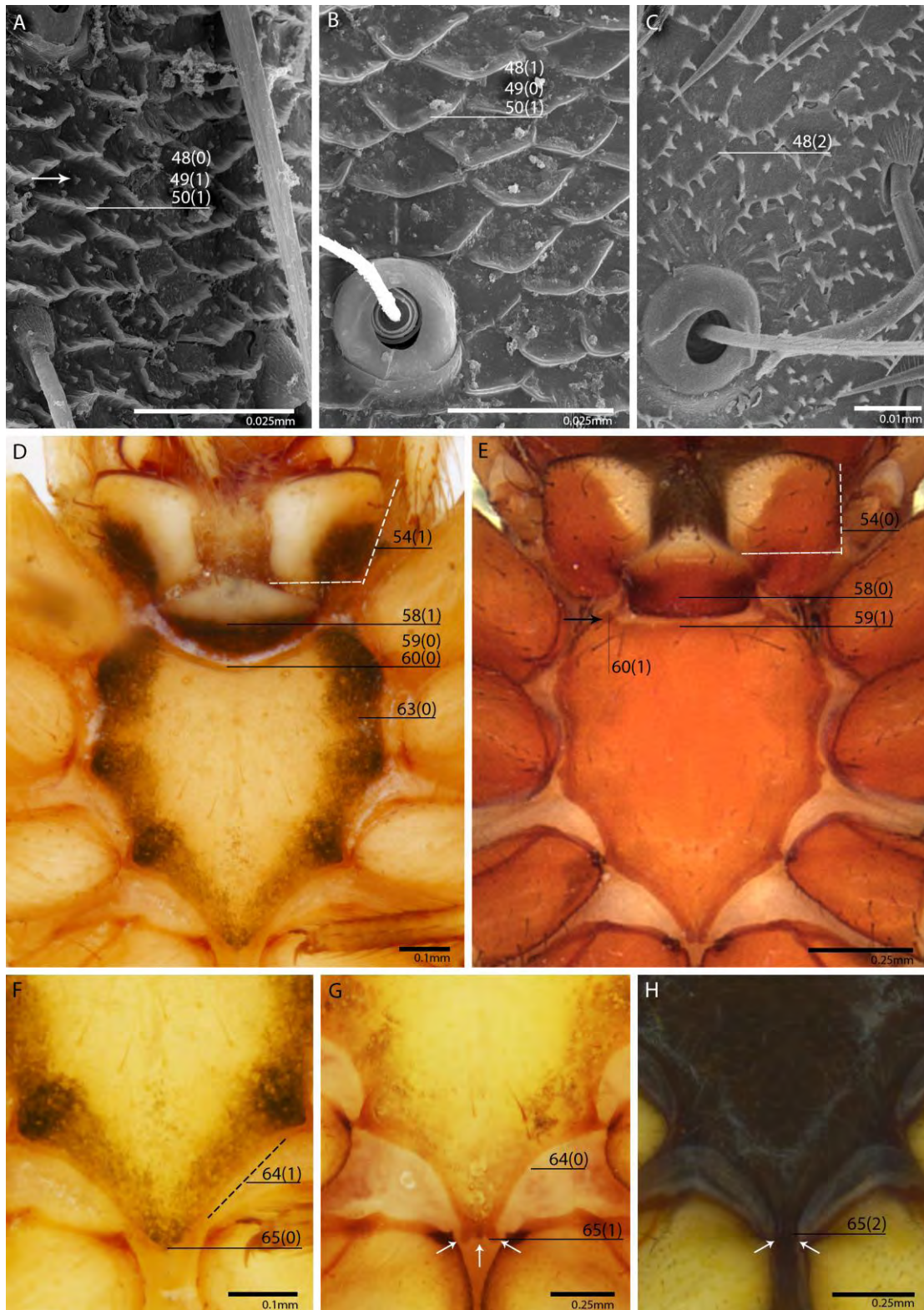


Fig. 6. (A–C) Tibiae II, dorsal, surface (female): (A) *Eustala belissima* Poeta, Marques and Buckup. 2010b, (B) *E. catarina* Poeta, 2014, (C) *E. illicita* (O. Pickard-Cambridge, 1889). (D–H) Sternum (female): (D, F) *E. devia* (Gertsch and Mulaik, 1936, (E) *Alpaida bicornuta* (Taczanowski, 1878), (G) *E. venusta* Chickering, 1955, (H) *E. anastera* (Walckenaer, 1841) (E, arrow: sternum, anterior border, lateral protusion; G, H, arrows: sternum, posterior border, projected tips).

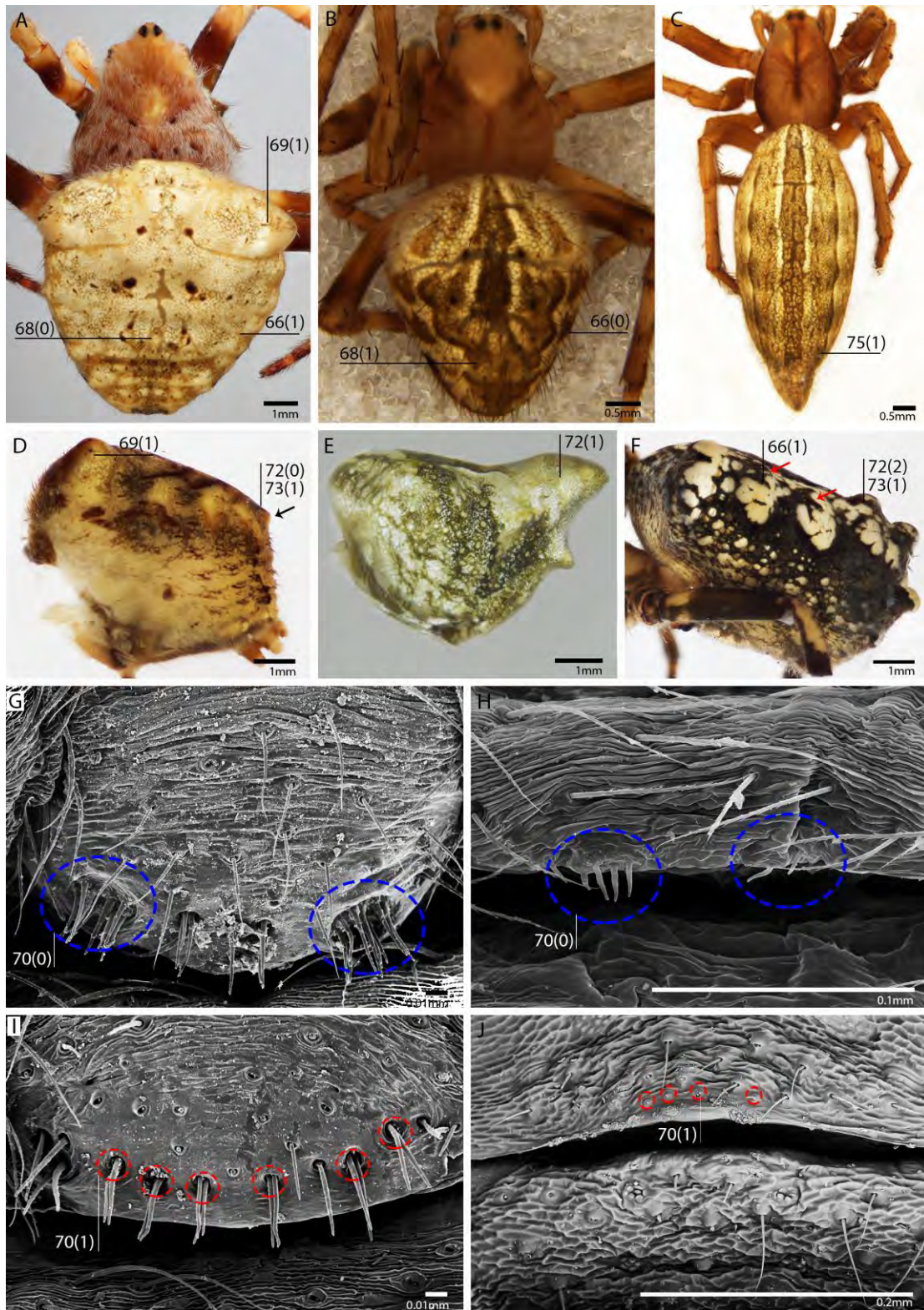


Fig. 7. (A–C) Habitus, dorsal (female): (A) *Eustala semifoliata* (O. Pickard-Cambridge, 1899), (B) *E. minuscula* (Keyserling, 1892), (C) *E. saga* (Keyserling, 1893). (D–F) Abdomen, lateral (female): (D) *E. histrio* Mello-Leitão, 1948, (E) *E. brevispina* Gertsch and Davis, 1936; (F) *E. tribrachiata* Badcock, 1932. (G–J) Epandrium: (G) *E. cazieri* Levi, 1977, (H) *Kaira altiventer* O. Pickard-Cambridge, 1889, (I) *E. unimaculata* Franganillo, 1930, (J) *Enacrossoma anomalum* (Taczanowski, 1873). (D, arrow: abdominal terminal protusion (F, G blue circles: large cluster; I, red circles: small clusters)

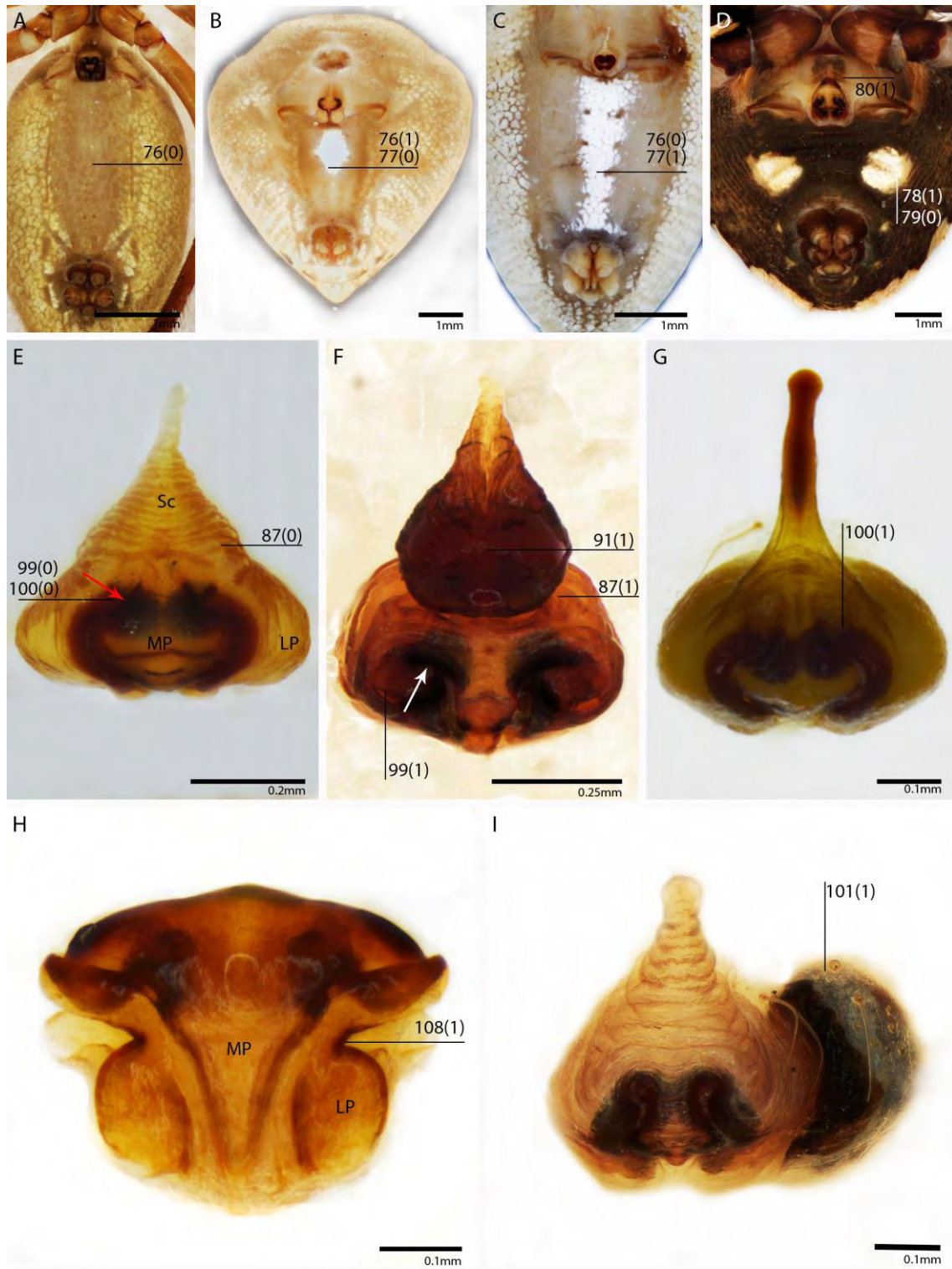


Fig. 8. (A–D) Abdomen, ventral (female): (A) *Eustala fuscovittata* (Keyserling, 1864), (B) *E. bifida* F. O. Pickard-Cambridge, 1904), (C) *E. smaragdinea* (Taczanowski, 1878), (D) *E. semifoliata* (O. Pickard-Cambridge, 1899). (E–G, I) Epigynum, ventral: (E) *E. bucolica* Chickering, 1955, (F) *E. saga* (Keyserling, 1893), (G) *E. ingenua* Chickering; (I) *E. conformans* Chamberlin, 1925. (H) epigynum, posterior: *E. minima* Chickering, 1955. (E, F, arrows: copulatory appendages). Abbreviations: LP, Lateral plate; MP, Median plate; Sc, Scapus.

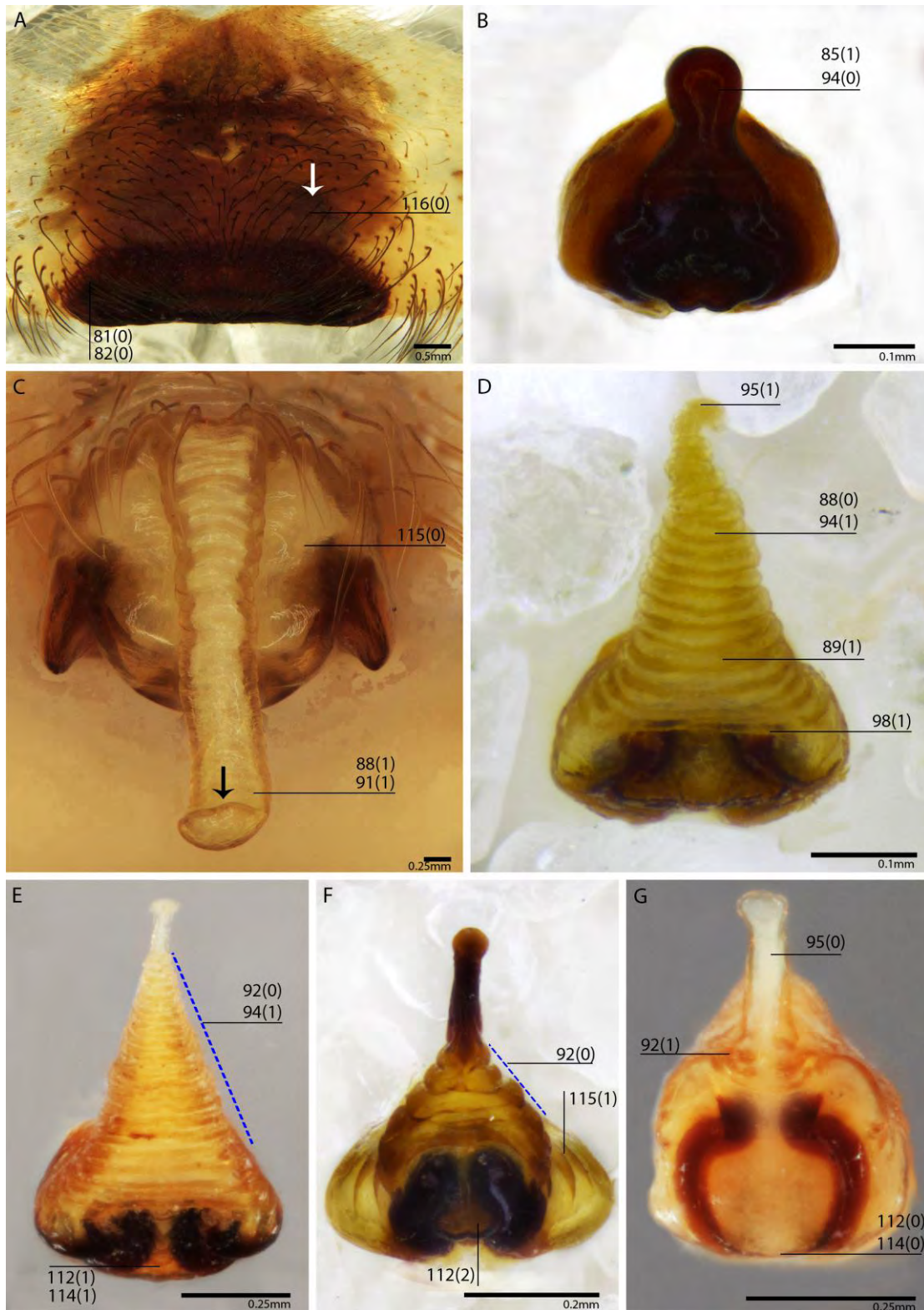


Fig. 9. Epigynum, ventral: (A) *Nephila clavipes* (Linnaeus, 1767), (B) *Eustala latebricola* (O. Pickard-Cambridge, 1889), (C) *Araneus unanims* (Keyserling, 1879), (D) *E. cepina* (Walckenaer, 1841), (E) *E. conchlea* (McCook, 1888); (F) *E. occidentalis* Baert, 2014; (G) *E. guttata* F. O. Pickard-Cambridge, 1904. (A, arrow: spermatechae; C, arrow: scapus, ventral pocket).

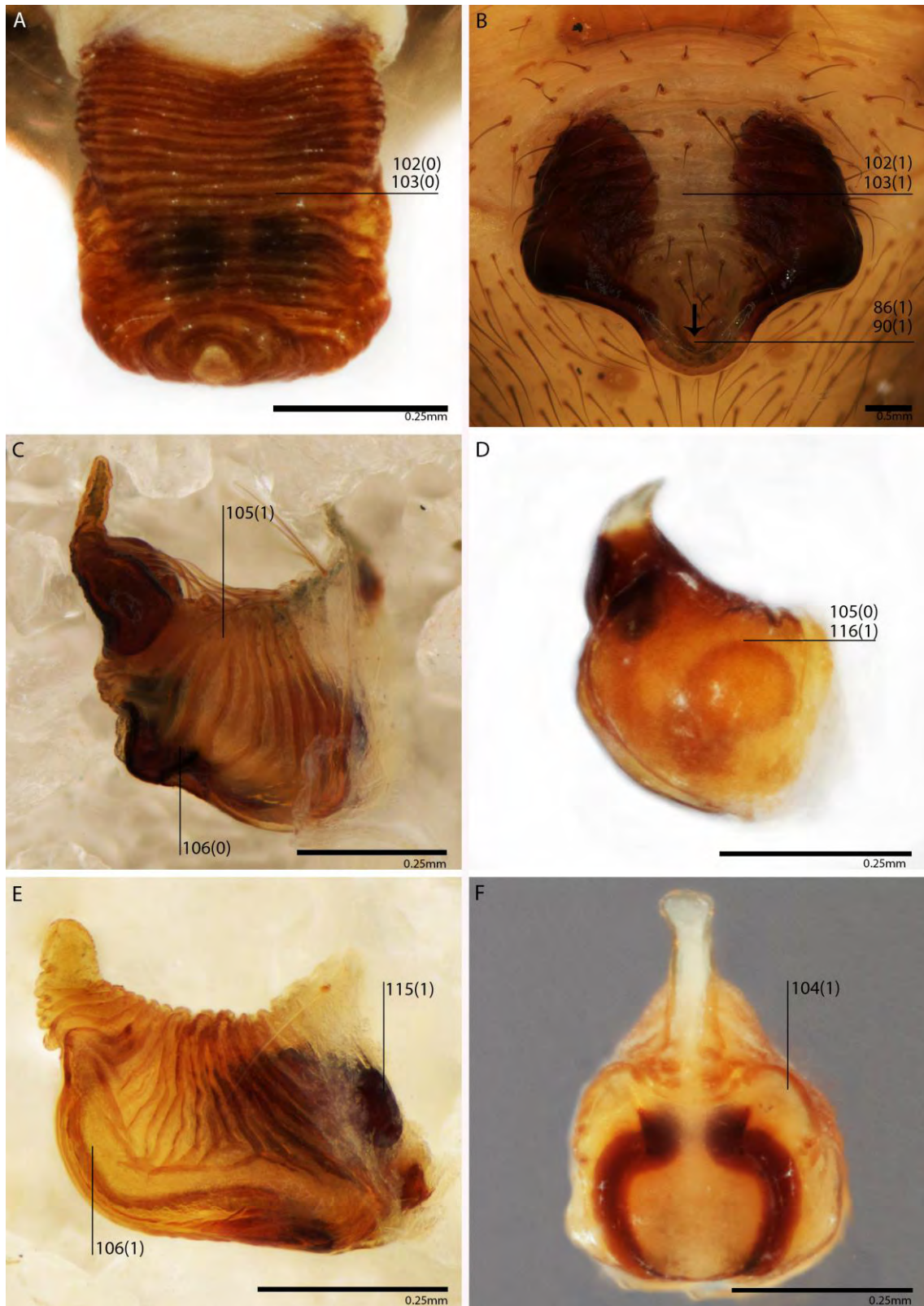


Fig. 10. (A, B) Epigynum, anterior: (A) *Eustala fuscovittata* (Keyserling, 1864), (B) *Alpaida bicornuta* (Taczanowski, 1878). (C–E) Epigynum lateral: (C) *E. sagana* (Keyserling, 1893), (D) *E. unimaculata* Franganillo, 1930, (E) *E. minuscula* (Keyserling, 1892). (F) Epigynum, ventral: *E. guttata* F. O. Pickard-Cambridge, 1904. (B, arrow: scapus, dorsal pocket).

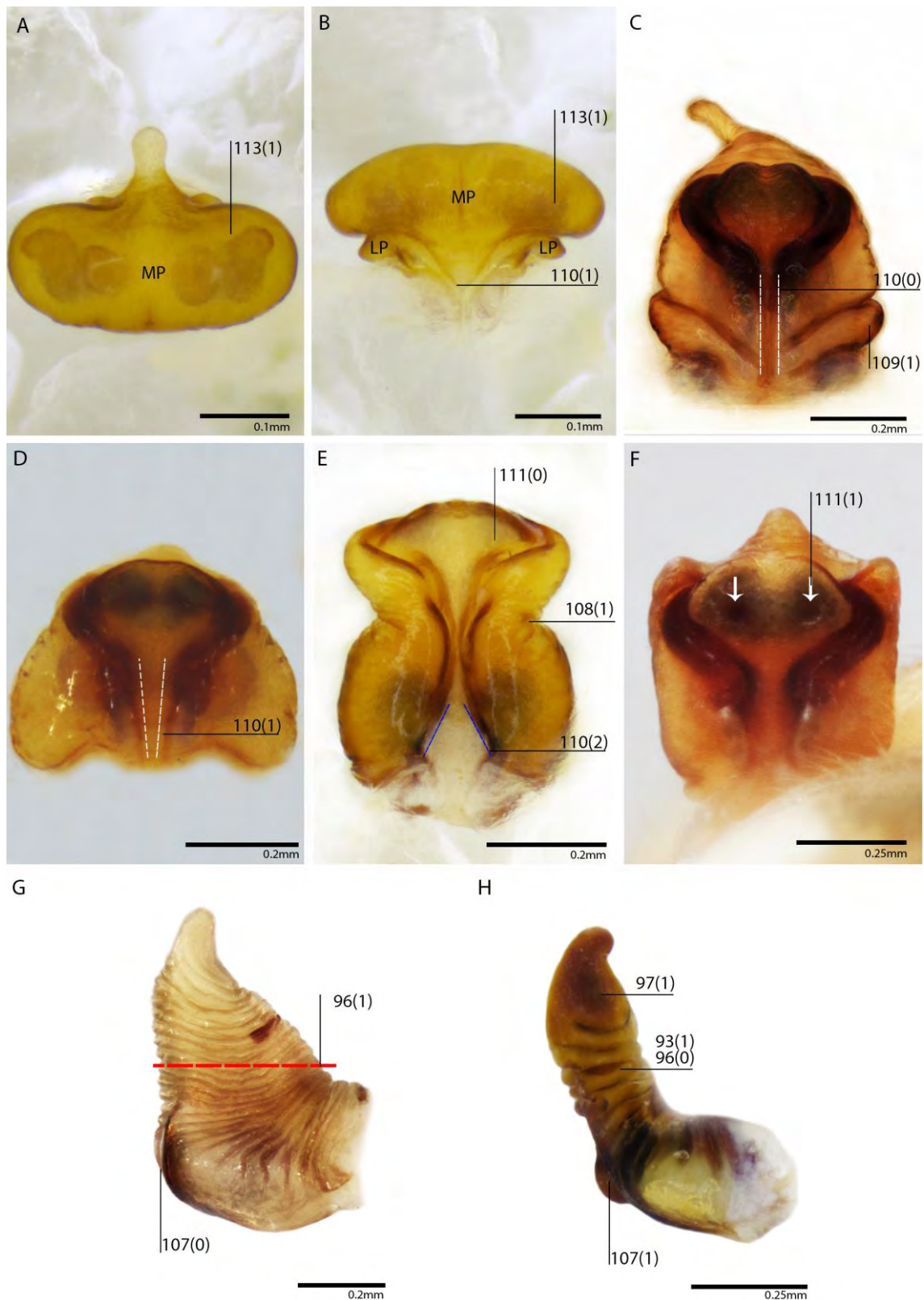


Fig 11. (A) Epigynum, ventral: *Eustala devia* (Gertsch and Mulaik, 1936). (B–F) Epigynum, posterior: (B) *E. devia*, (C) *E. trinitatis* (Hogg, 1918), (D) *E. bucolica* Chickering, 1955, (E) *E. californiensis* (Keyserling, 1885), (F) *E. guianensis* (Taczanowski, 1873). (G–H) Epigynum, lateral: (G) *E. clavispina* (O. Pickard-Cambridge, 1889), (H) *E. occidentalis* Baert, 2014. (F, arrows: median plate, rounded depressions).

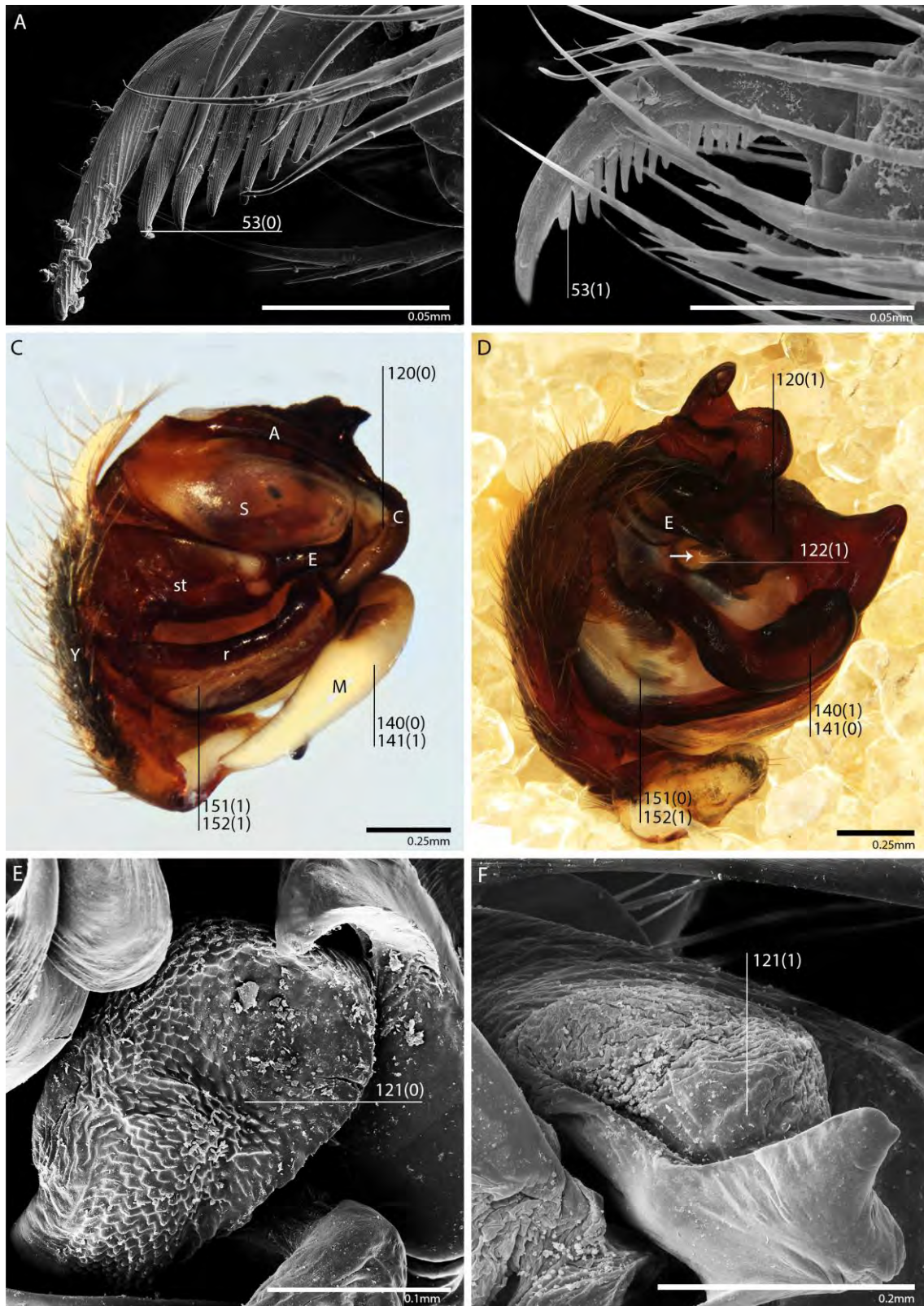


Fig. 12. (A, B) Palp, claw (female): (A) *Alpaida bicornuta* (Taczanowski, 1878), (B) *Eustala bellissima* Poeta, Marques and Buckup., 2010b. (C, D) Palp, mesal view: (C) *E. clavispinga* (O. Pickard-Cambridge, 1889), (D) *A. grayi* (Blackwall, 1863). (E, F) Palp, ventral view, conductor: (E) *E. palmares* Poeta, Marques and Buckup., 2010a (F) *Metazygia gregalis* (O. Pickard-Cambridge, 1889). Abbreviations: A, Terminal apophysis; C, Conductor; E, Embolus; M, Median apophysis; r, Radix; S, Subterminal apophysis; st, Stipes; Y, Cymbium.



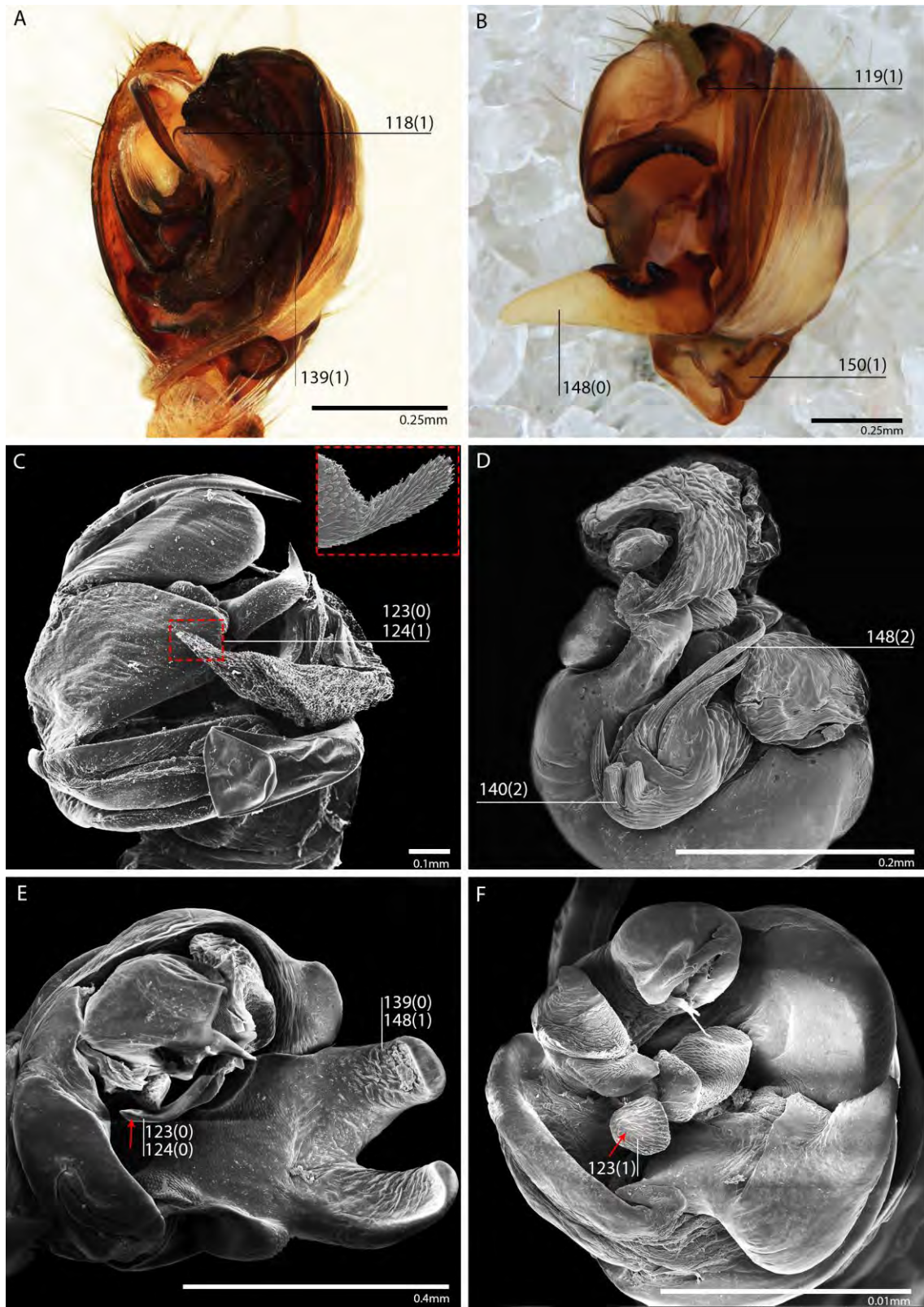


Fig. 13. (A, B) Palp, ventral view: (A) *E. anastera* (Walckenaer, 1841), (B) *E. saga* (Keyserling, 1893). (C–F) Palp, mesal view: (C) *E. anastera* (conductor lobe, detail), (D) *Kaira altiventer* O. Pickard-Cambridge, 1889, (E) *Acacesia hamata* (Hentz, 1847), (F) *Alpaida delicata* (Keyserling, 1892). (E, F, arrow: paramedin apophysis).



Fig. 14. (A, B) Palp, cymbium: (A) *Eustala devia* (Gertsch and Mulaik, 1936), (B) *E. saga* (Keyserling, 1893). (C) Palp, superior view: *E. guttata* F. O. Pickard-Cambridge, 1904. (D–F) Palp, ventral view: (D) *E. inconstans* Chickering, 1955, (E) *E. cameronensis* Gertsch and Davis, 1936, (F) *E. conformans* Chamberlin, 1925. (G–I) Palp, embolus, mesal view: (G) *E. illicita* (O. Pickard-Cambridge, 1889) (denticles, detail), (H) *E. anastera* (Walckenaer, 1841), (I) *E. levii* Poeta, Marques and Buckup. 2010a. (C, arrow: cymbium hollow).

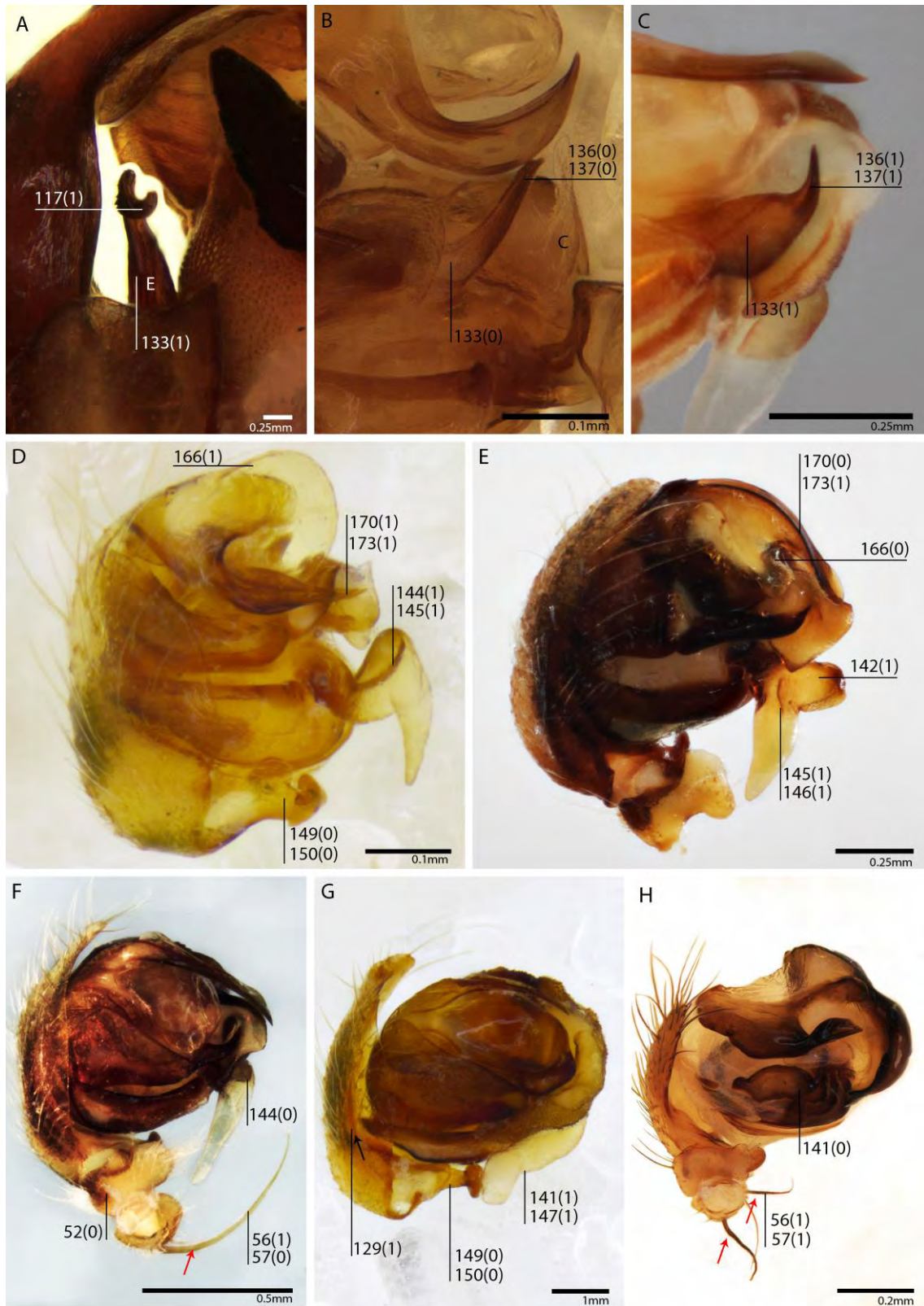


Fig. 15. (A–C) Palp, embolus: (A) *Araneus unanimus* (Keyserling, 1879), (B) *Eustala exigua* Chickering, 1955, (C) *E. scutigera* (O. Pickard-Cambridge, 1898). (D–H) Palp, mesal view: (D) *E. devia* (Gertsch and Mulaik, 1936), (E) *E. fuscovittata* (Keyserling, 1864), (F) *E. scitula* Chickering, 1955, (G) *E. cepina* (Walckenaer, 1841), (H) *Mangora bocaina* Levi, 2007.

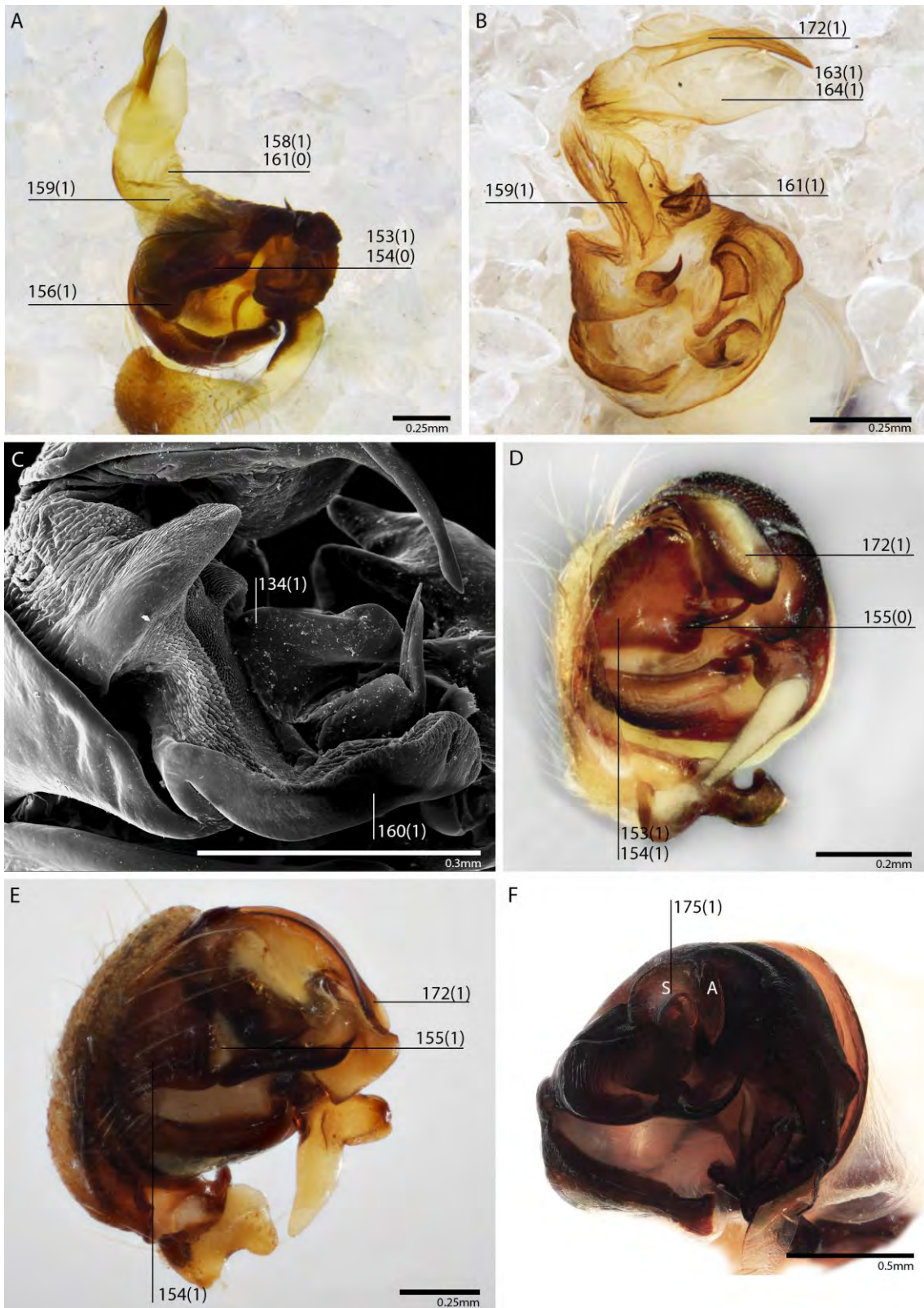


Fig. 16. (A–C, F) Palp, expanded: (A) *Eustala banksi* Chickering, 1955, (B) *E. taquara* (Keyserling, 1892), (C) *E. perfida* Mello-Leitão, 1947, (F) *E. cidae* Poeta 2014. (D, E) Palp, mesal view: (D) *E. cazieri* Levi, 1977, (E) *E. fuscovittata* (Keyserling, 1864).

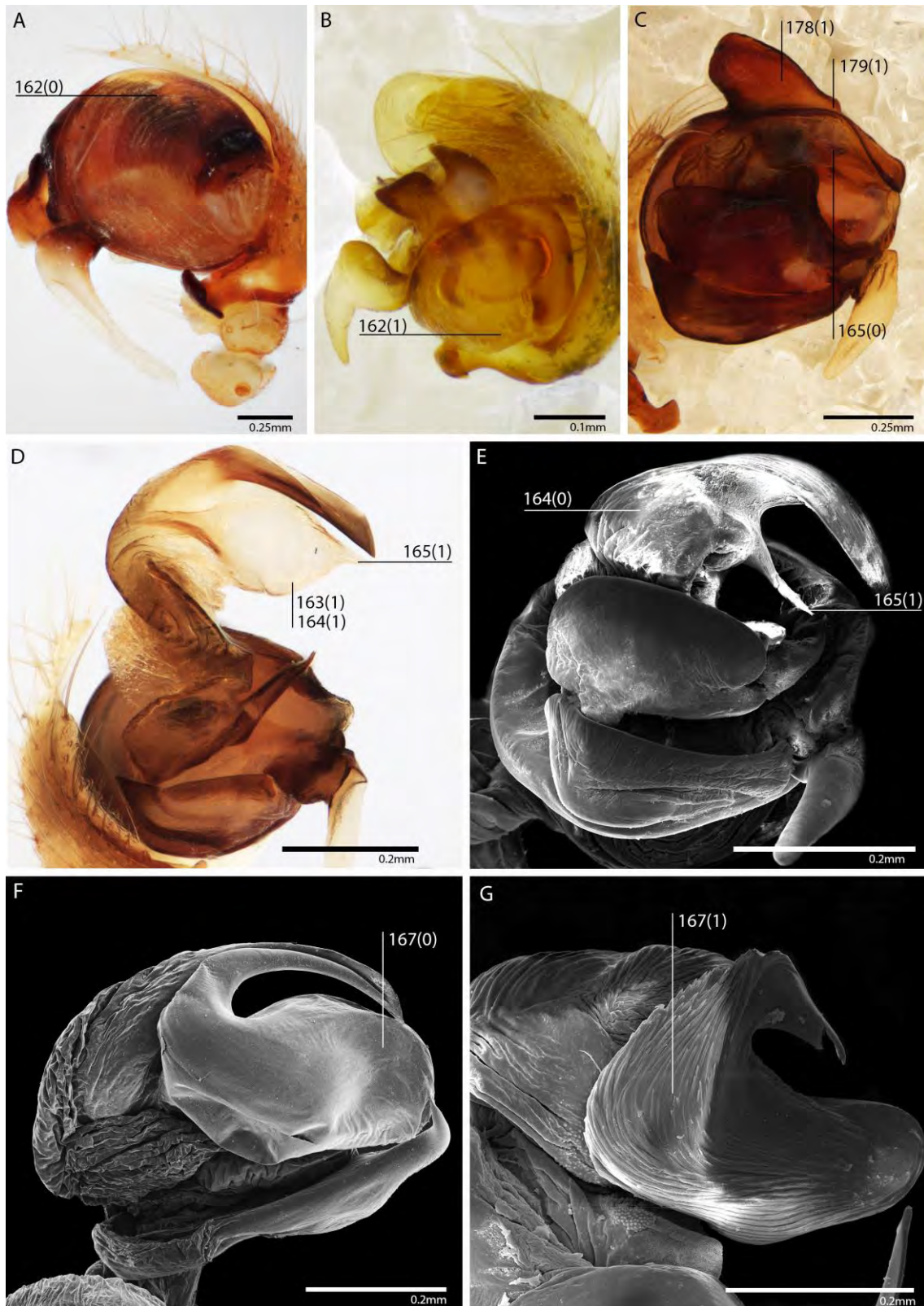


Fig. 17. (A, B, F) Palp, ectal: (A) *Eustala mimica* Chickering, 1955, (B) *E. devia* (Gertsch and Mulaik, 1936). (C) Palp, mesal: *E. minuscula* (Keyserling, 1892). (D, E) Palp expanded: (D) *E. albiventer* (Keyserling, 1884), (E) *E. mourei* Mello-Leitão, 1947. (F, G) Palp, subterminal and terminal apophysis: (F) *E. orientalis* Baert, 2014, (G) *E. cidae* Poeta, 2014.

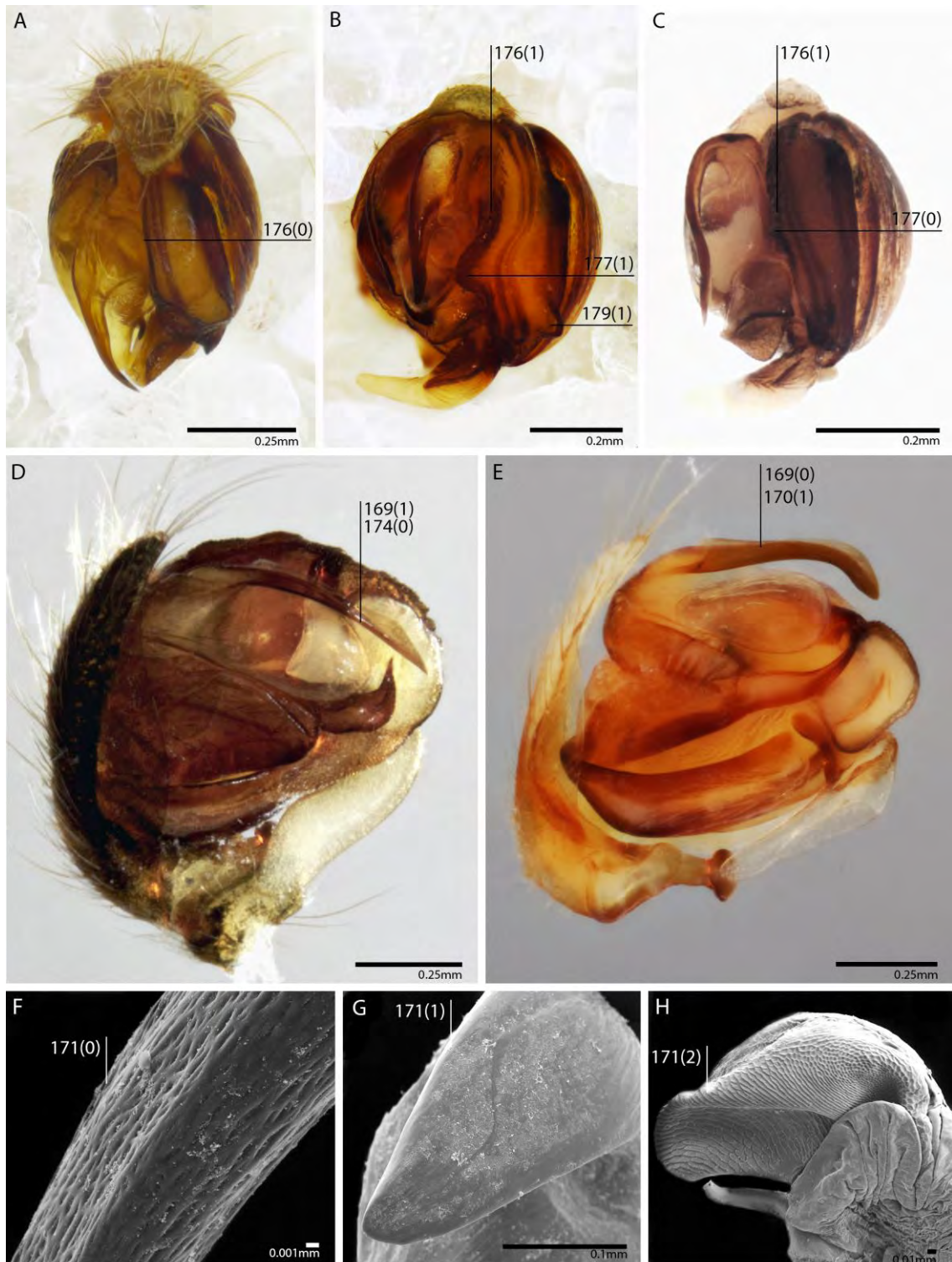


Fig. 18. (A–B, F) Palp, superior: (A) *Eustala conformans* Chamberlin, 1925, (B) *E. bucolica* Chickering, 1955, (C) *E. eleuthera* Levi, 1977. (D, E) Palp, mesal view: (D) *E. rosae* Chamberlin and Ivie, 1935, (E) *E. conformans*. (F–H) Palp, terminal apophysis, detail: (F) *E. banksi* Chickering, 1955, (G) *E. farroupilha* Poeta, 2014, (H) *E. cazieri* Levi, 1977.

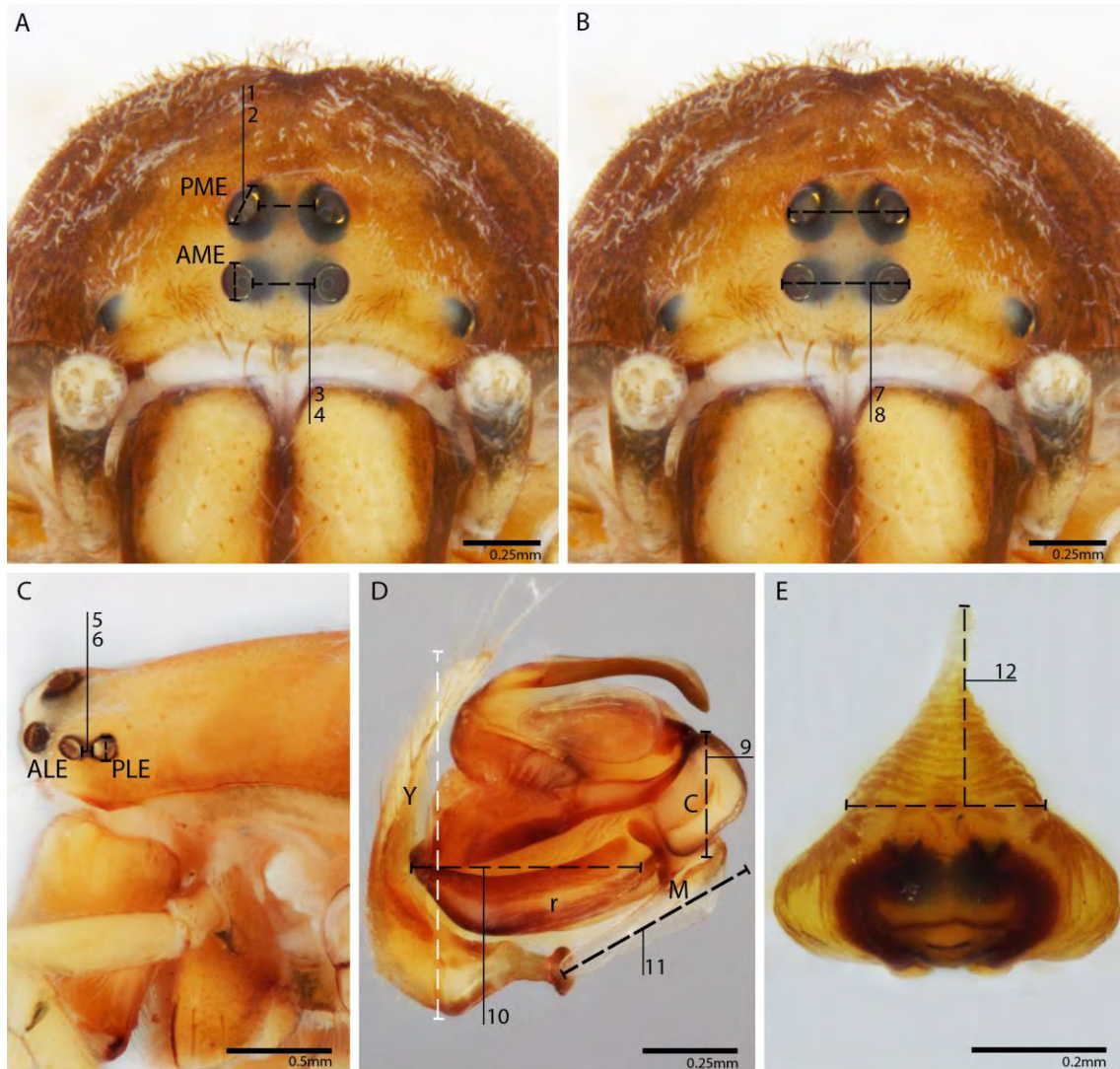


Fig. 19. (A, B) Carapace, frontal, female: *Eustala brevispina* Gertsch and Davis, 1936. (C) Carapace, lateral, female: *E. conformans* Chamberlain, 1925. (D) Palp, mesal view: *E. conformans*. (E) Epigynum, ventral view: *E. bucolica* Chickering, 1955. Abbreviations: ALE, anterior lateral eye; AME, anterior median eye; C, conductor; M, median apophysis; PLE, posterior lateral eye; PME, posterior median eye; r, radix, Y, cymbium.

**Appendix 3. Data Matrix.**

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
<i>Nephila clavipes</i>	1	0	1	0	1	0	0	0	1	1	0	0	0	0	1	0	0	1	0	0
<i>Zygiella atrica</i>	?	0	?	?	?	0	0	0	1	1	0	0	0	1	?	0	0	1	0	0
<i>Kaira altiventer</i>	0	0	?	?	?	1	0	0	1	0	1	1	0	0	0	0	?	?	?	0
<i>Metepeira compsa</i>	0	1	1	0	1	0	0	0	1	0	0	0	1	0	1	1	0	1	0	0
<i>Cyclosa conica</i>	0	0	?	0	?	0	0	0	1	1	0	0	?	0	1	1	0	0	-	0
<i>Cyclosa camargoi</i>	?	0	?	?	?	0	?	?	1	?	0	0	?	0	?	?	?	0	-	0
<i>Neoscona moreli</i>	1	0	1	0	1	0	0	1	0	1	0	0	1	0	0	1	0	1	0	0
<i>Neoscona adianta</i>	0	0	?	?	?	0	0	1	1	1	0	0	1	0	?	1	0	1	0	0
<i>Larinia directa</i>	1	0	0	1	1	0	0	0	0	1	0	0	1	1	0	1	0	1	0	0
<i>Larinia montecarlo</i>	0	0	?	?	?	0	0	0	1	0	0	0	1	0	1	1	?	1	?	0
<i>Araneus unanimus</i>	1	0	?	0	?	0	0	1	1	0	0	0	1	0	1	1	0	1	0	0
<i>Araneus diadematus</i>	1	0	0	0	?	0	0	1	1	1	0	0	1	0	1	1	0	1	0	0
<i>Mangora fundo</i>	1	0	?	?	?	0	0	0	1	0	0	0	1	0	0	1	?	?	?	0
<i>Mangora bocaina</i>	1	0	?	?	?	0	0	0	1	0	0	0	1	0	0	1	0	1	0	0
<i>Metazygia wittfeldae</i>	1	0	?	0	?	0	?	?	1	1	0	0	0	0	?	?	-	0	-	0
<i>Metazygia gregalis</i>	1	0	0	0	1	0	1	1	1	1	0	0	1	0	1	1	-	0	-	0
<i>Metazygia yobena</i>	1	0	?	0	?	0	1	1	1	1	0	0	1	0	1	1	-	0	-	0
<i>Metazygia isabelae</i>	1	0	0	0	1	0	1	0	1	1	0	0	1	0	1	1	-	0	-	0
<i>Metazygia rogenho</i>	1	0	1	0	1	0	1	1	1	1	0	0	1	0	1	1	0	1	0	0
<i>Alpaida delicata</i>	1	0	?	?	?	0	0	0	1	1	0	0	0	0	0	1	-	0	-	0
<i>Alpaida bicornuta</i>	1	0	0	0	0	1	0	1	1	1	0	0	0	0	0	1	-	0	-	0
<i>Alpaida grayi</i>	1	0	?	?	?	?	0	1	1	1	0	0	0	0	0	?	-	?	-	0
<i>Bertrana rufostriata</i>	1	1	1	0	1	0	0	0	1	0	0	0	1	0	1	1	0	1	0	0
<i>Enacrosoma anomalu</i>	1	1	0	0	0	0	0	0	1	0	0	0	1	0	1	1	0	1	1	0
<i>Wixia abdominalis</i>	1	0	?	?	?	1	0	0	0	1	0	0	0	0	1	0	?	1	?	0
<i>Acacesia villalobosi</i>	1	0	?	?	?	0	1	1	0	1	0	0	1	0	1	0	0	1	0	0
<i>Acacesia hamata</i>	1	0	0	0	1	0	0	1	0	0	0	0	1	0	1	0	0	1	0	0
<i>E. albiventer</i>	1	1	1	0	?	0	0	1	0	0	0	0	1	0	0	1	0	1	1	1
<i>E. anastera</i>	?	0	?	?	?	0	?	0	?	0	0	0	1	0	1	1	?	1	?	1
<i>E. banksi</i>	?	1	?	?	?	?	?	1	0	0	?	?	1	0	?	1	?	?	?	0
<i>E. belissima</i>	1	1	?	?	?	0	0	0	0	0	0	0	1	0	1	1	1	1	1	0
<i>E. bifida</i>	0	0	?	?	?	0	1	1	0	0	0	0	1	0	0	1	?	?	?	0
<i>E. unimaculata</i>	0	0	?	?	?	0	0	1	0	0	0	0	0	0	?	1	0	1	0	0
<i>E. brevispina</i>	1	0	?	?	?	0	1	?	0	?	0	0	1	1	0	1	?	?	?	0
<i>E. bucólica</i>	0	1	?	?	?	0	0	0	0	0	0	0	0	0	?	1	?	1	0	1
<i>E. californiensis</i>	?	0	?	?	?	0	0	0	0	0	0	0	1	0	0	1	?	1	0	1
<i>E. cameronensis</i>	?	0	?	?	?	?	?	1	?	?	?	?	?	0	?	1	?	1	?	0
<i>E. catarina</i>	1	0	?	?	?	0	0	0	0	0	0	0	1	0	0	1	?	?	?	0
<i>E. cazieri</i>	0	0	?	?	?	0	0	0	0	0	0	0	1	0	0	1	?	0	0	0
<i>E. cepina</i>	?	1	?	?	?	0	0	1	?	0	0	0	1	0	?	1	?	1	?	0
<i>E. cidae</i>	1	0	1	1	1	0	0	1	0	0	0	0	1	0	0	1	0	1	1	1
<i>E. clavispina</i>	0	1	?	?	?	1	0	1	0	?	1	1	1	0	1	1	?	?	?	0
<i>E. conchlea</i>	?	1	?	?	?	0	0	1	0	1	0	0	1	1	?	1	?	1	?	0
<i>E. conformans</i>	1	0	?	?	?	0	0	1	0	1	1	0	1	0	0	1	?	?	?	0
<i>E. cuia</i>	1	0	?	?	?	0	0	1	0	0	0	0	1	0	0	1	?	1	?	0
<i>E. crista</i>	1	1	?	?	?	0	0	1	0	0	0	0	1	0	0	1	?	?	?	1
<i>E. delasmata</i>	0	0	?	?	?	0	0	0	0	0	0	0	1	0	1	1	?	?	?	1
<i>E. delecta</i>	?	0	?	?	?	?	0	0	?	0	?	?	?	0	?	?	?	?	?	0
<i>E. devia</i>	?	1	?	?	?	0	0	1	0	0	0	0	1	0	?	1	?	1	?	1
<i>E. eldorado</i>	?	0	?	?	?	?	?	1	?	1	?	?	1	0	?	1	?	1	?	0
<i>E. eleuthera</i>	0	1	?	?	?	0	0	0	0	0	0	0	1	0&1	1	1	?	1	1	0
<i>E. ericae</i>	1	1	0	1	1	0	0	1	0	0	0	0	0	0	0	1	0	1	0	0
<i>E. farroupilha</i>	1	0	0	0	1	?	0	0	0	0	0	0	0	0	0	1	0	1	0	0



<i>E. fragilis</i>	0	1	?	?	?	?	?	?	1	?	0	0	1	0	1	0	?	?	?	0
<i>E. fuscovittata</i>	1	0	?	?	?	1	0	1	0	1	0	0	1	0	1	0	?	1	?	0
<i>E. gonygater</i>	?	0	?	?	?	?	?	1	?	0	?	?	1	0	?	1	-	-	-	0
<i>E. guarani</i>	0	0	?	?	?	0	0	1	0	0	0	0	1	0	0	1	?	?	?	0
<i>E. guianensis</i>	0	0	?	?	?	0	0	0	0	0	0	0	1	0	0	1	?	?	?	1
<i>E. guttata</i>	?	0	?	?	?	0	0	0	0	0	0	0	1	0	1	1	?	1	?	0
<i>E. inconstans</i>	?	0	?	?	?	?	?	1	0	0	?	?	?	0	?	1	?	?	?	0
<i>E. ingenua</i>	0	0	?	?	?	0	0	0	0	0	0	0	1	0	0	1	?	?	?	1
<i>E. innoxia</i>	1	0	?	?	?	0	0	?	0	?	0	0	0	0	0	1	?	?	?	1
<i>E. exigua</i>	?	1	?	?	?	?	?	1	?	0	?	?	?	0	0	1	?	?	?	1
<i>E. itapocuensis</i>	1	1	?	?	?	1	0	1	0	1	1	1	1	0	1	1	1	1	1	1
<i>E. illicita</i>	?	0	0	0	1	0	0	1	0	0	0	0	1	0	?	0	0	1	1	0
<i>E. lata</i>	0	0	?	?	?	0	0	?	0	?	0	0	1	0	0	1	?	?	?	0
<i>E. latebricola</i>	0	1	?	?	?	0	0	?	0	?	0	0	1	0	1	1	?	1	?	1
<i>E. levii</i>	1	0	?	?	?	0	0	0	0	0	0	0	1	0	0	1	?	1	?	1
<i>E. lisei</i>	1	1	?	?	?	0	0	0	0	0	0	0	1	0	1	1	?	1	?	1
<i>E. lunulifera</i>	0	0	?	?	?	0	1	?	0	?	0	0	1	0	?	1	?	1	?	0
<i>E. meridionalis</i>	?	0	?	?	?	0	1	1	?	0	0	0	1	0	1	1	?	1	?	1
<i>E. mimica</i>	?	0	?	?	?	?	?	0	0	1	?	?	1	0	0	1	?	?	?	1
<i>E. minuscula</i>	1	1	?	?	?	0	0	0	0	0	0	0	1	0	0	1	?	1	?	0
<i>E. montivaga</i>	1	0	?	?	?	0	0	0	0	0	0	0	1	0	?	1	?	?	?	1
<i>E. rustica</i>	1	0	?	?	?	0	0	1	0	0	0	0	1	0	0	1	?	?	?	0
<i>E. mourei</i>	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1
<i>E. mucronatella</i>	?	1	?	?	?	0	?	?	?	?	0	0	?	0	?	1	?	?	?	0
<i>E. nasuta</i>	0	0	?	?	?	1	0	0	0	1	1	1	1	0	0	1	?	?	?	0
<i>E. novemmamillata</i>	0	0	?	?	?	1	0	?	0	?	1	0	1	0	1	1	?	1	?	0
<i>E. oblonga</i>	1	0	?	?	?	0	0	1	1	1	0	0	1	0	?	1	?	?	?	0
<i>E. occidentalis</i>	?	0	?	?	?	?	0	?	0	?	0	0	1	0	?	1	?	1	?	1
<i>E. orientalis</i>	?	0	1	0	1	0	0	1	?	?	0	0	1	0	0	1	1	1	0	1
<i>E. pallida</i>	?	0	?	?	?	0	?	?	1	?	0	0	1	0	0	1	?	?	?	0
<i>E. palmares</i>	0	0&1	1	1	1	0	0	?	?	0	0	0	1	0	0	1	1	1	0	1
<i>E. perdita</i>	0	0	?	?	?	0	0	0	0	0	0	0	1	0	0	1	?	?	?	1
<i>E. perfida</i>	0	1	1	0	1	0	1	1	0	1	1	1	1	0	1	1	1	1	1	1
<i>E. photographica</i>	1	1	1	1	1	0	0	?	0	?	0	0	1	0	1	1	1	1	1	0
<i>E. redundans</i>	1	0	?	?	?	?	?	?	0	?	0	0	1	0	0	1	?	?	?	1
<i>E. rosae</i>	1	0	?	?	?	0	0	1	0	?	0	0	1	1	1	1	?	1	?	0
<i>E. rubroguttulata</i>	0	0	?	?	?	0	0	?	0	?	0	0	0	0	?	1	?	?	?	0
<i>E. saga</i>	1	0	0	0	1	0	1	1	0	0	0	0	1	0	0	1	1	1	1	0
<i>E. sagana</i>	1	1	0	0	1	0	1	1	1	0	0	0	1	0	0	1	1	1	1	0
<i>E. scutigera</i>	0	1	?	?	?	0	0	0	0	0	0	0	1	0	0	1	?	1	?	0
<i>E. secta</i>	1	0	?	?	?	0	0	1	0	0	0	0	1	0	0	1	?	?	?	1
<i>E. sedula</i>	1	1	?	?	?	1	0	?	0	?	1	1	1	0	0	1	?	?	?	0
<i>E. semifoliata</i>	1	1	?	?	?	1	0	?	0	?	1	1	1	0	?	1	?	1	?	1
<i>E. smaragdinea</i>	0	0	?	?	?	0	0	?	0	?	0	0	0	0	0	1	?	?	?	0
<i>E. scitula</i>	?	0	?	?	?	?	?	0	1	0	?	?	1	0	?	1	0	1	0	0
<i>E. tantula</i>	0	0	?	?	?	0	0	0	0	0	0	0	1	0	0	1	?	?	?	1
<i>E. taquara</i>	1	0	0	0	1	0	0	0	0	0	0	0	1	0	0	1	1	1	1	0
<i>E. tribrachiata</i>	0	0	1	0	1	0	0	?	1	?	1	0	1	1	0	1	1	1	1	1
<i>E. trinitatis</i>	1	0	0	0	1	?	0	?	0	?	0	0	1	0	0	1	0	1	0	0
<i>E. ulecebrosa</i>	?	0	?	?	?	?	?	?	0	?	0	0	1	0	?	1	?	1	?	0
<i>E. vellardi</i>	1	0	?	?	?	0	0	1	0	1	0	0	1	0	0	1	?	1	?	0
<i>E. vejeta</i>	1	0	?	?	?	0	0	0	0	0	0	0	1	0	1	1	?	1	?	0
<i>E. venusta</i>	0	0	?	?	?	0	1	?	0	?	0	0	1	0	?	1	?	1	?	0
<i>E. histrio</i>	?	0	?	?	?	0	0	?	0	?	0	0	1	0	0	1	?	1	?	0
<i>E. viridipedata</i>	0	0	?	?	?	1	0	?	0	?	1	0	1	0	0	1	?	1	?	0

	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
<i>Nephila clavipes</i>	0	0	-	0	0	0	0	1	0	0	0	0	0	0	0	0	0	-	0	-
<i>Zygiella atrica</i>	0	1	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	-	0	-
<i>Kaira altiventer</i>	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	-
<i>Metepeira compsa</i>	0	1	0	1	0	0	1	1	1	0	0	0	0	0	1	0	0	-	1	0
<i>Cyclosa conica</i>	0	1	1	0	0	0	1	1	1	?	1	0	?	1	0	1	?	?	?	?
<i>Cyclosa camargoi</i>	0	?	1	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>Neoscona moreli</i>	0	1	1	0	0	0	1	1	1	1	1	1	0	0	0&1	1	0	-	1	1
<i>Neoscona adianta</i>	1	1	1	0	0	?	1	1	1	1	1	1	0	0	0	?	?	?	?	?
<i>Larinia directa</i>	1	1	?	0	0	0	1	1	0	0	0	0	0	0	0	1	0	-	0	-
<i>Larinia montecarlo</i>	1	1	?	0	0	?	1	1	1	0	0	0	0	0	0	0	0	-	0	-
<i>Araneus unanimus</i>	0	0	1	0	0	?	1	1	0	1	1	0	0	0	1	0	1	0	0	-
<i>Araneus diadematus</i>	0	0	1	0	0	1	1	0	1	1	1	0	0	0	1	1	1	0	1	0
<i>Mangora fundo</i>	1	1	?	0	0	?	0	0	0	0	0	0	0	0	0	0	0	-	0	-
<i>Mangora bocaina</i>	1	1	?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	-
<i>Metazygia wittfeldae</i>	0	0	1	?	0	0	1	1	0	?	1	0	0	0	0	?	?	?	?	?
<i>Metazygia gregalis</i>	0	1	1	0	1	0	1	0	0	0	1	0	0	0	0	0	1	1	0	-
<i>Metazygia yobena</i>	0	1	1	0	1	?	1	0	0	0	1	0	0	0	0	0	0	-	1	0
<i>Metazygia isabelae</i>	0	1	1	0	0	0	1	1	0	1	1	0	0	0	0	0	0	-	0	-
<i>Metazygia rogenho</i>	0	1	1	0	0	0	1	1	0	0	1	0	0	0	0	0	0	-	0	-
<i>Alpaida delicata</i>	0	0	1	0	0	0	2	1	1	0	0	0	1	0	0	0	0	-	0	-
<i>Alpaida bicornuta</i>	0	0	1	0	0	0	2&3	1	1	1	1	0	0	1	0	1	1	0	1	1
<i>Alpaida grayi</i>	0	0	?	0	0	0	1	1	1	0	1	0	0	0	1	0	1	1	1	1
<i>Bertrana rufostriata</i>	0	0	1	0	0	?	0	1	0	0	1	0	0	0	0	0	0	-	0	-
<i>Enacrosoma anomalu</i>	0	0	0	0	0	0	0	1	0	0	1	0	0	0	1	1	1	1	1	1
<i>Wixia abdominalis</i>	0	0	?	?	0	?	1	1	1	1	1	0	0	1	0	1	?	?	?	?
<i>Acacesia villalobosi</i>	1	1	1	0	0	0	1	1	1	1	1	0	1	1	0	1	1	0	1	0
<i>Acacesia hamata</i>	0	1	1	0	0	0	1	1&2	1	1	1	0	1	1	0	1	1	0	1	0
<i>E. albiventer</i>	1	1	?	0	0	?	1	1	0	1	1	0	0	0	1	0	0	-	0	-
<i>E. anastera</i>	1	1	?	0	0	?	0	2	1	1	1	0	0	0	1	0	0	-	0	-
<i>E. banksi</i>	?	1	?	?	0	?	?	?	?	1	1	0	0	0	1	1	1	0	1	0
<i>E. belissima</i>	1	1	?	0	0	0	0	1	0	1	1	0	0	0	1	0	0	?	0	-
<i>E. bifida</i>	1	1	?	0	0	0	1	2	1	1	1	0	0	0	1	1	1	1	1	1
<i>E. unimaculata</i>	1	1	1	0	0	0	1	?	?	1	1	0	0	0	1	0	0	-	1	0
<i>E. brevispina</i>	1	1	?	0	0	?	1	1	1	1	1	0	0	0	1	?	?	?	?	?
<i>E. bucolica</i>	1	1	?	0	0	?	?	?	?	1	1	0	0	0	1	0	0	-	1	1
<i>E. californiensis</i>	1	1	?	0	0	?	?	?	?	1	1	0	0	0	1	0	0	-	0	-
<i>E. cameronensis</i>	?	1	?	?	0	?	?	?	?	1	1	0	0	0	1	1	1	0	1	0
<i>E. catarina</i>	1	1	1	0	0	?	1	1	0	1	1	0	0	0	1	0	0	-	0	-
<i>E. cazieri</i>	1	1	?	0	0	?	1	1	0	1	1	0	0	0	1	1	1	0	0	-
<i>E. cepina</i>	1	1	?	0	0	?	1	1	1	1	1	0	0	0	1	0	0	-	?	?
<i>E. cidae</i>	1	1	1	0	0	0	1	1	0	1	1	0	0	0	1	1	0	0	1	1
<i>E. clavispina</i>	1	1	1	1	0	0	1	1	0	1	1	0	0	0	1	?	1	0	1	1
<i>E. conchlea</i>	1	1	?	1	0	?	1	1	1	1	1	0	0	0	1	0	0	-	0	-
<i>E. conformans</i>	1	1	?	0	0	?	1	1	0	1	1	0	0	0	?	0	0	-	0	-
<i>E. cuia</i>	1	1	?	1	0	?	1	2	0	1	1	0	0	0	1	1	1	1	1	1
<i>E. crista</i>	1	1	?	0	0	?	1	1	0	1	1	0	0	0	1	?	?	?	?	?
<i>E. delasmata</i>	1	1	?	0	0	?	1	1	1	1	1	0	0	0	1	1	1	1	1	1
<i>E. delecta</i>	?	1	?	?	0	?	?	?	?	1	1	0	0	0	1	1	1	0	1	1
<i>E. devia</i>	1	1	?	0	0	?	1	1	1	1	1	0	0	0	1	1	1	0	1	1
<i>E. eldorado</i>	?	1	?	?	0	?	?	?	?	1	1	0	0	0	1	0	0	-	0	-
<i>E. eleuthera</i>	1	1	?	0	0	?	1	1	0	1	1	0	0	0	1	0	?	?	?	?
<i>E. ericae</i>	1	1	1	0	0	0	1	1	0	1	1	0	0	0	0	0	0	?	0	-
<i>E. farroupilha</i>	1	1	1	0	0	?	1	1	0	1	1	0	0	0	1	0	1	1	1	1
<i>E. fragilis</i>	1	?	?	0	?	?	?	1	0	?	?	?	?	?	0	?	?	?	?	?
<i>E. fuscovittata</i>	1	1	1	0	0	0	1	1	0	1	1	0	0	0	0	1	0	-	0	-
<i>E. gonygater</i>	?	1	-	?	0	?	-	-	-	1	1	0	0	0	0	1	1	0	1	1
<i>E. guarani</i>	1	1	?	0	0	?	1	1	0	1	1	0	0	0	1	1	1	1	1	1

	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
<i>E. guttata</i>	1	1	?	0	0	?	1	1	0	1	1	0	0	0	1	?	?	?	?	?
<i>E. inconstans</i>	?	1	?	?	0	?	?	?	?	0	1	0	0	0	0	0	0	?	0	-
<i>E. ingenua</i>	1	1	?	0	0	?	1	1	0	1	1	0	0	0	1	0	1	0	0	-
<i>E. innoxia</i>	1	?	?	0	?	?	1	1	1	?	?	?	?	?	1	?	?	?	?	?
<i>E. exigua</i>	?	1	?	?	0	?	?	?	?	1	1	0	0	0	1	1	1	0	1	0
<i>E. itapocuensis</i>	1	1	1	0	0	?	1&2	1&2	1	1	1	0	0	0	1	1	1	1	1	1
<i>E. illicita</i>	1	1	?	0	0	0	1	1	0	1	1	0	0	0	0	0	1	0	0	-
<i>E. lata</i>	1	?	?	0	?	?	1	2	0	?	?	?	?	?	?	?	?	?	?	?
<i>E. latebricola</i>	1	?	?	0	?	?	1	?	?	?	?	?	?	?	1	?	?	?	?	?
<i>E. levii</i>	1	1	?	0	0	?	1	1	0	1	1	0	0	0	1	0	1	0	1	1
<i>E. lisei</i>	1	1	1	0	0	0	1	1	1	1	1	0	0	0	1	0	1	0	0	-
<i>E. lunulifera</i>	1	?	?	0	0	?	1	1	1	?	?	?	?	?	0	?	?	?	?	?
<i>E. meridionalis</i>	1	1	?	1	0	0	1	1	1	1	1	0	0	0	1	0	1	0	1	1
<i>E. mimica</i>	?	1	?	?	0	?	?	?	?	1	1	0	0	0	1	0	1	1	1	1
<i>E. minuscula</i>	1	1	1	0	0	0	1	1	0	1	1	0	0	0	1	0	1	1	0	-
<i>E. montivaga</i>	1	1	?	0	0	?	1	1	0	1	1	0	0	0	1	0	0	-	1	1
<i>E. rustica</i>	1	1	?	0	0	?	1	1	0	1	1	0	0	0	1	0	1	0	0	-
<i>E. mourei</i>	1	1	0	0	0	0	1	1	0	1	1	0	0	0	1	0	1	1	1	1
<i>E. mucronatella</i>	1	?	?	0	?	?	?	?	?	?	?	?	?	?	0	?	?	?	?	?
<i>E. nasuta</i>	1	1	?	0	0	?	1	1	0	1	1	0	0	0	1	0	1	1	1	1
<i>E. novemmamillata</i>	1	?	?	0	?	?	1	1	1	?	?	?	?	?	1	?	?	?	?	?
<i>E. oblonga</i>	1	1	?	0	0	?	1	1	0	1	1	0	0	0	?	1	0	-	0	-
<i>E. occidentalis</i>	1	1	?	0	0	0	1	0&1	0	1	1	0	0	0	1	?	?	?	?	?
<i>E. orientalis</i>	1	1	1	0	0	0	1	1&2	0	1	1	0	0	0	1	?	?	?	?	?
<i>E. pallida</i>	?	?	1	0	?	?	1	1	1	?	?	?	?	?	0	?	?	?	?	?
<i>E. palmares</i>	1	1	?	0	0	0	1	1	0	1	1	0	0	0	1	1	1	0	1	1
<i>E. perdita</i>	1	1	?	0	0	?	1	1	1	1	1	0	0	0	1	?	0	?	0	-
<i>E. perfida</i>	1	1	1	0	0	1	1	1	0	1	1	0	0	0	1	0	1	1	0	-
<i>E. photographica</i>	1	1	1	0	0	0	1	1	0	?	1	0	0	0	1	?	?	?	?	?
<i>E. redundans</i>	1	?	?	0	?	?	1	1&2	0	?	?	?	?	?	1	?	?	?	?	?
<i>E. rosae</i>	1	1	?	0	0	0	1	1	1	1	1	0	0	0	1	?	1	0	?	?
<i>E. rubroguttulata</i>	1	?	?	0	?	?	1	1	0	?	?	?	?	?	0	?	?	?	?	?
<i>E. saga</i>	1	1	1	0	0	0	1	1	0	1	1	0	0	0	0	1	1	0	0	-
<i>E. sagana</i>	1	1	1	0	0	0	1	1	0	1	1	0	0	0	1	1	1	0	0	-
<i>E. scutigera</i>	1	1	?	0	0	?	1	1	0	1	1	0	0	0	1	0	0	?	0	-
<i>E. secta</i>	1	1	?	0	0	0	0	1	1	1	1	0	0	0	1	1	0	-	0	-
<i>E. sedula</i>	1	?	?	0	?	?	1	1	0	?	?	?	?	?	1	?	?	?	?	?
<i>E. semifoliata</i>	1	?	?	1	?	?	1	1	0	?	?	?	?	?	1	?	?	?	?	?
<i>E. smaragdinea</i>	1	?	-	0	?	?	1	1	0	?	?	?	?	?	0	?	?	?	?	?
<i>E. scitula</i>	?	1	?	?	0	?	?	?	?	1	1	0	0	0	1	0	1	1	1	1
<i>E. tantula</i>	1	1	?	0	0	?	1	1	0	1	1	0	0	0	1	0	0	-	0	-
<i>E. taquara</i>	1	1	0	0	0	0	1	1	0	1	1	0	0	0	1	1	1	1	1	1
<i>E. tribrachiata</i>	1	?	1	1	?	0	1	1	0	?	?	?	?	?	1	?	?	?	?	?
<i>E. trinitatis</i>	1	?	1	0	?	?	1	1	1	?	?	?	?	?	1	?	?	?	?	?
<i>E. ulecebrosa</i>	1	?	?	0	?	?	?	?	?	?	?	?	?	?	1	?	?	?	?	?
<i>E. vellardi</i>	1	1	?	0	0	0	1	1	0	1	1	0	0	0	0	1	0	-	0	-
<i>E. vegeta</i>	1	1	?	0	0	?	0	0&1	0	1	1	0	0	0	1	0	1	0	0	-
<i>E. venusta</i>	1	?	?	0	?	?	?	1	0	?	?	?	?	?	1	?	?	?	?	?
<i>E. histrio</i>	1	?	?	0	?	?	1	1	0	?	?	?	?	?	1	?	?	?	?	?
<i>E. viridipedata</i>	1	?	?	1	?	?	1	1	0	?	?	?	?	?	1	?	?	?	?	?

	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
<i>Nephila clavipes</i>	0	0	0	0	0	0	0	1	0	1	1	0	?	0	0	1	0	0	0	1
<i>Zygiella atrica</i>	0	0	0	0	0	0	0	1	0	1	?	1	0	0	0	0	-	0	0	0
<i>Kaira altiventer</i>	0	2	0	1	1	1	0	1	1	1	1	0	1	0	0	0	-	1	0	0
<i>Metepeira compsa</i>	0	0	0	0	?	?	0	1	0	1	1	0	?	0	0	1	1	0	0	0
<i>Cyclosa conica</i>	0	0	0	?	1	1	0	1	0	1	?	?	0	0	1	1	0	1	0	0
<i>Cyclosa camargoi</i>	2	?	0	?	1	1	0	1	0	1	1	?	?	0	?	?	?	?	0	0
<i>Neoscona moreli</i>	2	2	0	0	0	0	0	1	0	1	1	0	0	0	1	1	1	0	0	1
<i>Neoscona adianta</i>	?	?	0	0	0	0	0	1	0	1	1	0	0	?	1	1	1	?	?	?
<i>Larinia directa</i>	0	0	0	0	1	1	0	1	0	1	0	0	0	0	1	1	1	0	0	1
<i>Larinia montecarlo</i>	0	0	0	0	1	1	0	1	0	1	1	0	0	0	1	1	1	0	1	1
<i>Araneus unanimus</i>	0	0	0	?	0	0	0	1	0	1	1	0	0	0	1	1	1	0	0	1
<i>Araneus diadematus</i>	0	0	0	?	0	0	0	1	0	1	1	0	0	0	1	1	1	0	0	1
<i>Mangora fundo</i>	0	2	0	0	?	?	0	?	?	?	1	0	?	0	0	1	0	1	0	0
<i>Mangora bocaina</i>	2	2	0	0	?	?	0	?	?	?	1	0	?	0	0	1	0	1	1	0
<i>Metazygia wittfeldae</i>	0	0	0	?	0	0	?	1	0	1	?	0	0	?	1	1	0	?	?	?
<i>Metazygia gregalis</i>	0	0	0	0	0&1	0	0	-	0	0	1	0	0	1	0	1	0	0	0	1
<i>Metazygia yobena</i>	0	0	0	?	0&1	0	0	-	0	0	1	0	0	1	0	1	0	0	0	1
<i>Metazygia isabelae</i>	0	0	0	0	0	1	?	-	?	0	1	0	0	0	1	1	0	0	0	1
<i>Metazygia rogenhoi</i>	0	0	0	0	0	1	0	1	0	1	1	0	0	1	1	1	0	0	0	0
<i>Alpaida delicata</i>	0	1	0	0	1	0	0	-	0	1	1	1	1	0	1	1	0	0	0	0
<i>Alpaida bicornuta</i>	1	1	0	0	1	1	0	-	0	1	1	0	0	0	1	1	0	0	1	1
<i>Alpaida grayi</i>	1	1	0	0	?	?	0	-	0	1	?	0	0	0	1	1	1	0	1	0
<i>Bertrana rufostriata</i>	0	0	0	0	1	1	0	1	0	1	1	0	0	0	1	1	0	1	1	0
<i>Enacrosoma anomalu</i>	0	0	0	1	1	1	0	1	1	1	1	0	?	0	1	1	0	0	0	1
<i>Wixia abdominalis</i>	0	2	0	0	0	0	0	1	0	1	1	0	0	0	1	1	0	0	1	1
<i>Acacesia villalobosi</i>	0	0	0	1	1	1	0	1	0	1	1	0	0	0	1	1	0	0	0	1
<i>Acacesia hamata</i>	0	0	0	1	1	1	0	1	0	1	1	0	0	0	1	1	0	0	0	1
<i>E. albiventer</i>	0	0	0	?	1	1	1	1	0	1	1	0	0	1	1	1	0	0	0	0
<i>E. anastera</i>	0	0	0	1	1	1	1	1	0	1	1	0	0	1	1	1	0	0	0	1
<i>E. banksi</i>	?	0	0	?	?	?	?	?	?	?	?	0	?	?	1	1	0	?	?	?
<i>E. belissima</i>	0	0	0	0	1	1	1	0	1	1	1	0	1	0	1	1	0	0	0	1
<i>E. bifida</i>	0	0	0	1	1	1	?	1	0	1	1	0	0	1	1	1	0	0	0	0
<i>E. unimaculata</i>	0	0	0	0	0	1	1	1	0	1	1	0	0	1	1	1	0	0	0	0
<i>E. brevispina</i>	0	0	0	?	?	?	?	?	?	?	?	1	0	0	1	1	1	0	0	0
<i>E. bucolica</i>	0	0	0	?	?	?	?	?	?	?	?	1	0	?	1	1	1	0	0	0
<i>E. californiensis</i>	?	2	0	?	?	?	?	?	?	?	?	1	0	?	1	1	1	0	0	0
<i>E. cameronensis</i>	?	0	0	?	?	?	?	?	?	?	?	0	?	?	1	1	0	?	?	?
<i>E. catarina</i>	0	0	0	1	1	1	1	1	0	1	1	0	0	1	1	1	0	0	0	0
<i>E. cazieri</i>	0	0	0	1	0	1	0	1	0	1	1	0	0	1	1	1	0	1	0	0
<i>E. cepina</i>	?	?	0	?	?	?	0	?	?	?	1	1	0	?	1	1	1	0	0	1
<i>E. cidae</i>	0	0	0	1	1	1	1	1	0	1	1	0	0	0	1	1	0	0	0	0
<i>E. clavispina</i>	0	0	1	1	1	1	0	0	1	1	1	0	0	1	1	1	0	1	0	0
<i>E. conchlea</i>	0	0	0	?	?	?	1	?	?	?	1	1	0	?	1	1	1	0	0	1
<i>E. conformans</i>	0	0	0	?	?	?	?	?	?	?	?	1	0	?	1	1	1	0	0	1
<i>E. cuia</i>	0	0	0	1	1	1	1	0	0	1	1	0	0	0	1	1	0	0	1	1
<i>E. crista</i>	0	0	0	1	1	1	1	0	1	1	1	0	?	1	1	1	0	0	0	0
<i>E. delasmata</i>	0	0	0	?	?	?	?	?	?	?	?	1	0	0	1	1	1	0	0	1
<i>E. delecta</i>	?	0	0	?	0	1	?	1	0	1	?	0	?	?	1	1	0	?	?	?
<i>E. devia</i>	0	0	0	?	?	?	?	?	?	0	1	0	?	1	1	1	0	1	0	0
<i>E. eldorado</i>	?	0	0	?	?	?	0	?	?	?	?	0	?	?	1	1	0	?	?	?
<i>E. eleuthera</i>	0	0	0	1	?	?	?	?	?	?	?	1	0	0	1	1	1	0	0	1
<i>E. ericae</i>	0	0	0	0	?	?	0	1	0	1	1	0	?	0	1	1	0	1	0	1
<i>E. farroupilha</i>	0	0	0	0	?	?	0	?	?	?	?	1	0	0	1	1	1	0	0	1
<i>E. fragilis</i>	0	?	0	?	?	?	0	?	?	?	?	?	?	0	?	?	?	1	0	0
<i>E. fuscovittata</i>	1	1	0	?	1	1	1	1	1	1	1	0	0	1	1	1	0	0	0	0
<i>E. gonygater</i>	?	0	0	?	?	?	?	?	?	?	?	0	?	?	1	1	0	?	?	?
<i>E. guarani</i>	0	0	0	0	?	?	0	?	?	?	?	1	0	?	1	1	1	0	0	1

	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
<i>E. guianensis</i>	0	0	0	0	?	?	0	?	?	?	1	0	0	1	1	1	0	0	0	1
<i>E. guttata</i>	0	0	0	?	?	?	?	?	?	?	1	0	0	1	1	1	0	0	0	0
<i>E. inconstans</i>	?	0	0	?	?	?	?	?	?	?	?	0	?	?	1	1	0	?	?	?
<i>E. ingênu</i>	0	0	0	0	?	?	0	?	?	?	1	0	0	1	1	1	0	0	1	0
<i>E. innoxia</i>	0	?	0	0	?	?	?	?	?	?	1	?	0	0	?	?	?	1	0	0
<i>E. exigua</i>	?	0	0	?	0	1	?	1	0	1	?	0	?	?	1	1	0	?	?	?
<i>E. itapocuensis</i>	0	0	0	?	0	1	1	0	0	1	1	0	0	1	1	1	0	1	0	0
<i>E. illicita</i>	1	1	0	?	0	1	0	2	0	1	?	0	0	1	1	1	0	?	0	0
<i>E. lata</i>	0	?	0	1	?	?	1	?	?	?	1	?	0	1	?	?	?	0	0	0
<i>E. latebricola</i>	0	?	0	?	?	?	?	?	?	?	?	?	?	1	?	?	?	0	0	1
<i>E. levii</i>	0	0	0	1	0	1	1	1	0	1	1	0	?	1	1	1	0	0	0	1
<i>E. lisei</i>	0	0	0	1	1	1	1	0	1	1	1	0	0	1	1	1	0	0	0	1
<i>E. lunulifera</i>	2	?	0	0	?	?	0	?	?	?	1	?	0	1	?	?	?	0	0	0
<i>E. meridionalis</i>	0	0	0	?	?	?	0	?	?	?	1	0	?	1	1	1	0	0	0	1
<i>E. mimica</i>	?	0	0	1	?	?	1	?	?	?	?	0	?	?	1	1	0	?	?	?
<i>E. minuscula</i>	0	0	0	1	0	1	?	1	0	1	1	0	?	1	1	1	0	1	0	0
<i>E. montivaga</i>	0	0	0	0	0	1	0	?	?	?	1	0	0	1	1	1	0	0	0	0
<i>E. rustica</i>	0	0	0	0	?	?	0	?	?	?	1	0	?	1	1	1	0	0	0	0
<i>E. mourei</i>	0	0	0	1	0	1	1	1	0	1	1	0	0	1	1	1	0	0	0	1
<i>E. mucronatella</i>	?	?	0	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>E. nasuta</i>	0	0	0	0	1	1	0	0	1	1	1	0	?	1	1	1	0	0	0	1
<i>E. novemmamillata</i>	?	?	0	?	?	?	?	?	?	?	?	?	?	1	?	?	?	1	0	1
<i>E. oblonga</i>	0	1	0	0	?	?	0	?	?	?	1	0	0	0	1	1	0	0	0	1
<i>E. occidentalis</i>	0	0	0	?	?	?	?	?	?	1	1	0	?	1	1	1	0	?	?	?
<i>E. orientalis</i>	0	0	0	?	1	1	?	1	0	1	1	0	0	1	1	1	0	0	0	1
<i>E. pallida</i>	?	?	0	0	?	?	?	?	?	1	?	?	?	1	?	?	?	0	1	1
<i>E. palmares</i>	0	0	0	0	1	1	1	1	0	1	1	0	0	1	1	1	0	1	0	0
<i>E. perdita</i>	?	?	0	?	?	?	?	?	?	?	?	0	?	1	1	1	0	1	0	0
<i>E. perfida</i>	0	1	0	1	1	1	1	0	0	1	1	0	0	1	1	1	0	0	0	0
<i>E. photographica</i>	0	0	0	0	0	0	1	1	0	0	1	0	?	1	1	1	0	1	0	0
<i>E. redundans</i>	0	?	0	0	?	?	0	?	?	?	1	?	0	1	?	?	?	1	0	0
<i>E. rosae</i>	0	0	0	?	?	?	1	?	?	1	1	0	?	1	1	1	0	0	1	1
<i>E. rubroguttulata</i>	0	?	0	?	?	?	?	?	?	1	?	?	?	1	?	?	?	1	0	0
<i>E. saga</i>	0	0	0	0	0	1	0	2	0	1	1	0	0	1	1	1	0	1	0	1
<i>E. sagana</i>	0	1	0	?	1	1	0	2	1	1	0	0	?	1	1	1	0	0	1	1
<i>E. scutigera</i>	0	0	0	?	?	?	?	?	?	1	1	0	?	1	1	1	0	0	0	0
<i>E. secta</i>	0	0	0	?	?	?	?	?	?	?	1	0	?	0	1	1	0	0	0	0
<i>E. sedula</i>	0	?	0	?	?	?	1	?	?	?	1	?	?	1	?	?	?	0	0	1
<i>E. semifoliata</i>	0	?	0	0	?	?	1	?	?	?	1	?	0	1	?	?	?	0	0	0
<i>E. smaragdinea</i>	0	?	0	?	?	?	?	?	?	?	1	?	0	1	?	?	?	0	0	1
<i>E. scitula</i>	?	0	0	1	0	1	1	1	0	1	?	0	?	?	1	1	0	?	?	?
<i>E. tantula</i>	0	0	0	?	?	?	0	?	?	?	1	0	?	1	1	1	0	0	1	0
<i>E. taquara</i>	0	0	0	0	0&1	1	0	1	1	1	1	0	0	1	1	1	0	0	0	0
<i>E. tribrachiata</i>	0	?	0	1	1	1	1	0	0&1	1	1	?	?	1	?	?	?	0	0	0
<i>E. trinitatis</i>	0	?	0	1	1	1	0	0	0	1	1	?	0	1	?	?	?	0	1	1
<i>E. ulecebrosa</i>	0	?	0	?	?	?	?	?	?	?	1	?	?	1	?	?	?	?	?	?
<i>E. vellardi</i>	0	1	0	1	?	?	0	?	?	?	0	0	?	1	1	1	0	0	0	1
<i>E. vegeta</i>	0	0	0	?	?	?	?	?	?	?	1	0	?	1	1	1	0	0	0	1
<i>E. venusta</i>	0	?	0	?	?	?	?	?	?	?	1	?	?	1	?	?	?	0	0	1
<i>E. histrio</i>	0	?	1	?	?	?	?	?	?	1	1	?	?	1	?	?	?	0	0	1
<i>E. viridipedata</i>	0	?	0	0	?	?	1	0&2	?	1	1	?	0	1	?	?	?	0	0	1

	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
<i>Nephila clavipes</i>	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	-	?	?	0
<i>Zygiella atrica</i>	0	1	0	0	0	0	0	0	0	0	0	-	0	0	0	0	-	1	?	0
<i>Kaira altiventer</i>	0	0	0	?	0	0	0	0	1	0	1	-	0	0	0	0	-	?	?	0
<i>Metepeira compsa</i>	0	0	0	1	0	0	0	1	0	0	0	-	0	0	0	1	?	0	-	0
<i>Cyclosa conica</i>	?	?	0	0	0	0	0	0	0	0	0	0	1	0	1	0	-	1	0	1
<i>Cyclosa camargoi</i>	?	?	?	?	0	0	0	0	0	?	?	1	1	?	1	?	?	?	?	?
<i>Neoscona moreli</i>	?	?	1	0	1	0	0	0	0	1	0	-	0	0	1	0	-	1	1	1
<i>Neoscona adianta</i>	1	0	?	?	?	0	0	1	0	1	0	-	0	0	1	0	-	1	?	?
<i>Larinia directa</i>	0	1	1	0	0	0	1	0	0	0	0	-	0	0	1	1	?	0	-	1
<i>Larinia montecarlo</i>	0	1	0	1	0	0	1	0	0	?	0	-	0	0	1	1	?	0	-	1
<i>Araneus unanimus</i>	0	1	1	0	1	0	0	0	0	1	0	-	0	0	0	0	?	0	-	1
<i>Araneus diadematus</i>	0	0	0	0	1	0	0	1	0	1	0	-	0	0	0	0	-	1	0	1
<i>Mangora fundo</i>	0	1	0	1	0	0	0	1	0	?	0	-	0	0	1	0	-	0	-	0
<i>Mangora bocaina</i>	0	1	0	1	0	0	0	0	0	0	0	-	0	0	1	0	-	0	-	0
<i>Metazygia wittfeldae</i>	?	?	?	?	2	0	0	1	0	?	0	-	0	0	0	0	-	?	?	?
<i>Metazygia gregalis</i>	0	0	0	0	2	0	0	1	0	1	0	-	0	0	0	0	-	0	-	1
<i>Metazygia yobena</i>	0	0	0	0	2	0	0	1	0	1	0	-	0	0	0	0	-	0	-	1
<i>Metazygia isabelae</i>	0	0	0	0	1	0	0	0	0	1	0	-	0	0	0	0	-	0	-	1
<i>Metazygia rogenho</i>	0	0	0	0	0	0	0	0	0	1	0	-	0	0	0	0	-	0	-	1
<i>Alpaida delicata</i>	0	1	0	0	1	0	1	0	0	1	0	0	1	1	1	0	-	0	-	0
<i>Alpaida bicornuta</i>	1	1	0	0	1	0	1	0	0	1	0	0	1	0	1	0	-	1	1	1
<i>Alpaida grayi</i>	1	1	-	0	1	0	1	0	0	1	0	0	1	0	1	0	?	1	1	1
<i>Bertrana rufostriata</i>	0	1	1	1	0	0	0	0	0	1	0	-	0	0	0	0	?	0	-	0
<i>Enacrosoma anomalu</i>	0	1	1	1	0	1	1	0	1	1	1	-	0	0	0	0	-	1	0	0
<i>Wixia abdominalis</i>	?	?	0	0	1	0	0	0	0	0	0	-	0	0	0	0	?	0	-	1
<i>Acacesia villalobosi</i>	0	0	0	0	1	0	0	1	0	1	0	-	0	0	0	0	-	1	0	1
<i>Acacesia hamata</i>	0	0	0	0	1	0	0	0	0	1	0	-	0	0	0	0	-	1	1	1
<i>E. albiventer</i>	0	1	1	0	1	0	0	1	0	1	0	1	1	1	0	1	0	0	-	1
<i>E. anastera</i>	0	0	0	0	2	0	0	1	0	?	0	1	1	1	0	1	0	0	-	1
<i>E. banksi</i>	1	1	0	?	?	?	?	1	?	1	0	?	?	0	?	1	?	0	-	?
<i>E. belissima</i>	0	1	0	?	0	0	0	1	1	1	1	-	0	0	0	1	?	0	-	1
<i>E. bifida</i>	0	0	0	0	1	0	0	1	0	?	0	1	1	1	0	1	1	0	-	1
<i>E. unimaculata</i>	0	0	0	0	0	0	0	1	0	1	0	-	0	0	0	1	1	0	-	1
<i>E. brevispina</i>	?	?	0	0	0	0	0	1	?	?	?	1	1	?	0	1	0	0	-	0
<i>E. bucolica</i>	0	0	1	0	0	0	0	1	1	1	0	-	0	0	0	1	0	0	-	1
<i>E. californiensis</i>	0	0	0	1	1	0	0	1	0	?	0	0	1	0	0	1	0	0	-	?
<i>E. cameronensis</i>	1	1	1	?	?	?	?	1	?	?	0	?	?	0	?	?	?	0	-	?
<i>E. catarina</i>	0	0	0	0	0	0	0	1	0	1	0	0	1	1	0	1	1	0	-	1
<i>E. cazieri</i>	0	1	1	1	0	1	0	1	1	0	0	1	1	1	0	1	0	0	-	0
<i>E. cepina</i>	?	?	0	0	1	0	0	0	0	?	0	-	0	0	0	1	-	0	-	1
<i>E. cidae</i>	0	0	1	0	0	0	0	1	1	1	1	0	1	1	0	1	0	0	-	1
<i>E. clavispina</i>	1	0	0	0	1	0	0	0	0	?	0	2	1	1	0	1	?	0	-	1
<i>E. conchlea</i>	1	0	1	0	0	0	0	1	0	?	0	-	0	0	0	1	0	0	-	1
<i>E. conformans</i>	0	0	1	0	1	0	0	0&1	0	?	0	-	0	0	0	?	?	?	?	1
<i>E. cuia</i>	1	1	1	0	1	1	0	1	1	1	1	1	1	1	0	1	0	0	-	1
<i>E. crista</i>	0	0	1	0	1	0	0	1	1	1	1	-	0	0	0	1	0	0	-	1
<i>E. delasmata</i>	0	0	1	0	1	0	0	1	1	?	0	-	0	0	0	1	0	0	-	1
<i>E. delecta</i>	0	0	1	?	?	?	0	1	?	1	0	?	?	0	?	1	0	0	-	?
<i>E. devia</i>	0	0	1	1	0	0	0	1	0	?	0	-	0	0	0	0	-	0	-	1
<i>E. eldorado</i>	1	1	1	?	?	?	0	1	?	?	1	?	?	1	?	1	0	0	-	?
<i>E. eleuthera</i>	0	0	0	0	0	0	0	1	1	?	0	0	1	0	0	1	1	0	-	?
<i>E. ericae</i>	1	1	1	0	1	0	0	1	0	?	0	-	0	0	0	1	1	0	-	1
<i>E. farroupilha</i>	1	1	1	0	1	0	0	1	1	1	0	0	1	1	0	1	0	0	-	1
<i>E. fragilis</i>	?	?	0	1	0	0	0	?	0	?	?	-	0	?	0	?	?	?	?	0
<i>E. fuscovittata</i>	?	?	0	0	1	0	0	1	0	?	0	0	1	1	1	0	-	0	-	1
<i>E. gonygater</i>	1	1	0	?	?	?	0	0	?	?	0	?	?	0	?	1	0	0	-	?
<i>E. guarani</i>	0	1	0	0	0	0	0	1	1	?	0	0	1	1	0	1	0	0	-	1

	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
<i>E. guttata</i>	0	0	1	0	0	0	0	1	0	?	0	-	0	0	0	1	1	0	-	1
<i>E. inconstans</i>	0	0	0	?	?	?	0	0	?	?	0	?	?	0	?	0	-	0	-	?
<i>E. ingenua</i>	0	1	0	0	0	0	0	1	0	?	0	-	0	0	0	1	1	0	-	0
<i>E. innoxia</i>	?	?	0	1	0	0	0	1	0	?	?	-	0	?	0	0	-	0	-	1
<i>E. exigua</i>	0	1	0	?	?	?	0	1	?	1	0	?	?	0	?	0	-	0	-	?
<i>E. itapocuensis</i>	?	?	1	0	0	0	0	0	1	1	0	-	0	-	0	1	0	0	-	0
<i>E. illicita</i>	0	0	0	0	1	0	0	0	0	?	0	0	1	1	1	0	-	0	-	?
<i>E. lata</i>	?	?	0	0	0	0	0	1	0	?	?	1	1	?	0	1	0	0	-	0
<i>E. latebricola</i>	?	?	1	0	1	0	0	0	0	?	?	-	0	?	0	1	0	0	-	1
<i>E. levii</i>	1	1	1	0	1	0	0	0	1	?	0	0	1	0	0	1	0	0	-	1
<i>E. lisei</i>	1	0	1	0	1	0	0	1	0	?	0	0	1	1	0	1	0	0	-	0
<i>E. lunulifera</i>	?	?	0	0	0	0	0	0	0	?	?	0	1	?	1	1	0	0	-	0
<i>E. meridionalis</i>	1	0	0	0	1	0	0	1	1	?	0	-	0	0	0	1	1	0	-	1
<i>E. mimica</i>	1	0	0	?	?	?	0	0	?	?	0	?	?	0	?	1	0	0	-	?
<i>E. minuscula</i>	0	0	1	0	1	?	0	1	0	1	0	-	0	0	0	1	0	0	-	1
<i>E. montivaga</i>	1	1	1	0	1	0	0	1	1	?	0	1	1	0	0	1	0	0	-	1
<i>E. rustica</i>	0	1	0	0	1	0	0	1	0	?	0	-	0	0	0	1	0	0	-	?
<i>E. mourei</i>	0	1	1	0	1	0	0	1	1	1	0	-	0	0	0	1	1	0	-	1
<i>E. mucronatella</i>	?	?	?	?	?	0	0	0	0	?	?	1	1	?	0	0	-	0	-	?
<i>E. nasuta</i>	0	1	0	0	0	1	0	1	0	?	0	1	1	1	1	1	0	0	-	?
<i>E. novemmamillata</i>	?	?	0	?	0	1	0	0	0	?	?	1	1	?	0	1	?	0	-	?
<i>E. oblonga</i>	0	0	0	0	1	0	0	1	0	?	0	0	1	1	1	0	?	0	-	1
<i>E. occidentalis</i>	?	?	?	0	?	0	0	1	1	?	0	-	0	0	0	1	0	0	-	1
<i>E. orientalis</i>	?	?	1	0	1	0	0	1	0	?	0	-	0	0	0	1	?	0	-	1
<i>E. pallida</i>	?	?	0	?	0	0	0	0	0	?	?	-	0	?	0	0	-	0	-	0
<i>E. palmares</i>	0	1	1	0	0	0	0	0	0	1	0	-	0	0	0	1	0	0	-	1
<i>E. perdita</i>	0	1	1	1	0	0	0	0	0	?	0	-	0	0	0	0	-	0	-	0
<i>E. perfida</i>	?	?	1	0	1	1	0	1	0	?	0	1	1	1	0	1	0	0	-	0
<i>E. photographica</i>	?	?	1	0	1	0	0	1	0	?	0	0	1	1	0	1	0	0	-	1
<i>E. redundans</i>	?	?	0	0	1	0	0	1	0	?	?	-	0	?	0	1	1	0	-	0
<i>E. rosae</i>	0	1	0	0	1	0	0	1	0	1	0	2	1	1	0	1	0	0	-	1
<i>E. rubroguttulata</i>	?	?	0	1	0	0	0	1	0	?	?	-	0	?	1	0	-	0	-	0
<i>E. saga</i>	1	0	1	0	1	0	0	1	0	1	0	0	1	1	1	0	-	0	-	1
<i>E. sagana</i>	1	0	0	0	0	0	0	1	0	1	0	0	1	1	1	0	-	0	-	1
<i>E. scutigera</i>	1	1	1	0	1	0	0	1	0	?	0	0	1	0	0	1	0	0	-	1
<i>E. secta</i>	0	1	0	1	1	0	0	1	0	1	0	-	0	0	0	1	0	0	-	1
<i>E. sedula</i>	?	?	0	0	1	1	0	0	0	?	?	1	1	?	0	1	0	0	-	1
<i>E. semifoliata</i>	?	?	0	0	1	1	0	0	1	?	?	0	1	?	0	0	-	1	0	1
<i>E. smaragdinea</i>	?	?	0	0	1	0	0	0	0	?	?	-	0	?	1	1	?	0	1	0
<i>E. scitula</i>	0	1	1	?	?	?	0	1	?	1	0	?	?	0	?	1	0	0	-	?
<i>E. tantula</i>	0	0	1	1	0	0	0	1	0	?	0	-	0	0	0	0	-	0	-	1
<i>E. taquara</i>	0	1	1	0	1	0	0	1	0	1	0	-	0	0	0	1	0	0	-	1
<i>E. tribrachiata</i>	?	?	1	0	1	1	0	1	0	?	?	2	1	?	0	1	0	0	-	1
<i>E. trinitatis</i>	?	?	1	0	1	0	0	1	0	?	?	1	1	?	0	0	-	0	-	1
<i>E. ulecebrosa</i>	?	?	1	0	?	1	0	1	1	?	?	2	1	?	0	1	0	0	-	?
<i>E. vellardi</i>	1	0	1	0	1	0	0	0	0	1	0	0	1	1	1	0	-	0	-	1
<i>E. vegeta</i>	0	?	1	0	0	0	0	1	0	1	0	-	0	1	0	1	0	0	-	1
<i>E. venusta</i>	?	?	1	0	1	0	0	1	0	?	?	0	1	?	0	1	1	0	-	?
<i>E. histrio</i>	?	?	0	0	1	0	0	1	1	?	?	0	1	?	0	1	0	0	-	1
<i>E. viridipedata</i>	?	?	1	0	2	0	0	0	1	?	?	2	1	?	0	1	0	0	-	1

	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	
<i>Nephila clavipes</i>	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	?	0	
<i>Zygiella atrica</i>	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0
<i>Kaira altiventer</i>	1	1	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	
<i>Metepeira compsa</i>	1	1	0	-	0	0	0	0	0	0	0	0	0	1	0	0	0	-	0	0	
<i>Cyclosa conica</i>	1	1	0	-	0	?	0	1	0	0	0	1	0	1	0	0	0	-	0	0	
<i>Cyclosa camargoi</i>	1	1	0	-	0	1	0	1	0	0	0	1	0	0	?	0	0	-	?	0	
<i>Neoscona moreli</i>	1	1	0	-	1	1	0	1	0	1	0	0	0	0	0	0	0	-	0	0	
<i>Neoscona adianta</i>	1	1	0	-	1	?	0	1	0	1	0	0	0	0	0	0	0	-	0	0	
<i>Larinia directa</i>	1	1	0	-	0	?	0	1	0	1	0	0	0	1	?	0	0	-	0	1	
<i>Larinia montecarlo</i>	1	1	0	-	1	?	0	0	0	1	0	1	0	0	0	0	0	-	1	0	
<i>Araneus unanimus</i>	1	1	0	-	0	0	0	1	0	1	0	0	0	1	0	0	0	-	0	0	
<i>Araneus diadematus</i>	1	1	0	-	0	1	0	1	1	1	0	0	0	1	0	0	0	-	0	0	
<i>Mangora fundo</i>	0	1	0	-	0	?	0	0	0	0	0	1	0	0	0	0	0	-	0	0	
<i>Mangora bocaina</i>	0	1	0	-	0	?	0	0	0	0	0	1	0	0	0	0	0	-	0	0	
<i>Metazygia wittfeldae</i>	1	0	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	
<i>Metazygia gregalis</i>	1	1	0	-	0	0	0	0	1	0	0	1	0	0	0	1	1	0	0	1	
<i>Metazygia yobena</i>	1	1	0	-	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	
<i>Metazygia isabelae</i>	1	0	1	0	0	0	0	1	0	0	0	-	-	-	-	-	-	-	0	0	
<i>Metazygia rogenho</i>	1	0	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	?	
<i>Alpaida delicata</i>	1	1	0	-	0	?	0	1	0	1	0	0	0	0	0	0	0	-	0	0	
<i>Alpaida bicornuta</i>	1	1	0	-	0	1	0	1	0	1	0	0	0	0	0	0	0	-	0	0	
<i>Alpaida grayi</i>	1	1	0	-	1	?	0	1	0	1	0	0	0	0	0	0	0	-	0	0	
<i>Bertrana rufostriata</i>	1	1	0	-	1	?	0	1	0	1	0	0	0	0	0	?	0	-	0	0	
<i>Enacrosoma anomalu</i>	1	1	0	-	1	?	0	1	0	0	0	0	0	0	0	0	0	-	0	0	
<i>Wixia abdominalis</i>	1	1	0	-	1	1	0	1	0	0	1	0	0	0	0	0	0	-	?	0	
<i>Acacesia villalobosi</i>	1	1	0	-	0	1	0	1	0	1	0	0	0	0	0	0	0	-	0	0	
<i>Acacesia hamata</i>	1	1	0	-	0	1	0	1	0	1	0	0	0	0	0	0	0	-	0	0	
<i>E. albiventer</i>	1	1	0	-	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	
<i>E. anastera</i>	1	1	0	-	0	0	0	0	1	0	0	0	0	1	1	1	0	0	0	0	
<i>E. banksi</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	
<i>E. belissima</i>	1	1	0	-	0	0	0	0	1	0	0	0	0	1	0	1	0	0	0	0	
<i>E. bifida</i>	1	1	0	-	0	0	0	0	1	0	0	0	1	1	0	1	0	0	0	0	
<i>E. unimaculata</i>	1	1	0	-	0	0	0	0	1	0	1	0	0	0	0	-	0	-	0	0	
<i>E. brevispina</i>	1	1	0	-	0	0	0	0	1	0	0	0	0	1	0	1	0	1	0	0	
<i>E. bucolica</i>	1	1	0	-	0	0	0	0	1	0	0	0	0	1	0	1	0	0	0	0	
<i>E. californiensis</i>	1	1	0	-	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	
<i>E. cameronensis</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	
<i>E. catarina</i>	1	1	0	-	0	0	0	0	1	0	0	1	0	1	0	0	1	0	0	1	
<i>E. cazieri</i>	1	1	0	-	0	0	0	0	1	0	1	1	0	0	0	-	0	-	0	1	
<i>E. cepina</i>	1	1	0	-	0	0	0	0	1	0	0	0	0	1	1	1	0	1	0	0	
<i>E. cidae</i>	1	1	0	-	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0	1	
<i>E. clavispina</i>	1	1	0	-	0	0	0	0	1	0	0	0	0	1	0	1	0	0	0	0	
<i>E. conchlea</i>	1	1	0	-	0	0	0	0	1	0	0	0	0	1	1	1	0	1	0	0	
<i>E. conformans</i>	1	1	0	-	0	0	0	0	1	0	0	0	0	1	0	1	0	1	0	1	
<i>E. cuia</i>	1	1	0	-	0	0	0	0	1	0	0	0	?	1	0	1	0	1	0	1	
<i>E. crista</i>	1	1	0	-	0	0	0	0	1	0	1	0	0	1	0	1	1	0	0	0	
<i>E. delasmata</i>	1	1	0	-	0	0	0	0	1	0	0	0	0	1	0	1	0	0	0	0	
<i>E. delecta</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	
<i>E. devia</i>	1	1	0	-	0	0	0	0	1	0	0	1	0	0	0	-	0	-	?	0	
<i>E. eldorado</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	
<i>E. eleuthera</i>	1	1	0	-	0	0	0	0	1	0	0	0	1	1	0	0	0	1	0	0	
<i>E. ericae</i>	1	1	0	-	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	
<i>E. farroupilha</i>	1	1	0	-	0	0	0	0	1	0	0	0	1	1	0	1	0	1	0	0	
<i>E. fragilis</i>	1	1	0	-	0	0	0	0	1	0	0	1	0	0	0	0	0	-	0	0	
<i>E. fuscovittata</i>	1	1	0	-	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	
<i>E. gonygater</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	
<i>E. guarani</i>	1	1	0	-	0	0	0	0	1	0	0	0	1	1	0	0	1	0	0	0	



	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
<i>E. guttata</i>	1	1	0	-	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0
<i>E. inconstans</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>E. ingēna</i>	1	1	0	-	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	1
<i>E. inóxia</i>	1	1	0	-	0	0	0	0	1	0	0	1	0	0	0	-	0	-	?	0
<i>E. exigua</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>E. itapocuensis</i>	1	1	0	-	0	0	0	0	1	0	0	0	0	1	0	1	0	0	0	0
<i>E. illicita</i>	1	1	0	-	0	0	1	0	1	0	0	1	0	0	0	0	1	0	0	0
<i>E. lata</i>	1	1	0	-	0	0	0	0	1	0	0	0	0	1	0	1	0	0	0	0
<i>E. latebricola</i>	1	1	0	-	1	0	0	0	1	0	0	1	0	0	0	-	1	0	0	0
<i>E. levii</i>	1	1	0	-	0	0	0	0	1	0	0	0	1	1	1	0	0	1	0	?
<i>E. lisei</i>	1	1	0	-	0	0	0	0	1	0	0	0	1	1	0	0	1	1	0	0
<i>E. lunulifera</i>	1	1	0	-	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0
<i>E. meridionalis</i>	1	1	0	-	0	0	0	0	1	0	0	0	0	1	0	0	1	0	0	?
<i>E. mimica</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>E. minuscula</i>	1	1	0	-	0	0	0	0	1	0	0	1	0	1	0	0	0	1	0	1
<i>E. montivaga</i>	1	1	0	-	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0
<i>E. rustica</i>	1	1	0	-	0	0	0	0	1	0	0	0	0	1	0	0	0	1	0	1
<i>E. mourei</i>	1	1	0	-	0	0	0	0	1	0	0	0	0	1	0	1	0	1	?	0
<i>E. mucronatella</i>	1	1	0	-	0	0	0	0	1	0	0	0	0	1	1	1	0	0	0	0
<i>E. nasuta</i>	1	1	0	-	0	0	0	0	1	0	0	0	0	1	0	1	0	0	0	0
<i>E. novemmamillata</i>	1	1	0	-	0	?	0	0	1	0	0	0	0	1	0	?	0	0	0	0
<i>E. oblonga</i>	1	1	0	-	0	0	0	0	1	0	0	1	0	0	0	-	0	1	?	1
<i>E. occidentalis</i>	1	1	0	-	0	0	0	0	1	0	0	0	0	1	0	1	1	0	0	?
<i>E. orientalis</i>	1	1	0	-	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	?
<i>E. pallida</i>	1	1	0	-	0	0	0	0	1	0	0	0	1	1	0	0	0	1	0	0
<i>E. palmares</i>	1	1	0	-	0	0	0	0	1	0	0	0	0	1	0	1	0	0	0	?
<i>E. perdita</i>	1	1	0	-	0	0	0	0	1	0	0	0	0	0	0	-	0	-	?	0
<i>E. perfida</i>	1	1	0	-	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0
<i>E. photographica</i>	1	1	0	-	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	1
<i>E. redundans</i>	1	1	1	1	0	0	0	0	1	0	0	1	0	1	0	0	1	0	0	1
<i>E. rosae</i>	1	1	0	-	0	0	0	0	1	0	0	0	0	1	1	1	0	0	0	0
<i>E. rubroguttulata</i>	1	1	0	-	0	0	0	0	1	0	0	1	0	0	0	-	0	-	?	?
<i>E. saga</i>	1	1	0	-	1	0	1	0	1	0	1	1	0	0	0	0	0	0	1	1
<i>E. sagana</i>	1	1	0	-	1	0	1	0	1	0	1	1	0	0	0	0	0	0	1	1
<i>E. scutigera</i>	1	1	0	-	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0
<i>E. secta</i>	1	1	0	-	0	0	0	0	1	0	0	1	0	0	0	-	0	-	?	?
<i>E. sedula</i>	1	1	0	-	0	0	0	0	1	0	0	0	0	1	0	1	0	0	0	1
<i>E. semifoliata</i>	1	1	0	-	0	0	0	0	1	0	0	0	0	1	0	1	0	0	0	0
<i>E. smaragdinea</i>	1	1	0	-	0	0	0	0	1	0	0	0	1	1	0	0	0	1	0	1
<i>E. scitula</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>E. tantula</i>	1	1	0	-	0	0	0	0	1	0	0	1	0	0	0	?	0	-	?	0
<i>E. taquara</i>	1	1	0	-	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	?
<i>E. tribrachiata</i>	1	1	0	-	1	0	0	0	1	0	0	0	0	1	0	1	1	-	0	0
<i>E. trinitatis</i>	1	1	0	-	0	0	0	0	1	0	0	0	0	1	0	1	0	0	0	0
<i>E. ulecebrosa</i>	1	1	0	-	0	0	0	0	1	0	0	0	0	1	0	1	0	0	0	0
<i>E. vellardi</i>	1	1	0	-	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
<i>E. vegeta</i>	1	1	0	-	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0
<i>E. venusta</i>	1	1	0	-	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0
<i>E. histrio</i>	1	1	0	-	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0
<i>E. viridipedata</i>	1	1	0	-	0	0	0	0	1	0	0	0	0	1	0	1	0	0	0	0

	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
<i>Nephila clavipes</i>	0	0	1	0	-	0	0	0	0	0	0	0	0	0	-	0	0	0	0	1
<i>Zygiella atrica</i>	0	0	1	0	-	0	0	0	0	0	0	0	0	0	-	?	0	0	0	1
<i>Kaira altiventer</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	?	0	0	0
<i>Metepeira compsa</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
<i>Cyclosa conica</i>	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	1
<i>Cyclosa camargoi</i>	0	0	1	0	0	0	0	0	0	0	?	0	0	0	1	1	?	?	?	?
<i>Neoscona moreli</i>	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	?	0	0
<i>Neoscona adianta</i>	0	0	1	0	0	0	0	0	0	0	0	?	0	0	0	1	0	0	0	0
<i>Larinia directa</i>	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	1
<i>Larinia montecarlo</i>	0	0	0	0	0	0	0	0	0	0	0	?	0	0	?	0	1	0	0	1
<i>Araneus unaninus</i>	0	0	1	0	1	0	0	0	0	0	0	?	0	0	0	?	1	0	0	0
<i>Araneus diadematus</i>	0	0	1	0	1	0	1	0	0	0	0	?	?	0	0	?	1	0	0	0
<i>Mangora fundo</i>	0	0	?	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	1
<i>Mangora bocaina</i>	0	0	1	0	0	-	0	0	0	0	0	0	0	0	0	?	0	0	0	1
<i>Metazygia wittfeldae</i>	0	0	0	0	0	0	1	0	?	0	0	0	0	0	0	1	0	0	0	0
<i>Metazygia gregalis</i>	0	0	0	0	0	0	1	0	0	0	0	2	0	0	0	1	0	?	0	1
<i>Metazygia yobena</i>	0	1	0	0	0	0	1	0	?	0	0	2	0	0	0	1	0	?	0	1
<i>Metazygia isabellae</i>	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0	?	0	0
<i>Metazygia rogenho</i>	0	0	0	?	0	0	?	0	0	2	0	0	?	?	0	1	0	?	0	0
<i>Alpaida delicata</i>	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	?	0	1
<i>Alpaida bicornuta</i>	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	?	0	1
<i>Alpaida grayi</i>	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	1	0	?	0	1
<i>Bertrana rufostriata</i>	0	0	1	0	0	0	0	0	0	2	0	0	0	0	0	0	0	?	0	0
<i>Enacrosoma anomalu</i>	0	0	1	0	0	0	0	0	0	0	0	?	0	0	0	0	0	?	0	1
<i>Wixia abdominalis</i>	0	0	1	0	0	0	0	0	0	2	0	?	0	0	0	1	0	0	0	1
<i>Acacesia villalobosi</i>	0	1	1	0	0	0	0	0	0	0	0	?	0	0	0	1	0	0	0	1
<i>Acacesia hamata</i>	0	1	1	0	0	0	0	0	0	2	0	0	0	0	0	1	0	0	0	1
<i>E. albiventer</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0
<i>E. anastera</i>	0	0	0	0	1	0	1	0	0	0	0	0	0	1	0	1	0	1	0	0
<i>E. banksi</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	0	0	0	0
<i>E. belissima</i>	1	0	0	0	1	0	0	0	1	1	0	2	0	0	0	1	0	?	0	0
<i>E. bifida</i>	0	0	0	0	1	0	1	1	0	0	0	1	0	0	1	1	0	0	0	0
<i>E. unimaculata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
<i>E. brevispina</i>	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	?	0	0
<i>E. bucolica</i>	0	0	0	0	1	0	1	0	0	1	0	1	0	0	0	1	0	0	0	0
<i>E. californiensis</i>	0	0	0	0	1	0	1	1	0	2	0	0	0	0	0	1	0	0	0	0
<i>E. cameronensis</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	0	0	0	0
<i>E. catarina</i>	0	0	0	0	1	0	1	0	0	0	0	2	0	0	0	1	0	0	0	0
<i>E. cazieri</i>	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0
<i>E. cepina</i>	0	0	0	0	1	0	0	0	0	1	0	1	0	1	0	1	0	1	0	0
<i>E. cidae</i>	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0
<i>E. clavispina</i>	0	0	0	1	1	0	0	0	1	1	0	2	0	0	0	1	0	0	0	0
<i>E. conchlea</i>	0	0	0	0	1	0	1	0	0	1	1	0	0	1	0	1	0	1	0	0
<i>E. conformans</i>	1	0	0	0	1	0	0	0	0	0	0	1	0	1	0	1	0	0	0	0
<i>E. cuia</i>	0	0	0	0	1	0	1	0	0	0	1	1	0	1	1	1	0	0	0	0
<i>E. crista</i>	0	0	0	0	1	0	1	0	0	0	0	1	0	0	0	1	0	0	0	0
<i>E. delasmata</i>	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0
<i>E. delecta</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	0	0	0	0
<i>E. devia</i>	0	0	0	0	0	0	-	0	0	1	0	0	1	0	0	0&1	0	0	0	0
<i>E. eldorado</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	0	1	0	0
<i>E. eleuthera</i>	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0
<i>E. ericae</i>	0	0	0	0	1	1	1	1	0	1	0	1	0	0	0	1	0	0	0	0
<i>E. farroupilha</i>	0	0	0	0	1	0	1	0	0	1	0	1	0	0	0	1	0	1	0	0
<i>E. fragilis</i>	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	1	?	?	?	?
<i>E. fuscovittata</i>	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
<i>E. gonygater</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	0	0	0	0
<i>E. guarani</i>	0	0	0	1	1	0	1	0	1	0	0	0	0	0	0	1	0	0	0	0

	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
<i>E. guianensis</i>	0	0	0	1	1	0	0	0	1	1	1	1	0	0	0	1	0	0	0	0
<i>E. guttata</i>	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0
<i>E. inconstans</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	0	0	0	0
<i>E. ingêna</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0
<i>E. inóxia</i>	0	0	0	0	0	0	-	0	0	1	0	0	1	0	0	0&1	?	?	?	?
<i>E. exigua</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	0	?	0	0
<i>E. itapocuensis</i>	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	1	0	?	0	0
<i>E. illicita</i>	0	0	0	1	1	0	0	0	0	0	0	0	0	1	0	1	0	0	1	0
<i>E. lata</i>	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	?	?	?	?
<i>E. latebricola</i>	0	0	0	0	0	0	-	0	0	0	0	2	0	0	0	1	?	?	?	?
<i>E. levii</i>	0	0	0	?	1	0	0	0	0	1	0	0	?	?	0	1	0	?	0	0
<i>E. lisei</i>	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
<i>E. lunulifera</i>	0	0	0	0	1	0	1	0	0	1	0	0	0	0	0	1	0	0	0	0
<i>E. meridionalis</i>	0	0	0	?	1	0	0	0	0	0	0	1	?	?	1	1	0	0	0	0
<i>E. mimica</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	0	0	0	0
<i>E. minúscula</i>	0	0	0	1	1	1	0	0	0	0	0	0	0	1	0	1	0	?	0	0
<i>E. montivaga</i>	0	0	0	0	1	0	1	0	0	0	0	1	0	0	0	1	0	?	0	0
<i>E. rustica</i>	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	?	0	0
<i>E. mourei</i>	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1	0	1	0	0
<i>E. mucronatella</i>	0	0	0	0	1	0	0	0	?	0	0	0	0	?	0	1	?	?	?	?
<i>E. nasuta</i>	0	0	0	1	1	0	0	0	0	0	0	0	0	1	0	1	0	?	0	0
<i>E. novemmamillata</i>	0	0	?	0	1	?	?	0	0	?	0	0	0	?	0	1	?	?	?	?
<i>E. oblonga</i>	0	0	0	0	0	0	0	0	0	0	0	?	?	0	0	1	0	0	1	0
<i>E. occidentalis</i>	0	0	0	?	1	0	1	0	0	0	0	1	?	?	1	1	0	0	0	0
<i>E. orientalis</i>	0	0	0	?	1	0	0	0	0	1	0	0	?	?	1	1	0	0	0	0
<i>E. pallida</i>	0	0	0	1	1	0	1	0	0	0	0	0	?	1	0	1	?	?	?	?
<i>E. palmares</i>	0	0	0	?	1	0	1	0	0	0	0	0	?	?	0	1	0	?	0	0
<i>E. perdita</i>	0	0	0	0	0	0	-	0	0	1	0	0	1	0	0	0&1	0	?	0	0
<i>E. pérfida</i>	0	0	0	1	1	0	0	1	0	1	0	0	0	1	0	1	0	?	0	0
<i>E. photographica</i>	0	0	0	?	1	0	0	0	0	1	0	0	0	1	0	1	0	?	0	0
<i>E. redundans</i>	0	0	0	1	1	0	1	0	0	1	0	0	0	1	0	1	?	?	?	?
<i>E. rosae</i>	0	0	0	0	1	0	0	0	1	1	0	1	0	1	0	1	0	1	0	0
<i>E. rubroguttulata</i>	0	1	0	?	0	0	-	0	0	1	0	0	1	0	0	1	?	?	?	?
<i>E. saga</i>	0	0	1	1	1	0	0	0	0	0	0	0	0	1	0	1	0	0	1	0
<i>E. sagana</i>	0	0	1	1	1	0	0	0	0	0	0	0	0	1	0	1	0	0	1	0
<i>E. scutigera</i>	0	0	0	1	1	0	0	0	0	1	0	1	0	0	0	1	0	0	0	0
<i>E. secta</i>	0	0	0	0	?	0	0	0	0	1	0	2	1	0	0	1	0	?	0	0
<i>E. sedula</i>	0	0	0	0	1	0	1	0	?	0	0	0	0	0	0	1	?	?	?	?
<i>E. semifoliata</i>	1	0	0	1	1	0	1	0	1	0	0	1	0	1	0	1	?	?	?	?
<i>E. smaragdinea</i>	0	0	0	0	1	0	1	0	0	1	0	0	0	0	0	1	?	?	?	?
<i>E. scitula</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	0	0	0	0
<i>E. tantula</i>	0	0	0	0	0	0	-	1	0	1	0	0	1	0	0	0&1	0	0	0	0
<i>E. taquara</i>	0	0	0	0	1	0	0	0	0	1	0	1	0	?	0	1	0	0	0	0
<i>E. tribrachiata</i>	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	?	?	?	?
<i>E. trinitatis</i>	0	0	0	0	1	0	1	0	1	1	0	0	0	1	0	1	?	?	?	?
<i>E. ulecebrosa</i>	0	0	0	0	1	0	1	0	1	0	0	0	1	0	0	1	?	?	?	?
<i>E. vellardi</i>	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	1	0	?	0	0
<i>E. vegeta</i>	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0
<i>E. venusta</i>	0	0	0	0	1	0	1	0	0	1	0	1	0	0	0	1	?	?	?	?
<i>E. histrio</i>	0	0	0	0	1	0	1	0	1	1	0	0	1	0	0	1	?	?	?	?
<i>E. viridipedata</i>	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0	1	?	?	?	?

	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140
<i>Nephila clavipes</i>	1	0	-	-	1	0	0	0	0	0	0	0	1	0	0	0	1	-	-	-
<i>Zygiella atrica</i>	1	0	-	-	0	0	0	0	0	0	0	0	1	0	0	0	0	?	1	1
<i>Kaira altiventer</i>	1	0	-	-	1	0	0	0	0	0	0	?	?	0	0	0	?	1	0	1
<i>Metepeira compsa</i>	?	0	-	-	0	0	0	0	0	0	0	?	?	0	?	0	0	1	0	1
<i>Cyclosa conica</i>	1	1	1	0	1	0	?	0	1	1	1	0	?	0	0	0	?	1	1	1
<i>Cyclosa camargoi</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>Neoscona moreli</i>	-	0	-	-	1	0	0	0	0	0	0	0	?	0	0	0	?	1	1	1
<i>Neoscona adianta</i>	1	0	-	-	1	0	0	1	0	0	0	0	1	0	0	0	1	1	1	1
<i>Larinia directa</i>	?	0	-	-	0	0	0	0	0	0	0	?	0	0	?	0	0	1	0	1
<i>Larinia montecarlo</i>	?	0	-	-	0	0	0	0	0	0	0	?	1	0	?	0	0	1	0	1
<i>Araneus unaninus</i>	1	0	-	-	0	0	0	0	0	0	0	0	?	1	0	0	?	0	0	1
<i>Araneus diadematus</i>	1	0	-	-	1	0	?	0	0	0	0	0	?	?	0	0	?	0	0	1
<i>Mangora fundo</i>	?	0	-	-	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
<i>Mangora bocaina</i>	?	0	-	-	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
<i>Metazygia wittfeldae</i>	?	0	-	-	1	0	0	0	0	0	0	?	1	0	?	0	0	1	1	0
<i>Metazygia gregalis</i>	1	0	-	-	1	0	0	0	1	0	0	0	?	0	0	0	0	1	1	1
<i>Metazygia yobena</i>	1	0	-	-	0	0	0	0	1	0	0	0	?	0	0	0	0	1	1	1
<i>Metazygia isabellae</i>	?	0	-	-	1	0	0	0	0	0	0	?	?	0	?	0	0	1	1	0
<i>Metazygia rogenho</i>	?	0	-	-	1	0	0	0	0	1	0	?	1	0	?	0	1	1	1	1
<i>Alpaida delicata</i>	0	1	1	0	1	0	0	0	0	0	0	0	?	0	0	0	0	0	0	1
<i>Alpaida bicornuta</i>	0	1	1	0	1	0	0	0	0	0	0	0	?	0	0	0	?	0	0	1
<i>Alpaida grayi</i>	?	1	1	0	1	0	0	0	0	0	0	?	?	0	?	0	?	0	0	1
<i>Bertrana rufostriata</i>	1	0	-	-	0	0	0	0	0	0	0	0	?	0	0	0	1	1	0	1
<i>Enacrosoma anomalu</i>	?	1	0	0	0	0	?	0	0	1	0	?	?	0	?	0	?	1	0	1
<i>Wixia abdominalis</i>	?	1	0	0	0	0	0	0	0	1	0	?	?	0	0	?	?	0	0	1
<i>Acacesia villalobosi</i>	?	1	0	0	0	0	0	0	0	1	0	?	1	0	0	0	0	0	0	1
<i>Acacesia hamata</i>	?	1	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1
<i>E. albiventer</i>	?	0	-	-	0	0	0	1	1	1	0	0	?	0	0	0	0	0	1	0
<i>E. anastera</i>	0	1	0	1	1	0	1	0	1	1	0	0	1	0	1	1	1	0	1	0
<i>E. banksi</i>	0	0	-	-	1	0	1	0	1	1	1	0	1	0	1	1	1	0	1	0
<i>E. belissima</i>	0	0	-	-	1	0	0	0	1	1	1	0	?	0	0	1	1	0	1	0
<i>E. bifida</i>	0	0	-	-	1	0	1	1	1	1	1	0	0	0	0	1	1	0	1	0
<i>E. unimaculata</i>	0	0	-	-	0	0	0	0	1	0	1	0	1	0	0	0	0	0	1	0
<i>E. brevispina</i>	?	0	-	-	1	1	?	?	1	1	0	?	1	0	?	0	?	0	1	0
<i>E. bucolica</i>	0	0	-	-	1	1	0	1	1	1	1	0	1	0	1	1	1	0	1	0
<i>E. californiensis</i>	0	0	-	-	1	1	0	0	1	0	1	?	1	0	1	0	1	0	1	0
<i>E. cameronensis</i>	0	0	-	-	1	1	0	1	1	1	1	?	1	0	1	0	1	0	1	0
<i>E. catarina</i>	0	0	-	-	1	1	0	0	1	1	0	0	1	0	1	0	1	0	1	0
<i>E. cazieri</i>	0	0	-	-	1	0	0	1	1	0	0	0	1	0	0	0	1	0	1	0
<i>E. cepina</i>	0	1	0	1	1	0	1	0	1	0	0	?	?	0	1	1	1	0	1	0
<i>E. cidae</i>	0	0	-	?	1	1	0	0	1	1	1	0	?	0	0	0	1	0	1	0
<i>E. clavispina</i>	0	0	-	-	1	1	1	1	1	1	0	0	1	0	0&1	1	1	0	1	0
<i>E. conchlea</i>	0	1	0	1	1	0	1	0	1	1	0	?	1	0	1	1	1	0	1	0
<i>E. conformans</i>	0	0	-	-	1	0	1	0	1	1	0	?	0	0	?	0	1	0	1	0
<i>E. cuia</i>	0	0	-	-	1	0	1	1	1	1	1	0	?	0	1	1	1	0	1	0
<i>E. crista</i>	0	0	-	-	1	1	0	0	1	1	1	0	?	0	1	0	1	0	1	0
<i>E. delasmata</i>	0	0	-	-	1	1	1	0	1	1	0	0	0	0	0	0	1	0	1	0
<i>E. delecta</i>	0	0	-	-	1	0	1	1	1	0	0	?	1	0	?	0	1	0	1	0
<i>E. devia</i>	-	0	-	-	0	0	0	0	1	0	0	?	0	0	?	1	0	0	1	0
<i>E. eldorado</i>	0	0	-	-	1	1	0	1	1	1	1	0	1	0	1	1	1	0	1	0
<i>E. eleuthera</i>	0	0	-	-	1	1	0	0	1	0&1	0	0	1	0	1	0	1	0	1	0
<i>E. ericae</i>	0	0	-	-	1	1	0	0	1	1	1	?	1	0	0	1	1	0	1	0
<i>E. farroupilha</i>	0	0	-	-	1	0	0	0	1	1	1	1	1	0	1	1	1	0	1	0
<i>E. fragilis</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>E. fuscovittata</i>	0	0	-	-	1	0	1	0	1	1	0	?	1	0	?	0	1	0	1	0
<i>E. gonygater</i>	0	0	-	-	1	1	0	0	1	1	1	?	?	0	?	0	1	0	1	0
<i>E. guarani</i>	0	0	-	-	1	1	0	0	1	1	0	0	?	0	1	0	1	0	1	0

	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140
<i>E. guttata</i>	0	0	-	-	1	1	0	0	1	1	1	?	1	0	1	1	1	0	1	0
<i>E. inconstans</i>	0	0	-	-	1	0	0	0	1	1	0	?	0	0	1	1	1	0	1	0
<i>E. ingênu</i>	0	0	-	-	1	1	0	0	1	1	?	?	?	0	?	?	?	0	1	0
<i>E. inóxia</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>E. exigua</i>	-	0	-	-	0	0	?	0	1	1	0	?	?	0	?	0	0	0	1	0
<i>E. itapocuensis</i>	0	0	-	-	1	1	0	1	1	1	1	0	?	0	1	0	1	0	1	0
<i>E. illicita</i>	0	0	-	-	1	1	0	0	1	1	1	1	1	0	1	0	1	0	1	0
<i>E. lata</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>E. latebricola</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>E. levii</i>	0	0	-	-	1	0	0	1	1	1	1	0	?	0	1	1	1	0	1	0
<i>E. lisei</i>	0	0	-	-	1	1	0	0	?	0	1	0	?	0	1	0	1	0	1	0
<i>E. lunulifera</i>	0	0	-	-	1	?	?	?	?	?	?	?	?	0	?	?	?	0	1	0
<i>E. meridionalis</i>	0	0	-	-	1	1	0	0	1	1	0	0	1	0	1	0	1	0	1	0
<i>E. mimica</i>	0	0	-	-	1	0	1	1	1	1	1	?	1	0	1	1	1	0	1	0
<i>E. minúscula</i>	0	0	-	-	1	0	0	0	1	1	1	0	?	0	1	1	1	0	1	0
<i>E. montivaga</i>	0	0	-	-	1	1	0	1	1	1	1	0	?	0	1	1	1	0	1	0
<i>E. rustica</i>	0	0	-	-	1	1	0	0	1	1	0	?	?	0	?	0	1	0	1	0
<i>E. mourei</i>	0	0	-	-	1	0	0	0	1	1	1	1	?	0	1	1	1	0	1	0
<i>E. mucronatella</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>E. nasuta</i>	0	0	-	-	1	1	0	0	1	1	0	0	?	0	0	1	?	0	1	0
<i>E. novemmamillata</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>E. oblonga</i>	0	0	-	-	1	0	0	0	1	1	0	?	1	0	1	0	1	0	1	0
<i>E. occidentalis</i>	0	0	-	-	1	1	0	0	1	1	0	0	1	0	1	0	1	0	1	0
<i>E. orientalis</i>	0	0	-	-	1	1	0	0	1	1	0	0	1	0	1	0	1	0	1	0
<i>E. pallida</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>E. palmares</i>	0	0	-	-	1	0	1	0	1	1	1	0	?	0	1	0	1	0	1	0
<i>E. perdita</i>	?	0	-	-	0	0	0	0	?	0	0	?	?	0	?	0	?	0	1	0
<i>E. pérfida</i>	0	0	-	-	0	0	0	1	1	1	1	1	?	0	1	0	1	0	1	0
<i>E. photographica</i>	0	0	-	-	1	0	0	?	?	?	1	?	?	0	?	0	1	0	1	0
<i>E. redundans</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>E. rosae</i>	0	1	0	1	1	0	1	0	1	1	0	?	1	0	1	1	1	0	1	0
<i>E. rubroguttulata</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>E. saga</i>	0	0	-	-	1	1	0	0	1	1	1	0	0	0	1	1	1	0	1	0
<i>E. sagana</i>	0	0	-	-	1	1	0	0	1	1	1	0	1	0	1	1	1	0	1	0
<i>E. scutigera</i>	0	0	-	-	1	1	1	0	1	1	1	0	1	0	1	1	1	0	1	0
<i>E. secta</i>	-	0	-	-	0	0	0	0	1	1	1	0	?	1	0	1	0	0	1	0
<i>E. sedula</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>E. semifoliata</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>E. smaragdinea</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>E. scitula</i>	0	0	-	-	1	1	0	0	1	1	0	0	1	0	1	0	1	0	1	0
<i>E. tantula</i>	?	0	-	-	1	0	0	0	1	0	0	?	0	0	?	0	?	0	1	0
<i>E. taquara</i>	0	0	-	-	1	1	0	1	1	1	1	0	?	0	1	0	1	0	1	0
<i>E. tribrachiata</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>E. trinitatis</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>E. ulecebrosa</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>E. vellardi</i>	0	0	-	-	1	0	0	0	1	1	0	0	?	0	1	0	1	0	1	0
<i>E. vegeta</i>	?	0	-	-	1	1	0	1	1	1	1	?	1	0	?	1	1	0	1	0
<i>E. venusta</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>E. histrio</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>E. viridipedata</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?

	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160
<i>Nephila clavipes</i>	-	-	-	?	-	-	-	-	1	1	1	1	0	-	-	-	-	-	-	-
<i>Zygiella atrica</i>	0	0	1	-	0	-	0	1	1	1	0	0	0	-	-	-	-	-	-	-
<i>Kaira altiventer</i>	0	0	1	-	0	-	0	2	0	1	0	1	1	?	0	0	0	1	0	0
<i>Metepeira compsa</i>	0	0	1	-	0	-	0	2	0	1	1	1	1	?	0	0	0	1	0	0
<i>Cyclosa conica</i>	0	0	0	-	0	-	-	0	0	1	0	0	1	?	?	?	1	0	?	?
<i>Cyclosa camargoi</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>Neoscona moreli</i>	0	0	0	-	0	-	0	1	0	1	-	0	1	0	?	0	0	1	0	0
<i>Neoscona adianta</i>	0	0	0	-	0	-	0	1	0	1	?	0	1	0	0	0	0	1	0	0
<i>Larinia directa</i>	1	1	0	-	0	-	-	1	0	1	1	1	1	1	0	0	0	1	0	0
<i>Larinia montecarlo</i>	0	0	0	-	0	-	-	1	0	1	1	1	1	1	0	0	0	1	?	0
<i>Araneus unanimus</i>	1	0	1	-	0	-	0	0	0	1	0	0	1	0	0	0	0	1	0	0
<i>Araneus diadematus</i>	1	0	1	-	0	-	0	0	0	1	1	0	1	0	1	0	0	1	1	0
<i>Mangora fundo</i>	0	0	0	0	0	-	0	0	0	1	1	1	1	0	0	0	0	1	0	0
<i>Mangora bocaina</i>	0	0	0	0	0	-	0	0	0	1	1	1	1	0	0	0	0	1	0	0
<i>Metazygia wittfeldae</i>	1	0	0	0	0	-	0	0	0	1	1	1	1	1	1	1	0	1	1	0
<i>Metazygia gregalis</i>	1	0	0	-	0	-	0	0	0	1	1	0	1	0	0	0	-	0	0	0
<i>Metazygia yobena</i>	1	0	0	-	0	-	0	0	0	0	1	1	1	0	0	0	-	0	0	0
<i>Metazygia isabelae</i>	1	0	0	0	1	0	0	0	0	0	1	1	1	1	0	1	0	0	-	0
<i>Metazygia rogenho</i>	0	0	0	-	1	0	0	0	0	0	1	1	1	1	1	0	0	1	1	1
<i>Alpaida delicata</i>	0	0	0	-	0	-	0	0	0	1	1	0	1	1	1	-	1	0	?	0
<i>Alpaida bicornuta</i>	0	0	0	-	0	-	0	0	0	1	1	1	1	0	1	-	1	0	?	0
<i>Alpaida grayi</i>	0	0	0	-	0	-	0	0	0	1	1	1	1	0	?	?	1	0	?	0
<i>Bertrana rufostriata</i>	0	0	1	-	0	-	0	0	0	1	1	1	1	1	0	0	0	0	-	0
<i>Enacrosoma anomalu</i>	0	0	0	-	0	-	-	0	0	1	0	0	1	?	?	-	0	0	-	-
<i>Wixia abdominalis</i>	0	0	0	-	0	-	-	1	0	1	1	1	1	?	-	-	-	-	-	-
<i>Acacesia villalobosi</i>	0	0	0	-	0	-	-	1	0	1	0	1	1	1	0	0	0	0	-	-
<i>Acacesia hamata</i>	0	0	0	-	0	-	-	1	0	1	0	1	1	1	0	0	0	0	-	-
<i>E. albiventer</i>	1	0	0	0	1	0	0	0	0	0	1	1	1	0	1	0	0	1	1	0
<i>E. anastera</i>	1	0	0	0	1	0	1	0	0	0	1	1	1	0	1	0	0	1	1	0
<i>E. banksi</i>	1	0	0	0	1	1	0	0	0	0	1	1	1	0	1	1	0	1	1	0
<i>E. belissima</i>	1	0	0	0	1	0	1	0	0	1	1	1	1	0	1	0	0	1	0	0
<i>E. bifida</i>	1	0	0	0	1	0	1	0	0	0	1	1	1	0	1	1	0	1	1	0
<i>E. unimaculata</i>	1	0	0	0	1	0	0	0	0	1	1	1	1	1	1	0	0	1	0	0
<i>E. brevispina</i>	1	0	0	0	1	0	0	0	0	0	1	1	1	0	1	?	0	1	?	0
<i>E. bucolica</i>	1	0	0	0	1	0	0	0	0	0	1	1	1	0	1	1	0	1	1	0
<i>E. californiensis</i>	1	0	0	0	1	0	0	0	0	0	1	1	1	0	1	0	0	1	1	0
<i>E. cameronensis</i>	1	0	0	0	1	0	0	0	0	0	1	1	1	0	1	1	0	1	1	0
<i>E. catarina</i>	1	0	0	0	1	0	0	0	0	0	1	1	1	0	1	1	0	1	1	0
<i>E. cazieri</i>	1	0	0	0	1	0	0	0	0	1	1	1	1	1	0	0	0	1	0	0
<i>E. cepina</i>	1	0	0	0	1	0	1	0	0	0	1	1	1	0	1	1	0	1	1	0
<i>E. cidae</i>	1	0	0	0	1	0	0	0	0	1	1	1	1	0	1	0	0	1	1	0
<i>E. clavispina</i>	1	0	0	0	1	1	0	0	0	0	1	1	1	0	1	1	0	1	0	0
<i>E. conchlea</i>	1	0	0	0	1	0	1	0	0	0	1	1	1	0	1	?	0	1	1	0
<i>E. conformans</i>	1	0	0	0	1	0	0	0	0	0	1	1	1	0	1	0	0	1	1	0
<i>E. cuia</i>	1	0	0	0	1	1	0	0	0	0	1	1	1	0	1	1	0	1	1	0
<i>E. crista</i>	1	0	0	0	1	0	0	0	0	1	1	1	1	0	1	0	0	1	0	0
<i>E. delasmata</i>	1	0	0	0	1	0	1	0	0	0	1	1	1	0	1	1	0	1	0	0
<i>E. delecta</i>	1	0	0	0	1	1	0	0	0	0	1	1	1	0	1	0	0	1	1	0
<i>E. devia</i>	1	0	0	1	1	0	0	0	0	0	1	1	1	0	1	1	0	1	?	0
<i>E. eldorado</i>	1	0	0	0	0	1	0	0	0	0	1	1	1	0	1	1	0	1	0	0
<i>E. eleuthera</i>	1	0	0	0	1	0	0	0	0	0	1	1	1	0	1	?	0	1	1	0
<i>E. ericae</i>	1	0	0	0	1	0	0	0	0	0	1	1	1	0	1	1	0	1	1	1
<i>E. farroupilha</i>	1	0	0	0	1	0	0	0	0	0	1	1	1	0	1	1	0	1	1	1
<i>E. fragilis</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>E. fuscovittata</i>	1	1	0	0	1	1	0	0	0	0	1	1	1	1	1	1	0	1	1	1
<i>E. gonygater</i>	1	0	0	0	1	0	0	0	0	0	1	1	1	0	1	0	0	1	1	0
<i>E. guarani</i>	1	0	0	0	1	0	0	0	0	0	1	1	1	1	1	0	0	1	?	0

	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160
<i>E. guianensis</i>	1	0	0	0	1	0	0	0	0	0	1	1	1	0	1	0	0	1	1	1
<i>E. guttata</i>	1	0	0	0	1	0	0	0	0	0	1	1	1	0	1	0	0	1	1	0
<i>E. inconstans</i>	1	0	0	0	1	0	0	0	0	0	1	1	1	0	1	0	0	1	0	0
<i>E. ingênu</i>	1	0	0	0	1	0	0	0	0	0	1	1	1	0	1	1	0	1	1	0
<i>E. inóxia</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>E. exigua</i>	1	0	0	1	1	0	0	0	0	0	1	1	1	0	1	0	0	1	1	0
<i>E. itapocuensis</i>	1	0	0	0	1	0	1	0	0	0	1	1	1	0	1	1	0	1	0	0
<i>E. illicita</i>	1	0	0	0	1	0	0	0	0	0	1	1	1	0	1	1	0	1	1	0
<i>E. lata</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>E. latebricola</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>E. levii</i>	1	0	0	0	1	0	0	0	0	1	1	1	1	1	1	1	0	1	0	0
<i>E. lisei</i>	1	0	0	0	1	0	0	0	0	0	1	1	1	0	1	0	0	1	0	0
<i>E. lunulifera</i>	?	0	0	0	1	0	0	0	0	?	1	1	1	0	?	?	0	?	?	?
<i>E. meridionalis</i>	1	0	0	0	1	0	0	0	0	0	1	1	1	0	1	1	0	1	1	0
<i>E. mimica</i>	1	0	0	0	1	1	0	0	0	0	1	1	1	0	1	1	0	1	1	0
<i>E. minúscula</i>	1	0	0	0	1	1	0	0	0	0	1	1	1	0	1	1	0	1	1	1
<i>E. montivaga</i>	1	0	0	0	1	0	0	0	0	0	1	1	1	0	1	1	0	1	1	0
<i>E. rustica</i>	1	0	0	0	1	0	0	0	0	0	1	1	1	0	1	0	0	1	0	0
<i>E. mourei</i>	1	0	0	0	1	0	0	0	0	0	1	1	1	0	1	1	0	1	1	1
<i>E. mucronatella</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>E. nasuta</i>	1	0	0	0	1	1	1	0	0	0	1	1	1	1	1	1	0	1	1	0
<i>E. novemmamillata</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>E. oblonga</i>	1	0	1	0	1	0	0	0	0	1	1	1	1	0	1	1	0	1	1	0
<i>E. occidentalis</i>	1	0	0	0	1	0	0	0	0	0	1	1	1	0	1	1	0	1	1	0
<i>E. orientalis</i>	1	0	0	0	1	0	0	0	0	0	1	1	1	0	1	1	0	1	1	0
<i>E. pallida</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>E. palmares</i>	1	0	0	0	1	0	0	0	0	0	1	1	1	0	1	1	0	1	1	0
<i>E. perdita</i>	1	0	0	1	1	0	0	0	0	0	1	1	1	0	1	0	0	1	1	0
<i>E. pérfida</i>	1	0	0	0	1	0	1	0	0	1	1	1	1	1	1	1	0	1	1	0
<i>E. photographica</i>	1	0	0	0	1	0	0	0	0	0	1	1	1	0	1	1	0	1	1	1
<i>E. redundans</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>E. rosae</i>	1	0	0	0	1	0	1	0	0	0	1	1	1	0	1	?	0	1	1	0
<i>E. rubroguttulata</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>E. saga</i>	1	0	1	0	1	0	0	0	0	1	1	1	1	1	1	0	0	1	1	1
<i>E. sagana</i>	1	0	1	0	1	0	0	0	0	1	1	1	1	1	1	0	0	1	1	1
<i>E. scutigera</i>	1	0	0	0	1	0	0	0	0	0	1	1	1	0	1	1	0	1	1	0
<i>E. secta</i>	1	0	0	0	1	0	0	0	0	0	0	1	1	1	1	1	0	1	1	1
<i>E. sedula</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>E. semifoliata</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>E. smaragdinea</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>E. scitula</i>	1	0	0	0	1	0	0	0	0	0	1	1	1	0	1	0	0	1	0	0
<i>E. tantula</i>	1	0	0	1	1	0	0	0	0	0	1	1	1	0	1	0	0	1	0	0
<i>E. taquara</i>	1	0	0	0	1	0	0	0	0	0	1	1	1	0	1	0	0	1	1	0
<i>E. tribrachiata</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>E. trinitatis</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>E. ulecebrosa</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>E. vellardi</i>	1	0	0	0	1	0	0	0	0	1	1	1	1	0	1	0	0	1	1	0
<i>E. vegeta</i>	1	0	0	0	1	0	1	0	0	1	1	1	1	0	1	1	0	1	1	0
<i>E. venusta</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>E. histrio</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>E. viridipedata</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?

	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179
<i>Nephila clavipes</i>	-	0	0	-	-	-	-	0	-	-	-	-	?	-	-	0	-	0	0
<i>Zygiella atrica</i>	-	1	0	-	-	-	-	0	-	-	-	-	?	-	-	0	-	0	0
<i>Kaira altiventer</i>	0	0	1	0	0	1	?	1	0	0	?	0	1	0	0	0	0	0	0
<i>Metepeira compsa</i>	1	0	1	0	0	0	?	1	1	0	?	1	0	0	0	0	1	0	0
<i>Cyclosa conica</i>	?	?	0	-	-	-	-	1	1	0	?	0	0	0	?	?	-	?	?
<i>Cyclosa camargoi</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>Neoscona moreli</i>	1	0	1	0	-	-	-	?	?	0	1	0	0	0	?	1	0	0	1
<i>Neoscona adianta</i>	1	0	0	-	-	-	-	1	1	0	?	1	0	0	?	1	0	0	0
<i>Larinia directa</i>	1	0	1	0	0	0	?	1	0	0	2	0	0	0	0	0	0	0	1
<i>Larinia montecarlo</i>	?	0	1	0	0	1	?	1	0	0	?	0	1	0	0	0	1	0	0
<i>Araneus unanimus</i>	1	0	1	0	0	0	?	1	?	0	?	0	?	0	?	0	0	0	0
<i>Araneus diadematus</i>	1	0	?	-	-	-	-	1	0	0	?	0	1	0	?	0	0	1	0
<i>Mangora fundo</i>	?	1	1	0	0	0	?	1	?	0	1	1	?	0	?	0	0	0	0
<i>Mangora bocaina</i>	0	1	1	0	0	1	?	1	1	0	?	1	0	0	?	0	0	0	0
<i>Metazygia wittfeldae</i>	0	1	1	1	1	1	?	1	0	0	?	0	1	0	0	0	1	0	0
<i>Metazygia gregalis</i>	0	0	0	-	-	-	-	0	-	-	-	-	-	-	-	0	-	0	1
<i>Metazygia yobena</i>	0	0	0	-	-	-	-	0	-	-	-	-	-	-	-	0	-	1	1
<i>Metazygia isabellae</i>	?	1	1	1	0	1	?	1	0	1	?	0	1	0	0	0&1	1	0	0
<i>Metazygia rogenho</i>	?	0	1	0	-	-	-	1	1	1	1	0	0	0	-	0	1	0	0
<i>Alpaida delicata</i>	0	1	1	0	-	-	-	1	1	0	1	1	0	0	-	0	-	0	0
<i>Alpaida bicornuta</i>	0	0	1	0	-	-	-	1	0	0	2	1	1	0	-	0	-	0	1
<i>Alpaida grayi</i>	0	0	1	0	-	1	-	1	0	0	2	1	0	0	-	0	-	0	1
<i>Bertrana rufostriata</i>	0	1	1	0	-	-	-	0	?	0	?	1	?	0	-	0	0	0	0
<i>Enacrosoma anomalu</i>	-	1	0	-	-	-	-	1	0	0	?	1	?	0	-	0	-	0	0
<i>Wixia abdominalis</i>	-	?	?	1	?	?	?	1	?	?	?	?	?	?	?	0	-	1	0
<i>Acacesia villalobosi</i>	-	0	1	0	0	0	?	1	1	0	1	0	0	0	1	0	0	0	1
<i>Acacesia hamata</i>	-	0	1	0	0	0	?	1	1	0	1	0	0	0	1	0	0	0	1
<i>E. albiventer</i>	0	0	1	1	1	0	0	1	1	1	0	0	0	0	0	0	0	0	1
<i>E. anastera</i>	1	0	1	1	0	0	0	1	1	1	0	0	0	0	0	0	1	0	1
<i>E. banksi</i>	0	0	1	1	1	0	1	1	0	1	0	0	0	0	0	1	1	0	1
<i>E. belissima</i>	0	0	1	1	0	0	0	1	0	1	0	0	0	1	0	1	1	0	1
<i>E. bifida</i>	0	0	1	1	0	0	0	1	0	1	0	0	0	0	0	0	1	0	0
<i>E. unimaculata</i>	0	0	1	1	0	1	-	1	0	0	1	1	0	0	0	0	1	0	1
<i>E. brevispina</i>	?	0	1	1	?	0	?	1	0	1	?	1	0	?	?	1	0	1	1
<i>E. bucolica</i>	1	0	1	1	0	0	0	1	0	1	1	0	0	0	0	1	1	0	1
<i>E. californiensis</i>	0	1	1	1	-	0	?	1	0	0	2	1	0	0	0	0	1	0	1
<i>E. cameronensis</i>	1	0	1	1	0	0	?	1	1	1	?	0	0	0	0	1	0	0	1
<i>E. catarina</i>	0	0	1	1	0	0	?	1	0	1	1	0	1	0	0	0	0	1	1
<i>E. cazieri</i>	0	0	1	0	0	0	-	1	1	0	2	1	0	0	0	1	1	1	0
<i>E. cepina</i>	?	0	1	1	0	0	?	1	1	1	?	0	0	0	0	1	1	0	1
<i>E. cidae</i>	0	0	1	1	0	0	1	1	0	1	2	0	0	0	1	1	1	0	1
<i>E. clavispina</i>	0	0	1	1	0	0	0	1	0	1	1	0	0	0	0	1	1	0	1
<i>E. conchlea</i>	?	0	1	1	0	0	?	1	1	1	?	0	0	1	0	1	1	0	1
<i>E. conformans</i>	0	0	1	1	0	0	?	1	1	1	?	0	0	1	0	1	1	0	1
<i>E. cuia</i>	1	0	1	1	0	0	0	1	0	1	0	0	0	0	0	0	1	0	1
<i>E. crista</i>	0	0	1	1	0	0	1	1	0	1	1	0	0	0	1	0	0	1	1
<i>E. delasmata</i>	0	0	1	1	0	0	0	1	1	1	0	0	0	0	0	1	1	0	1
<i>E. delecta</i>	0	0	1	1	0	0	?	1	0	0	?	0	0	1	0	0	1	0	1
<i>E. devia</i>	?	1	1	1	0	1	?	1	1	1	?	0	1	0	0	0	0	1	0
<i>E. eldorado</i>	1	0	1	1	0	0	0	1	0	1	0	0	0	0	0	0	1	1	1
<i>E. eleuthera</i>	?	0	1	1	0	0	?	1	1	1	?	0	0	1	0	1	0	0	0
<i>E. ericae</i>	1	0	1	0	0	0	-	1	0	0	1	1	0	0	-	0	1	1	0
<i>E. farroupilha</i>	0	0	1	0	1	0	1	1	0	0	1	1	0	0	0	1	1	0	1
<i>E. fragilis</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>E. fuscovittata</i>	?	0	1	1	0	0	-	1	0	0	?	1	0	0	-	1	1	0	1
<i>E. gonygater</i>	?	0	1	1	0	0	-	1	1	1	-	0	0	1	0	1	1	0	1
<i>E. guarani</i>	0	0	1	1	0	0	0	1	0	1	0	0	0	0	0	0	1	0	1



	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179
<i>E. guianensis</i>	?	0	1	1	0	0	-	1	0	0	?	1	0	0	-	1	0	0	1
<i>E. guttata</i>	?	0	1	1	0	0	?	1	0	1	?	0	0	0	0	1	1	1	1
<i>E. inconstans</i>	0	0	1	0	0	0	?	1	0	0	?	0	0	0	-	1	0	0	1
<i>E. ingêna</i>	?	0	1	1	0	0	?	1	0	1	0	0	0	0	0	1	1	1	1
<i>E. inóxia</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>E. exigua</i>	0	1	1	1	0	1	?	1	0	1	?	1	1	0	0	0	1	1	0
<i>E. itapocuensis</i>	?	0	1	1	0	0	0	1	1	1	0	0	0	0	0	0	1	0	1
<i>E. illicita</i>	?	0	1	1	0	0	-	1	0	0	1	1	0	-	-	1	0	1	1
<i>E. lata</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>E. latebricola</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>E. levii</i>	0	0	1	1	0	0	0	1	1	1	0	0	1	0	0	1	0	0	1
<i>E. lisei</i>	0	0	1	1	0	0	0	1	1	1	0	0	0	0	0	0	1	0	1
<i>E. lunulifera</i>	?	?	?	?	?	?	?	1	1	?	?	0	0	?	0	?	?	0	1
<i>E. meridionalis</i>	?	0	1	1	0	0	0	1	1	1	0	0	0	0	0	1	1	0	1
<i>E. mimica</i>	?	0	1	1	0	0	?	1	1	1	?	0	0	1	0	1	0	0	1
<i>E. minúscula</i>	1	0	1	0	0	0	-	1	0	0	1	1	0	0	-	0	1	1	1
<i>E. montivaga</i>	0	0	1	1	1	0	0	1	1	1	0	0	0	1	0	1	1	0	1
<i>E. rustica</i>	0	0	1	1	0	0	?	1	1	1	?	0	0	0	0	1	0	0	1
<i>E. mourei</i>	1	0	1	0	1	0	1	1	0	0	1	1	0	0	-	1	1	0	1
<i>E. mucronatella</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>E. nasuta</i>	0	0	1	1	0	0	0	1	1	1	0	0	0	0	0	0	1	0	1
<i>E. novemmamillata</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>E. oblonga</i>	0	0	1	1	0	0	?	1	0	0	?	1	0	0	0	0	0	0	1
<i>E. occidentalis</i>	?	0	1	1	0	0	0	1	0	1	0	0	0	0	0	1	1	0	1
<i>E. orientalis</i>	0	0	1	1	0	0	0	1	0	1	0	0	0	1	0	1	1	0	1
<i>E. pallida</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>E. palmares</i>	1	0	1	1	1	0	0	1	1	1	0	0	0	1	0	1	1	0	1
<i>E. perdita</i>	?	1	1	1	0	1	?	1	0	1	?	0	1	0	0	0	0	0	0
<i>E. pérfida</i>	0	0	1	1	0	0	1	1	1	1	0	0	0	0	0	0	0	1	1
<i>E. photographica</i>	?	?	1	0	1	0	1	1	0	0	?	1	0	0	-	1	1	1	1
<i>E. redundans</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>E. rosae</i>	?	0	1	1	0	0	?	1	1	1	?	0	0	?	0	1	1	0	1
<i>E. rubroguttulata</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>E. saga</i>	0	0	1	1	0	0	-	1	0	0	1	0	0	0	-	0	1	0	1
<i>E. sagana</i>	0	0	1	1	0	0	-	1	0	0	1	0	0	0	-	0	1	0	1
<i>E. scutigera</i>	0	0	1	1	0	0	0	1	1	1	0	0	0	1	0	1	1	0	1
<i>E. secta</i>	0	1	1	1	0	0	1	1	0	1	1	0	0	0	0	0	1	1	1
<i>E. sedula</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>E. semifoliata</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>E. smaragdinea</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>E. scitula</i>	1	0	1	1	0	0	0	?	1	1	0	0	0	1	0	1	1	0	1
<i>E. tantula</i>	?	1	1	1	0	1	?	?	0	1	?	0	1	0	0	0	0	1	0
<i>E. taquara</i>	1	0	1	1	0	0	0	?	0	1	0	0	0	0	0	1	1	0	1
<i>E. tribrachiata</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>E. trinitatis</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>E. ulecebrosa</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>E. vellardi</i>	0	0	1	1	0	0	0	?	0	1	1	0	0	0	0	0	0	0	1
<i>E. vegeta</i>	?	0	1	1	0	0	?	?	0	1	?	0	0	0	0	1	1	1	1
<i>E. venusta</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>E. histrio</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>E. viridipedata</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?

All supplementary material could be accessed via < <https://goo.gl/6LqrLC> >

**Supplementary material 1.**

Link to matrix “eustalamatrix.nex”

**Supplementary material 2.**

Link to Excel spreadsheets containing K's calculation of the continuous and discrete characters partitions, and similarity indexes resulting from the IW schemes per pair comparison.

**Supplementary material 3.**

Batch “eustalroutine” to heuristic searches described in Material and Methods section.

**Supplementary material 4.**

Batch “eustalsupport” to calculation of relative Bremer support and symmetric resampling as described in Material and Methods section.

**Supplementary material 5.**

Figures of EW and IW trees with relative Bremer support, symmetric resampling and optimization of the unambiguous characters.

## Supplementary material 6.

Morphology of the male palpal organ in the subfamily Araneinae (Araneae: Araneidae).

The basic composition of araneid male palp was illustrated and discussed by many authors along the years by labeling the sclerites of an expanded palp (e.g. Simon 1895; Comstock 1912, 1940; Grasshoff 1973) and/or discussing the copulation process (e.g. Grasshoff 1968, 1973). Herbert W. Levi tried to standardize Araneidae nomenclature for taxonomic revisions, including illustrations in different angles of unexpanded and expanded palps, labeling the sclerites and seeking for features that could be useful for taxonomic studies (Leibensperger 2016). Later, Coddington (1990) presented a discussion of the ontogeny and homology of the male genitalia among orb-weaving spiders and relatives, although, no clear definition on sclerites among the studied taxa was presented. Also, due to the complexity of the araneid male palp propositions on homology among its sclerites revealed to be a challenge – as noticed by Scharff and Coddington (1997), which reduced the use of palpal structures on their phylogenetic analysis for this reason.

Although the nomenclature proposed by Comstock (1912, 1940) is mostly consistent with those presented by subsequent authors, some sclerites have contentious names, as pointed out by Camargo (1953) and summarized hereafter (SM6 Table I). For example, F.O.-Pickard-Cambridge (1904) called the paracymbium by two different names, “uncus” and “tarsal hook” (see F.O.-Pickard-Cambridge 1904, pl.47 figure 14A and pl.48 figure 7A, respectively). Incongruences in sclerite definitions go beyond nomenclatural problems and may compromise phylogenetic inferences.

With all these problems in mind, here we bring substantial information on the araneid male palpal organ and clarify some *lapses* that occurred along the years and

present three new sclerites. This is of extreme importance due its implications on taxonomic nomenclature and homology statements on phylogenetic analysis.

This study was based on the analysis of the expanded palp and scanning electron microscopy images (SEM) of representatives of 16 Araneinae' genera (*sensu* Scharff and Coddington 1997): *Zygiella* F.O. Pickard-Cambridge, 1902, *Kaira* O. Pickard-Cambridge, 1889, *Metepeira* F.O. Pickard-Cambridge, 1903 *Cyclosa* Menge, 1866, *Neoscona* Simon, 1864, *Larinia* Simon, 1874, *Araneus* Clerk, 1757, *Mangora* O. Pickard-Cambridge, 1889, *Metazygia* F.O. Pickard-Cambridge, 1904, *Alpaida* O. Pickard-Cambridge, 1889, *Bertrana* Keyserling, 1884, *Enacrosoma* Mello-Leitão, 1932, *Wixia* O. Pickard-Cambridge, 1882, *Acacesia* Simon, 1895, and *Eustala* Simon, 1895 (details of specimen data in Supplementary material 6.1).

Male palps were expanded by submersion in 10% KOH and then transferred to distilled water. For the scanning electron micrographs (SEM), the expanded palps were immersed in Glutaraldehyde 25% for two hours, then submitted to dehydration by crescent alcohol concentration series (90%, 96%, 100%), then moved to acetone 100% and submitted to critical-pointed dried. Afterwards, the dried structures were fixed in stubs and coated with palladium or gold. A JEOL JSM-6335-F scanning electron microscope (in ZMUC) and a Philips XL 30 field-emission scanning electron microscope (in CEMM-PUCRS) were used to analyze the ultrastruture of morphological external features of the palp. The stereomicroscopes Leica M205A (MCTP), Leica M205AC (ZMUC) and a camera Canon EOS 7D fitted on BK Plus Laboratory System (ZMUC) were used to genarete the images, this latter with photo automontage using Helicon Focus v.5.3. Subsequently, the images were processed in Photoshop 6.

We standardized our observations following the route of the ejaculatory duct, which basically runs through (SM6. Fig. 1): Subtegulum > Tegulum > Radix > Stipes > Embolus.

Comstock (1912, 1940) summarized general parts of the palp, which are (in part): “Basal division of the bulb”, including the basal haematodocha and subtegulum; “Middle division of the bulb”, composed by the middle haematodocha, tegulum, median apophysis, and paramedian apophysis; and “Apical division of the bulb”, with the conductor, the embolic subdivision (radix, stipes, embolus, distal haematodocha and terminal apophysis). Coddington (1990) considers the palp to be formed by a “Basal division” (subtegulum and tegulum) and an “Embolic division”. According to Coddington (1990), the basal and embolic divisions are the first parts to be differentiated from each other during the development. Thus, homologies among sclerites from the embolic and basal divisions are considered unlikely. In this way, the divisions proposed by Comstock (1912, 1940) are not suitable currently, since he related sclerites that are developed from distinct regions (e.g. the conductor, which arises from the basal division, and the embolus, from the embolic division).

The male palpal structures are described below and its definitions are improved and discussed when necessary. The structures and/or terminologies are named using the prerogative of priority (starting since Comstock 1912); those sclerites proposed herein for the first time are marked with asterisk.

### *Tarsus*

***Cymbium (Y)***. It is a modified Palp tarsus, which involves partially the bulb, and may partially hide the sclerites (SM6. Figs 1; 2B; SM6.Table I).

***Paracymbium (p)***. Consists in a projection in the basis of the cymbium (Comstock 1912, 1940) (SM6. Figs 1; 5C, D; SM6. Table I). Its shape and position related to the cymbium vary according to the species (Coddington 1990; Grashoff 1968).

#### *Basal division*

***Basal haematodocha (BH)***. The haematodocha consists in a membrane that is filled with hemolymph, expanding the bulbus during the copula (SM6. Figs 1; 2A, B; 6E). The basal haematodocha (BH) connects the cymbium with the bulb properly, and it is visible in the expanded palp (Comstock 1912, 1940).

***Subtegulum (STe)***. It is a sclerotized ring-shaped sclerite that involves the median haematodocha (Comstock 1912, 1940) (SM6. Fig. 1).

***Median haematodocha (MH)***. It is the membranous portion between the subtegulum and tegulum (see Comstock 1940, fig. 106, “middle haematodocha”) (SM6. Figs 1; 2A; 6E).

***Tegulum (T)***. Sclerotized sclerite, ring-shaped, that forms the “wall” of the bulbs from where other sclerites (e.g. conductor) arise (Comstock 1912, 1940) (SM6. Figs 1; 2A; 3B–E; 4A, C–F; 5B–F; 6E; SM6. Table I).

***Conductor (C)***. The conductor arises from the tegulum and is a support to the tip of embolus (Comstock 1912, 1940) (SM6. Figs 1–3; 4A–C, E; 5A–D; 6A, B, D, E; 7A, C–F). The degree of fusion with the tegulum, however, may vary according to the genus (SM6. Figs 3F; 5C). The conductor may be placed in the center of the bulb (SM6. Figs 3E, 4C), or on its edge (SM6. Figs 6B, C, E, F) and usually is strongly sclerotized (SM6. Fig. 3C), but also may be partially membranous (e.g. most *Eustala* has its mesal face soft hyaline and the ventral face dark sclerotized, SM6. Figs 2A; 6E) or membranous (SM6. Figs 4C, E). This wide variation in size and shape confers an important diagnostic feature to this sclerite. Ontogenetically it seems to be related with the median apophysis, since

both arise from the dorsal lobe of the “claw fundament” (Coddington 1990). When expanded (in *Eustala*) the conductor may fit in the basal concavity of the median apophysis.

***Paramedian apophysis (PM)***. The conductor may have a prong arising from its inner edge that usually goes behind the other sclerites (e.g. stipes), emerging under the embolus (SM6. Figs 3C–E; 4A; SM6.Table I) (see Levi 1977, figures 17, 18, 20; see Magalhães and Santos 2012, figures. 21, 22, 39). Yet, the tip of the paramedian apophysis may be pointed (SM6. Fig. 4A) or conspicuously enlarged (SM6. Figs 3C–E) and have distinct textures.

Comstock (1912, see fig. 111) made comments on the paramedian apophysis in *Eriophora* palp, but he did not describe it and mistakenly claimed its connection with the tegulum. Levi (1985) considered the paramedian apophysis a sclerite “usually found near the proximal end of the conductor in the center of the mesal face of the palp”, that may be fused or free from the conductor. Afterwards, Levi (1999) listed three ways in which the paramedian apophysis could be found: attached to the tegulum; linked with the conductor by a membrane; or fused to the conductor, resembling a lobe. However, all species of the 16 genera studied here only present the paramedian apophysis fused with the conductor.

Controversially, in the araneid phylogeny, Scharff and Coddington (1997) scored what is defined herein as paramedian apophysis as “conductor with lobe” (Scharff and Coddington 1997, their character 8). Yet, the structure scored as paramedian apophysis by Scharff and Coddington (1997, their character 18) does not fit in our definition of paramedian apophysis, but do to the so called “conductor lobe” by Levi (1985), as previously noticed by Magalhães and Santos (2012). Thus, the definition of “conductor lobe” remains unclear: it may be found as arising from different portions of the conductor, and also

vary in shape, *e.g.* as a folded portion of the conductor (see Magalhães and Santos 2012, figures. 15, 21), or an elongated prong (see Magalhães and Santos 2011, figures 19, 22, 39; 2012, figure 14). Although inconsistent, both structures were used in the phylogeny of Scharff and Coddington (1997) – which was strongly criticized by Levi (1999) – and the “conductor lobe” of Scharff and Coddington 1997 (char. 18, paramedian apophysis) emerged as one of the five sinapomorphies that support Gasteracanthinae. Finally, we do not find any homologous structure to the “conductor lobe” in Araneinae representatives, but we strongly recommend a review of this structure for a broader study with Araneidae.

***Median apophysis (M).*** It is a sclerite that arises in the distal margin of the tegulum and it is articulated with the distal portion of the radix (Comstock 1912; 1940) (SM6. Figs 1–3; SM6.Table I). The median apophysis may be placed in the center of the bulb (*e.g.*, *Alpaida*, Figure 3C) or on its edge (*e.g.* *Eustala*, *Metazygia*, SM6. Figs 2A; 5C). The median apophysis shape is astonishingly diverse, being usually very sclerotized (SM6. Figs 3C; 4A), but whitish in some genera (*e.g.* *Eustala*, *Larinia* and *Metazygia*, SM6. Figs 3A, B; 4C–F; 6A, E). Sometimes it is covered with ornaments (SM6. Fig. 5A).

***Distal haematodocha (DH).*** It is a membranous portion between the tegulum and the embolic division, responsible for changes in the disposition of the sclerites in the expanded palp (Comstock 1912; 1940; Coddington 1990, figure 8) (SM6. Figs 1; 2A; 6A, E).

#### *Embolic elements*

***Radix (r).*** It is the basal segment of the embolic division, which may be tubular or bifurcate and united by a membrane (Coddington 1990) (SM6. Figs 3B, C; 4E, 5C; 6A). Its proximal portion is related with the median apophysis and its distal one is articulated



with the basal portion of the stipes. Thus, the radix guides the ejaculatory duct until it reaches the stipes (Comstock 1912, 1940).

**Stipes (S).** It is a sclerite which proximally is related to the radix (Comstock 1912, 1940), and distally it is connected to the embolus – leading the ejaculatory duct to the embolus (SM6. Figs 1; 2A, B; SM6.Table I). This connection may be completely fused (SM6. Figs 4C–E) or partially fused (presenting a separation in mesal view, but connected in ectal view) (SM6. Figs 7A–F). In some genera (e.g. *Eustala*, *Acacesia*, *Araneus*) there are terminal sclerites that arise from the stipes (SM6. Fig. 1). Still, the stipes may be provided with an ectal portion termed hereafter as “stalk”.

The stipes is widely used in taxonomy (e.g. Chickering 1955; Levi 1977) and phylogenetic works (Scharff and Coddington 1997, char. 19). However, although presented in morphological works (e.g. Grasshoff 1968, Coddington 1990) this structure was never fully defined. Levi (1999) claimed that the absence/presence of stipes is a “poor character” and should have been avoided by Scharff and Coddington (1997); this is because the stipes could be a subdivision of the radix or just an enlargement of the base of the embolus from where the terminal sclerite arises. Probably the major question is not if this character is “good” or “bad”, but how to delimit it unambiguously on phylogenetic studies.

**\*Stipes stalk (k).** It is an elongated and sclerotized projection that is basally articulated with the distal end of the stipes, and its apex is articulated with the terminal apophysis (SM6. Figs 1; 2A, B; 3F; 5E, F; 6A–D; SM6.Table I). Comstock (1912, 1940) named it as “mesal subterminal apophysis” and “lateral subterminal apophysis”, what seems to be the same structure viewed in different angles (see Comstock 1940, figure 105, 106) (SM6.Table I). We considered it homologous to the “subterminal apophysis” of Levi in some genera (e.g. *Araneus*, Levi 1971, figures 6, 8) and as “terminal apophysis” in *Larinia*

directa (see Levi 1975, figure 3). Additionally, the stalk may have a sclerotized area, which can be more or less conspicuous, termed here as \***“stalk ectal projection” (ke)** (SM6. Figs 2A, B) – pointed by Comstock (1940) as “distal haematodocha” (see Comstock 1940, figure 106).

**\*Terminal haematodocha (TH).** Is a membranous portion between the embolic division and the terminal sclerites, which is inflated in the expanded palp, separating the terminal sclerites from the bulb (SM6. Figs 1; 2A, B; 3F; 5E, F; 6A, C, E; SM6.Table I). The Terminal haematodocha may be absent (e.g. *Metazygia gregalis*, SM6. Fig. 5C; see Levi 1995, figure 260), reduced (e.g. *Neoscona*, see Berman and Levi 1971, figure 5, “DH”), or well developed (e.g. *Eustala*, SM6. Fig. 2A and *Araneus*, SM6. Fig. 3A; see Levi 1971, figure 8, “dist. hemat.”).

Although Comstock (1940) designated the “Distal haematodocha”, herein proposed as Terminal Haematodocha (see Comstock 1940, figures 105, 106, 113), it seems that he neglected the membrane near the embolic sclerites, i.e. the distal hematodacha herein. Levi (1977; 1988) also considered this area as “distal haematodocha” (e.g. Levi 1977, *Metazygia wittfeldae* (McCook, 1894), figure 103; *Eustala anastera* (Walckenaer, 1841), figure 232), nevertheless he mentioned that the absence/presence of this character could group some araneid genera. This homology problem was pointed out by Coddington (1990) and Scharff and Coddington (1997), however they do not distinguish between these membranous areas.

**Subterminal apophysis (S).** The subterminal apophysis is a basal projection of the terminal apophysis (SM6. Figs 1; 2A, B; 5E, F; 6A–C, E, F; 7A–F). It may have a wide variation in shape, from balloon-shaped in many *Eustala* (SM6. Figs 1A, B, 7A–F) and *Metazygia*, to ‘null-shaped’ (Poeta 2014; SM6. Figs 6C, D, E). The null subterminal apophysis may be provided with a membranous finger-like projection (e.g.

*E. photographica* Mello-Letão, 1944, *E. mourei* Mello-Letão, 1947 and *E. farroupilha* Poeta 2014) (SM6. Figs 6E, F). As discussed previously, the subterminal apophysis was mistakenly pointed out by Comstock (1912, 1940) as what is here considered as the stipes stalk. This structure was mostly neglected along the years (e.g. Levi 1971, figures. 6, 8).

**Terminal apophysis (A).** The terminal apophysis is the most apical sclerite of the bulb (Comstock 1912, 1940) (SM6. Figs 1; 2A, B; 5E, F; 6A–F; 7A–F; SM6.Table I). It is usually very sclerotized and has an elongate shape (e.g. needle-shaped, laminar-shaped). In the “*E. devia* group” and some *Metazygia* species (see Levi 1995, figure 45) the TA and the SA seem to have changed places. Levi (1985) wrote that the presence or absence of this structure may be useful to group araneids.

**Embolus (E).** It is a prolongation that corresponds to the terminal portion of the *fundus* that leads ejaculatory duct to its opening (Comstock 1912, 1940) (SM6. Figs 1; 2A, B; 5E, F; 6A–F; 7A–F; SM6.Table I). It is usually very sclerotized, and may be short, as a hook (SM6. Figs 7A–F) or elongated (SM6. Fig. 4B). In the virgin male, the embolus may present a cap (Levi 1971) (SM6. Fig. 3A, arrow).

**Embolus lamella (L).** The embolus may be provided with a basal projection, besides the stipes (SM6. Figs 5E, F) and is usually partially hidden by the stipes. Levi (1995) comments on the difficulty of finding this structures in some species. Despite the poor definition this sclerite was found in several araneid genera – e.g. *Araneus* (see Levi 1991, figures 3, 4), *Neoscona* (see Berman and Levi 1971, figures 2, 3), *Eustala* (see Poeta 2014, figure 19), *Metazygia* (see Levi 1995, figure 45). Yet, the stipes was equivocally called as “embolus lamella” in *Acacesia hamata* (see Glueck 1994, figure 1).

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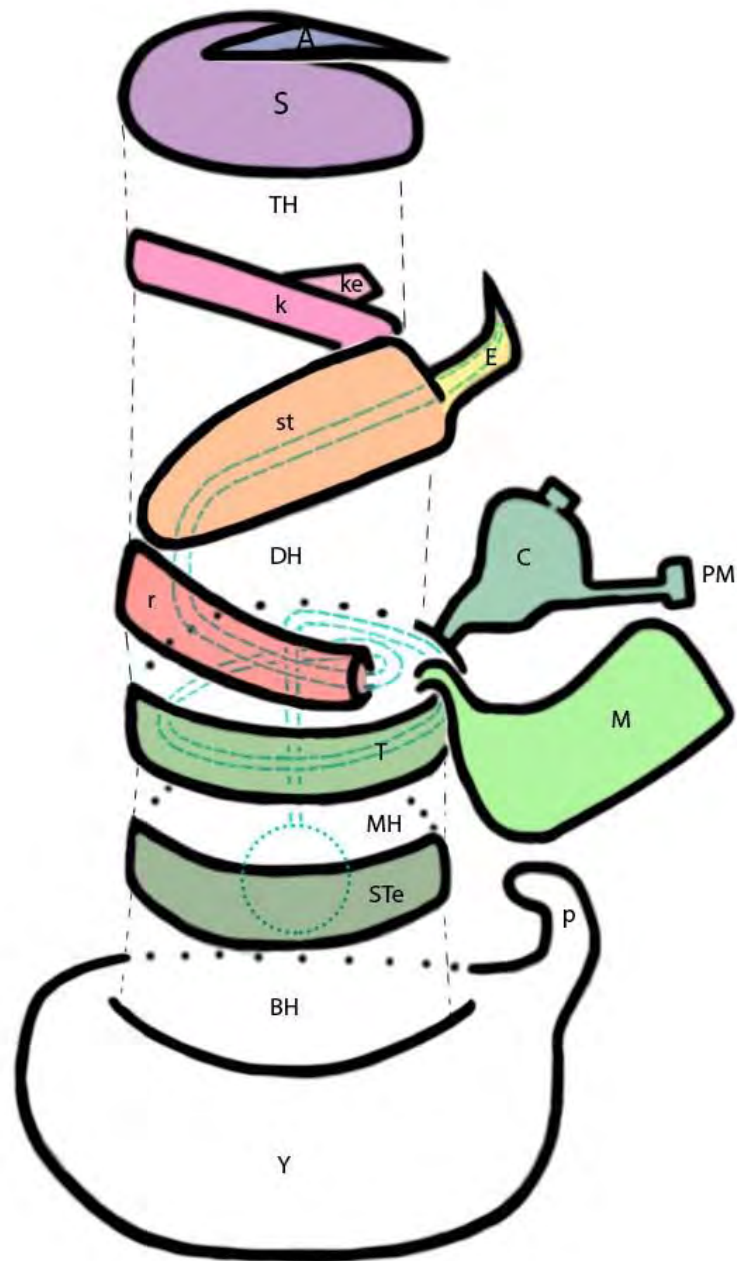
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## Supplementary material 6. Table I.

**Table I.** Comparative sheet showing the names discussed and redefined herein, and alternative names used by other authors.

	<b>Present paper</b>	<b>Different terminology</b>	<b>Authority</b>
<i>Tarsus</i>	<b>Cymbium</b>	"Terminal laminae" "Apophyse basilaire du tarse"	Chickering (1955) (figs A, B) Simon (1985) (fig. 839) Baert (2014) (figs 1A, B)
	<b>Paracymbium</b>	"Tarsal hook" "Uncus"	F.O.-Pickard-Cambridge (1904) (pl.48 figs. 7, 9, 13) Chickering (1955) (figs A, B) F.O.-Pickard-Cambridge (1904) (pl.47 figs. 14A-B)
	<b>Tegulum</b>	"Terminal laminae" "Lamina"	Chickering (1955) (figs A, B) F.O.-Pickard-Cambridge (1904) (pl.47 figs.16A, 17A)
	<b>Median apophysis</b>	"Clavis" "Lamina clavis"	F.O.-Pickard-Cambridge (1904) (pl.48 figs. 3, 7, 9) Chickering (1955) (figs A, B) F.O.-Pickard-Cambridge (1904) (pl.47, figs. 2, 22)
<i>Basal division</i>	<b>Paramedian apophysis</b>	"Conductor tail" "Conductor lobe"	Levi (1977), (1996) (figs. 336, 345) Scharff and Coddington (1997) (fig. 10)
	<b>Stipes</b>	"Embolus lamella"	Glueck (1994) (fig. 1) Levi (1995) (fig. 4) Banks (1929) (fig. 54)
<i>Embolitic division</i>	<b>Stipes stalk</b>	"Mesal subterminal apophysis" "Lateral subterminal apophysis" "Subterminal apophysis" "Terminal apophysis"	Comstock (1940) (fig. 106) Comstock (1940) (fig. 106) Levi (1971) (figs 6, 8) Levi (1975) (fig. 3)
	<b>Stalk ectal projection</b>	"Distal haematodocha"	Comstock (1940) (fig. 106) Levi (1977) (figs. 103, 232)
	<b>Terminal haematodocha</b>	"Distal haematodocha"	Levi (1999) (fig. 1) Scharff and Coddington (1997)
	<b>Subterminal apophysis</b>	"Vesicle"	Chickering (1955) (figs A, B) F.O.-Pickard-Cambridge (1904) (pl.48 figs. 3, 5, 7, 9, 13)
	<b>Terminal apophysis</b>	"Embolus"	Chickering (1955) (figs A, B)
	<b>Embolus</b>	"Style" "Uncus"	Simon (1985) (fig. 839) F.O.-Pickard-Cambridge (1904) (pl.48 figs. 3, 5, 7, 9, 13)

Supplementary material 6. Figures.



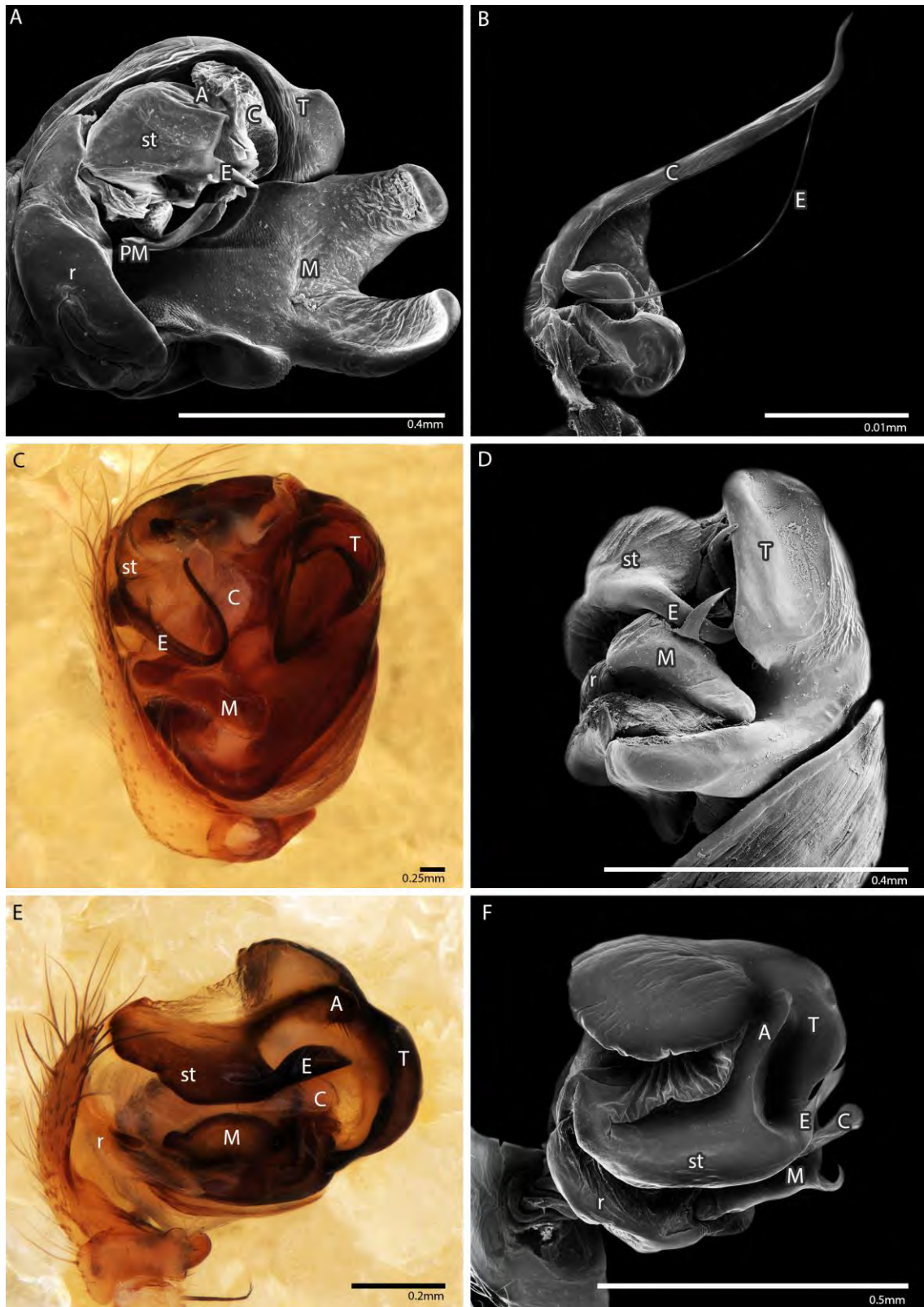
SM6. Figure 1. Diagrammatic illustration of a generalized araneid palp, adapted from Coddington (1990). Abbreviations: A, Terminal apophysis; BH, Basal haematodocha; C, Conductor; DH, Distal haematodocha; E, Embolus; M, Median apophysis; MH, Median haematodocha; p, Paracymbium; PM, Paramedian apophysis; r, Radix; S, Subterminal apophysis; st, Stipes; k, Stipes stalk; ke, Stipes stalk ectal; STe, Subtegulum; T, Tegulum; TH, Terminal Haematodocha, Y, Cymbium.



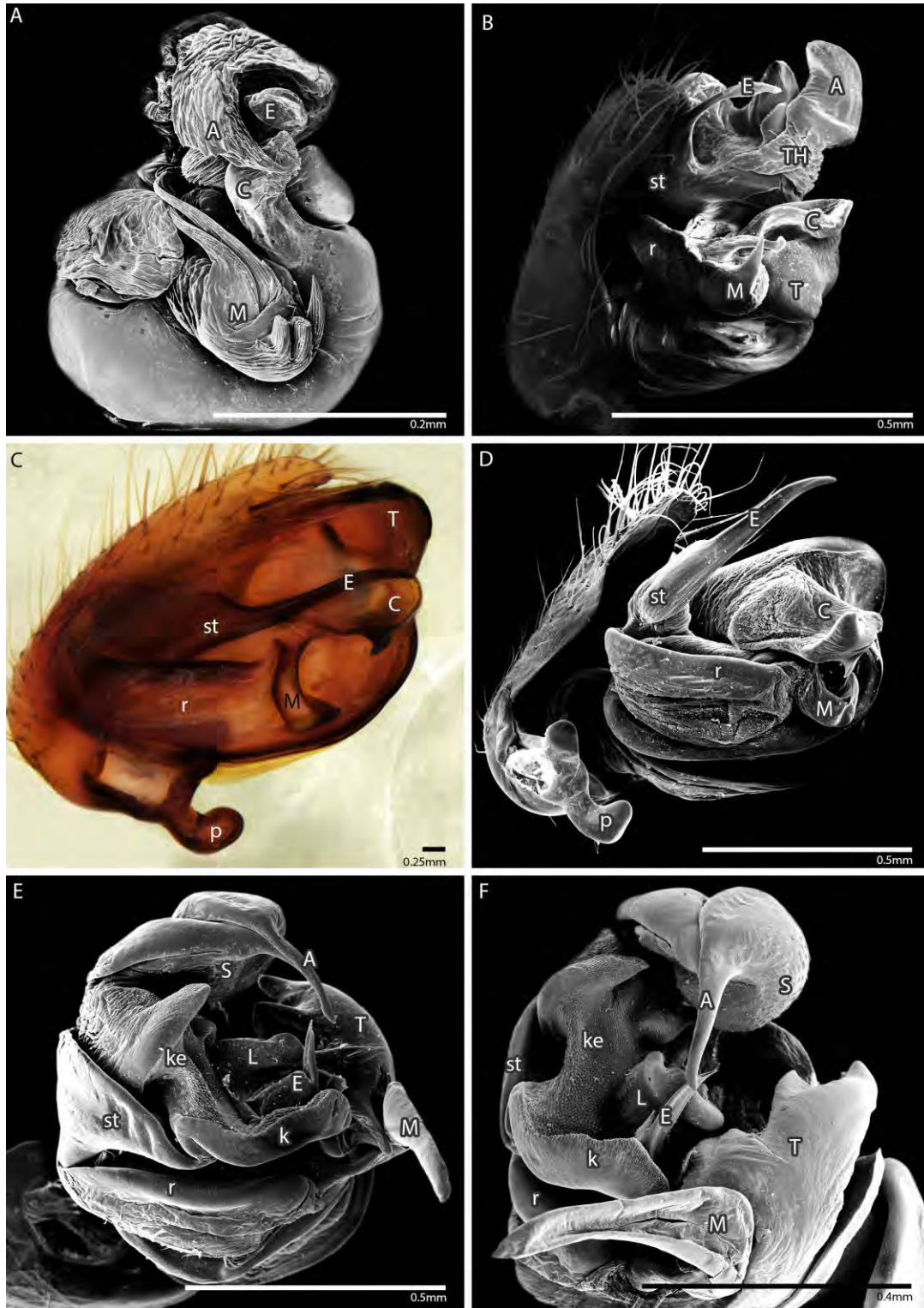
SM6. Figure 2. Araneidae male genital morphology. (A, B) *Eustala taquara* (Keyserling, 1892). (A) Expanded palp. (B) Same, SEM. Abbreviations: A, Terminal apophysis; BH, Basal haematodocha; C, Conductor; DH, Distal haematodocha; E, Embolus; M, Median apophysis; MH, Median haematodocha; r, Radix; S, Subterminal apophysis; st, Stipes; k, Stipes stalk; ke, Stipes stalk ectal; STe, Subtegulum; T, Tegulum; TH, Terminal Haematodocha, Y, Cymbium.



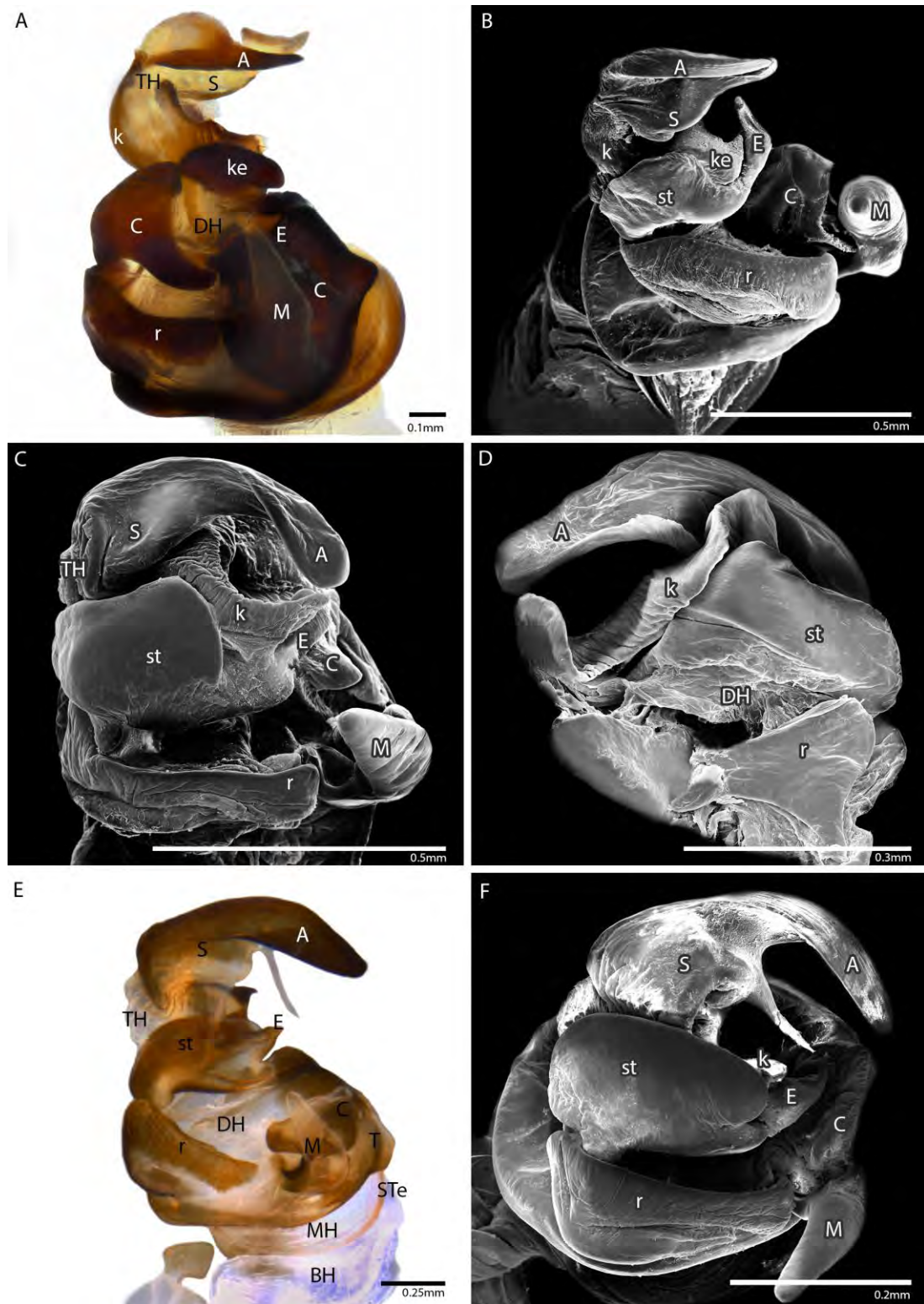
SM6. Figure 3. Expanded Araneinae male palp. (A, B) *Araneus unanimus* (Keyserling, 1879). (A) Ventral. (B) Mesal. (C) *Alpaida grayi* (Blackwall, 1863), mesal. (D) *A. bicornuta* (Taczanowski, 1878), mesal, SEM. (E) *A. delicata* (Keyserling, 1892), mesal, SEM. (F) *Metazygia rogenhoferi* (Keyserling, 1878), mesal. Abbreviations: A, Terminal apophysis; C, Conductor; E, Embolus; M, Median apophysis; p, Paracymbium; PM, Paramedian apophysis; r, Radix; S, Subterminal apophysis; st, Stipes; k, Stipes stalk; T, Tegulum; TH, Terminal Haematodocha, Y, Cymbium; Arrow, embolus cap.



SM6. Figure 4. Expanded Araneinae male palpi. (A) *Acacesia hamata* (Hentz, 1847), mesal, SEM. (B) *Nephila clavipes* (Linnaeus, 1767), mesal (SEM). (C, D) *Bertrana rufostriata* Simon, 1893. (C) Mesal. (D) Same, SEM. (E, F) *Mangora bocaina* Levi, 2007. (E) Mesal. (F) Same, SEM. Abbreviations: A, Terminal apophysis; BH, Basal haematodocha; C, Conductor; E, Embolus; M, Median apophysis; PM, Paramedian apophysis; r, Radix; st, Stipes; T, Tegulum.

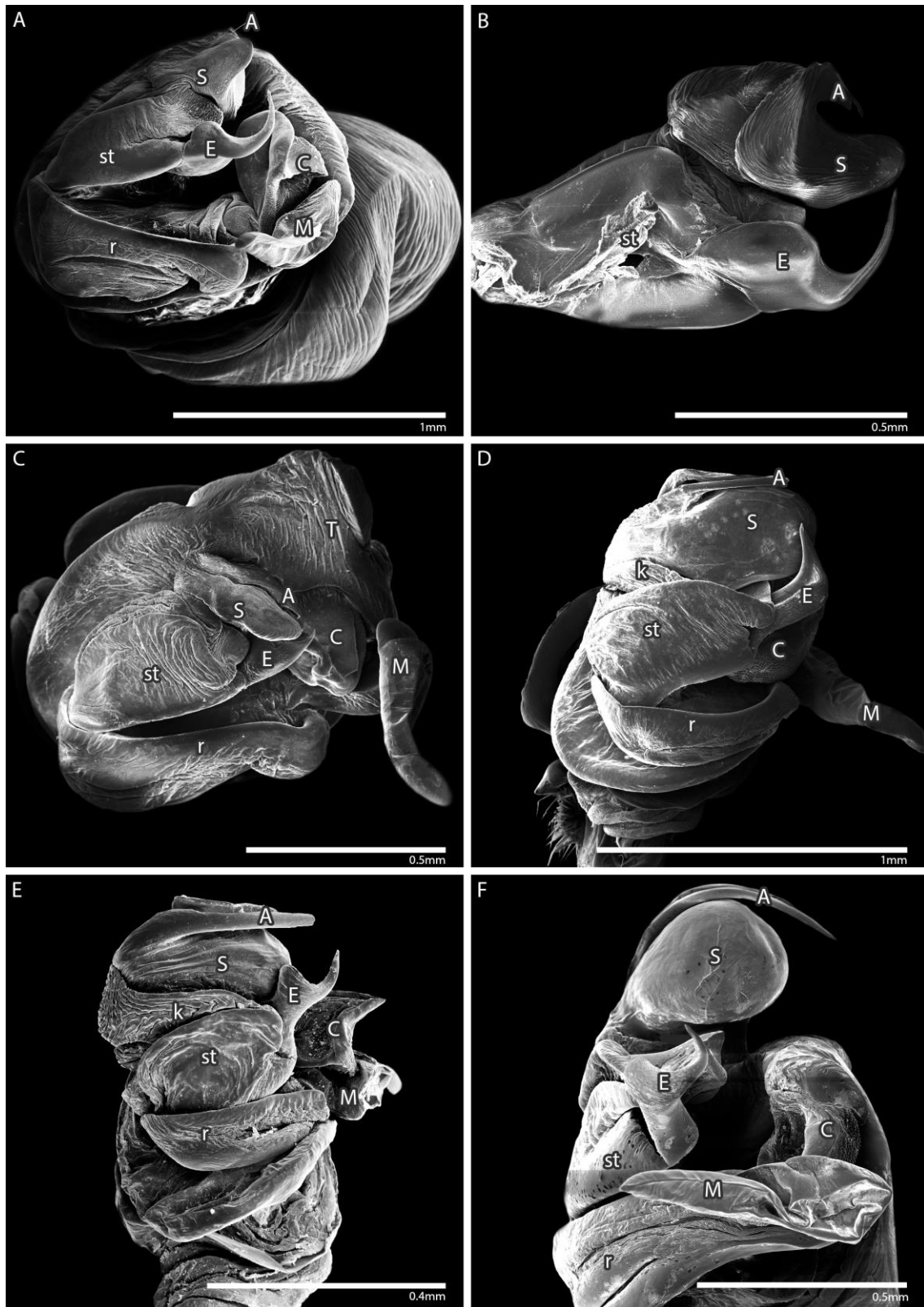


SM6. Figure 5. Expanded Araneinae male palpi. (A) *Kaira altiventer* O. Pickard-Cambridge, 1889, mesal, SEM. (B) *Larinia directa* (Hentz, 1847), Mesal, SEM. (C, D) *Metazygia gregalis* (O. Pickard-Cambridge, 1889). (C) Mesal. (D) Same, SEM. (E, F) *Eustala secta* Mello-Leitão, 1945. (E) Mesal, SEM. (F) Ventral, SEM. Abbreviations: A, Terminal apophysis; BH, Basal haematodocha; C, Conductor; E, Embolus; L, Embolus lamella; M, Median apophysis; p, Paracymbium; r, Radix; S, Subterminal apophysis; st, Stipes; k, Stipes stalk; ke, Stipes stalk ectal; STe, Subtegulum; T, Tegulum; TH, Terminal Haematodocha.



SM6. Figure 6. Expanded Araneinae male palpi. (A, B) *Eustala saga* (Keyserling, 1893). (A) Mesal. (B) Same, SEM. (C, D) *E. minuscula* (Keyserling, 1892). (C) Mesal. (D) Ectal, SEM. (E, F) *E. mourei* Mello-Leitão, 1947 (E) Mesal. (F) Same, SEM. Abbreviations: A, Terminal apophysis; BH, Basal haematodocha; C, Conductor; DH, Distal haematodocha; E, Embolus; L, Embolus lamella; M, Median apophysis; MH, Median haematodocha; r, Radix; S, Subterminal apophysis; st, Stipes; k, Stipes stalk; ke, Stipes stalk ectal; STe, Subtegulum; T, Tegulum; TH, Terminal Haematodocha.





SM6. Figure 7. Expanded Araneinae male palpi (SEM). (A, B) *Eustala cidae* Poeta, 2014. (A) Mesal. (B) Ectal. (C) *E. crista* Poeta, Marques & Buckup., 2010b, mesal. (D) *E. cuia* Poeta, 2014, mesal. (E) *E. bellissima* Poeta, Marques & Buckup., 2010b, mesal. (F) *E. eldorado* Poeta, 2014, ventral. Abbreviations: A, Terminal apophysis; BH, Basal haematodocha; C, Conductor; E, Embolus; M, Median apophysis; r, Radix; S, Subterminal apophysis; st, Stipes; T, Tegulum.

Supplementary material 6. 1. List of material used to obtain photographs and SEM images.

The following institutions provided the material examined in this work (abbreviations and curators in parentheses): American Museum of Natural History, New York (AMNH, L. Prendini); University of Guelph, Ontario (DEBU, J. Dewaard); Museu de Ciências e Tecnologia da Pontifícia Universidade Católica do Rio Grande do Sul, Porto Alegre (MCTP, R.A. Teixeira); Museum of Comparative Zoology, Harvard University, Cambridge (MCZ, G. Gibret); Naturhistorisches Museum Wien, Wien (NHMW, C. Hörweg); Zoological Museum, Natural History Museum of Denmark, Copenhagen (ZMUC, N. Scharff).

#### ARANEIDAE

1. *Acacesia hamata* (Hentz, 1847). Brazil: Rio Grande do Sul (Rio Uruguai), 2 #m, II.1989, Eq. Itá-Machadinho (MCTP 788);
2. *Alpaida grayi* (Blackwall, 1863). Brazil: Rio Grande do Sul (Cambará do Sul), #m, #f, 16.XII.1990, A.A. Lise (MCTP 66);
3. *Alpaida bicornuta* (Taczanowski, 1878). Brazil: Mato Grosso (Pantanal), #m, 04–10.VIII.1992, Lise and Bräul (MCTP 2308);
4. *Alpaida delicata* (Keyserling, 1892). Brazil: Amazonas (Maturacá), #m, #f, 13.X.1990, H.W. Levi (MCTP 1343);
5. *Araneus unanimus* (Keyserling, 1879). Brazil: Rio Grande do Sul (Santa Maria), #m, XII.1993, E.C. Costa (MCTP 38291);
6. *Bertrana rufostriata* Simon, 1893. Brazil: Santa Catarina (Florianópolis, Reserva Biológica Marinha do Arvoredo), #m, 5, 06.X.1995, A.Bräul (MCTP 7516);
7. *Enacrosoma anomalum* (Taczanowski, 1873). Brazil: Roraima (Uraricoera, Ilha de Maracá), #m, #f, 31.I.–14.II.1992, A.B. Bonaldo, #m, #f (MCTP 1886);
8. *Eustala albiventer* (Keyserling, 1884). Brazil: Rio Grande do Sul (Cachoeira do Sul), #m, #f, 26.VII.1992, R.G. Buss (MCTP 32558);
9. *Eustala anastera* (Walckenaer, 1891). Canada: Quebec (Saint-Mathieu, La Maurice National Park), #m, 03.vii.2013, M. Toure (BIOUG11435-G04). #m, ZMUC 1697;
10. *Eustala banksi* Chickering, 1955. Costa Rica: Santa Clara (Humburg Farm), 2 #m, VII.1931, Nevermann (NHMW);
11. *Eustala bifida* F.O. Pickard-Cambridge, 1904. Panamá: Barro Colorado island, #m, 20.VIII.1954, A.M. Chickering (MCZ 73369);
12. *Eustala bucolica* Chickering, 1955. Panamá: Chiriquí (Boquete), #m, 2 #f, 04–11.VIII.1954, A.M. Chickering (MCZ 73365);
13. *Eustala californiensis* (Keyserling, 1885). Mexico: San Luis Potosí (Ciudad

- Valles), 7 #m, 15 #f, VII.1959 (AMNH);
14. *Eustala catarina* Poeta, 2014. Brazil: Santa Catarina (Rio Uruguay), #m, #f, 02.IX.2010, R.C. Francisco (MCTP 35518);
  15. *Eustala cazieri* Levi, 1977#. Bahamas: Great Abaco Islands, #m, #f, 18.IV.1984, D. Spiller (MCZ 73410);
  16. *Eustala cidae* Poeta, 2014. Brazil: Rio Grande do Sul (São Leopoldo), #m, holotype, 01.IX.1986, C.J. Becker (MCTP 334);
  17. *Eustala clavispina* (O. Pickard-Cambridge, 1889). United States of America: Texas (Edinburg) 3 #m, 3 #f, XII.1939, D. and S. Mulaik (AMNH);  
*Eustala crista* Poeta, Marques and Buckup., 2010b. Brazil: Rio Grande do Sul (São Francisco de Paula), #m, 24.X.1996, R.Ott (MCTP 30238);
  18. *Eustala cuia* Poeta, 2014. Brazil: Rio Grande do Sul, (Capão do Leão, Hortobotânico Irmão Teodoro Luis, 25.X.2001, E.N.L. Rodrigues (MCN 49062);
  19. *Eustala delasmata* Bryant, 1945. Dominican Republic: Barahora (Valle del Polo), #m, #f, 18.VIII.1935, W.G. Hassler (AMNH);
  20. *Eustala eldorado* Poeta, 2014. Brazil: Rio Grande do Sul (Cachoeira do Sul), #m paratype, 02.XII.1992, R.G. Buss (MCTP 3674);
  21. *Eustala ericae* Poeta, 2014. Brazil: Rio Grande do Sul (São Francisco de Paula), #m holotype, XII.1996, A.A. Lise (MCTP 14139);
  22. *Eustala itapocuensis* Strand, 1916. Brazil: Nova Santa Rita (Quinta São José), #m, II.2009, A. Oliveira et al. (MCTP 36332);
  23. *Eustala minuscula* (Keyserling, 1892). Brazil: Rio Grande do Sul (Santo Antonio da Patrulha), #m, 27.VIII.1994, C.L. Koch (MCTP 31978);
  24. *Eustala mourei* Mello-Leitão, 1947. Brazil: Rio Grande do Sul (São Borja, Reserva Biológica São Donato), #m, 21.I.2012 M. Machado (MCTP 34836);
  25. *Eustala rustica* Mexico: Puebla (Villa Juárez), #m, 10.X.1947, H.M. Wagner (AMNH);
  26. *Eustala saga* (Keyserling, 1893). Brazil: Rio Grande do Sul (Marcelino Ramos), #m, 2 #f, II.1989, A. Bräul (MCTP 19779);
  27. *Eustala secta* Mello-Leitão, 1945. Brazil: Rio Grande do Sul (Derrubadas, Parque Estadual do Turvo), #m, #f, 28-31.X.2003, R. Ott *et al.* (MCN 37613);
  28. *Eustala scitula* Chickering, 1955. Panamá: Barro Colorado Island, 2 #m, VII.1950, A.M. Chickering (MCZ 73437);
  29. *Eustala scutigera* (O. Pickard-Cambridge, 1898). Panamá: Barro Colorado Island, 1 #m, 22.VII.1954, A.M. Chickering (MCZ 73441);
  30. *Eustala taquara* (Keyserling, 1892). Brazil: Rio Grande do Sul (São Francisco de Paula), #m, #f, 05–08.XII.1996, A.A. Lise (MCTP 14136);
  31. *Eustala unimaculata* Franganillo, 1930. Cuba: Sierra del Cobre (Loma de los Gatos), #m, 2#f, VIII.1941, P.J. Darlington (MCZ 75114);
  32. *Eustala vellardi* Mello-Leitão, 1924. Brazil: Pará (Itaituba, Com. Santo Antônio), 3 #m, #f, 02.VIII.1993, A.A. Lise and A. Bräul Jr. (MCTP 2608);
  33. *Kaira altiventer* O. Pickard-Cambridge, 1889. Brazil: Rio Grande do Sul (São Borja, Reserva Biológica São Donato) #f, 26.XI.2012, M. Machado (MCTP 38149);
  34. *Larinia directa* (Hentz, 1847). Brazil: Pará (Melgaço, Floresta Nacional de Caxiuanã), #m, #f, 11.VIII.1996, A.A. Lise *et al.* (MCTP 9375);
  35. *Mangora bocaina* Levi, 2007. Brazil: Rio Grande do Sul (São Francisco de Paula), #m, 12–14.XI.1998, A.A. Lise (MCTP 12698);

36. *Metazygia gregalis* (O. Pickard-Cambridge, 1889). Brazil: Rio Grande do Sul (Cachoeira do Sul), #m, 27.IV.1993, R. Buss (MCTP 3631);
37. *Metazygia rogenhoferi* (Keyserling, 1878). Brazil: Rio Grande do Sul (Viamão), #m, #f, 20.V.1994, A.A. Lise (MCTP 4775);
38. *Metepeira compsa* (Chamberlin, 1916). Brazil: Paraíba (Santa Luzia), #m, 24.X.1978, P.F.L. Duarte (MCN 25672);
39. *Neoscona moreli* (Vinson, 1863). Brazil: Rio Grande do Sul (Capão da Canoa-Capão Novo), #m, #f, 17–18.IV.1993, A.A. Lise (MCTP 3141);
40. *Nephila clavipes* (Linnaeus, 1767). Brazil: Santa Catarina (Chapecó, Quebra Queixos), #m, #f, 26, 27.II.2002, M. Kammers (MCTP 12916);
41. *Wixia abdominalis* O. Pickard-Cambridge, 1882. Brazil: Mato Grosso do Sul (Diamantina, Alto do rio Arinos), #m, #f, X.1983, E.H. Buckup (MCN 24039);
42. *Zygiella atrica* (C. L. Koch, 1845). Scharff and Coddington images (zB39S05).

CHAPTER 2: A taxonomic review of the orb-weaver spider *Eustala* (Araneae: Araneidae)\*

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## Abstract

The systematics of *Eustala* Simon, 1895 is revised based on the combination of a taxonomy revision, presented here, with an evaluation of specimen collections and the phylogenetic analysis of the species previously developed by the same authors. Among araneids, *Eustala* is diagnosed based on the female epigynum oriented anteriorly and the males by the palp provided with a bubble-shaped subterminal apophysis and a whitish median apophysis that hangs down laterally into the bulb. Based on specimen observation and bibliography, *E. conchlea* (McCook, 1888) is considered senior synonym of *E. emertoni* (Banks, 1904); *E. guianensis* (Taczanowski, 1873) as senior synonym of *E. monticola* Chamberlin, 1916 and *E. bacelarae* Caporiacco, 1955; *E. bifida* F. O. Pickard-Cambridge, 1904 as senior synonym of *E. wiedenmeyeri* Schenkel, 1953 and *E. maxima* Chickering, 1955; *E. unimaculata* Franganillo, 1930 as senior synonym of *E. bisetosa* Bryant, 1945; and *E. venusta* Chickering, 1955 is revalidated. Also, 54 species are redescribed and illustrated: *E. fuscovittata* (Keyserling, 1864), *E. oblonga* Chickering, 1955, *E. saga* (Keyserling, 1893), *E. sagana* (Keyserling, 1893), *E. latebricola* (O. Pickard-Cambridge, 1889), *E. unimaculata*, *E. cazieri* Levi, 1977, *E. innoxia* Chickering, 1955, *E. tantula* Chickering, 1955, *E. exigua* Chickering, 1955, *E. devia* (Gertsch & Mulaik, 1936), *E. perdita* Bryant, 1945, *E. fragilis* (O. Pickard-Cambridge, 1889), *E. rubroguttulata* (Keyserling, 1879), *E. californiensis* (Keyserling, 1885), *E. minuscula* (Keyserling, 1892), *E. guianensis*, *E. guttata* F. O. Pickard-Cambridge, 1904, *E. ingenua* Chickering, 1955, *E. redundans* Chickering, 1955, *E. rustica* Chickering, 1955, *E. brevispina* Gertsch & Davis, 1936, *E. scitula* Chickering, 1955, *E. bifida*, *E. lata* Chickering, 1955, *E. conformans* Chamberlin, 1925, *E. cepina* (Walckenaer, 1841), *E. conchlea*, *E. anastera* (Walckenaer, 1841), *E. rosae* Chamberlin & Ivie, 1935, *E. delecta* Chickering, 1955, *E. banksi* Chickering, 1955, *E. mimica* Chickering, 1955, *E. trinitatis* (Hogg, 1918), *E. bucolica* Chickering, 1955, *E. montivaga* Chamberlin, 1916, *E. cameronensis* Gertsch & Davis, 1936, *E. scutigera* (O. Pickard-Cambridge, 1898), *E. eleuthera* Levi, 1977, *E. venusta* Chickering, 1955, *E. histrio* Mello-Leitão, 1948, *E. gonygaster* (C.L. Koch, 1838), *E. lunulifera* Mello-Leitão, 1939, *E. pallida* Mello-Leitão, 1940, *E. smaragdinea* Mello-Leitão, 1939, *E. clavispina* (O. Pickard-Cambridge, 1889), *E. viridipedata* (Roewer, 1942), *E. vegeta* (Keyserling, 1865), *E. tribrachiata* Badcock, 1932, *E. novemmamillata* Mello-Leitão, 1941, *E. nasuta* Mello-

Leitão, 1939, *E. sedula* Chickering, 1955, *E. semifoliata* (O. Pickard-Cambridge, 1899), and *E. inconstans* Chickering, 1955. Additionally, eleven species presented new records: *E. nasuta* from Costa Rica, *E. guttata* from Guyana, *E. lata* from Jamaica, *E. montivaga* from Guatemala and Dominican Republic, *E. mimica* from Venezuela, *E. rustica* from Mexico, *E. scutigera*, *E. conformans*, *E. tribrachiata* and *E. lunulifera* from Brazil, *E. minuscula* from Argentina, and *E. smaragdinea* from Paraguay.

Key words: Neotropical, Nearctic, South America, North America

## Introduction

The arachnologist H.W. Levi initiated a legendary revision of the American genera of Araneidae in 1985 (Levi 1985). In these papers he presented descriptions of new species, redescriptions, informations on its natural history and his own ideas of relationships among the genera. Additionally, the informative illustrations on male and female genitalia, showing different angles and naming the structures, were a milestone to arachnology (Leibensperger 2016). However, two Neotropical araneid genera were left behind of his revisions: *Verrucosa* McCook, 1888, which was recently revised by Lise *et al.* (2015) and *Eustala* Simon, 1895.

The genus *Eustala* was proposed by Simon (1895) based on *Epeira anastera* Walckenaer, 1841 by the female with the epigynum with a scapus anteriorly projected. Later, Levi (1977) added some male features as the palp with one patellar macrosetae and the bulb with a white median apophysis, which hangs down laterally from the bulb. These spiders are restricted of the American Continent. Species of the genus present a cryptic coloration, usually with folium, which seems to match with the lichens and mosses of the substrate that they occur, as shrub, tree vegetation and trucks (Eberhard 1985, Poeta *et al.* 2010b, Messas *et al.* 2014). According to Messas *et al.* (2014), *E. perfida* Mello-Leitão, 1947 prefers tree trunks surface, using small concavities to rest and built its web, while *E. taquara*



(Keyserling, 1982) and *E. sagana* (Keyserling, 1983) showed to prefer dry branches of bushes. Also, *E. oblonga* Chickering, 1955 and *E. illicita* (O. Pickard-Cambridge, 1889); seems to have a preference to inhabit Acacia trees, (Hesselberg & Triana, 2010) and present a mirmecophilic behavior (Garcia & Styrsky, 2013; Styrsky 2014). According to Messas *et al.* (2014), species of *Eustala* may be preyed by several animals, as lizards, birds and other spiders. Adicionally, several studies (e.g Souza & Vasconcellos-Neto 2005, Bushini *et al.* 2006, Camillo & Brescovit 1999) showed that species of this genus are an important content of some hunting wasps diet (e.g. *Trypoxylon* sp.), what was confirmed here for the species *E. fuscovittata*, (Keyserling, 1864) *E. guttata* F. O. Pickard-Cambridge, 1904, *E. lunulifera* Mello-Leitão, 1939 and *E. nasuta* Mello-Leitão, 1939.

Several taxonomists contributed with the knowlegment of *Eustala*, resulting in 86 valid species (WSC 2017). Nevertheless, due the wide intraspecific variation, especially regarding the color pattern of the abdomen (Levi 1977, see figures 280–295; 297–318; Messas *et al.* 2014, see figure 2; Baert 2014, see figure 2; Souza *et al.* 2015, see figure 2), many nomenclatural and taxonomic problems were generated. Among the authors that have worked with the taxonomy of *Eustala*, herein we highlight the revision of the Central America species, presented by Chickering (1955), in which 26 species are described, mostly based on only one sex – since he pointed out the difficult of match males and females as coespecific by the abdomen color-pattern. Later, Levi (1977) revised 13 species from North and Central America, presenting two new species, one new combination, two synonymies, and redescribed and illustrated the others. Recently, nine complementary descriptions of the missing sexes are presented (Poeta, Marques & Buckup. 2010a, b; Poeta & Teixeira 2017); 12 synonymies were proposed (Poeta, Marques & Buckup. 2010a; Levi & Santos 2013); 13 new species were described (Poeta,

Marques & Buckup. 2010a, b, Poeta 2014, Baert 2014); and seven species were declared *nomina dubia* (Poeta & Teixeira 2017).

Recent phylogenetic study recovered the monophily of *Eustala* and showed *Metazygia* as its sister-group (Poeta *et al. in prep.*, Chapter 1). Additionally, four clades of *Eustala* were characterized: *inconstans* clade, based on male specimen; *fuscovittata* clade, which includes species with elongated abdomen; *rubroguttulata* clade, that have rounded abdomen and smooth scapus; and *anastera* clade that includes species with wrinkled scapus.

Thus, we present a review of the taxonomy of *Eustala*, being the first comprehensive study of the genus since Levi (1977). Based on the observation of more than 2700 specimens, *E. conchlea* (McCook, 1888) is considered senior synonym of *E. emertoni* (Banks, 1904); *E. guianensis* (Taczanowski, 1873) as senior synonym of *E. monticola* Chamberlin, 1916 and *E. bacelarae* Caporiacco, 1955; *E. bifida* F. O. Pickard-Cambridge, 1904 as senior synonym of *E. wiedenmeyeri* Schenkel, 1953 and *E. maxima* Chickering, 1955; *E. unimaculata* Franganillo, 1930 as senior synonym of *E. bisetosa* Bryant, 1945; and *E. venusta* Chickering, 1955 is revalidated. Also, 54 species are redescribed and illustrated and the following species presented new records: *E. nasuta* from Costa Rica; *E. guttata* from Guyana; *E. lata* Chickering, 1955 from Jamaica; *E. montivaga* Chickering, 1955 from Guatemala and Dominican Republic; *E. mimica* Chickering, 1955 from Venezuela; *E. rustica* Chickering, 1955 from Mexico; *E. scutigera* (O. Pickard-Cambridge, 1898), *E. conformans* Chamberlin, 1925, *E. tribrachiata* Badcock, 1932, and *E. lunulifera* from Brazil; *E. minuscula* (Keyserling, 1892) from Argentina; and *E. smaragdinea* (Taczanowski, 1878) from Paraguay.

## Material and methods

The type-species of *Eustala* were examined whenever possible and, in some cases, the species were delimited according to already available diagnosis (e.g. Chickering 1955; Levi 1977; Levi 2007; Levi *et al.* 2010). The species that were not included here, were either not able to be obtained or recently described (e.g. Framenau *et al.* 2009; Poeta, Marques & Buckup. 2010a, b; Poeta 2014; Baert 2014; Poeta & Teixeira 2017).

The institutions listed below were either cited or presented specimens used for this revision:

- AMNH American Museum of Natural History, New York (L. Prendini);
- ANSP Academy of Natural Sciences, Philadelphia
- CAS California Academy of Science, California (L. Esposito);
- IBSP Instituto Butantan, São Paulo (A.D. Brescovit);
- MCN Museu de Ciências Naturais da Fundação Zoobotânica do Rio Grande do Sul,  
Porto Alegre (R. Ott);
- MSNV Museo Civico di Storia Naturale di Verona, Verona (L. Latella);
- MCTP Museu de Ciências e Tecnologia da Pontifícia Universidade Católica do Rio  
Grande do Sul, Porto Alegre (R.A. Teixeira);
- MCZ Museum of Comparative Zoology, Harvard University, Cambridge (G.  
Gibiret);
- MHNCI Museu de História Natural Capão da Imbuia, Curitiba (O.L. Lopes);
- MHNLS Museo de Historia Natural La Salle, Caracas (F. Rojas-Runjaic);
- MNHG Museum of Natural History, Geneva (P.J. Schwendinger);
- MZPW Museum & Institute of Zoology, Polish Academy of Sciences, Warsaw (W.  
Wawer);
- MLP Museo de La Plata, La Plata (L.A. Pereira);

- MNRJ Museu Nacional, Universidade Federal do Rio de Janeiro, Rio de Janeiro (A.B. Kury);
- MPEG Museu Paraense Emílio Goeldi, Belém (A.B. Bonaldo);
- MZSP Museu de Zoologia da Universidade de São Paulo, São Paulo (R. Pinto da Rocha);
- MZUF Museo Zoologico "La Specola", Firenze (L. Bartolozzi);
- NHM The Natural History Museum, London (J. Beccaloni);
- NHMB Naturhistorisches Museum Basel, Basel (A. Hänggi);
- NHMW Naturhistorisches Museum Wien, Vienna (C. Hörweg);
- ZMUC Zoological Museum of Copenhagen, Copenhagen (N. Scharff).
- DEBU University of Guelph, Ontario (J. Dewaard).

The male palpi were expanded with hydroxide potassium solution (KOH) 10%, cold, for 12–24 hours; then were transferred to a plate with distilled water.

Nomenclature and abbreviation follow Levi (1977) and Poeta (2014), being:

A, Terminal apophysis;	PME, Posterior median eyes;
C, Conductor;	r, radix;
E, Embolus;	S, subterminal apophysis,
LP, Lateral plate;	Sc, Scapus,
M, Median apophysis;	st, stipes;
MP, Median plate;	T, tegulum.

Images were acquired with stereo-microscopes Leica M205A (MCTP) and Leica M205AC (ZMUC), and with a Canon EOS 7D camera equipped on BK Plus Laboratory System (ZMUC). Images were combined with Helicon Focus version 5.3

(www.heliconsoft.com). Geographic distribution maps were generated using Google Earth 6.2. The illustrations were made by *camara lucida* fitted to microscope stereoscope (MCTP). To obtain SEM images, the structures of the specimens were immersed in Glutaraldehyde 25% for two hours, then dehydrated (graded ethanol 80–100% and acetone 100%) critical point dried, and coated (with palladium or gold). SEM micrographs were taken with Philips XL 30 field-emission scanning electron microscope (CEMM-PUCRS) and JEOL JSM-6335-F (ZMUC). The images were processed using Photoshop 6.

## Taxonomy

Family Araneidae Clerck, 1957

*Eustala* Simon, 1895

*Eustala* Simon, 1895: 795. Type species *Epeira anastera* Walckenaer 1941: 33. Bryant 1945: 359 Caporiacco 1954: 88; Chickering 1955: 391; Poeta, Marques & Buckup. 2010a: 152; Levi & Santos 2013: 221; Baert 2014: 2; Poeta 2014: 441; Poeta & Teixeira 2017: 112; WSC 2017.

Diagnosis. Along the years, *Eustala* was diagnosed by the females with scapus directed anteriorly and males with a white median apophysis that hangs down laterally in the bulb and by the bubble-shaped subterminal apophysis (Simon 1985; Chickering 1955; Levi 1977; Poeta, Marques & Buckup. 2010a, b; Levi and Santos 2013; Baert 2014; Poeta 2014). However, such features revealed to be shared with some species of *Metazygia* (Levi 1995; Levi and Santos 2013). Males of *Metazygia wittfeldae* resemble those of *Eustala* by the median apophysis hanged, bubble-shaped subterminal apophysis, paracymbium with head, and palpal patella with one macrosetae. However, they differ from each other by the median apophysis elongated in *Eustala*, which is very short in

these *Metazygia* species (less than half the size of the cymbium). The females of *Eustala* and *Metazygia* also share several features in common, as the epigynum with scapus directed anteriorly (in *gregalis* clade); yet, they can be distinguished by the lateral eyes placed side-by-side horizontally in *Eustala*, which is angled in *Metazygia*.

**Description.** Medium sized spiders (total length 3.50–8.00 in males, 4.00–12.00 in females). Carapace longer than wide, usually covered by white setae. Male endite toothed, palpal femur with tubercle. Legs brown banded; coxae I with ventral hook that fits in a groove in femura II. Abdomen subtriangular, elongated, or rounded, sometimes provided with 1–3 terminal projections and anterior shoulder. Abdomen dorsum commonly with folium; venter normally with one white central patch. Male palpal patella with one stout macrosetae, and tibia wider than long. Cymbium leaf-shaped with an inner ridge. Bulb with terminal apophysis (acute or laminar) and subterminal apophysis (bubble-shaped or null). Conductor placed in the edge of the bulb, diverse in shape, size, and sclerotization (usually whitish mesally where the embolus repose, and dark in ventral view). Median apophysis white, placed laterally. Embolus very sclerotized, usually hook-shaped. Female epigynum with scapus projected anteriorly (wrinkled or smooth), glabrous.

“*inconstans* group”

**Species included.** *Eustala inconstans* Chickering, 1955.

**Group diagnose.** *Eustala inconstans* differ from the other males of *Eustala* by the palp with a pale embolus basis, the inner border of the tegulum serrated, and the unique shape of the terminal apophysis.

*Eustala inconstans* Chickering, 1955

Figs 29D, E, G

*Eustala inconstans* Chickering, 1955: 446, figures 69–72. Male holotype from Barro Colorado Island, Panamá [09°09'07"N, 79°50'47"W], A.M. Chickering (MCZ 21628, examined). WSC 2017.

Diagnosis. Males of *Eustala inconstans* (Figs 29D, E) resemble those of *E. delecta* (Figs 19 G, H) by the male palp with a wide terminal apophysis. It differs from this species by the entire conductor in *E. inconstans* (ventral view, Fig. 29E) (vs. conductor with transversal section in *E. delecta*, Fig. 19H).

Description. *Male* (MCZ 21628, holotype). Carapace pale-yellow, PME with dark borders. Sternum and legs pale yellow. Abdomen subtriangular, longer than wide, with pair of postero-lateral mamiliform projections, dorsum and venter light grey (Fig. 29G). Legs pale yellow. Total length 4.50. Carapace length 2.20, width 1.85. Leg formula 1243. Length leg I: femur 2.93; patella+tibia 3.42; metatarsus 2.20; tarsus 0.95; total 9.50. Patella+tibia II 2.69; III 1.27; IV 2.18.

*Female*. Unknown.

Distribution. Panamá: Barro Colorado Island.

***'fuscovittata group'***

**Species included.** *Eustala vellardi* Mello-Leitão, 1924, *E. fuscovittata* (Keyserling, 1864); *E. oblonga* Chickering, 1955; *E. illicita* (O. Pickard-Cambridge, 1889); *E. saga* (Keyserling, 1893); *E. sagana* (Keyserling, 1893).

**Group diagnose.** Species of this group differ from the others by the elongate abdomen, usually with longitudinal stripes dorsally, and lacking the white circular patch in its venter.

***Eustala vellardi* Mello-Leitão, 1924**

*Eustala vellardi* Mello-Leitão, 1924: 279, female holotype from Nova Iguaçu [22°45'22"S, 43°27'38"W], Rio de Janeiro, Brazil (MNRJ 351, examined). Roewer 1942: 767; Poeta & Teixeira 2017; WSC 2017.

**Diagnosis and description.** See Poeta & Teixeira (2017).

**Distribution.** Brazil: Amazonas, Pará, Mato Grosso, Mato Grosso do Sul, Rio de Janeiro, and Rio Grande do Sul. Paraguay: Concepción (see Poeta & Teixeira, Figure 19).

*Eustala fuscovittata* (Keyserling, 1864)

Figs 1A–H

*Epeira fusco-vittata* Keyserling, 1864: 129, pl. 6, figures 7, 8. Female holotype from Bogotá (Santa Fé de Bogotá), Colombia [04°36'31"N, 74°04'12"W] (NHM, not examined).

*Nephila hirta* Taczanowski, 1873: 149. Synonymized by Kuntner & Levi 2007: 446, figures 1–3.

*Epeira fuscovittata*; Keyserling, 1893: 251, pl. 13, figure 187.



*Eustala fuscovittata*; F. O. Pickard-Cambridge 1904: 505, pl. 48, figures 3, 4; Roewer 1942: 765; Chickering 1955: 398, figures A, B, 1–5; Grasshoff 1970: 216, figures 2a–c; Levi & Santos 2013: 222; WSC 2017.

*Eustala anastera vermiformis* Franganillo, 1931: 44. Female holotype from Sierra Rangel, Cuba [22°25'38"N, 83°51'14"W], VIII.1930 (Museum unknown, probably lost). Synonymized by Levi & Santos 2013: 222.

*Eustala procurva* Franganillo, 1936: 80, figures 37a, b. Female holotype from Cuba (Museum unknown, probably lost). Synonymized by Levi & Santos 2013: 222.

*Eustala richardsi* Mello-Leitão, 1939: 105, figures 1–4. Male lectotype from, Mazaruni Settlement, Mazaruni, Guyana [06°04'02"N, 59°36'52"W] (*Trypoxylon nitidum* nest), Dr. O.W. Richards, 25.IX.1937. Female lectotype designed by Levi in 1973 (male paralectotype is not *Eustala*) (NHM, examined). Synonymized by Levi & Santos 2013: 222.

Additional material examined. MEXICO, *Tabasco*: Teapa, 17°33'39"N, 92°57'07"W, 6 #m, 11 #f (NHM). *Veracruz*: Atoyac, 18°54'46"N, 96°46'43"W, 2 #f (NHM); 7 #m, 4 #f (NHM); Tuxpan, 19°33'39"N, 96°56'25"W, 4 #m, 3#f, 15.X.1947, H.M. Wagner (AMNH); Martinez de la Torre, 2 #m, 1 #f, 06.VII.1946, H.M. Wagner (AMNH). GUATEMALA, 15°47'00"N, 90°13'50"W: 1 #m, 5 #f (NHM). *Alta Verapaz*: Cahabón (Santa Maria Cahabón), 15°36'26"N, 89°48'42"W, 6 #m, 4 #f (NHM). DOMINICAN REPUBLIC (Central Cordillera, 1000 m, 18°45'00"N, 70°30'00"W): 2 #m, 1 #f, J. & S. Klapperich, 12.VIII.1972 (MNHG). COSTA RICA: (Waldeck Farm), 09°44'56"N, 83°45'12"W, 2 #m, 2 #f, 13.V.1930, Reimoser (NHMW). PANAMÁ, *Colón*: Gamboa, 09°06'59"N, 79°41'47"W: 2 #f, V.1983; 1 #m, 6 #f, VI.1983; 3 #m, VII.1983; 2 #f, VII.1983; 2 #f, VIII.1983; 3 #m, 1 #f, VIII.1983; 1 #m, 1 #f, IX.1983; 1 #m, IX.1983; 1

#m, 2 #f, X.1983; 2 #m, 4 #f, XI.1983; 2 #m, XI.1983; 1 #f, XII.1983; 1 #f, I.1984, 2 #m, II.1984, all collected by S. Heimer (MNHG). *El Valle de Antón*, 08°36'35"N, 80°07'54"W: 3 #f, XII.1983; 2 #m, 5 #f, VIII.1983, all collected by S. Heimer (MNHG). BRAZIL, *Pará*: Oriximiná, 01°59'53"S, 54°55'50"W, 1 #f, 11.VI.2011, E.L.C. Silva (MCTP 31935). No data, 4 #m, 25 #f (NHM).

Diagnosis. Males and females *E. fuscovittata* are similar to the ones of the “*E. fuscovittata* group” by the elongated abdomen (Figs 1G, H). Nevertheless, the male palp of *E. fuscovittata* (Figs 1A–C) presents a conspicuous cylindrical projection on the median apophysis basis. The female of *E. fuscovittata* (Figs 1D–F) is similar to *E. anastera* (Figs 35C–E) by the wrinkled scapus. They can be distinguished from each other by the narrow scapus and an elongated abdomen in *E. fuscovittata* (lateral view, Fig. 1F) (vs. wide scapus and subtriangular abdomen in *E. anastera*, Fig. 35E).

Description. *Male* (NHM). Carapace brown, PME lack black border. Sternum and legs yellow. Abdomen elliptical, longer than wide, pointed posteriorly; dorsum pale yellow to white, with longitudinal longitudinal brown band (Fig. 1G). Ventral surface discolored, with light brown band from epigastric furrow to spinnerets. Total length 7.90. Carapace length 3.15, width 2.35. Leg formula 1423. Length leg I: femur 3.50; patella+tibia 5.00; metatarsus 3.95; tarsus 1.35; total 13.80. Patella+tibia II 3.95; III 1.75; IV 4.05.

*Female* (AMNH). Carapace, sternum and legs, yellow (Fig. 1H). Adomen elongated, posteriorly projected, doesum white (Fig. 1H). Venter of abdomen with longitudinal light grey band from epigastric furrow to the spinnerets. Total length 10.69. Carapace length 3.25, width 2.25. Leg formula 1423. Length leg I: femur 3.40; patella+tibia 4.53; metatarsus 3.20; tarsus 1.20; total 12.33. Patella+tibia II 4.40; III 2.10; IV 4.20.

Variation. Male (n=2): total length 6.60–7.90; carapace length 2.80–3.15, width 1.10–2.35. Female (n=5): total length 6.70–10.69; carapace length 2.70–3.25, width 1.90–2.25.

Carapace and legs orange; greenish cephalotorax; abdomen with stripes that may or may not be conspicuous.

Distribution. Mexico: Tabasco, Veracruz, Martínez de la Torre. Guatemala: Alta Verapaz. Dominican Republic: Central Cordillera. Costa Rica. Panamá: Colón, El Valle. Colombia: Bogotá. Guyana. Brazil: Pará.

*Eustala oblonga* Chickering, 1955

Figs 2A–G

*Eustala oblonga* Chickering, 1955: 404, figures 12–18. Male holotype from Barro Colorado Island, Panamá [09°09'07"N, 79°50'47"W], VII.1950, A.M. Chickering (MCZ 22350, examined). Female allotype from the same holotype locality, VII.1936, A.M. Chickering (MCZ 24511, examined); female paratype, same locality, 15.VIII.1946, N.L.H. Krauss (AMNH, examined); WSC 2017.

Additional material examined. PANAMÁ, Colón: Gamboa, 09°06'59"N, 79°41'47"W: 2 #f, VII.1983; 2 #f, IX.1983, S. Heimer (MNHG).

Diagnosis. Males of *Eustala oblonga* (Figs 2A, B, F) resemble those of *E. fuscovittata* (Figs 1A, B, G) by the elongated abdomen and by the palp with laminar terminal apophysis. At the same time, they differ from one another by the median apophysis with a pointed basal projection in *E. oblonga* (vs. cylindrical in *E. fuscovittata*, Fig. 1A). Additionally, the epigynum of *E. oblonga* (Figs 2C–E) presents a unique very elongated, thin, smooth and sclerotized scapus (vs. wrinkled scapus in *E. fuscovittata*, Fig. 1D).

Description. *Male* (MCZ 22350, holotype). Carapace orange, PME with dark borders. Sternum yellow with dusk grey pigment. Abdomen elongated, projected apically, dorsum

light brown with brown stripes and one wide longitudinal brown band (Fig. 2F). Ventral surface dark grey, with pair of discolored lines laterally. Legs yellow with faint orange bands. Total length 6.05. Carapace length 2.95, width 2.30. Leg formula 1423. Length leg I: femur 4.35; patella+tibia 5.20; metatarsus 4.10; tarsus 1.25; total 14.90. Patella+tibia II 4.25; tibia 2.20; IV 4.20. Leg III missing many articles.

*Female* (MCZ 24511, allotype). Carapace, sternum and legs as male. Abdomen elongated, anteriorly and apically projected; dorsum yellowish, with longitudinal brown bands (Fig. 2G); venter as male. Total length 6.05. Carapace length 3.55, width 2.60. Many legs articles missing.

Distribution. Panamá: Barro Colorado Island, Colón.

### ***Eustala saga* (Keyserling, 1893)**

Figs 3A–G

*Epeira saga* Keyserling, 1893: 253, pl. 13, figure 188. Syntypes female from Uruguay and male from Rio Grande do Sul, Brazil, H. Von Ihering (NHM, not examined).

*Araneus sagus*; Petrunkevitch, 1911: 313.

*Eustala saga*; Roewer 1942: 766; Poeta, Marques & Buckup. 2010a.

Additional material examined. BRAZIL, *Bahia*: Camacan (RPPN Serra Bonita) 15°25'12"S, 39°29'47"W, 1 #m, 11–13.VI.2009, A.B. Chagas-Jr, A. Kury, A. Pedroso, A. Giupponi & V. Dill (MNRJ 4527). *São Paulo*: Guarulhos (Parque Cocaia), 23°27'15"S, 46°32'01"W, 1 #f, V.1951, H. Urban (MZSP 9531 (e1817)); 1 #f, 08.X.1950, H. Urban (MZSP 9539 (e 2307)); Mogi das Cruzes, 23°32'16"S, 46°11'09"W, 1 #f, 02.V.1945,

Meissner (MZSP 4620). *Paraná*, 25°25'27"S, 49°15'55"W: (R. Doraia) 1 #f, R.B. Lange, XI.1944 (MHNCI 348); (Valle Grande) 1 #f, IV.1945, B. Hentel (MHNCI); Ponta Grossa (Parque Estadual de Vila Velha, 25°15'38"S, 50°00'21"W), 1 #f, 17.VIII.1947, K. Imaguire (MZSP 7850(2229)); Morretes (Serra da Graciosa, 25°21'14"S, 48°53'00"W), 4 #m, 2 #f, 09–20.I.1995, A.A. Lise *et al.* (MCTP 6949, 7040, 7078, 7417); Serra Negra, 25°10'33"S, 48°25'34"W, 5 #f, VIII.1946, A. Mayer (MHNCI 3362–3372); Matinhos (Caiobá, 25°49'48"S, 48°32'07"W), 3 #f, VI.1944, R.B. Lange (MHNCI 350–352); Pinhais, 25°26'36"S, 49°11'35"W, 1 #f, E.D. Rosal (MHNCI 25967); Mangueirinha (UHE Segredo), 25°47'34"S, 52°06'46"W, 1 #m, 2 #f, 23.I.1992, R. Pinto da Rocha & M.R.S. Lopes (MZSP 14664, 14701); Pinhão (UHE Segredo, Barra do Capoteiro), 25°41'40"S, 51°39'14"W, 1 #m, 25.X.1991, R. Pinto da Rocha & M.R.S. Lopes (MZSP 14706). *Santa Catarina*: Rancho Queimado, 27°40'25"S, 49°00'44"W, 1 #m, 2 #f, 09–13.X.1995, A.A. Lise *et al.* (MCTP 7005); Rio Uruguai, 27°22'46"S, 51°59'06"W, 1 #m, 02.IX.2010, R.C. Francisco (MCTP 34476); Lebon Régis, 26°52'35"S, 50°43'15"W, 3 #f, 15.VII.2006, R. Lignau (MCTP 19584); Serra do Avencal, 26°14'00"S, 49°42'00"W, 2 #f, VII.1943, R.B. Lange (MHNCI 353–356); Corupá, 26°26'07"S, 49°14'42"W, 1 #f, 03.V.1967, P. Biasi (MZSP 7003); Nova Teutônia, 27°09'40"S, 52°25'00"W, 2 #f, I.1961, F. Plaumann (MNHG). *Rio Grande do Sul*: Torres, 29°20'03"S, 49°43'26"W, 1 #f, 26.III.2006, E.L.C. Silva (MCTP 1606); (Colônia de São Pedro de Alcântara) 1 #f, 07–09.V.1992, A. Braul (MCTP 1624); Itaara, 29°35'26"S, 53°45'31"W, 3 #f, 16.II.2006, 1 #f, 28.III.2006, L. Indrusiak (MCTP 21528, 21529); 1 #m, 16.I.2007; 1 #f, 23.VI.2007; 2 #m, 1 #f, 14.IX.2007, all collected by A.A. Lise *et al.* (MCTP 20627, 20628, 20748); São Francisco de Paula, 29°24'52"S, 50°15'24"W, 1 #m, 7 #f, 21–24.III.1995, R. Ott (MCTP 10382); 2 #m, 21–24.III.1995, A.A. Lise (MCTP 11887, 24145); 2 #f, 25–28.VII.1996, A.A. Lise *et al.* (MCTP 10167); 1 #f, 09–12.I.1997, A.A. Lise *et al.* (MCTP 10868); (Potreiro

Velho) 2 #m, 1 #f, 05–08.XII.1996, A.A. Lise (MCTP 10222; 13813, 13926); 2 #f, 05–09.III.1997, A.A. Lise (MCTP 11974, 14043); 5 #m, 6 #f, 10–13.IV.1997, A.A. Lise (MCTP 14197, 14200, 14202, 14205, 15693, 31997); 5 #f, 19–22.VIII.1998, A.A. Lise (MCTP 15695, 15696, 15697); Caxias do Sul (Ana Rech, 29°06'20"S, 51°05'31"W), 1 #f, 08.II.1955, P. Friedman (MCTP 3910); (Fazenda Souza) 1 #m, 1 #f, 18–21.XI.1993 (MCTP 4140). Novo Cabrais (Parque Witeck, 29°46'59"S, 52°58'18"W), 1 #m, 11.IX.2008, R.G. Buss (MCTP 28072); 1 #m, 1 #f 01.XI.2008, R.G. Buss (MCTP 27954, 27897); Taquara (Morro da Pedra, 29°41'57"S, 50°53'33"W), 1 #m, 17.II.1995, A.D. Brescovit (IBSP 6732); Viamão, 30°04'20"S, 51°05'49"W, 1 #m, 23.IX.1994, A.A. Lise (MCTP 8684); 2 #m, 07.X.1994, A.A. Lise (MCTP 12237); 1 #m, 08.XII.1999, A. Brault (MCTP 10985); 2 #m, 4 #f, 25.XI.1994 (MCTP 5812); 1 #m, 2 #f, 24.III.1995 (MCTP 5930, 7340); 3 #m, 5 #f, 12.V.1995 (MCTP 7815); 1 #m, 5 #m, 23.VI.1995 (MCTP 7713, 8544); 1 #f, 07.VII.1995 (MCTP 6667); 3 #m, 25.VIII.1995 (MCTP 7754); 1 #f, 03.X.1995 (MCTP 7750); 2 #f, 10.X.1995 (MCTP 7803); 4 #m, 24.II.1996, (MCTP 5929); 1 #f, 09.XII.1996 (MCTP 7779), all collected by A.A. Lise *et al.*; (Instituto Educacional Nossa Senhora das Graças) 1 #f, 26.V.1996, Eq. Lab. Aracno. (MCTP 7123); 2 #f, 18.VI.1998, P. Prates (MCTP 10222); (Estação Fitotécnica de Águas Belas) 1 #m, 2 #f, 06.V.1994. A.A. Lise *et al.* (MCTP 4660); 1 #f, 25.VII.1995, A.A. Lise (MCTP 7581); (Escola Marista) 1 #f, 20.V.1994, A.A. Lise *et al.* (MCTP 4718); Guaíba 30°06'32"S, 51°19'25"W, 1 #m, 1 #f, 03.VI.1994 (MCTP 4796); 5 #f, 29.X.1994 (MCTP 5556, 5657, 5681); 2 #f, 28.IV.1995 (MCTP 8655); 2 #m, 03.X.1995, (MCTP 7739) all collected by A.A. Lise *et al.*; (Fazenda São Maximiliano) 1 #f, 26.VIII.1994, A.A. Lise *et al.* (MCTP 6049); 1 #f, 29.X.1994 A.A. Lise *et al.* (MCTP 6900); 1 #f, 17.III.1995, A.A. Lise *et al.* (MCTP 8010); 1 #m, 14.VII.1995, A.A. Lise *et al.* (MCTP 6686); (Fazenda Matzembacher) 2 #m, 26.VIII.1994, A.A. Lise (MCTP 5410); Santo Antônio

da Patrulha, 29°49'37"S, 50°31'05"W, 2 #f, 27.VIII.1994, L. Koch (MCTP 4923); Santa Maria, 29°41'13"S, 53°48'55"W, 1 #m, 1 #f, 12.VIII.1998, C. Kotzian & L. Indrusiak (MCTP 10345); São Leopoldo, 29°45'18"S, 51°09'01"W, 2 #f, 10.IX.1964, C. Valle (MZSP 4435); Porto Alegre, 30°02'04"S, 51°13'03"W, 1 #m, 23.IV.1991, D. Picada (MCTP 1285); 1 #m, 18.V.1991, C.L. Dornelles (MCTP 33584). Canoas (Horta REFAP), 29°54'46"S, 51°11'10"W, 1 #f, 23.X.2000, F. Diefentheler (MCTP 13019).

Diagnosis. Males of *E. saga* (Figs 3A, B) and *E. sagana* (Figs 4A, B) present a very similar palp. Yet, they can be differentiated by the wide and obtuse basal portion of the conductor in *E. saga* (Fig. 3B) (vs. narrow and pointed in *E. sagana*, Fig. 4B). The females of these species also present a similar epigynum (Fig. 3C–E), however they can be distinguished by the scapus with a developed basis in *E. saga* (Fig. 3E) (vs. not developed basis in *E. sagana* Fig. 4E).

Description. *Male* (MCTP 34476). Carapace yellow. PME with dark borders. Sternum and legs yellow. Abdomen elongated, with apical wide projection; dorsum pale white with longitudinal brownish stripes (Fig. 3F). Venter discolored with well-defined dark gray band from epigastric furrow to spinnerets. Total length 7.95. Carapace length 3.35, width 2.55. Leg formula 1423. Length leg I: femur 1.70; patella +tibia 2.03; metatarsus 1.60; tarsus 0.55; total 5.88. Patella+tibia II 1.60; III 0.9 IV 1.75.

*Female* (MCTP 7815). Carapace. PME with dark borders. Sternum orange and legs. Abdomen as male (Fig. 3G). Total length 10.23. Carapace length 3.38, width 2.25. Leg formula 1423. Length leg I: femur 3.05; patella+tibia 3.70; metatarsus 2.38; tarsus 0.71; total 9.07. Patella+tibia II 3.45; III 1.60; IV 3.30.

Variation. Male (n=5): total length 5.30–7.95, carapace length 1.91–3.13, width 2.06–2.38. Female (n=5): total length 7.05–10.23; carapace length 2.75–3.38, width 1.97–2.34. Carapace and legs orange.

Distribution. Brazil: Bahia, São Paulo, Paraná, Santa Catarina, and Rio Grande do Sul. Uruguay (see Poeta, Marques & Buckup 2010a, figure 7).

***Eustala sagana* (Keyserling, 1893)**

Figs 4A–G

*Epeira sagana* Keyserling, 1893: 254, pl. 13, figure 189. Male and female syntypes from Rio de Janeiro, Brazil, E. Goeldi (AMNH, not examined).

*Araneus saganus*; Petrunkevitch, 1911: 314.

*Eustala sagana*; Roewer 1942: 766; Poeta, Marques & Buckup. 2010b; WSC 2017.

Additional material examined. BRAZIL, *Bahia*: Camacan (RPPN Serra Bonita), 15°25'12"S, 39°29'47"W, 2 #f, 11–13.VI.2009, A.B. Chagas-Jr, A. Kury, A. Pedroso, A. Giupponi & V. Dill (MNRJ 4525); Una (Reserva Biológica de Una, 15°10'37"S, 39°06'19"W), 1 #f, A.B. Chagas-Jr, A. Kury, A. Pedroso, A. Giupponi & V. Dill (MNRJ 4526). *Minas Gerais*: Rio Matipó, 20°13'37"S, 42°20'51"W, 1 #f, VIII.1919, P. Fonseca (MZSP 5785). *São Paulo*: São Sebastião (Barra do Ulna), 23°48'22"S, 45°24'05"W, 1 #f, 03.VI.1961, K. Lenko (MZSP 9532 (e1842)). *Paraná*, 25°25'27"S, 49°15'55"W: (R. Doraia), 1 #f, R.B. Lange, 1 #f, XI.1944 (MHNCI 349); 1 #m, 1 #f (MHNCI 357-394); (R. de Maio) 1 #f, B. Hentel (MHNCI 3433); Ponta Grossa (Parque Estadual de Vila Velha, 25°15'38"S, 50°00'21"W), 2 #f, 17.VIII.1947, K. Imaguire (MZSP); Morretes, 25°28'57"S, 48°49'44"W, 1 #f, E. Rosal, 27.II.1968 (MHNCI 3982); (Serra da Graciosa, 25°21'14"S, 48°53'00"W) 1 #f, 09–20.I.1995, Eq. Lab. Aracno. (MCTP 30234); Serra Negra, 25°10'33"S, 48°25'34"W, 2 #f, VIII.1946, A. Mayer (MHNCI 3362–3372). *Santa Catarina*: Nova Teutônia, 27°09'40"S, 52°25'00"W, 1#f, X.1968, F. Plaumann (MNHG);



(Seasa) 2 #f, 13–15.X.2006, E.L.C. Silva *et al.* (MCTP 28708). Rio Grande do Sul: Marcelino Ramos, 27°28'32"S, 51°55'34"W, 1 #m, 2 #f, II.1989, A. Brault (MCTP 19779); Rio Uruguai (BR-153), 27°22'46"S, 51°59'06"W 1#m, XII.1988, Itá-Machadinho (MCTP 819); 1 #m, 02.IX.2010, R.C. Francisco (MCTP 34476); São Francisco de Paula, 29°24'52"S, 50°15'24"W, 6 #f, 21–24.III.1995, R. Ott (MCTP 10382); Jaquirana, 28°57'58"S, 50°23'22"W 1 #f, 28.VIII.2002, R. Cunha (MCTP 15282); Terra de Areia (Rio do Pinto), 29°36'33"S, 50°04'49"W, 1 #f, 26.I.1993, G.L. Fiorentim (MCTP 4317); Augusto Pestana, 28°30'57"S, 53°59'33"W, 2 #f, 09.II.2009, L.V. Silva & L.B. Medeiros (MCTP 30364).

Diagnosis. Males of *E. sagana* (Figs 4A, B) and *E. saga* (Figs 3A, B) present similar palp and body shape, but distinguished by the basal portion of the conductor narrow and pointed in *E. sagana* (Fig. 4B) (*vs.* wide and obtuse in *E. saga*, Fig. 3B). As for the females of *E. sagana* (Fig. 4C–E), they can be distinguished by the epyginum with a wide and circular median plate in *E. sagana* (Fig. 4D) (*vs.* narrow and parallel in *E. saga*, Fig. 3D)

Description. *Male* (MCTP 19779). Carapace yellow. PME with dark borders. Sternum with dusk gray and white pigment. Legs yellow. Abdomen elongated, with apical wide projection; dorsum whitish with longitudinal light brown stripes (Fig. 10F). Venter discolored with well-defined dark gray band from epigastric furrow to spinnerets. Total length 7.60. Carapace length 3.10, width 2.35. Leg formula 1423. Length leg I: femur 3.80; patella+tibia 4.70; metatarsus 3.50; tarsus 1.25; total 13.25. Patella+tibia II 3.60; III 2.00; IV femur 3.75.

*Female* (MCTP 7815). Carapace, pale orange bordered in brown, legs and abdomen as male (Fig. 10G). Sternum gray. Total length 10.60. Carapace length 3.25, width 2.25. Leg formula 1423. Length leg I: femur 3.55; patella+tibia 4.55; metatarsus 4.30; tarsus 1.20;

total 13.60. Patella+tibia II 4.25 III 2.00; IV 4.05.

Variation. Male (n=2): total length 7.10–7.60; carapace length 3.00–3.10, width 2.05–2.35. Female (n=5): total length 7.85–11.40; carapace length 3.00–3.40, width 2.00–2.25. Carapace orange with a longitudinal brown line; legs orange. Dorsum of the abdomen yellow with just a central longitudinal brown stripe.

Distribution. Brazil: Bahia, Minas Gerais, São Paulo, Paraná, Santa Catarina, and Rio Grande do Sul (see Poeta, Marques & Buckup 2010b, figure 3).

### ***'rubroguttulata group'***

**Species included.** *Eustala unimaculata* Franganillo, 1930; *E. cazieri* Levi, 1977; *E. albiventer* (Keyserling, 1884); *E. latebricola* (O. Pickard-Cambridge); *E. secta* Mello-Leitão, 1945; *E. innoxia* Chickering, 1955; *E. exigua* Chickering, 1955; *E. devia* (Gertsch & Mulaik, 1936); *E. tantula* Chickering, 1955; *E. fragilis* (O. Pickard-Cambridge, 1889); *E. perdita* Bryant, 1945; *E. rubroguttulata* (Keyserling, 1879).

**Group diagnosis.** Males of these group usually have the palpal subterminal apophysis placed in an apical position, and the females present the epigynum with a smooth scapus and the median plate may cover the lateral plates.

### ***Eustala unimaculata* Franganillo, 1930**

Figs 5A–G

*Eustala unimaculata* Franganillo, 1930: 22. Female holotype from Sierra Maestra, Cuba [20°00'00"N, 76°45'00"W] (Museum unknown, apparently lost). Bryant 1936: 327, pl. 23, figures 1, 5; Roewer 1942: 767; WSC 2017.

*Eustala bisetosa* Bryant, 1945: 370, figures 5, 6. Male holotype from S. of Santiago (1–3000ft.), Hispaniola foothills of Cordilleira Central, Greater Antilles, Dominican Republic [18°44'08"N, 70°09'45"W], VI.1938, P.J. Darlington (MCZ 130798/ 20589 examined). Male paratype and female allotype from Kenskoff Commune, Port-au-Prince, Haiti [18°30'03"N, 72°18'14"W], 02.IX.1934, P.J. Darlington (MCZ 73115, examined); four females paratypes, same locality, 03.V.1935, P.J. Darlington (MCZ 75117, examined). Syn. nov.

Note. Synonymy based on the examination of the type material of *E. bisetosa*, and similarities in the illustrations, description and geographic distribution provided by Franganillo (1930) of *E. unimaculata*.

Additional material examined. CUBA, *Santiago de Cuba*: (Gran Piedra Oriente 20°00'33"N, 75°37'37"W) 1 #m, 29.VI.1955, A.F. Archer (AMNH). *Sierra del Cobre*, 20°00'00"N, 70°05'00"W: (Loma de los Gatos 2600–3325m) 4 #f, S.C. Bruner (MCZ 72634, det. as *E. unimaculata*); 1 #m, 2#f, VIII.1941, P.J. Darlington (MCZ 75114). DOMINICAN REPUBLIC: (Central Cordilleira, 1000 m, 18°44'08"N, 70°09'45"W) 1 #f, 18.III.1972; 1 #f, 12.VIII.1972, J. & S. Klapperich (MNHG). *San Cristobal Province* 18°25'04"N, 70°06'23"W: (Loma de los Pinos, Colonia Ramfis, T. Valdéz, 2400–3000 m) 1 #f, 07.VIII.1956, A.F. Archer & E.B. Moya (AMNH). *Puerto Plata*, 19°46'50"N, 70°41'13"W: 1 #m, VII.–VIII.1941, P.J. Darlington (MCZ 73116).

Diagnosis. The males of *E. unimaculata* (Figs 5A, B, F) resemble those of *E. guianensis* (Figs 16A, B) by the laminar terminal apophysis. At the same time, they can be distinguished from each other by the absence of the transparent subterminal apophysis and by the embolus connected in the stipes by membrane in *E. unimaculata* (Fig. 5A) (vs.

bubble-shaped subterminal apophysis and embolus/stipes connection without membrane in *E. guianensis*, Fig. 16A). The female of *E. unimaculata* (Figs 5C–E, G) presents the genitalia similar to those of *E. cazieri* (Figs 6C–F) by the smooth epigynum and by the general shape of the median plate. They can be distinguished from one another by the median plate partially covered by the lateral plates in *E. unimaculata* (ventral view, Fig. 5C) (vs. median plate fully exposed in *E. cazieri*, Fig. 6C, D). Note. The male and females allotypes present its genitalia poorly sclerotized.

Description. *Male* (AMNH). Carapace yellow. PME with dark borders. Sternum yellow with gray border. Abdomen subtriangular, longer than wide, brownish (Fig. 5F). Legs pale yellow with light brown bands. Total length 3.35. Carapace length 1.85, width 1.60. Leg formula 1243. Length leg I: femur 3.35; patella+tibia 3.75; metatarsus 2.40; tarsus 0.85; total 7.9. Patella+tibia II 2.55; III 1.15; IV 2.00.

*Female* (AMNH). Carapace yellow with white setae. AME and PME with black borders (Fig. 5G). LE with long white setae. Sternum pale yellow with light gray dusk border. Abdomen subtriangular, as longer as wide; dorsum whitish with light-brown folium, with three pairs of elongated small brown dots (Fig. 17G). Venter discolored with light brown band from epigastric furrow to spinirets and elongated median white patch. Legs pale yellow, light brown banded. Total length 5.15. Carapace length 2.20, width 1.85. Leg formula 1243. Length leg I: femur 3.00; patella+tibia 3.30; metatarsus 1.95; tarsus 0.75; total 9.00. Patella+tibia II 2.55; III 1.25; IV 2.10.

Variation. Male (n=2): total length 5.15–5.95 carapace length 1.9–2.2, width 1.6–1.8. Female (n=3): total length 5.15–5.95; carapace length 1.75–2.2, width 1.45–1.95. Males and females vary from pale-yellow to orange and the carapace and sternum may or may not have white pigment. Dorsum of the abdomen all white; venter may lack the median white patch.

Distribution. Cuba: Santiago de Cuba, Sierra del Cobre. Dominican Republic: Central Cordillera, Hispaniola, Puerto Plata, and San Cristobal Province. Haiti: Ouest.

*Eustala cazieri* Levi, 1977

Figs 6A–H

*Eustala cazieri* Levi, 1977: 102, figures 128–137. Female holotype from Monroe County, Florida, United States of America [24°19'33"N, 79°46'36"W], 11.III.1963, H. & L. Levi (MCZ 20748, examined). One male and three females paratypes, South Bimini Island, Bahamas [24°38'29"N, 79°52'11"W], 13.VI.1950, M. Cazier & F. Ringe (AMNH, examined); five males and 14 females paratypes, same locality, VI.1951, M.A. Cazier & C.P. Vaurie (AMNH, examined); one male and two females paratypes, same locality, 13.V.1951, M. Cazier & W.J. Gertsh (MCZ 23938, examined). WSC 2017.

Additional material examined. BAHAMAS, *Great Abaco Islands* 26°21'19"N, 77°08'54"W: 1 #m, 1 #f, 18.IV.1984, D. Spiller (MCZ 73410).

Diagnosis. Males of *Eustala cazieri* (Figs 6A, B) present a unique palp by the very developed, bulged, terminal apophysis, and subtriangular. Moreover, the tegulum is strongly scratchy with a median invagination. The females of *E. cazieri* (Figs 6C–F) resemble those of *E. unimaculata* (Figs 5C–E) by the epigynum with smooth scapus. Alternatively, they differ from one another by the median plate projected laterally in *E. cazieri* (Fig. 6F) (vs. not visible in *E. unimaculata*, Fig. 5E).

Description. *Male* (AMNH, paratype). Carapace orange with light brown marks. Sternum pale yellow dusk gray. Abdomen oval, longer than wide, with a minute terminal

projection; dorsum white, dusk gray, with longitudinal dark brown line, and a brown partial folium (Fig. 6G). Ventral surface decolorated with some white pigment. Legs pale yellow with dark brown bands. Total length 3.85. Carapace length 2.00, width 1.70. Leg formula 1243. Length leg I: femur 3.15; patella+tibia 3.55; metatarsus 2.90; tarsus 0.05; total 9.65. Patella+tibia II 2.40; III 1.30; IV 2.10.

*Female* (AMNH, paratype). Carapace and legs as the male, with many white setae. PME with black borders. Sternum with white pigment. Abdomen subtriangular, with lateral humps and two terminal tubercles, colored as the male (Fig. 6H). Venter pale yellow and light brown, with a light gray band from the epigastric furrow to the spinnerets, and an elongated median white patch. Legs pale yellow. Total length 5.25. Carapace length 1.90, width 1.75. Leg formula 1243. Length leg I: femur 2.65; patella+tibia 3.09; metatarsus 1.95; tarsus 0.80; total 8.49. Patella+tibia II 2.70; III 1.20; IV 2.25.

Variation. Male (n=2): carapace length 2.00–2.05, width 1.70–1.85. Female (n=5): total length 4.00–5.55; carapace length 1.65–1.90, width 1.50–1.75. Carapace and legs orange. “V”-shaped white mark on the carapace. Female abdomen subtriangular or oval, decolored.

Distribution. United States of America: Florida. Bahamas: South Bimini Island, Great Abaco Islands.

### ***Eustala albiventer* (Keyserling, 1884)**

*Epeira albiventer* Keyserling, 1884:651, pl. 21, fig. 3. Female holotype from Santa Isabela (currently Santa Isabel do Sul, Arroio Grande), Rio Grande do Sul, Brazil, [32°14'15"S, 53°05'13"W] (National Museum of Ireland, not examined). Keyserling, 1892: 157, pl. 8, fig. 115.

*Araneus albiventer*; Petrunkevitch, 1911: 278.

*Araneus sanguinosus*; Petrunkevitch, 1911:314.

*Eustala sanguinosa*; Roewer, 1942:766.

*Metazygia albiventer*; Mello-Leitão, 1943:186.

*Eustala albiventer*; Levi, 1991:178; Poeta, Marques & Buckup, 2010a: 155, figs 20–24.

**Diagnosis and descriptions.** See Poeta, Marques & Buckup, 2010a: 155.

**Distribution.** Brazil: São Paulo, Paraná, Santa Catarina, and Rio Grande do Sul (See Poeta 2014, Figure 88).

***Eustala latebricola* (O. Pickard-Cambridge)**

Figs 7A–C, G

*Epeira latebricola* O. Pickard-Cambridge, 1889: 31, pl. 8, figure 4. Female holotype and paratype from Bugaba, Chiriquí Province, Panamá [08°37'29"N, 82°37'16"W], Godman & Salvin (NHM, examined). Female paratype, same data as holotype (NHM, examined). Keyserling 1892: 150, pl. 7, figure 110.

*Eustala latebricola*; F. O. Pickard-Cambridge 1904: 508, pl. 48, figure 15; Roewer 1942: 765; Chickering 1955: 457, figures 78–80; WSC 2017.

Additional material examined. COSTA RICA, *San José*: San José, 09°55'41"N, 84°05'26"W: 2 #f (AMNH).

Diagnosis. The genitalia of females of *E. latebricola* (Figs 7A–C) are similar to those of *E. perfida* (see Poeta, Marques & Buckup. 2010b, figures 24–26) by the smooth epigynum. Yet, *Eustala latebricola* can be separated from these species by the median plate with an invagination (Fig. 7A) and by the triangular and smooth lateral plate (lateral

view, Fig. 34C) (*vs.* median plate without invagination, and lateral plate wrinkled in *E. perfida*, see Poeta, Marques & Buckup, 2010b, figures 24, 26).

Description. *Female* (NHM, paratype). Carapace yellow, greyish on thoracic area, with two brown dots on cephalic area border. PME with black borders. Sternum pale yellow with anterior white pigment. Abdomen subtriangular, dorsum whitish with brown dusk marks and faint folium (Fig. 7G). Venter with faint white patch. Legs pale yellow. Total length 11.69. Carapace length 4.70, width 3.74. Leg formula 1243. Legs I and I missing. Patella+tibia III patella 0.91; IV 2.47.

Variation. Female (n=3): total length 5.05–5.91; carapace length 2.05–2.16, width 1.70–1.79.

Distribution. Costa Rica: San José. Panamá: Chiriquí Province.

### ***Eustala secta* Mello-Leitão, 1945**

*Eustala secta* Mello-Leitão, 1945b: 238, figure 11. Female holotype from Puerto Victoria,

Misiones, Argentina [26°19'49"N, 54°37'20"W], Zenzes (MLP 16390, not examined).

Poeta, Marques & Buckup, 2010b: 272, figures 27–31; WSC 2017.

Description and diagnosis. See Poeta, Marques & Buckup, 2010b: 272, figures 27–31.

Distribution. Brazil: Goiás, Paraná, Rio Grande do Sul. Argentina: Misiones (See Poeta,

Marques & Buckup, 2010b, figure 2).

### ***Eustala innoxia* Chickering, 1955**

(Figs 8A–C, F)



*Eustala innoxia* Chickering, 1955: 452, figures 74–76. Female holotype from Forest Reserve, Canal Zone, Panamá [09°07'33"N, 79°43'37"W], VIII.1939, A.M. Chickering (MCZ 21651, examined). Female paratype, same data as holotype (MCZ 24522, examined). WSC 2017.

Diagnosis. The epyginum of *E. innoxia* (Figs 8A–C) resembles those of *E. tantula* (Figs 10C–E) by the lateral position of the copulatory openings, but they can be distinguished by the rounded median plate of *E. innoxia* (vs. enlarged laterally in *E. tantula*, Fig. 10C).

Description. *Female* (MCZ 21651, holotype). Carapace yellow, with “V”-shaped mark on cephalic area, followed by pair of brown dots on thoracic area. PME with dark borders. Sternum pale yellow. Abdomen circular, dorsum decolored, with faint light brown folium (Fig. 8F). Ventral surface discolored. Legs pale yellow, light brown ringed. Total length 5.20. Carapace length 2.00, width 1.70. Leg formula 1243. Length leg I: femur 3.40; patella+tibia 3.50; metatarsus 2.45; tarsus 1.00; total 10.35. Patella+tibia II 3.05; III 1.40; IV 2.10.

*Male*. Unknown.

Distribution. Panamá: Canal Zone.

### ***Eustala exigua* Chickering, 1955**

(Figs 8D, E, G)

*Eustala exigua* Chickering, 1955: 435, figures 55–58. Male holotype from Barro Colorado Island, Canal Zone, Panamá [09°09'07"N, 79°50'47"W], VII.1939, A.M. Chickering (MCZ 21242, examined). Four males paratypes, same locality as holotype, VII–VIII.1936, A.M. Chickering (MCZ 24479, examined); male paratype from Forest

Reserve, Canal Zone, Panamá [09°07'33"N, 79°43'37"W] (MCZ 24522); Paratypes, same locality as holotype, VII–VIII.1939; VI–VII.1950 (not examined); Ft. Sherman, Canal Zone, VIII.1939; VII–VIII.1939 (not examined); Forest Reserve, Canal Zone, Panamá, VII.1936, VII–VIII.1950 (not examined); El Valle, Panamá, R.P. VII.1936 (not examined); Arraijan, R.P., Panamá, VII.1950 (not examined). WSC 2017.

**Diagnosis.** The male of palpus of *E. exigua* (Figs 8D, E) are similar to those of *E. tantula* (Figs 10A, B) by the membranous C and by the inverted position of the complex STA+A. They can be separated by the finger-like C of *E. exigua* (Fig. 8D), which is bifurcated in *E. tantula* (mesal view, Fig.10A).

**Description.** *Male* (MCZ 24479, paratype). Carapace yellow, with a triangular white patch, brownish surrounded in the cephalic area, thoracic area with brown dots. LE with long macrosetae, MPE with dark borders. Sternum yellow. Abdomen subtriangular, longer than wide, dorsum brown with dark brown folium, and an anterior transversal white band (Fig. 8G). Ventral surface brownish. Legs yellow, dark brown ringed. Total length 3.60. Carapace length 1.75, width 1.5. Leg formula 1243. Length leg I: femur 3.00; patella+tibia 3.13; metatarsus 2.40; tarsus 0.70; total 9.23. Patella+tibia II 2.45; III 1.25; IV 1.65.

*Female.* Unknown.

**Variation.** Male (n=4) no variation in the measurements. Female (n=5): total length 4.7–5.6; carapace length 1.9–2.3, width 1.4–1.9. Males may have the carapace and legs pale yellow with faint light brown marks. Abdomen whitish with gray folium, whitish with just demilited folium.

**Distribution.** Panamá: Canal Zone, Barro Colorado, Forest Reserve, El Valle.

***Eustala devia* (Gertsch & Mulaik, 1936)**

Figs 9A–G

*Neosconella devia* Gertsch & Mulaik, 1936: 16, figure 38. Female holotype from Edinburg, Texas, United States of America [26°18'06"N, 98°09'48"W], 25.VIII.1935 (AMNH, not examined).

*Eustala devia*; Levi 1973: 487; Levi 1977: 101, figures 118–127. WSC 2017.

Additional material examined. BAHAMAS ISLANDS, ‘South’ Bimini, 24°38'29"N, 79°52'11"W: 1 #m, 1 #f, VI.1951, M.A. Cazier (AMNH, Archer det. as *E. perdita*).

Diagnosis. Males of *E. devia* (Figs 9A, B) resembled to those of *E. perdita* (Figs 11A, B) by the palp with membranous conductor and by the subterminal apophysis in apical position. Alternatively, they can be differentiated from each other based on the tegulum with two conspicuous pointed projections in *E. devia* (Fig. 9B) (*vs.* absent in *E. perdita*, Fig. 11B). Also, the epigynum of *E. devia* (Figs 9C–E) is similar to the one of *E. innoxia* (Figs 8A–C) by the smooth epigynum with the median plate covering the lateral plates, in ventral view. However, *E. devia* can be distinguished by the “V”-shaped lateral plates, in posterior view (Fig. 9D) (*vs.* square in *E. innoxia*, Fig. 8B).

Description. *Male* (AMNH). Carapace orange, with pair of dusk brown bands and dark-brown dots and “V”-shaped white pigment on cephalic area; thoracic area with pair of faint spots and PME with dark borders. Sternum pale yellow with gray border. Abdomen oval, longer than wide; dorsum yellowish with brown folium and transversal brown band anteriorly (Fig. 9F). Ventral surface discolored, dusk brown laterally, light brown centrally, leaving two discolored rounded areas. Legs pale yellow brown ringed. Total length 3.1. Carapace length 1.50, width 1.15. Leg formula 1243. Leg I: missing.

Patella+tibia II: 1.75; III 0.90; IV 1.55.

*Female* (AMNH). Carapace yellow, with pair of brown bands laterally, dark-brown dots and “V”-shaped white pigment on cephalic area, two pairs of brown spots in thoracic area, PME with dark borders. Sternum pale yellow with dark brown border. Abdomen subtriangular, dorsum whitish with brown marks as the male; ventral surface and legs as male (Fig. 9G). Legs pale yellow brown ringed. Total length 5.6. Carapace length 2.50, width 1.05. Leg formula 1243. Length leg I: femur 2.00; patella+tibia 2.22; metatarsus 1.50; tarsus 0.60; total 6.32. Patella+tibia II 1.85; III 1.00; IV 1.55.

Distribution. Bahama Islands: South Bimini.

*Eustala tantula* Chickering, 1955

Figs 10A–G

*Eustala tantula* Chickering, 1955: 505–507, figures 128–130. Male holotype from Barro Colorado Island, Panamá [09°09'07"N, 79°50'47"W] (NHM, examined). Male paratype from Fort Davis, Canal Zone, Panamá [09°17'30"N, 79°54'27"W], VII.1936 (NHM, examined).

*Eustala minima* Chickering, 1955: 471, figures 94–96. Female holotype from Barro Colorado Island, Canal Zone, Panamá [09°09'07"N, 79°50'47"W], VI.1950 (MCZ 22081, examined). Synonymized by Levi & Santos 2013: 223. WSC 2017.

Additional material examined. PANAMÁ, *Colón*: Gamboa, 09°06'59"N, 79°41'47"W: 1 #f, IV.1983, S. Heimer (MNHG).

Diagnosis. The male palp of *E. tantula* (Figs 10A, B) is similar to those of *E. perdita* (Figs 11A, B) by the membranous conductor, bifurcated (mesal view) and by the

subterminal apophysis in apical position. They can be separated by terminal apophysis linear and pointing up in *E. tantula* (vs. sinuous terminal apophysis, pointing to the venter of the bulbus in *E. perditia*, Fig. 11A). The epigynum of *E. tantula* (Figs 10C–E) is similar to *E. perditia* (Figs 11C–E) by the presence of a sclerotized extension into the abdomen. They can be separated from each other by the median plate enlarged laterally and by the lateral plates noticeable in ventral view, of *E. tantula* (Fig. 10A) (vs. rounded median plate covering the lateral plates, *E. perditia*, Figs 11C).

Description. *Male* (NHM, paratype). Carapace pale yellow. PME with black borders. Sternum pale yellow. Abdomen subtriangular; dorsum discolored with light brown folium and transversal brown band anteriorly (Fig. 10F). Venter discolored with light brown marks laterally. Legs pale yellow with brown bands. Total length 3.22. Carapace length 1.55, width 1.39. Leg formula 1243. Length leg I: femur 2.93; patella+tibia 3.04; metatarsus 2.37; tarsus 0.89; total 9.23. Patella+tibia II 2.40; III 1.18; IV 1.99.

*Female* (MNHG). Carapace yellow, cephalic area dusk grey with dark-brown dots thoracic area with transversal line of dark-brown spots. PME with black borders. Sternum pale yellow with wide light gray border. Abdomen oval, dorsum discolored (Fig. 10G). Ventral surface discolored, with lateral brown lines without pattern. Legs pale yellow with brown bands. Total length 3.97. Carapace length 1.67, width 1.44. Leg formula 1243. Length leg I: femur 2.08; patella+tibia 1.87; 1.60; metatarsus 1.51; tarsus 0.21; total 6.30. Patella+tibia II 1.88; III patella 1.18; IV 1.99; tibia 1.40.

Distribution. Panamá: Barro Colorado Island.

### ***Eustala perditia* Bryant, 1945**

Figs 11A–G

*Eustala perdit*a Bryant, 1945: 373, figures 4, 9. Male holotype from Port-au-prince, Haiti [18°35'39"N, 72°18'26"W], VII.1941, A. Audant (MCZ 22601, examined). Female allotype, same data as holotype (MCZ 44034, examined). Five female paratypes, same data as holotype (MCZ 73069, examined). WSC 2017.

Diagnosis. Males of *E. perdit*a (Figs 11A, B) resemble those of *E. exigua* (Figs 8D, E) by the subterminal apophysis in an apical position. It differs from these species by the sinuous terminal apophysis, pointing to the venter of the bulbus in *E. perdit*a (Fig. 11A) (vs. linear and pointing up in *E. exigua*, Fig. 8D). The female of *E. perdit*a (Figs 11C–E) is similar to those of *E. tantula* (Figs 10C–E) by the smooth epigynum with rounded basis. They can be distinguished by the median plate covering totally the lateral plates, in ventral view, in *E. perdit*a (Fig. 11C) (vs. visible lateral plates Fig. 10C in *E. tantula*).

Description. *Male* (MCZ holotype). Carapace pale yellow with dusk grey lateral cephalic area, with pair of dark-brown dots and two pairs of brown spots on thoracic area. PME with dark borders. Sternum pale yellow with dusk light gray border. Abdomen subtriangular, longer than wide, dorsum light brown with brown folium (Fig. 11F). Ventral surface light brown with lateral discolored area. Legs pale yellow with dark brown bands. Total length 2.85. Carapace length 1.55, width 1.25. Many legs articles missing.

*Female* (MCZ 73069). Carapace as male, with darker marks and “V”-shaped white pigment on cephalic area. Sternum and legs as male. Abdomen oval, whitish (Fig. 11G). Total length 4.75. Carapace length 1.60, width 1.60. Many legs articles missing.

Variation. Female (n=3): total length 4.75–5.00. Carapace length 1.60–2.10, width 1.60–3.00. Female abdomen dorsum may be white, and the ventral surface may be discolored with white pigment centrally, without a pattern.

Distribution. Haiti: Port-au-prince.

*Eustala fragilis* (O. Pickard-Cambridge, 1889)

Figs 12D–F, H

*Epeira fragilis* O. Pickard-Cambridge, 1889: 23, pl. 4, figure 18. Female holotype from Bugaba, Chiriquí Province, Panamá [08°37'29"N, 82°37'16"W], Champion (NHM, examined). Keyserling 1892: 186, pl. 9, figure 137.

*Eustala fragilis*; F. O. Pickard-Cambridge 1904: 509, pl. 48, figure 18; Roewer 1942: 765; WSC 2017.

Note. The specimen is in poor conditions and the abdomen is extremely damaged. Therefore, many measurements were not possible to be taken.

Diagnosis. *Eustala fragilis* has an epigynum (Figs 12D–F) with a smooth scapus as those of *E. tantula* (Figs 10C–E). Yet, *E. fragilis* can be distinguished from this species by the very prominent projected median plate (Fig. 12E), and by the distal border of the lateral plates linear (posterior view, Fig. 12E) (vs. median plate not as projected and border of the lateral plates hourglass-shaped in *E. tantula* (Fig. 10D).

Description. *Female* (NHM, holotype). Carapace yellow with central white mark (Fig. 12H). Sternum and legs yellow. Abdomen damaged, discolored. Carapace length 1.30, width 1.21. Leg formula 1243. Length leg I: femur 1.54; patella 0.52; tibia 1.28; metatarsus 0.92; tarsus 0.47; total 4.72. Patella+tibia II 1.15; III 0.75; IV 1.29.

*Male*. Unknown.

Distribution. Panamá: Bugaba.

*Eustala rubroguttulata* (Keyserling, 1879)

Figs 12A–C, G

*Larinia rubroguttulata* Keyserling, 1879: 314, pl. 4, figure 15. Female holotype from Junin, Amable Maria, Peru [11°20'08"N, 75°20'28"W], K. Jelski (MZPW, examined).

Keyserling 1893: 292, pl. 15, figure 216.

*Araneus rubroguttulatus*; Grasshoff 1970: 218.

*Eustala rubroguttulata*; Harrod Levi & Leibensperger 1991: 246. WSC 2017.

Diagnosis. The epigynum of *Eustala rubroguttulata* (Figs 12A–C, G) resembles those of *E. secta* by the general shape of the scapus in ventral view (see Poeta, Marques & Buckup, 2010b, figure 29). However, *E. rubroguttulata* have a unique epigynum with a scapus that arises from the median plate, which seems to be folded above the lateral plates. Additionally, the lateral plates seem to be connected to a cuboid membranous portion, posteriorly (Figs 12B).

Description. *Female* (MZPW, holotype). Carapace, sternum, and legs pale brown. PME with black borders. Abdomen oval, longer than wide; dorsum yellowish-brown, with posterior brown folium (Fig. 12G). Venter pale brown with brown band from epigastric furrow to spinnerets. Total length 4.35. Carapace length 1.85, width 1.65. Many legs articles missing (leg measurements, see Keyserling 1879).

*Male*. Unknown.

Distribution. Peru: Junin.

***‘anastera group’***



**Species included.** *Eustala californiensis* (Keyserling, 1885); *E. catarina* Poeta, 2014; *E. cidae* Poeta, 2014; *E. crista* Poeta, Marques & Buckup, 2010; *E. redundans* Chickering, 1955; *E. minúscula* (Keyserling, 1892); *E. photographica* Mello-Leitão, 1944; *E. ericae* Poeta, 2014; *E. guianensis* (Taczanowski, 1873); *E. farroupilha* Poeta, 2014; *E. bucolica* Chickering, 1955; *E. scutigera* (O. Pickard-Cambridge, 1898); *E. venusta* Chickering, 1955; *E. levii* Poeta, Marques & Buckup, 2010; *E. scitula* Chickering, 1955; *E. guarani* Poeta, 2014; *E. histrio* Mello-Leitão, 1948; *E. montivaga* Chickering, 1955; *E. occidentalis* Baert, 2014; *E. meridionalis* Baert, 2014; *E. orientalis* Baert, 2014; *E. gonygaster* (C.L. Koch, 1838); *E. cameronensis* Gertsch & Davis, 1936; *E. taquara* (Keyserling, 1892); *E. vegeta* (Keyserling, 1865); *E. guttata* F. O. Pickard-Cambridge, 1904; *E. ingenua* Chickering, 1955; *E. belissima* Poeta, Marques & Buckup, 2010; *E. rustica* Chickering, 1955; *E. brevispina* Gertsch & Davis, 1936; *E. eleuthera* Levi, 1977; *E. lisei* Poeta, 2014; *E. pallida* Mello-Leitão, 1940; *E. lunulifera* Mello-Leitão, 1939; *E. smaragdinea* (Taczanowski, 1878); *E. conformans* Chamberlain, 1925; *E. delecta* Chickering, 1955; *E. palmares* Poeta, Marques & Buckup, 2010; *E. bifida* F. O. Pickard-Cambridge, 1904; *E. lata* Chickering, 1955; *E. mucronatella* (Roewer, 1942); *E. anastera* (Walckenaer, 1841); *E. cepina* (Walckenaer, 1841); *E. conchlea* (McCook, 1888); *E. rosae* Chamberlain & Ivie, 1935; *E. banksi* Chickering, 1955; *E. trinitatis* (Hogg, 1918); *E. cuia* Poeta, 2014; *E. ulecebrosa* (Keyserling, 1892); *E. tribrachiata* Badcock, 1932; *E. mimica* Chickering, 1955; *E. clavispina* (O. Pickard-Cambridge, 1889); *E. viridipedata* (Roewer, 1942); *E. novemmamillata* Mello-Leitão, 1941; *E. sedula* Chickering, 1955; *E. eldorado* Poeta, 2014; *E. nasuta* Mello-Leitão, 1939; *E. perfida* Mello-Leitão, 1947; *E. itapocuensis* Strand, 1916; *E. semifoliata* (O. Pickard-Cambridge).

**Group diagnosis.** This group is extremely diverse, including most of the known species. Males present the palp with a hook-shaped embolus and the females have the epigynum with wrinkled scapus.

*Eustala californiensis* (Keyserling, 1885)

Figs 13A–G

*Cyrtophora californiensis* Keyserling, 1885: 525, pl. 13, figure 24. Female holotype from California, United States of America [36°46'41"N, 119°25'04"W] (MCZ, not examined). Keyserling 1893: 263, pl. 13, figure 106.

*Araneus diegensis* Schenkel, 1950: 67, figures 23a–c. Female holotype from Missions bay, San Diego, California, United States of America [32°42'44"N, 117°15'36"W] (NMB 1766-a, examined). Synonymized by Levi 1977: 104, figures 138–148.

*Eustala abdita* Chickering, 1955: 410, figures 19–23. Male holotype from Huajuapán, Oaxaca, Mexico [17°01'48"N, 96°31'14"W] (AMNH, not examined). Synonymized by Levi 1977: 104.

*Eustala mexicana* Chickering, 1955: 465, figures 88, 89. Female holotype from Lo Bajo, Guerrero, Mexico [17°33'42"N, 118°01'49"W] (AMNH, not examined). Synonymized by Levi 1977: 104.

*Eustala californiensis*; Levi 1977: 104, figures 138–148; WSC 2017.

Additional material examined. MEXICO, *Tepic*, 21°30'14"N, 104°53'40"W: 1 #m, 2 #f, 24.VI.1940, L.W. Saylor (AMNH) (Ivie det. as *E. scutigera*). *San Luis Potosí*: Ciudad Valles, 22°07'02"N, 100°57'37"W, 7 #m, 15 #f, VII.1959, L. Steude (AMNH); 5 #m, 15 #f, VII.1959, L. Steude (AMNH, Levi det. 1975 as *A. diegensis* and *E. californiensis*).

Diagnosis. Males of *Eustala californiensis* (Figs 13A, B) resembles those of *E. rustica* by the conductor with a transversal section, in ventral view (Fig. 26A, B). They differ by the strongly developed tegular projection and a wide terminal apophysis in *E. californiensis* (Figs 13A, B) (vs. absence of developed tegular projection and acute terminal apophysis in *E. rustica* Fig. 26A, B). The epigynum of *E. californiensis* (Figs 11C–E) is similar to those of *E. brevispina* (Figs 27A–C) by the wrinkled scapus. Yet, they are easily distinguished by the distal border of the lateral plates hourglass shaped in *E. californiensis* (posterior view, Fig 13D) (vs. linear in *E. brevispina*, Fig. 27B).

Description. *Male* (AMNH, San Luis Potosí, Mexico). Carapace yellow with some light brown dots on thoracic area, PME with dark borders. Sternum pale yellow. Abdomen oval, longer than wide, dorsum white with light gray folium, ventral surface yellow with decolored median area (Fig. 13F). Legs pale yellow. Total length 4.80. Carapace length 2.29, width 1.85. Leg formula 1243. Length leg I: femur 3.70; patella, tibia, metatarsus, tarsus missing. Patella+tibia II 2.77; III 1.39; IV 2.39.

*Female* (AMNH, San Luis Potosí, Mexico). Carapace yellow. PME with black borders. Sternum pale yellow with white pigment. Abdomen subtriangular, longer than wide. Dorsum pale yellow, with light-gray folium (Fig. 13G). Venter with well-defined gray band from epigastric furrow to spinnerets and elongated median white patch. Legs yellow with light brown bands. Total length 4.80. Carapace length 2.58, width 2.18. Leg formula 1243. Length leg I: femur 3.88; patella+tibia 4.19; metatarsus 2.14; tarsus 0.95; total 11.18. Patella+tibia II 3.42; III: 1.73; IV 2.76.

Variation. Male (n=4): total length 4.25–4.80; carapace length 2.05–3.01, width 1.85–1.93. Female (n=5): total length 4.89–7.36; carapace length 2.09–2.60, width 1.86–2.18. Females: Dark green marks on legs and cephalic area (trespassing to the thoracic area) Abdomen with no folium, and mostly dark green with white pignment in the shoulders;

mostly pale yellow, with gray, brown, green or faded folium; venter with random white pigment. May or may not present the black lateral stripe on the carapace. Legs banded or pale-yellow. Carapace pale-yellow to orange, with or without brown and/or white marks. Males carapace may be orange to pale yellow, with brown thoracic. Most specimens have brown to dark brown marks to the AME to the ALE and black strip on the carapace, laterally.

Variation. Females can vary a lot in size and color, being pale yellow to dark orange, or brownish. Two apical tubercles that look like as ondulations.

Distribution. United States of America: California. Mexico: Tepic, San Luis Potosí.

#### ***Eustala catarina* Poeta, 2014**

*Eustala catarina* Poeta, 2014: 443, figures 10–18. Male holotype from Rio Uruguai, Santa Catarina, Brazil [27°22'46"S, 51°59'06"W], 02.IX.2010, R.C. Francisco (MCTP 35517, examined). Male and two females paratypes, same data as holotype (MCTP 35518, examined).

**Diagnosis and description.** See Poeta (2014).

**Distribution.** Brazil: Santa Catarina (see Poeta 2014, Figure 85).

#### ***Eustala cidae* Poeta, 2014**

*Eustala cidae* Poeta, 2014: 446, figures 29–37. Male holotype from São Leopoldo, Rio Grande do Sul, Brazil [29°45'17"S, 51°09'04"W], 01.IX.1986, C.J. Becker (MCTP 334). Male and female paratypes from P.E.S. da Cantaneira, Pedra Grande, São Paulo, Brazil [23°27'S, 46°38'W], 20.XII.2000, R. Pinto da Rocha (MZSP 24667, 24671);

females paratypes from Rancho Queimado, Santa Catarina, Brazil, [27°40'25"S, 49°00'44"W], 09.–13.X.1995, A.A. Lise *et al.* (MCTP 7050) and A.B. Bonaldo (MCN 26770); male paratype from Parque Witeck, Cachoeira do Sul, Rio Grande do Sul, Brazil [29°46'59"S, 52°58'18"W], 09.X.2008, R.G. Buss (MCTP 28025).

**Diagnosis and description.** See Poeta (2014).

**Distribution.** Brazil: São Paulo, Santa Catarina, and Rio Grande do Sul (See Poeta 2014, Figure 85).

### ***Eustala crista* Poeta, Marques & Buckup, 2010**

*Eustala crista* Poeta, Marques & Buckup, 2010b: 268, figures 10–15. Male holotype and female paratype from Iraí, Rio Grande do Sul, Brazil [27°11'30"S, 53°15'43"W], 18.XI.1975, A.A. Lise (MCN 3060, 3058, examined). Three males and one female paratypes from Estrela Velha, Rio Grande do Sul, Brazil [29°12'44"S, 53°11'47"W], 20, 21.X.1998 and 27.X.1998, A.B. Bonaldo (MCN 29546, 29570, 31505, examined); female paratype from Maquiné, Rio Grande do Sul, Brazil [29°36'31"S, 50°13'27"W], 08.IV.1995, L. Moura (MCN 26542).

**Diagnosis and descriptions.** See Poeta, Marques & Buckup, 2010b.

**Distribution.** Brazil: Paraná, Santa Catarina and Rio Grande do Sul) (see Poeta, Marques & Buckup, 2010b, Figure 1).

***Eustala redundans* Chickering, 1955**

Figs 14D–F, H

*Eustala redundans* Chickering, 1955: 484, figures 106–107. Female holotype from Madden Dam Forest, Canal Zone, Panamá [09°12'40"N, 79°36'58"W], A.M. Chickering (MCZ 22873, examined). WSC 2017.

Diagnosis. The epigynum of *E. redundans* (Figs 14D–F) resembles those of *E. guttata* (Figs 24D–F) by the scapus that abruptly arises from its basis. However, they differ from each other by the median plate with a conspicuous lobe in *E. redundans* (Figs 26D–F) (vs. absent in *E. guttata*, Figs 24D–F).

Description. *Female* (MCZ 22873, holotype). Carapace pale orange with dusk grey marks on the cephalic area, with two pairs of brown dots on the thoracic area. PME with dark borders. Sternum pale yellow with dusk light gray border. Abdomen subtriangular, longer than wide, dorsum discolored with light brown folium and a central rounded brown patch (Fig. 14H). Venter yellowish with lateral brown lines and dark brown band from epigastric furrow to spinnerets, with an elongated median white patch. Legs pale orange with dark brown bands. Total length 6.40. Carapace length 2.65, width 2.15. Leg formula 1243. Length leg I: femur 3.38; patella+tibia 4.10; metatarsus 2.74; tarsus 0.98; total 11.20. Patella+tibia II 3.51; III 1.79; IV 2.96.

*Male*. Unknown.

Distribution. Panamá: Canal Zone.

***Eustala minuscula* (Keyserling, 1892)**

Figs 15A–G

*Epeira minuscula* Keyserling, 1892: 140, pl. 7, figures 103a–e. Male and female syntypes from Rio Grande do Sul, Brazil, H. Ihering (NHM, not examined).

*Eustala minuscula*; Mello-Leitão 1919: 478; 1943: 179; Poeta, Marques & Buckup. 2010a: 159. WSC 2017.

Additional material examined BRAZIL, *São Paulo*: Serra da Bocaina (San José do Barreiro, Faz. Bonito), 22°44'03"S, 44°36'59"W, 1 #f, 01–31.I.1963, Vulcano (MZSP 7844/e2816-4). *Paraná*: Ponta Grossa (Parque Estadual de Vila Velha, 25°15'38"S, 50°00'21"W), 1 #f, F. Lange (MHNCI 1899). *Santa Catarina*: Chapecó (Quebra-Queixo), 27°06'03"S, 52°36'56"W, 1 #m, 26, 27.II.2002, M. Kammes (MCTP 12920); Rio Uruguai, 27°22'46"S, 51°59'06"W, 1 #m, 1 #f, 02.IX.2010, R.C. Francisco (MCTP 34474). *Rio Grande do Sul*: Machadinho (Rio Uruguai, Br-153), 27°36'03"S, 51°36'03"W, 1 #f, IX.1989, Eq. Itá-Machadinho (MCTP 817). Itaara, 29°35'27"S, 53°45'31"W, 1 #m, 01.XII.2005 (MCTP 21526); 1 #m, 16.II.2006 (MCTP 21527); 1 #f, 28.III.2006 (MCTP 21524), all collected by L. Indrusiak; 1 #f, 22.XI.2006, A.A. Lise *et al.* (MCTP 20625); 2 #f, 14.IV.2007, A.A. Lise *et al.*, (MCTP 20626); 1 #f, A.A. Lise *et al.*, 14.IX.2007 (MCTP 20747); Marcelino Ramos, 27°28'36"S, 51°55'34"W, 1 #f, II.1989, A. Braul (MCTP 19777); Caxias do Sul (Faz. Souza), 29°09'48"S, 51°10'56"W, 1 #m, 18–21.XI.1993, A.A. Lise (MCTP 32539); 1 #f, 03–05.XI.1994, A.A. Lise (MCTP 5325); 1 #f, 11–12.XI.1995, Eq. Lab. Aracno (MCTP 7138); São Francisco de Paula, 29°25'53"S, 50°36'11"W, 1 #f, 21–24.III.1995, R. Ott (MCTP 10379); 1 #m, 2 #f, 25–28.VII.1996, A.A. Lise *et al.* (MCTP 10168); 1 #f, 09–12.I.1997, A.A. Lise *et al.* (MCTP 10841, 10849); (Potreiro Velho) 3 #f, 1 #m, 05–08.XII.1996, A.A. Lise *et al.* (MCTP 13903, 13928, 15689); 1 #f, 08.XII.1996, A.A. Lise (MCTP 13925); 1 #f, 14–17.XII.1996, A.A.

Lise (MCTP 31966); 2 #m, 19.III.1998, A.A. Lise (MCTP 15688); 1 #f, I.1999, A.A. Lise (MCTP 32627); Erval Grande, 27°20'21"S, 52°35'45"W, 2 #m, 3 #f, 17–20.IV.1992, A. Brul (MCTP 2060, 2057, 2222, 31963); Santo Antônio da Patrulha, 29°49'38"S, 50°31'05"W, 1 #m, 27.III.1994, L. Koch (MCTP 31978); Nova Prata, 28°47'02"S, 51°36'58"W, 1 #f, 06.IX.1987, F.C. Quadros (MCTP 26133); Xangrilá, 29°48'10"S, 50°02'28"W, 3 #f, 24.II.1993, A.A. Lise (MCTP 2978); Viamão, 30°04'19"S, 51°05'49"W, 1 #m, 2 #f, 25.XI.1994, A.A. Lise *et al.* (MCTP 5809); 2 #f, 29.XI.1994, A.A. Lise *et al.* (MCTP 32545); 1 #m, 2 #f, 02.XII.1994, A.A. Lise *et al.* (MCTP 5867); 1 #m, 12.V.1995, A.A. Lise (MCTP 8542); 1 #f, 18.IV.1998, A.A. Lise (MCTP 10233); (Estação Fitotécnica de Águas Belas), 1 #f, 06.V.1994, A.A. Lise *et al.* (MCTP 4673); 3 #m, 12.VIII.1994, A.A. Lise *et al.* (MCTP 5256); Guaíba, 30°07'37"S, 51°24'15"W, 1 #f, 25.X.1994, A.A. Lise *et al.* (MCTP 5658); Porto Alegre, 30°02'04"S, 51°13'03"W, 1 #m, 18.V.1991, C.L. Dorneles (MCTP 987); (Vila Nova), 1 #m, 05.IX.2006, E.L.C. Silva (MCTP 28579); 3 #f, 15.I.1991, K.R. Menezes (MCTP 6566). ARGENTINA, *Buenos Aires*: Tigre, 34°25'30"S, 58°34'46"W, 1 #f, Dr. Max Birabén (NHM).

Diagnosis. Poeta, Marques & Buckup. (2010a).

Description. *Male* (MCTP 31978). Carapace yellow with white pigment. PME with black borders. Sternum yellow with wide gray border. Abdomen oval, dorsum whitish with light-brown folium (Fig. 15F). Ventral surface discolored, with light gray band from epigastric furrow to spinnerets and central median white patch. Legs orange with brown bands. Total length 4.60. Carapace length 1.75, width 2.15. Leg formula 1243. Length leg I: femur 3.25; patella+tibia 2.97; metatarsus 2.05; tarsus 0.85; total 9.67. Patella+tibia II 2.35; III 1.20; IV 2.05.

*Female* (MCTP 32627). Carapace yellow, cephalic division dusk brown with white pigment. PME with black borders. Sternum as male. Abdomen subtriangular, dorsum



whitish with brown folium (Fig. 15G); venter as male. Legs yellow. Total length 6.25. Carapace length 2.55, width 2.10. Leg formula 1243. Length leg I: femur 3.25; patella+tibia 3.52; metatarsus 2.05; tarsus 0.85; total 9.67. Patella+tibia II 3.00; III 1.45; IV 2.65.

Variation. Male (n=5): total length 4.60–4.75; carapace length 2.15–2.25, width 1.75–1.85. Female (n=5): total length 6.25–6.75; carapace length 2.35–2.55, width 2.00–2.10. Carapace orange or yellow. Dorsum of abdomen yellow with the posterior half dark gray with posterior folium; latero-posterior portion with one rounded brown patch each side. Distribution. Brazil: São Paulo, Paraná, Santa Catarina, and Rio Grande do Sul (Fig. 41C).

#### ***Eustala photographica* Mello-Leitão, 1944**

*Eustala photographica* Mello-Leitão, 1944b: 329, figures 13, 14. Female holotype, Punta Chica, Buenos Aires, Argentina, Prosen (MLP 15955, not examined). Poeta, Marques & Buckup, 2010a: 158, figures 30–34.

**Diagnosis and description.** See Poeta, Marques & Buckup, 2010a.

**Distribution.** Brazil: Minas Gerais, Paraná, Santa Catarina, and Rio Grande do Sul. Uruguay: Artigas (Poeta et al. 2010a). Argentina: Buenos Aires (Mello-Leitão 1944) (See Poeta 2014, Figure 87).

#### ***Eustala ericae* Poeta, 2014**

*Eustala ericae* Poeta, 2014: 445, figures 19–28. Male holotype from Potreiro Velho, São Francisco de Paula, Rio Grande do Sul, Brazil [29°24'52"S, 50°15'24"W]. XII.1996,

A.A. Lise (MCTP 14139, examined). Female paratypes, same data as holotype (MCTP 14139, examined); female, São Luiz do Purunã, Paraná, Brazil [25°27'03"S, 49°42'21"W], 27.IV.1967, P. Biasi (MZSP 7024); female from, Cambará do Sul, Rio Grande do Sul, Brazil [28°58'51"S, 50°06'03"W], 30.VIII.1994, N. Silveira (MCN 25806).

**Diagnosis and description.** See Poeta (2014)

**Distribution.** Brazil: Paraná and Rio Grande do Sul (Fig. 85).

***Eustala guianensis* (Taczanowski, 1873)**

Figs 16A–I

*Singa guianensis* Taczanowski, 1873: 124. Female paratype from Guyana [04°51'50"N, 58°55'48"W] (MZPW, examined, poor conditions).

*Epeira guianensis*; Taczanowski 1878: 160, pl. 2, figure 11; Roewer 1942: 765; WSC 2017.

*Eustala guianensis*; Simon 1895: 789.

*Aranea orina* Chamberlin, 1916: 248, pl. 19, figure 3. Male holotype from San Miguel, Cusco, Peru [13°31'27"S, 71°58'32"W], VII.1911, H.W. Foote (MCZ 227, examined).

*Eustala orina*; Levi 1991: 177. Synonymized by Levi & Santos 2013: 221.

*Eustala monticola* Chamberlin, 1916: 246, plate 18, figure 7. Female holotype from San Miguel, Cusco, Peru [13°31'27"S, 71°58'32"W], VII.1911 (MCZ 216/15403, examined). One immature male paratype, same locality (MCZ 15405, examined). Roewer 1942:766. Syn. nov.

*Eustala bacelarae* Caporiacco, 1955: 310, figures 27 a–d. Male and female syntypes from Rancho Grande, Aragua, Venezuela [10°04'00"N, 67°32'51' W] (not found in MZUF, MHNLS or MSNV). Syn. nov.

Note. Synonymy based on the examination of the type material and distribution records. The scapus of *E. monticola* is broken, thus the genitalia it is exactly as *E. guianensis*. According to the figures provided by Caporiacco (1955) and Levi (2007) we propose *E. bacelarae* as junior synonym of *E. guianensis* (just one male palp, carapace, and abdomen of *Singa guianensis* were found at MZPW and there is no illustrations or descriptions available in the original paper (Taczanowski 1873)).

Additional material examined. PERU, *Junin*: Amable Maria (Tarma Province), 11°20'08"N, 75°20'28"W, 1 #m, 2 #f, 1j, 1871–1882, K. Jelski & J. Sztolcman (MZPW 188399–188401).

Diagnosis. Males of *E. guianensis* (Figs 16A, B) resemble those of *E. farroupilha* (see Poeta 2014, figures 56, 57) by the laminar terminal apophysis and by the strongly serrated tegulum. Yet, the species can be distinguished by the wide bubble-shaped subterminal apophysis in *E. guianensis* (Fig. 16A) (vs. finger-shape subterminal apophysis in *E. farroupilha*, see Poeta 2014, figure 56). The females (Figs 16C–E) present the epigynum similar to those of *E. cuia* (see Poeta 2014, figures 51–53) based on the wrinkled scapus and wide copulatory openings, and the median plate with a pair of rounded depressions, in posterior view (Fig. 16D). They differ from each other, however, based on the smooth median plate in *E. guianensis* (Fig. 16C) (vs. wrinkled in *E. cuia*, see Poeta 2014, figure 51).

Description. *Male* (MZPW 188399-188401). Carapace pale yellow, with many white

setae. LE with long white setae, MPE with dark lozenge borders. Sternum pale yellow. Abdomen subtriangular, longer than wide, with terminal projection; dorsum white, with brownish-green dusk, and fate folium (Fig. 16F). Venter pale yellow, brownish-green dusk around the elongated median white patch. Legs pale yellow. Total length 6.2. Carapace length 3.1, width 2.5. Leg formula 1243. Length leg I: femur 4.10; patella+tibia 4.65; metatarsus 3.40, tarsus missing. Patella+tibia II, III, articles missing; IV 3.25.

*Female* (MZPW, 188399-188401). Carapace orange, hirsute as male and with pair of brown dots between thoracic and cephalic area (Figs 16G–I). PME with black borders. Abdomen as the male (Fig. 16G). Sternum pale yellow with some white pigment. Legs orange. Total length 8.65. Carapace length 3.35, width 2.26. Leg formula 1243. Length leg I: femur 4.25; patella+tibia 4.70; metatarsus 2.90; tarsus 1.20; total 13.05. Patella+tibia II 4.70; III 1.65; IV 4.70.

Variation. Female (n=2): total length 7.55–8.65; carapace length 2.80–3.35, width 1.25–1.95. Carapace and legs yellow. Abdomen white, with inconspicuous ventral median white patch.

Distribution. Guyana. Peru: Cusco, Junin. Venezuela: Arangua.

### ***Eustala farroupilha* Poeta, 2014**

*Eustala farroupilha* Poeta, 2014: 451, figures 56–64. Male holotype from Morro da Fortaleza, Itapuã, Viamão, Rio Grande do Sul, Brazil [30°17'03"S, 51°00'55"W], 21.–22.IX.1992, A. Brault (MCTP 2652). Four female paratypes, same data as holotype (MCTP 2652, 34689); two male paratypes from Parque Tingui, Curitiba, Paraná, Brazil [25°23'32"S, 49°18'18"W], VII.1995, J. Ricetti & E. Xavier (MCTP 35516).

**Diagnosis and description.** See Poeta (2014).

**Distribution.** Brazil: Paraná, Santa Catarina, and Rio Grande do Sul (See Poeta 2014, Figure 86).

***Eustala mourei* Mello-Leitão, 1947**

*Eustala mourei* Mello-Leitão 1947: 241, figures 9–10. Males syntypes from Barigüí, Curitiba, Paraná, Brazil [25°25'27"S, 49°15'55"W] (MHNCI 2508, examined). Brignoli 1983: 270; examined by H.W. Levi in 1988 (Levi 2007, figures); Pinto-da-Rocha & Caron 1989: 1025, designated a male lectotype, MHNCI 2508 and the specimens 2507, 2509 and 2510, as paralectotypes. Poeta, 2014: 455, figures 75–84.

**Note.** The males and females paralectotypes (MHNCI 2507, 2509, and 2510) are apparently lost.

**Diagnosis and descriptions.** See Poeta (2014).

**Distribution.** Brazil: Paraná, Santa Catarina, and Rio Grande do Sul (See Poeta 2014, Figure 87).

*Eustala bucolica* Chickering, 1955

Figs 17A–H

*Eustala bucolica* Chickering, 1955: 425, figures 41–44. Male holotype from Boquete, Chiriquí, Panamá [08°46'38"N, 82°26'53"W], VIII.1938, A.M. Chickering (MCZ 20620, examined). Male paratype from El Volcán, Chiriquí, Panamá [08°43'55"N, 82°39'32"W], 20.II.1936 (AMNH, examined); 11 #m paratypes from Boquete, Chiriquí, Panamá, A.M. Chickering (MCZ 24515, examined); 4 #m, same locality, VIII.1950 (MCZ 24514).

*Eustala Panamana* Chickering, 1955: 480, figures 103–105. Female holotype from Cerro Punta, Chiriquí, Panamá [08°52'22"N, 82°35'00"W], III.1936 (AMNH), female paratype with same data (AMNH, examined). Synonymized by Levi & Santos 2013: 222; WSC 2017.

Additional material examined PANAMÁ, *Chiriquí*: Boquete, 08°46'38"N, 82°26'53"W, 1 #m, 2 #f, 04–11.VIII.1954, A.M. Chickering (MCZ 73365); Cerro Punta, 08°52'22"N, 82°35'00"W, 4 #f, X.1983, S. Heimer (MNHG).

Diagnosis. Males of *Eustala bucolica* (Figs 17A, B) are similar to those of *E. guttata* (Figs 24A, B) by the palp with small and square-shaped conductor, with transversal section, in ventral view. It differs from this species by the fusiform subterminal apophysis and the embolus completely exposed in *E. bucolica* (Fig. 17A) (*vs.* rectangular subterminal apophysis and embolus covered by the subterminal apophysis in *E. guttata*, Fig. 24A). The epigynum of *E. bucolica* resembles those of *E. palmares* (see Poeta, Marques & Buckup. 2010a, figures 16–18) by the wrinkled scapus, yet *E. bucolica* can be easily recognized by basal border of the lateral plates forming a lobe (posterior view, Fig. 17D) (*vs.* linear in *E. palmares*, see Poeta, Marques & Buckup. 2010a, figure 17).

Description. *Male* (AMNH, paratype). Carapace orange, cephalica area darker, MPE with dark borders. Sternum pale yellow with gray border. Abdomen sutriangular longer than wide, dorsum dusk gray with brown folium, ventral surface light brown with faint elongated white median patch (Fig. 17F). Legs pale yellow with light brown rings. Total length 5.45. Carapace length 2.15, width 1.90. Many legs articles missing (legs measurements, see Chickering 1955).

*Female* (AMNH, paratype). Carapace orange, with white “V”-shaped mark, thoracic area with brown dots, wide thoracic furrow. PME with black borders (Fig. 17H). Sternum pale

yellow with gray border and white pigment. Abdomen subtriangular, longer than wide; dorsum yellow, with light brown foilium (Fig. 17G). Venter brown, whitish band from epigastric furrow to spinnerets and wide rounded median white patch. Legs pale yellow. Total length 5.50. Carapace length 2.40, width 1.96. Leg formula 1243. Length leg I: femur 3.55; patella+tibia 3.58; metatarsus 2.00; tarsus 1.00; total 10.13. Patella+tibia II 3.05; III 1.60; IV 2.75.

Distribution. Panamá: Chiriquí.

***Eustala scutigera* (O. Pickard-Cambridge, 1898)**

Figs 18A–I

*Epeira scutigera* O. Pickard-Cambridge, 1898: 243, pl. 33, figure 8. Female lectotype from Teapa, Tabasco, Mexico [17°33'39"N, 92°57'07"W] (NHM, examined). Two females paralectotypes, same data as lectotype (NHM, examined), designed by Levi 1975.

*Epeira nava* O. Pickard-Cambridge, 1899: 300, pl. 37, figures 5a–d. Teapa, Tabasco, Mexico [17°33'39"N, 92°57'07"W] (NHM, not examined). Synonymized by F.O. Pickard-Cambridge 1904: 508.

*Eustala scutigera*; F. O. Pickard-Cambridge 1904: 508, pl. 48, figures 11, 12; Roewer 1942: 766; Chickering 1955: 496, figures 118–123; WSC 2017.

Note. Examining the NHM material we agree with Chickering (1955) hypothesis that the Cambridge's described this species based on mixed material, once one can find similar specimens labeled as *E. guttata* in the NHM. Apparently, the male described by F.P.-

Cambridge (1904) is lost, once it was not illustrated or cited by Levi along the years, neither found in the NHM.

Additional material examined. MEXICO, *Veracruz*: Cerro Azul, 21°11'03"N, 97°44'49"W, 1 #f, 23.III.1945, E.K. Waering (AMNH). *Chiapas*: Ocosingo, 16°54'31"N, 92°05'39"W, 1 #m, 25.VI.1950, C. & M. Goodnight & L.J. Stannard (AMNH, F.P. Cambridge det. as *E. guttata*). HONDURAS, 15°12'07"N, 86°14'30"W: 1 #f, 01–12.IX.1945, “A+M. Carr” (AMNH, Chickering det.). PANAMÁ, *Arraijan*, 08°56'30"N, 79°38'33"W: 1 #m, VII.1950, R.V. (ex MCZ 24545). *Chiriquí*: Bugaba, 08°28'29"N, 82°37'16"W, 1 #m, Champion (NHM, det. as ‘*E. guttata* paralectotype’, and a note: “not *E. guttata*”). *Barro Colorado Island* 09°09'07"N, 79°50'47"W: 1 #m, 22.VII.1954, A.M. Chickering (MCZ 73441).

Diagnosis. Males of *E. scutigera* (Figs 18A, B) resembles those of *E. banksi* (Figs 22A, B) by the conductor “S”-shaped in ventral view, with lateral depression. However, they can be differentiated by the embolus with an enlarged rounded basis in *E. scutigera* (Fig. 18A) (vs. embolus with elongated basis in *E. banksi*, Fig. 22A). The female epigynum (Figs 18C–F) is similar to those of *E. pallida* (Fig. 29A–C) by its basis square-shaped and the thin scapus. They can be distinguished by the inner borders of the lateral plates “V”-shaped in *E. scutigera* (posterior view, Fig. 18E) (vs. parallel in *E. pallida*, Fig. 29B).

Description. *Male* (AMNH, Chiapas, Mexico). Carapace orange, with some dark orange marks; eyes with black borders with long white setae. Sternum pale yellow with dark grey borders. Abdomen subtriangular longer than wide; dorsum yellow with brown folium (Fig. 18G). Venter pale yellow with light-brown band from epigastric furrow to spinnerets, median white patch. Legs pale yellow brown ringed. Total length 5.70. Carapace length 1.85, width 1.55. Leg formula 1243. Length leg I: femur 4.25; patella+tibia 4.55; metatarsus 2.80; tarsus 1.05; total 12.65. Patella+tibia II 3.10; III 1.65;



IV 2.85.

*Female* (AMNH, Vera Cruz). Carapace orange with “V”-shaped white mark on cephalic area, and white setae (Fig. 18H). AME-ALE with light-brown mask; PME with black borders. Sternum pale yellow with gray border, and many long brown setae. Abdomen triangular, longer than wide; dorsum yellowish, with “Y”-shaped white mark and partial dark brown folium behind (Fig. 18I). Venter pale-yellow with well defined light gray band from epigastric furrow to spinnerets and elongated median white patch. Legs orange with faint brown rings. Total length 7.05. Carapace length 2.50, width 2.00. Leg formula 1243. Length leg I: femur 3.30; patella+tibia 3.38; metatarsus 2.10; tarsus 0.85; total 13.01. Patella.tibia II 3.15; III 1.60; IV 2.50.

Note. *Eustala scutigera* (female, Fig. 18I) and *E. scitula* (male, Fig. 19C) shared the same color pattern on the abdomen.

Variation. Male (n=3): total length 3.90–5.70; carapace length 1.85–2.55, width 1.55–2.15. Female (n=2): total length 4.85–7.05; carapace length 1.90–2.50, width 1.65–2.00. Abdomen decolorated, or greenish, lacking the white patch; sternum without grey border. Carapace and legs pale yellow. White marking on the carapace faded or absent.

Distribution. Mexico: Tabasco, Veracruz, Chiapas. Honduras. Panamá: Arraijan, Chiriquí Province, Barro Colorado Island. Brazil: Rio Grande do Sul (Fig. 41A).

### ***Eustala venusta* Chickering, 1955**

Figs 14A–C, G

*Eustala venusta* Chickering, 1955: 515–517, figures 139, 140. Female holotype from Barro Colorado, Canal Zone, Panamá [09°09'07"N, 79°50'47"W], VII.1950 (MCZ,

examined). Female paratype, same locality as holotype, VII.1939 (NHM, examined).

Levi & Santos 2013: 222 (*lapsus*); WSC 2017. Sp. Reval.

Note. Species revalided based on examination of type-material of both species. *E. venusta* and *E. histrio* are distinct species due the female genitalia and abdomen shape.

Additional material examined. PANAMÁ, *Colón*: Gamboa, 09°06'59"N, 79°41'47"W: 2 #f, IX.1983, S. Heimer (MNHG). *Veracruz*: Cerro Galera, 08°55'59"N, 79°37'00"W, 1#f, S. Heimer, VII.1983 (MNHG).

Diagnosis. The epigynum of *E. venusta* (Figs 14A–C) is very similar to those of *E. guianensis* (Figs 16C–E) by the ringed scapus with a waved basis (as necklace), followed by a narrow portion and an enlarged middle portion in the scapus, and a wide copulatory openings. However, they can be separated from each other by the narrow scapus laterally, in *E. venusta* (Fig. 14C) (vs. wide scapus in *E. guianensis*, Fig. 16E).

Description. *Female* (MCZ, holotype). Carapace pale orange, cephalic area brownish, with two brown dots on thoracic area. PME and LE with black borders. Sternum pale yellow with gray border. Abdomen subtriangular, longer than wide. dorsum yellowish, with dark gray band that extends vertically through abdomen, and partial folium (Fig. 14G). Venter with well-defined brown band from epigastric furrow to spinnerets and elongated median white patch (not crackeled). Legs pale yellow with brown rings. Total length 5.65. Carapace length 3.10, width 2.85. Leg formula 1243. Length leg I: femur 4.85; patella+tibia 5.13; metatarsus 3.20; tarsus 0.95; total 14.13. Leg II 4.60; III 2.20; IV 5.55.

*Male*. Unknown.

Distribution. Panamá: Cólón, Barro Colorado Island, Veracruz.

***Eustala levii* Poeta, Marques & Buckup, 2010**

*Eustala levii* Poeta, Marques & Buckup, 2010a: 151, figures 8–13. Male holotype and female paratype from, São Francisco de Paula (Fazenda Três Cachoeiras), Rio Grande do Sul, Brazil [29°26'45"S, 50°34'50"W], 05.XI.1998, A.B. Bonaldo (MCN 29718). Females paratypes from same locality as holotype, 05.XI.1998, L. Moura (MCN 29716); (Usina Passo do Inferno), 16.XII.1999, A.B. Bonaldo (MCN 31715); (Passo dos Bugres), 04.XI.1998, L. Moura (MCN 29705); male paratype from Triunfo, Rio Grande do Sul, Brazil [29°55'59"S, 51°42'46"W], 21.IX.1989, E.H. Buckup (MCN 18660). WSC 2017.

**Diagnosis and description.** See Poeta, Marques & Buckup, 2010a.

**Distribution.** Brazil: Minas Gerais, Paraná, Santa Catarina, and Rio Grande do Sul (Poeta et al. 2010a) (see Poeta 2014, Figure 90).

*Eustala scitula* Chickering, 1955

Figs 19A–C

*Eustala scitula* Chickering, 1955: 492, figures 114–117. Male holotype from Barro Colorado Island, Panamá [09°09'07"N, 79°50'47"W], VII.1950, (MCZ 24496, examined). Male paratype from “Res.”, Panamá, VII.1939 (NHM, examined); male paratype, 12.III.1936, W.J. Gertsh (AMNH 360312G, examined); male, A.M. Chickering (MCZ 24498, examined), same locality as holotype; two paratypes from

Summit, Canal Zone, Panamá [09°03'54"N, 79°38'43"W], A.M. Chickering (MCZ 24496, examined). WSC 2017.

Additional material examined. PANAMÁ, Colón: Gamboa, 09°06'59"N, 79°41'47"W: 1 #m, VIII.1983, S. Heimer (MNHG); (Portobelo) 09°33'26"N, 79°39'58"W, 1 #m, VIII.1936, A.M. Chickering (MCZ 73443). Barro Colorado Island, 09°09'07"N, 79°50'47"W: 2 #m, VII.1950, A.M. Chickering (MCZ 73437); 1 #m, VII.1954, A.M. Chickering (MCZ 73439).

Diagnosis. Males of *Eustala scitula* (Figs 19A, B) resembles those of *E. cameronensis* (Figs 22 D, E) by the conductor with a transversal section, in ventral view. Yet, they can be distinguished from each other by the embolus fully exposed in *E. scitula* (mesal view, Fig. 19A) (vs. embolus partially covered by the subterminal apophysis in *E. cameronensis*, Fig. 22D).

Description. *Male* (AMNH 360312G, paratype). Carapace orange with brown marks on cephalic area. PME with dark borders. Sternum pale yellow with gray border. Abdomen oval, longer than wide, dorsum yellow with partial brown folium, ventral surface pale yellow, dark brown from epigastric furrow to spinnerets with white median patch (Fig. 16C). Legs pale yellow with brown bands. Total length 5.50, carapace length 2.50, width 2.20. Leg formula 1243. Length leg I: femur 4.75; patella+tibia 5.33; metatarsus 3.45; tarsus 1.25; total 14.70. Patella+tibia II 3.60; III 1.85; IV 4.50.

*Female*. Unknown.

Variation. Male (n=5): Total length 5.50–5.75; carapace length 2.50–3.05, width 2.20–2.55. Carapace and legs yellow, abdomen dorsum with brown folium.

Distribution. Panamá: Colón, Barro Colorado Island.

***Eustala guarani*** Poeta, 2014

*Eustala guarani* Poeta, 2014: 442, figures 1–9. Male holotype from Rio Guarani, foz do correjo Três Barras, Três Barras do Paraná, Paraná, Brazil [25°25'18"S, 53°11'03"W], 20.–26.II.1993, A.B. Bonaldo (MCN 22996). Female paratype (MCN 22996); 4 males and 5 females, same data as holotype (MCN 49299); female, Chapecó, Santa Catarina, Brazil, 25°25'18"S, 53°11'03"W],, 03.III.2011, R.C. Francisco (MCTP 35519).

Diagnosis and description. See Poeta (2014).

**Distribution.** Brazil: Mato Grosso, Paraná, Santa Catarina, and Rio Grande do Sul (See Poeta 2014, Figure 85).

***Eustala histrio*** Mello-Leitão, 1948

Figs 20A–G

*Eustala histrio* Mello-Leitão, 1948: 165, figure 8. Female holotype from Cattle Trail Survey, Guyana [04°51'50"N, 58°55'48"W], A.A. Abraham (NHM, examined).

Diagnosis. The epigynum of *E. histrio* (Figs 20A–C) resembles those of *E. venusta* (Figs 14A–C) by the wrinkled scapus that abruptly arises from its basis. Yet, they can be distinguished by the distal border of the lateral plates rounded in *E. histrio* (Fig. 20B) (vs. square, narrow in the median portion in *E. venusta*, Fig. 14B).

Description. *Female* (holotype, NHM): Carapace yellow with some orange marks and two brown dots in thoracic area, covered with white setae and random brown ones (Fig. 20D). PME and LE with black borders. Sternum pale yellow covered with long brown setae. Abdomen subtriangular, longer than wide, high, with anterior shoulders and small

terminal projection, that not transpasses the spinnerets; dorsum yellow, with two anterior spots, two pairs of median dark brown brackets, followed by rounded black spot, dusk brown laterally (Figs 20E, F). Venter decolorated with defined brown band from epigastric furrow to the spinnerets and rounded median white patch. Legs yellow with brown rings and clave-shaped setae (Fig. 20G) (also found in *E. clavispina*). Total length 9.47. Carapace length 2.02, width 1.57. Leg formula 1243. Length leg I: femur 4.87; patella+tibia 5.86; metatarsus 3.01; tarsus 1.33; total 15.06. Patella+tibia II 5.43; III 2.83; IV 4.87.

*Female*. Unknown.

Distribution. Guyana: Cattle Trail Survey.

*Eustala montivaga* Chickering, 1955

Figs 21A–G

*Eustala montivaga* Chickering, 1955: 478, figures 101, 102. Female holotype from El Volcán, Panamá [08°43'55"N, 82°39'32"W], VIII.1950, A.M. Chickering (MCZ 22200, examined). Two female, same data as holotype (MCZ 24531, examined).

*Eustala montana* Chickering, 1955: 474, figures 97–100. Male holotype from El Volcán, Panamá [08°43'55"N, 82°39'32"W], VIII.1950 (MCZ 22161, examined).

Synonymized by Levi & Santos 2013: 223. WSC 2017.

Additional material examined. DOMINICAN REPUBLIC, *Hato Mayor*: Sabana del Mar, 19°03'12"N, 69°23'20"W, 20.VII.1935, W.G. Hassler (AMNH, Gertsch det. as *E. delasmata*). GUATEMALA, *Alotenango*, 14°29'07"N, 90°48'11"W: (Capetillo) 1 #m,

20–23.VIII.1947, C. & P. Vaurie (AMNH, det as '*E. scutigera* atypical'). No data, 3 #m (NHM).

Diagnosis. Males of *Eustala montivaga* (Figs 21A, B) are similar of those of *E. scitula* (Fig. 19A, B) based on the conductor with transversal section and straight terminal apophysis. They differ from each other by the subterminal apophysis bubble-shaped with a pointed projection in *E. montivaga* (Fig. 21B, arrow) and the conductor with a laterally folded white portion in *E. montivaga* (ventral view, Fig. 21B) (vs. subterminal apophysis lacking the pointed projection and conductor not folded laterally in *E. scitula*, Fig. 20B). The epigynum of *E. montivaga* (Figs 21C–E) is similar to those of *E. bucolica* (Figs 17C–E) by the general triangular wrinkled scapus. However, they can be differentiated by the lateral shape of the scapus, which is short with a wide tip in *E. montivaga* (Fig. 21E) (vs. elongated, thin and curved in *E. bucolica*, Fig. 17E).

Description. *Male* (NHM). Carapace orange, PME black bordered. Sternum pale yellow with gray border. Abdomen subtriangular, longer than wide, dorsum brown, with folium and four anterior rounded white patches. Ventral surface light brown with faint white median patch and whitish rounded marks on each side (Fig. 21F). Legs pale yellow with orange bands. Total length 5.50, carapace length 2.50, width 2.20. Leg formula 1243. Length leg I: femur 3.82; patella+tibia 4.38; metatarsus 2.93; tarsus 1.08; total 12.21. Patella+tibia II 3.44; III 1.84; IV 2.83.

*Female* (MCZ 22200, holotype). Carapace yellow covered with white setae, faint brown dots on thoracic area. PME with black borders. Sternum pale yellow with gray border. Abdomen subtriangular, with anterior shoulders and terminal projection. Dorsum whitish, with dusk gray folium. (Fig. 21G). Venter whitish with partial light brown central band and faint median white patch. Total length 8.15. Carapace length 2.90, width 2.60. Many legs articles missing (legs measurements, see Chickering 1955, pag. 476)

Variation. Female (n=3): total length 5.10–8.15; carapace length 2.65–2.90, width 1.25–1.65. Abdomen oval, yellow with dusk dark brown marks.

Distribution. Dominican Republic: Hato Mayor. Guatemala: Alotenango. Panamá: El Volcán (Fig. 41A).

#### ***Eustala occidentalis* Baert, 2014**

*Eustala occidentalis* Baert, 2014b: 3, figures 1A–E, 2A–F, 5A, 6A. Male holotype from Isla Santa Cruz, Bahía Tortuga, Galapagos Islands, Ecuador [00°42'00"S, 90°19'37"W], 14.III.1986, Baert, Maelfait & Desender. Female allotype from same locality. Several males and females paratypes from same locality. WSC 2017.

**Diagnosis and description.** See Baert, 2014b.

**Distribution.** Ecuador: Galapagos Islands (See Baert, 2014b, Figure 7).

#### ***Eustala meridionalis* Baert, 2014**

*Eustala meridionalis* Baert, 2014b: 12, figures 4A–C, 5B, 6B. Male holotype from Isla Floreana, Cerro Pajas, Galapagos Islands, Ecuador [01°18'29"S, 90°25'52"W], 18.IV.1996 (P.96/55), S. Peck. Female allotype from same locality, 20.II.1977, W.G. Reeder. Several males and females paratypes from same locality. WSC 2017.

**Diagnosis and description.** See Baert, 2014b.

**Distribution.** Ecuador: Galapagos Islands (See Baert, 2014b, Figure 7).

#### ***Eustala orientalis* Baert, 2014**



*Eustala orientalis* Baert, 2014: 9, figures 3A–E, 5C, 6C. Male holotype from Isla Española, Galapagos Island, Ecuador [01°22'33"S, 89°40'19"W], 7.II. 1977, W.G. Reeder. Female allotype, same data as holotype. Several males and females paratypes from same locality. WSC 2017.

**Diagnosis and description.** See Baert, 2014.

**Distribution.** Ecuador: Galapagos Islands (See Baert, 2014b, Figure 7).

***Eustala gonygaster* (C.L. Koch, 1838)**

Figs 22G–I

*Argyopes gonygaster* C. L. Koch, 1838: 43, figure 365. Female holotype from Brazil, not examined, apparently lost).

*Eustala gonygaster*; Simon 1895: 789; Caporiacco 1948: 660, figures 68, 69. One male and two juvenile females from Tumatumari, Potaro-Siparuni, Guyana [05°15'41"N, 59°08'54"W], 21.VII.1936 (MZUF 1942, examined); four juvenile females from “Two Mouths”, Essequibo, Guyana [04°15'54"N, 58°30'05"W], 14.VII.1937 ((MZUF 1941, examined); one juvenile female from “Malale”, 18.IX.1931 (MZUF 1943, examined). WSC 2017.

Note. C. L. Koch (1838) presented a new species based on female and immature male. Therefore, description, diagnosis, and illustrations provided at the time (just from the habitus) are not sufficient to recognize the species. Despite that, Caporiacco (1948) suggested a coespecific male for this species, deposited in MZUF, which is redescribed here. The type species were not found at ZSM, ZMB, NHM, MCSN, MHNLS, or NMB.

Diagnosis. The male palp of *E. gonygaster* (Figs 22G, H) and those of *E. delasmata* (see Poeta & Teixeira 2017, figures 10, 11) are similar by the “S”-shaped conductor, in ventral view. However, the males of *E. gonygaster* can be distinguished by the median apophysis with dark and enlarged basis and terminal apophysis with the tip wider than its neck (Fig. 22G) (vs. absent in *E. delasmata*, see Poeta & Teixeira 2017, figure 10).

Description. *Male* (MZUF). Carapace orange. PME with black borders. Sternum yellow. Abdomen subtriangular, longer than wide, pointed posteriorly. Dorsum decolored with white pigment, with faint longitudinal grey band (Fig. 22I). Venter decolored with dusk dark gray band from epigastric furrow to spinnerets and circular median white patch. Legs orange. Total length 5.50, carapace length 2.50, width 2.20. Leg formula 1243. Length leg I: femur 3.10; patella+tibia 3.70; metatarsus 2.50; tarsus 1.00; total 10.30. Patella+tibia II 3.25; III 1.65; IV 3.00.

*Female*. Unknown.

Distribution. Guyana: Potaro-Siparuni.

### ***Eustala cameronensis* Gertsch & Davis, 1936**

Figs 22D–F

*Eustala cameronensis* Gertsch & Davis, 1936: 13, figure 13. Male holotype from Cameron County, Texas, United States of America [26°05'23"N, 97°44'54"W] (AMNH, not examined); Levi 1977: 112, figures 189–191; Roewer 1942: 768. WSC 2017.

Additional material examined. UNITED STATES OF AMERICA, *Texas*: Edinburg, 26°18'06"N, 98°09'48"W, 1 #m, 03.IX.1953, S. Mulaik (AMNH, Gertsch det. 1967; Levi det. 1975).

Diagnosis. Male palp of *E. cameronensis* (Figs 22D, E) present a strongly toothed tegulum and the conductor with a transversal section as *E. eleuthera* (Figs 28A, B). They can be separated by the straight terminal apophysis in *E. cameronensis* (mesal view, Fig. 22D) (*vs.* curved in *E. eleuthera*, Fig. 28A).

Description. *Male* (AMNH). Carapace brownish, yellow longitudinally. PME and LE with with dark borders. Sternum pale yellow with dusk gray. Abdomen oval, longer than wide, dorsum white with a partial brown folium (Fig. 22F). Venter yellowish with white pigment in center. Legs yellow. Total length 4.14. Carapace length 2.19, width 1.85. Leg formula 1243. Length leg I: femur 6.57; patella+tibia 7.35; metatarsus 4.23, tarsus 1.58; total 19.73. Patella+tibia II 4.59; III 2.40; IV 3.94.

*Female*. Unknown.

Distribution. United States of America, Texas.

### ***Eustala taquara* (Keyserling, 1892)**

*Epeira taquara* Keyserling, 1892: 143, pl. 7, figure 105. Female holotype from Taquara, Rio Grande do Sul, Brazil [29°39'03"S, 50°46'32"W] H. von Ihering. (NHM, not found).

*Araneus taquara* Petrunkevitch, 1911: 318.

*Eustala taquara* Roewer, 1942a: 766; Poeta, Marques & Buckup, 2010a: 157, figures 25–29; WSC 2017.

**Diagnosis and description.** See Poeta, Marques & Buckup, 2010a.

**Distribution.** Brazil: Pernambuco, Mato Grosso, Rio de Janeiro, São Paulo, Paraná, Santa Catarina, and Rio Grande do Sul (See Poeta 2014, Figure 89).

***Eustala vegeta* (Keyserling, 1865)**

Figs 23A–H

*Epeira vegeta* Keyserling, 1865: 819, pl. 19, figures 31–34. Male and female syntypes from Bogotá, Colombia (“Nova Granada, South America”) [04°42'39"N, 74°04'19"W] (Museum unknown, probably lost). Keyserling 1892: 144, pl. 7, figure 106.

*Acacesia vegeta*; Simon 1895: 789, figures 858, 859.

*Eustala vegeta*; F. O. Pickard-Cambridge, 1904: 509, pl. 48, figures 16, 17; Bryant 1945: 374, figure 7; Roewer 1942: 767; Chickering 1955: 511, figures 133–138; WSC 2017.

Additional material examined MEXICO, *Veracruz*: Córdoba, 18°53'02"N, 96°55'25"W, 1 #f (MCZ 73070); Orizaba, 18°50'46"N, 97°05'31"W: 1 #m, H.H. Smith (NHM, det. as '*E. guttata* paralectotype'). *Taumalipas*, 24°16'08"N, 98°50'10"W: (Santa Gracia) 1 #f, 05.VII.1940, P. Rau (MCZ 73072/ 2405). *Puebla Villa*, 19°02'28"N, 98°12'22"W: 1 #m, 10.X.1947, H.M. Wagner (AMNH, Chickering det. as *E. guttata*). *Jalisco*: Atoyac, 20°00'26"N, 103°31'03"W, 1 #m, 23.IX.1952 (NHM); 7 #m, 4 #f (NHM); 2 #f (NHM).

Note. *Eustala vegeta* was misdetermined as *E. guttata*, including paralectotype material designed by H.W. Levi, which end up being a mixed type series. In this way, we are redescribing here *E. vegeta sensu* Chickering (1955).

Diagnosis. Males of *E. vegeta* (Figs 23A–C) resemble those of *E. guttata* (Figs 24 A–C)

by the small conductor with a transversal section medially (ventral view). They can be separated from each other based on the semi-translucent portion of the stipes that partially covers the subterminal apophysis in *E. vegeta* (mesal, Fig. 23A, arrow) (*vs.* absent in *E. guttata*, Fig. 24A). Moreover, the epigynum of *E. vegeta* (Figs 23D–F) resembles those of *E. guttata* (Figs 24D–F) by the epigynums with shoulders in its lateral plates (ventral view). They can be differentiated from each other by the parallel inner borders of the lateral plates, almost touching each other, in *E. vegeta* (Fig. 23E) (*vs.* “V”-like in *E. guttata*, Fig. 24E).

*Description. Male* (NHM). Carapace, sternum and legs pale yellow. PME with dark borders. Abdomen subtriangular, longer than wide, dorsum decolorated with light brown folium (Fig. 23G). Venter decolorated with light brown band from epigastric furrow to spinnerets, delimited by two lateral decolorated lines, and with centrally decolorated median band. Legs pale yellow, with brown bands. Femura III and IV with row of macrosetae. Total length 4.75. Carapace length 2.25, width 1.90. Leg formula 1243. Length leg I: femur 3.00; patella+tibia 3.60; metatarsus 2.35; tarsus 1.00; total 9.95. Patella+tibia II 2.70; III 1.50; IV 2.50.

*Female* (MCZ 73070). Carapace pale yellow. PME with black borders. Sternum pale yellow with gray border. Abdomen subtriangular, longer than wide; dorsum whitish, with pale yellow folium and posterior pair of lateral rounded brown marks (Fig. 23H). Venter whitish, with yellow band from epigastric furrow to spinnerets, delimited by decolorated portion and brown lines, with elongated median white patch. Legs pale yellow with yellowish bands. Total length 5.65. Carapace length 2.20, width 1.75. Leg formula 1243. Length leg I: femur 3.25; patella+tibia 3.33; metatarsus 2.00; tarsus 0.90; total 9.48. Patella+tibia II 2.80; III 1.50; IV 2.65.

*Distribution.* Mexico: Veracruz, Taumalipas, Puebla Villa, Jalisco.

***Eustala guttata* F. O. Pickard-Cambridge, 1904**

Figs 23A–H

*Eustala guttata* F. O. Pickard-Cambridge, 1904: 508, pl. 48, figures 13, 14. Female lectotype and one male paralectotype from: Bugaba, Chiriquí Province, Panamá [08°37'29"N, 82°37'16"W], 28.IV.1905, Champion (Godman & Salvin collection, NHM 021-3035, examined). Twenty-two female paralectotypes from Teapa, Tabasco, Mexico [17°33'39"N, 92°57'07"W], H.H. Smith, Godman & Salvin collection (NHM, examined); Roewer 1942:765; Camargo, 1953: 309, figures 6, 8, 31–34, 48; Chickering 1955: 442, figures 63–68; Kraus 1955: 22, figure 53. WSC 2017.

Note. Males of *Eustala guttata* are very similar to those of *E. ingenua*, which may be the reason for so many misdeterminations along the years. Chickering (1955) presented difficulty in separating males while examining NHM material, in a way that the material from NHM presents males from both *E. guttata* and *E. ingenua*. Levi, in 1975, designed a lectotype and paralectotypes from this species. But, after analyse these specimens we concluded that it is mixed material – just the couple lectotype and paralectotype (from Bugaba, Panamá, NHM) belongs to *E. guttata*. The male paralectotype from Guatemala (NHM) is actually a specimen of *E. ingenua*, and the male paralectotype from Panamá (NHM) is *E. scutigera*.

Additional material examined. MEXICO, *Quintano Roo*: Cozumel, 20°25'22"N, 86°55'20"W, 1 #m, 1 #f, VIII.1949, C. Goognight (AMNH). GUATEMALA, *Baja Verapaz*: San Jerónimo, 15°03'51"N, 90°14'44"W: 1 #f, 24–26.VII.1947, C. & P. Vaurie (AMNH). COSTA RICA, *San José*: San José, 09°55'41"N, 84°05'26"W, 2 #f, 1930,

Schmidt (NHMW). PANAMÁ, *Barro Colorado Island*, 09°09'07"N, 79°50'47"W: 1 #f, 1928, A.M. Chickering (AMNH). *El Valle de Antón*, 08°36'35"N, 80°07'54"W: 1 #m, 2#f, XII.1983, S. Heimer (MNHG); 1 #f, VIII.1983, S. Heimer (MNHG); (Road to Chiva) 4 #f, VIII.1950 (MCZ 24545). GUYANA, Mazaruni: Mazaruni Settlement, 06°04'02"N, 59°36'52"W (*Trypoxylon nitidum* nest), 1 #f, 25.IX.1937, Dr. O.W. Richards (Mello-Leitão det. 1939 as *E. scutigera*) (NHM).

Diagnosis. The males of *E. guttata* (Figs 24A–C) are similar of those of *E. ingenua* (Figs 25A, B) by the long, thin, and strongly curved terminal apophysis and the subterminal shape. They can be distinguished from each other by the tegular projection (mesal view), which is a conspicuous rectangular projection in *E. guttata* (mesal view, Fig. 24A) (vs. pointed tegular projection in *E. ingenua*, Fig 25A). The female epigynum of *E. guttata* (Figs 24D–F) resembles those of *E. scutigera* by abruptly projected scapus and the flat median plate (posterior and lateral view, Figs 18E, F). They can be distinguished by the epigynum lateral plates projected as shoulders next to the scapus (ventral view, Fig. 24D) (absent in *E. scutigera*, Figs 18C).

Description. *Male* (NHM, paralectotype,). Carapace pale yellow with brown dusk marks. PME with dark borders. Sternum pale yellow with grey border. Abdomen subtriangular, longer than wide, dorsum white with dark brown folium (Fig. 24G); Venter surface decolorated with brown band from epigastric furrow to spinnerets and white median patch with two smaller rounded decolorated marks. Legs pale yellow. Total length 4.20, carapace length 2.05, width 1.84. Leg formula 1243. Length leg I: femur 2.87; patella+tibia 3.85; metatarsus and tarsus missing. Patella+tibia II 2.29; III 1.21; IV articles missing.

*Female* (MCZ 24545). Carapace yellow with light brown marks on cephalic area and between AME and ALE. PME with black borders. Sternum yellow with gray border.

Abdomen subtriangular, as long as wide; dorsum white with well demarcated dark brown folium (Fig. 24H). Venter as dorsum, with marks as male. Legs pale yellow. Total length 4.48, carapace length 1.81, width 1.53. Leg formula 1243. Length leg I: femur 2.66; patella+tibia 3.32; metatarsus 1.91; tarsus 0.65; total 8.53. Patella+tibia II 2.65; III 1.25; IV 2.25.

Variation. Female (n=5): total length 5.15–6.55; carapace length 2.15–2.50, width 1.80–2.10.

Distribution. Mexico: Tabasco, Quintano Roo. Guatemala: Baja Verapaz. Costa Rica: San José. Panamá: Chiriquí Province, Barro Colorado Island. Guyana: Mazaruni (Fig. 41B).

*Eustala ingenua* Chickering, 1955

Figs 25A–G

*Eustala ingenua* Chickering, 1955: 449, figure 73. Female holotype from Summit, Canal Zone, Panamá [09°03'54"N, 79°38'43"W], VII.1950, A.M. Chickering (MCZ 21645, examined).

*Eustala longembola* Chickering, 1955: 458, figures 81–85. Male holotype from Barro Colorado Island, Canal Zone, Panamá [09°09'07"N, 79°50'47"W], VIII.1939, A.M. Chickering (MCZ 21867, examined). Male paratype from Guatemala [15°47'00"N, 90°13'50"W], 27–31.VIII.1947, C. & P. Vaurie (AMNH, examined); three male paratypes from Road to Chira, Canal Zone, Panamá, VIII.1950 (MCZ 24549, examined); one male paratype from Arraijan, Panamá [08°56'30"N, 79°38'33"W], VII.1950 (MCZ 24545, examined); one male paratype from Madden Dam, Canal Zone, Panamá [09°12'40"N, 79°36'58"W], VIII.1939 (MCZ 24542, examined); three



male paratypes from Forest Reserve, Canal Zone, Panamá, VII.–VIII.1939 (MCZ 24543, examined). Synonymized by Levi & Santos 2013: 223. WSC 2017.

Note. The vial MCZ 24549 contains two male paratypes of *E. ingenua* with four females of *E. guttata*. The vial MCZ 24545 presents one male paratype of *E. ingenua* and a male of *E. scutigera*.

Additional material examined. COSTA RICA, *Santa Clara*: (“Hamburg Farm”) 10°21'43"N, 84°30'51"W, 1 #f, VII.1931, Nevermann (NHMW). GUATEMALA, 15°47'00"N, 90°13'50"W: 1 #m (NHM, det. as *E. guttata* paralectotype). PANAMÁ, *El Valle*, 08°36'35"N, 80°07'54"W: 1 #m, VII.1983, S. Heimer (MNHG). *Barro Colorado Island*, 09°09'07"N, 79°50'47"W: 2 #m, VI.–VII.1934, A.M. Chickering (MCZ 73091)

Diagnosis. The palp of *E. ingenua* (Figs 25A, B) resembles those of *E. guttata* (Figs 24A, B) by the long and strongly curved terminal apophysis (mesal view). They differ from each other by the pointed tegular projection and by the conductor laterally enlarged in *E. ingenua* (mesal view, Fig. 25A) (*vs.* rectangular tegular projection and conductor without basal enlargement in *E. guttata*, Fig. 24A). The epigynum of *E. ingenua* (Figs 25C–E) is similar to those of *E. sedula* (Figs 30D–F) by the copulatory openings forming a median septum in the median plate (ventral view). It differs from those species by the smooth scapus (Fig. 25C) and the median plate not noticeable, in lateral view in *E. ingenua* (Fig. 25E) (*vs.* wrinkled scapus and median plate projected in *E. sedula*, Figs 30D, F).

Description. *Male* (MCZ 24545, paratype). Carapace yellow, with brown bands, with two pairs of brown points on thoracic area. PME with borders. Sternum pale yellow. Abdomen subtriangular, longer than wide, dorsum white with light brown folium (Fig. 25F). Venter pale yellow with faint white median patch. Legs pale yellow with brown bands. Total length 4.30. Carapace length 2.15, width 1.75. Leg formula 1243. Length

leg I: femur 3.25; patella+tibia 3.70; metatarsus 2.15; tarsus 0.95; total 10.05. Patella+tibia II 2.75; III 1.35; IV 2.25.

*Female* (MCZ 21645, paratype). Carapace orange. PME without evident black borders. Sternum pale yellow. Abdomen subtriangular, longer than wide, posteriorly pointed, dorsum decolorated, with dark brown folium (Fig. 25G). Venter decolorated elongated faint median white patch. Legs orange. Total length 6.75. Carapace length 2.35, width 1.88. Leg formula 1243. Length leg I: femur 2.35; patella+tibia 2.80; metatarsus 1.75; tarsus 0.75; total 7.65. Patella+tibia II 2.75; III 2.25; IV 2.20.

Variation. Male (n=3): total length 4.30–4.85. carapace length 2.10–2.35, width 0.85–0.90. Female (n=2): total length 4.80–6.75; carapace length 2.00–2.35, width 1.80–1.88. Carapace and legs orange with large rings. Pale-brown marks on the carapace. Abdomen subtriangular or oval, discolored. The male E may be exposed or covered by the STA.

Distribution. Costa Rica: Santa Clara. Guatemala. Panamá: El Valle; Barro Colorado Island.

### ***Eustala belissima* Poeta, Marques & Buckup, 2010**

*Eustala belissima* Poeta, Marques & Buckup, 2010b: 267, figures 4–9. Male holotype and female paratype from Cambará do Sul, Rio Grande do Sul, Brazil, [28°58'51"S, 20°06'03"W], 11-19.IV.1994, M.A.L. Marques (MCN 46389). Male and females paratypes, same data as holotype, (MCN 25409, 46388).

**Diagnosis and description.** See Poeta, Marques & Buckup, 2010b.

**Distribution.** Brazil: Rio Grande do Sul. Uruguay: Lavalleja (see Poeta 2014, Figure 90).

*Eustala rustica* Chickering, 1955

Figs 26A–G

*Eustala rustica* Chickering, 1955: 486, figures 108–113. Male holotype and female allotype from El Valle, Panamá [08°36'35"N, 80°07'54"W], VII.1936, A.M. Chickering (MCZ 22955, examined). WSC 2017.

Additional material examined. MEXICO, *Puebla*: Villa Juárez, 19°03'07"N, 98°13'36"W: 1 #m 10.X.1947, H.M. Wagner (AMNH, Chickering det. as '*E. guttata* atypical').

Diagnosis. Males of *Eustala rustica* (Figs 26A, B) resembles those of *E. catarina* by the small conductor with a transversal projection, in ventral view (see Poeta 2014, figure 11). At the same time, can be distinguished by the straight terminal apophysis in *e. rustica* (Fig. 26A) (*vs.* strongly curved in *E. catarina*, see Poeta 2014, figure 10). The females of *E. rustica* are similar to those of *E. lunulifera* (Figs 30A–C) by the epigynum with a narrow scapus laterally. However, they can be distinguished from each other by the lateral plates parallel in *E. rustica* (posterior view, Fig. 26D) (*vs.* narrow and “V”-shaped in *E. lunulifera*, Fig. 30B).

Description. *Male* (MCZ, holotype). Carapace pale yellow. PME with black borders. Sternum pale. Abdomen oval, longer than wide, dorsum pale yellow, with brown folium (Fig. 26F). Venter with yellowish with central faint light brown portion, discolored centrally. Legs pale yellow. Total length 4.20. Carapace length 1.85, width 2.15. Leg formula 1243. Length leg I: femur 3.50; patella+tibia 3.88; metatarsus 2.40; tarsus 1.00; total 10.78. Patella+tibia II 2.85; III 1.60; IV 2.60.

*Female* (MCZ, allotype). Carapace pale yellow, cephalic area light brown. PME postero-

median eyes with black borders. Sternum pale yellow. Abdomen subtriangular, as long as wide, with anterior shoulders, dorsum brownish-orange, with folium borders dark-brown and two anterior white spots (Fig. 26G). Venter as male. Legs pale yellow with brown bands. Total length 5.80. Carapace length 2.30, width 2.00. Leg formula 1243. Length leg I: femur 3.45; patella+tibia 3.60; metatarsus 2.05; tarsus 0.80; total 10.06. Patella+tibia II 3.10; III 1.55; IV 2.55.

Distribution. Mexico: Puebla. Panamá: El Valle.

### ***Eustala brevispina* Gertsch & Davis, 1936**

Figs 27A–C, G, H

*Eustala brevispina* Gertsch & Davis, 1936: 12, figures 9, 10. Male holotype from Cameron County, Texas, United States of America [26°05'23"N, 97°44'54"W] (AMNH, not examined). Female allotype from Brownsville, Texas, United States of America [25°54'06"N, 97°29'50"W], 25.V.1934, J.N. Knull (AMNH, not examined); paratypes, same locality, 01.VI.1934, J.N. Knull (AMNH, not examined); female paratype, same locality, 08.VI.1934, J.N. Knull (MCZ 73413, examined). Levi 1977: 106, figures 149–158; Roewer 1942: 768; WSC 2017.

Diagnosis. The epigynum of *E. brevispina* (Figs 27A–C) resembles those of *E. farroupilha* (see Poeta 2014, figures 59–62) by the ringed and short scapus. They can be distinguished by the parallel border of the lateral plates in *E. brevispina* (ventral view, Fig. 27A) (vs. sinuous in *E. farroupilha*, see Poeta 2014, figure 59).

Description. *Female* (MCZ 73413). Carapace yellow on cephalic area and orange on thoracic area, covered with white setae. PME and LE with black borders. Sternum pale

yellow with yellowish border. Abdomen subtriangular, longer than wide, high, with huge apical projection and small posterior one; dorsum whitish, with partial brown folium (Figs 27G, H). Venter white, with a central brown band and an elongated median white patch. Legs yellow with dark brown bands. Total length 8.05. Carapace length 2.48, width 2.22. Leg formula 1243. Length leg I: femur 3.10; patella+tibia 3.47; metatarsus 2.09; tarsus 0.91; total 9.56. Patella+tibia II articles missing; III 2.64; IV 2.68.

*Male*: see Levi (1977).

Distribution. United States of America: Texas.

*Eustala eleuthera* Levi, 1977

Figs 28A–I

*Eustala eleuthera* Levi, 1977: 111, figures 179–188. Male holotype from South Bimini, Bahamas [24°38'29"N, 79°52'11"W], W.J. Gertsh & M.A. Cazier, V.1951 (AMNH, examined). Two females paratypes from Holland Bay, Jamaica [17°56'46"N, 76°13'18"W], 15.III.1955, A.M. Nadler (AMNH, examined); one female paratype from Crooked Island, Bahamas, [22°38'20"N, 74°00'23"W], 06.III.1953, E.B. Hayden (AMNH, examined); one female, same locality, 03.VI.1953, E.B. Hayden (AMNH, examined); one male paratype from Landrail Point, Crooked Island, Bahamas, 05.III.1953, G. Rabb (AMNH, examined). WSC 2017.

Note. In the original description, Levi (1977) designated a male holotype from Monroe County, Florida, supposedly deposited in MCZ – however, this material was not found in MCZ. On the other hand, we had access to a vial from AMNH labeled as holotype and paratypes of *E. eleuthera*.

Additional material examined. BAHAMAS, *Great Abaco Islands*, 26°21'19"N, 77°08'54"W: 1 #f, 18.IV.1984, D. Spiller (ex MCZ 73410).

Diagnosis. The palp *E. eleuthera* (Figs 28A, B) resembles those of *E. cameronensis* by the rectangular conductor with transversal section (ventral view, Figs 22D, E). They can be separated by the straight terminal apophysis, curved at the apex in *E. eleuthera* (mesal view, Fig. 28A) (*vs.* straight and not angulated in *E. cameronensis*, Fig. 22D) The females of *E. eleuthera* (Figs 28C–E) resembles those of *E. redundans* (Figs 14D) by the abruptly projected scapus. However, they can be diagnosed by the very small median plate, without projections in *E. eleuthera* (mesal view, Fig. 28C) (*vs.* median plate with lobe in *E. redundans*, Fig. 14D).

Description. *Male* (AMNH). Carapace pale orange, with brown setae. PME with dark borders. Sternum pale yellow with grey border. Abdomen subtriangular, longer than wide, dorsum brownish with faint folium (Fig. 28F). Venter decolorated with brown band from the epigastric furrow to spinnerets, with decolorated elongated median band and two lateral rounded ones. Carapace length 1.84, width 1.56. Leg formula 1243. Length leg I: femur 2.21; patella+tibia 2.83; metatarsus 1.92; tarus 0.71; total 7.67. Patella+tibia II 2.15; III 1.16; IV 1.84.

*Female* (AMNH, paratype, Jamaica). Carapace pale orange with white pigment in the cephalic area (Fig. 28G). PME black bordered. Sternum yellow with anterior white pigment. Abdomen subtriangular, with two terminal projection; dorsum whitish with faint brown folium and anterior white band (Figs 28H, I). Abdomen subtriangular, longer than wide, with two terminal projections, dorsum white with gray folium. Venter white with partial brown band between epigastric furrow and spinnerets and elongated median white patch. Many legs articles missing.

Variation. Male (n=2): total length 3.75–3.90; carapace length 1.75–1.84, width 1.45–1.56. Female (n=5): total length 4.97–6.36; carapace length 1.85–2.50, width 1.53–1.90. Males and females usually have the abdomen yellowish with dusk gray and brow folium. However, their abdomen may also be white with gray folium, or just the border of the folium, or dark green, or dark grey without folium.

Distribution. Bahamas: Great Abaco Islands, South Bimini, Crooked Islands. Jamaica: Holland Bay.

### ***Eustala lisei* Poeta, 2014**

*Eustala lisei* Poeta, 2014: 448, figures 38-46. Male holotype from Parque Estadual do Delta do Jacuí (Fazenda Pontal), Triunfo, Rio Grande do Sul, Brazil [29°55'59"S, 51°42'46"W], 28.I.1999, A.B. Bonaldo (MCN 30206). Two female paratypes from Pantanal, Mato Grosso, Brazil, 04.–10.VIII.1992, A.A. Lise & A. Braul (MCTP 2304); male paratype from Estação Ambiental Braskem, Triunfo, Rio Grande do Sul, Brazil, 11.X.1992, M.A.L. Marques (MCN 22342); female paratype from Ilha das Flores, Porto Alegre, Rio Grande do Sul, Brazil [29°59'15"S, 51°15'28"W], 12.X.1998, L. Moura (MCN 31034); female paratype from Arroio do Salso, Serraria, Porto Alegre, Rio Grande do Sul, Brazil [29°50'24"S, 50°51'44"W], 17.X.2003, R. Ott & I. Heydrich (MCN 36351).

Diagnosis and description. See Poeta (2014).

**Distribution.** Brazil: Pará, Mato Grosso, São Paulo, and Rio Grande do Sul. Uruguay: Salto (See Poeta 2014, Figure 86).

***Eustala pallida* Mello-Leitão, 1940**

Figs 29A–C, F

*Eustala pallida* Mello-Leitão, 1940: 25, figures 2, 3. Female holotype from Rio Xingú (Pará to Mato Grosso states), Brazil, H. Leonardos (MNRJ 706, examined, poor conditions). Roewer 1942: 766; WSC 2017.

Additional material examined. BRAZIL, *Rio Grande do Sul*: Cambará do Sul (Itaimbezinho), 29°11'04"S, 50°05'00"W, 1 #f, 04.III.1986, F.C. Quadros (MCTP 36586).

Diagnosis. The epigynum of *E. pallida* (Figs 29A–C) resembles those of *E. scutigera* (Figs 18C–F) by the scapus abruptly arising from its basis. They can be separate from each other by the elevated median plate in *E. pallida* (posterior view, Fig. 29B) (vs. flat in *E. scutigera*, Fig. 18E).

Description. *Female* (MCTP 36586). Carapace and sternum pale yellow. PME black borders. Abdomen subtriangular, dorsum and venter discolored (Fig. 29F). Legs pale yellow. Total length 4.90. Carapace length 2.25, width -. Many legs articles missing.

*Male*. Unknown.

Distribution. Brazil: Rio Xingú and Rio Grande do Sul.

***Eustala lunulifera* Mello-Leitão, 1939**

Figs 30A–C, G, H



*Eustala lunulifera* Mello-Leitão, 1939: 108, figures 7, 8. Female holotype from Mazaruni Settlement, Mazaruni, Guyana (*Trypoxylon* sp. nest) [06°04'02"N, 59°36'52"W], 17.VII.1937, Dr. O.W. Richards (NHM, poor conditions, examined). Caporiacco 1954: 90, figure 17 (male not found in MZUF and MHNLS); Roewer 1942:766; WSC 2017.

Additional material examined. BRAZIL, *Pará*, 01°59'53"S, 54°55'50"W: 1 #f, S. Reimoser (NHMW).

Diagnosis. The epigynum of *E. lunulifera* (Figs 30A–C) is similar to those of *E. histrio* (Figs 20A–C) by the scapus that abruptly projected from its basis. They can be separated from each other by the general square-shape of the lateral plates that form a square in *E. lunulifera* (posterior view, Fig. 30B) (vs. circular in *E. histrio*, Fig. 20B).

Description. *Female* (NHM, holotype). Carapace pale yellow (Fig. 30G). Sternum orange. Abdomen elongated with pointed end, dorsum white (Fig. 30H). Venter decolorated with vestigial median white patch. Legs orange not banded. Total length 8.50. Carapace length 3.30, width 2.4. Many legs articles missing. (Legs measurements see Mello-Leitão (1939).

*Male*. Unknown.

Variation. Female (n=2): total length 5.15–8.50; carapace length 2.15–3.30, width 1.80–2.40. No color variation.

Distribution. Guyana: Mazaruni. Brazil: *Pará* (Fig. 41B).

### ***Eustala smaragdinea* (Taczanowski, 1878)**

Figs 31D–F, H, I

*Epeira smaragdinea* Taczanowski, 1878: 161, pl. 2, figure 12. Four females syntypes from Amable Maria, Junin, Peru [11°20'08"N, 75°20'28"W], K. Jelski (MZPW 225744–225747, examined).

*Eustala smaragdinea*; Simon 1895: 789; Roewer 1942:766; WSC 2017.

Additional material examined. PARAGUAY, Puerto Foncière (“*Territ. Foncière*”), 22°29'12"S, 57°50'17"W: 1 #f, 1908, Reimoser (NHMW, det. as *E. gonygaster*).

Diagnosis. The epyginum of *E. smaragdinea* (Figs 31D–F) is similar to those of *E. sedula* (Figs 30D–F), by the median plate forming a septum with median septum and by the ringed scapus. They can be separated from one another by narrow scapus, in lateral view (Fig. 31F) and by the white and elongate abdomen of *E. smaragdinea* (Fig. 31H, I) (vs. scapus wide laterally and abdomen subtriangular with two apical tubercles in *E. sedula*, Figs 30F, J).

Description. *Female* (MZPW 225744–225747, syntype). Carapace yellow. PME and LE with black borders. Sternum yellow. Abdomen oval, longer than wide. Dorsum white (Figs 31H, I). Venter discolored with well-defined elongated median white patch from epigastric furrow to spinnerets. Legs pale yellow, femura I and II with black pigment distally (ventral). Total length 7.2. Carapace length 2.45, width 2.20. Leg formula 1243. Length leg I: femur 4.20; patella+tibia 4.70; metatarsus 3.10; tarsus 1.00; total 13.00. Patella+tibia II 4.00; III 1.95; IV 3.05.

*Male*. Unknown.

Variation. Female (n=4): total length 8.05–6.85; carapace length 2.45–2.9, width 2.2–2.25. Carapace and legs pale orange or orange, femur I and II black ringed (distally), or completely pale yellow. The specimen from Paraguay is dark orange, and the dorsum of the abdomen is decolorated with transversal white stripes (incomplete in the cardiac

mark).

Distribution. Peru: Junin. Paraguay: Puerto Foncière (Fig. 41C).

***Eustala conformans* Chamberlain, 1925**

(Figs 32A–G)

*Eustala conformans* Chamberlain, 1925: 216. Female holotype from Barro Colorado Island Canal Zone, Panamá [09°09'07"N, 79°50'47"W], W.C. Allee (MCZ 1273/15411, examined). Chickering 1955: 430, figures 49, 50; Roewer 1942: 764.

*Eustala gertschi* Chickering, 1955: 440, figures 59–62. Male holotype from Barro Colorado Island Canal Zone, Panamá [09°09'07"N, 79°50'47"W], VI.1950 (MCZ 21453, examined). Male paratype, same locality, 12.II.1936, W.J. Gertsch (AMNH, examined); male paratype from the same locality, VI.1948, T.C. Schneirla (MCZ 21453, examined). Synonymized by Levi & Santos 2013: 222.

Additional material examined. PANAMÁ, *Barro Colorado Island*, 09°09'07"N, 79°50'47"W, 1 #f, 21.V.1946, T.C. Schneirla (AMNH). BRAZIL, *Roraima*: Ilha de Maracá, 02°02'07"N, 50°27'05"W, 1 #f, 31.I.–14.II.1992, A.A. Lise (MCTP 1865). *Minas Gerais*: Araguari (Bosque John Kennedy), 18°39'00"S, 48°11'04"W, 2 #f, 30.IV. 2016, J.C.F. Cardoso (MCTP 40002).

Diagnosis. Male palps of *E. conformans* (Figs 32A, B) are similar to those of *E. mimica* (Figs 19D, E) by the conductor with longitudinal section, forming an apical concavity, in ventral view. It differs from this species by the curved apex of the terminal apphysis in *E. conformans* (Fig. 32A) (vs. straight in *E. mimica*, Fig. 19D). The epyginum of *E. conformans* (32C–E) resemble those of *E. bellissima* (see Poeta, Marques & Buckup.

2010b, figures 6–8) by the general shape of the scapus and by the presence strongly sclerotized structures on each side of the epyginum on the epigastric furrow – which have no directly connection with the epyginum. They can be differentiated from each other by the median plate deeply positioned, when compared with the lateral plates, and flat *E. conforman* (Fig. 32D) (vs. bulged median plate in *E. belissima*, see Poeta, Marques & Buckup. 2010b, figure 7).

Description. *Male* (MCZ, *E. gertschi* holotype). Carapace orange, darker in basis and pale yellow in the cephalic area; white setae especially near LE. Eyes with dark borders, MOA with median conical projection. Sternum pale yellow with gray border and white pigment. Abdomen circular, white with faint light brown folium (Fig. 32F), ventral surface yellow laterally and dusk grey in center; with median white rounded patch. Legs pale yellow, femura mostly light brown. Total length 5.00. Carapace length 2.50, width 1.95. Leg formula 1243. Length leg I: femur 2.40; patella+tibia 3.00; metatarsus 2.00; tarsus 0.95; total 8.35. Patella+tibia II 2.45; III 1.50; IV: 2.25.

*Female* (AMNH, Barro Colorado). Carapace yellow, hirsute (white setae) and brown border and white pigment on cephalic area, thoracic furrow reduced (rounded, not elongated). All eyes with black borders. Sternum pale yellow with gray border and white pigment. Abdomen oval (damage and filled with worms). Dorsum white (Fig. 32G), Venter decolored with black marks laterally and white ones medially (without pattern). Legs pale yellow, just partially ringed at terminal tip of each article. Total length 7.55, carapace length 2.70, width 2.10. Leg formula 1243. Length leg I: femur 2.75; patella+tibia 3.30; metatarsus 2.25; tarsus 1.00; total 12.60. Patella+tibia II 3.20; III 1.60; IV 2.45.

Variation. Male (n=2): total length 5.00–5.55, carapace length 2.50–2.55, width does not vary. The male paratype has a white elongated abdomen, with thin decolored lines from

the terminal apex till the center (similar to *E. viridipedata*). The venter of the abdomen in females may present different patterns of white patches: circular with an irregular transversal line near the spinnerets; without the circular white patch.

Distribution. Panamá: Barro Colorado Island. Brazil: Roraima, Minas Gerais (Fig. 41C).

*Eustala delecta* Chickering, 1955

Figs 19G–I

*Eustala delecta* Chickering, 1955: 431, figures 51–54. Male holotype from Barro Colorado Island, Panamá [09°09'07"N, 79°50'47"W], A.M. Chickering (MCZ 21032, examined). Male paratype from Canal Zone, Barro Colorado Island, Panamá, VII.1950 (AMNH, examined); male paratype from Summit, Canal Zone, Panamá [09°03'54"N, 79°38'43"W], VII.1950 (NHM, examined); three males paratypes, same data as holotype (MCZ 24516–24518, examined); one male paratype from Boquete, Chiriquí, Panamá [08°46'38"N, 82°26'53"W] (MCZ 24519, examined). WSC 2017.

Diagnosis. The male palp of *E. delecta* (Figs 19G, H) resembles those of *E. bifida* (Figs 33A, B) by the conductor with longitudinal section, forming an apical circular concavity and by the terminal apophysis wider than its neck. They can be distinguished by the wide and strongly curved terminal apophysis in *E. delecta* (mesal view, Fig. 19G) (vs. straight in *E. bifida*, 33A).

Description. *Male* (AMNH, paratype). Carapace orange, darker on cephalic area border; PME with dark borders. Sternum yellow. Abdomen subtriangular, longer than wide, dorsum white with dark brown; ventral surface decolorated with brown band from epigastric furrow to spinnerets, with wide white median patch (Fig. 19I). Legs yellow with

orange bands. Total length 5.44. Carapace length 2.63, width 2.18. Many legs articles missing. Leg formula 1243. Length leg I: femur 4.00; patella+tibia 4.10; metatarsus 3.30; tarsus 1.20; total 12.60. Patella+tibia II 3.60; III 1.70; IV 3.00.

*Female.* Unknown.

Variation. Male (n=4): carapace length 2.25–2.60; width 1.9–2.15. Carapace, sternum pale yellow. Legs pale yellow with no bands.

Distribution. Panamá: Barro Colorado Island, Chiriquí.

*Eustala palmares* Poeta, Marques & Buckup, 2010

*Eustala palmares* Poeta, Marques & Buckup, 2010a: 152, figures 14–19. Male holotype and female paratype from Palmares do Sul, Rio Grande do Sul, Brazil [30°15'34"S, 50°30'39"W], 11.XI.2003, Equipe Probio (MCN 36612). Several males and females paratypes, same holotype data (MCN 46637, 46638). WSC 2017.

**Diagnosis and descriptions.** See Poeta, Marques & Buckup, 2010a.

**Distribution.** Brazil: Rio de Janeiro, São Paulo, Paraná, Santa Catarina, and Rio Grande do Sul. Uruguay: Artigas (Poeta et al. 2010a) (See Poeta 2014, Figure 90).

*Eustala delasmata* Bryant, 1945

*Eustala delasmata* Bryant, 1945: 372, figure 11. One male holotype and two male paratypes from San José de las Matas [19°20'16"N, 70°56'23"W], Dominican Republic, VI.1938, P.J. Darlington Jr. (MCZ 21031, examined); one male paratype from Sánchez [19°13'45"N, 69°36'45"W], Dominican Republic, VII.1938, P.J. Darlington Jr. (MCZ 24613, examined). Poeta & Teixeira 2017; WSC 2017.

**Diagnosis and description.** See Poeta & Teixeira (2017)

**Distribution.** Mexico: Puebla. Dominican Republic: San José de las Matas and Sánchez  
(See Poeta & Teixeira, Figure 19).

***Eustala bifida* F. O. Pickard-Cambridge, 1904**

Figs 33A–I

*Eustala bifida* F. O. Pickard-Cambridge, 1904: 507, pl. 48, figures 9, 10. Male and female syntypes from San José, Costa Rica [09°55'41"N, 84°05'26"W], Tristan, (NHM, examined). Four males and five females syntypes from San José, Costa Rica (NHM, examined). WSC 2017.

*Epeira bifida* Banks, 1909: 212.

*Eustala bifida*; Chickering 1955: 421, figures 35–40; Levi 1977: 108, figures 167–175, 178; Roewer 1942:764; WSC 2017.

*Eustala wiedenmeyeri* Schenkel, 1953: 21, figures 19a, b. Female lectotype, from Pozo, Falcon, Venezuela [11°10'51"N, 69°51'35"W] (NMB 1780A, examined). Syn. nov.

*Eustala maxima* Chickering, 1955: 461, figures 86, 87. Female holotype from Summit, Canal Zone, Panamá [09°03'54"N, 79°38'43"W], VII.1950 (MCZ 22011, examined).  
Syn. nov.

Note. Synonymies based on the examination of the type material. The illustrations presented by Chickering (1955, see figures 37 – 40) and Levi (1977, see figures 167–175) for females of *E. bifida* and *E. wiedenmeyeri* are very distinct from each other due the median plate of the epyginum flat in one and bulged in the other one. However, there are

several individuals collected together (*E. bifida*, Chickering det., MCZ) that present epyginum with flat median plate and also intermediate conditions, due to the poor conditions of the specimens. Therefore, the specimens illustrated by Chickering are very likely to have deformed epyginum.

Additional material examined PANAMÁ, *Barro Colorado Island*, 09°09'07"N, 79°50'47"W: 1 #f, A.M. Chickering, (AMNH, det. as *E. maxima*); 1 #m, 20.VIII.1954, A.M. Chickering (MCZ 73369). COSTA RICA, *La Verbena*, 09°54'21"N, 84°06'34"W: 2 #f, January (MCZ 73375); 24 #f, Tristan (MCZ 73373).

Diagnosis. The male palp of *E. bifida* (Figs 33A, B) resembles those of *E. mimica* (Figs 19D, E) by the conductor with a transversal section forming an apical concavity (ventral view). However, *E. bifida* presents a distinct embolus with white basis and its tip curled directed to the venter of the bulb (mesal view, Fig. 33A) (vs. embolus with dark basis in *E. mimica*, Fig. 19D). The epyginum (Figs 33C–E) is similar to those of *E. californiensis* (Figs 13C–E) by the distal border of the lateral plates with a median constriction, as an hourglass, in posterior view. Yet, the internal boards of the lateral plates are parallel in *E. bifida* (posterior view, Fig. 33D) (vs. divergent in *E. californiensis* (Fig. 13D).

Description. *Male* (MCZ 73369). Carapace dark orange, with brown bands marking thoracic division PME and LE with black borders. Sternum pale yellow with white pigment. Abdomen subtriangular, longer than wide; dorsum white with dark gray dusk laterally (Fig. 33F). Venter yellow with well-defined black band from epigastric furrow to spinnerets and elongated median white patch. Legs pale yellow with orange bands and dusk marks. Femura I and II with one row of stout setae; Legs III, IV with two rows of stout setae. Total length 6.44. Carapace length 2.74, width 3.31. Leg formula 1243.



Length leg I: femur 3.77; patella+tibia 4.86; metatarsus 3.30 tarsus 1.22; total 12.82.

Patella+tibia II 3.63; III 1.99; IV 3.31.

*Female* (NMB 1780A, lectotype). Carapace orange and legs yellow (Fig. 33G). PME and LE with black borders. Sternum yellow with white pigment. Abdomen subtriangular, as long as wide with two conspicuous terminal tubercles; dorsum white, with fawn and dusky brown marks laterally (Figs 33H, I). Venter with decoloration with losangular median white patch. Total length 10.70. Carapace length 4.30, width 3.74. Leg formula 1243. Length leg I: femur 4.20; other articles are missing. Patella+tibia II 4.83; III 2.56; IV 4.36

Variation. Female (n=5) total length 8.00–8.65; carapace length 3.75–4.15, width 3.15–3.45.

Distribution. Costa Rica: La Verbena, San José. Panamá Canal Zone, La Verbena. Venezuela: Falcon.

### ***Eustala lata* Chickering, 1955**

Figs 34A–C, G

*Eustala lata* Chickering, 1955: 454, figures 77. Female holotype from Barro Colorado, Panamá [09°09'07"N, 79°50'47"W], VIII.1950, A.M. Chickering (MCZ 21787, examined). WSC 2017.

Additional material examined. JAMAICA, *Saint Thomas*: Golden Grove, 17°54'30"N, 76°15'12"W, 1#f, 26.VII.1960, P. & C. Vaurie (AMNH).

Note. The female from Jamaica (AMNH) was labeled as a new species paratype by Archer & Gertsh, but it was never described. 2. It seems that is a penultimate molting of the specimens, because the tissues are really soft, having some deformation on the carapace. Besides that, the genitalia is in perfect conditions so the identification is unquestionable.

Diagnosis. Females of *E. lata* (Figs 34A–C) resembles those of *E. viridipedata* by the pyramidal and ringed scapus (Fig. 31A). It can be distinguished from those species by the lateral plates almost touching each other (Fig. 34B, posterior view) and by the median plate noticeable in lateral view in *E. lata* (Fig. 36C) (vs. lateral plates parallel, and median plate not exposed in lateral view in *E. viridipedata*, Figs 31B, C).

Description. *Female* (MCZ holotype). Carapace yellow. PME with black borders. Sternum yellow mostly white under surface. Abdomen subtriangular, longer than wide, with two posterior projections; dorsum discolored, with light brown folium (Fig. 34G). Venter whitish with black band from epigastric furrow to spinnerets, and rounded median white patch. Legs yellow. Many legs articles missing. Total length 8.26, carapace length 3.64, width 3.38.

*Male*. Unknown.

Variation. Female (n=2): total length 7.90–8.26; carapace length 2.90–3.64, width 2.50–3.38. Dorsum of the abdomen pale yellow, with faint folium; ventral median white patch not surrounded by a black band.

Distribution. Panamá: Barro Colorado. Jamaica: Saint Thomas (Fig. 41B).

***Eustala mucronatella* (Roewer, 1942)**

*Epeira mucronata* L. Koch, 1871: 74–76, pl. 6, figures 2, 3, 3a; Butler 1876: 352; Karsch 1878: 789.

*Aranea mucronatella* Roewer, 1942: 830 (replacement name).

*Araneus mucronatus* (L. Koch). Bonnet 1955: 547.

*Eustala mucronatella* Framenau, Scharff & Levi, 2009: 26, figures 4A-H. WSC 2017.

Diagnosis and description. See Framenau, Scharff & Levi, 2009.

**Distribution.** Brazil.

***Eustala anastera* (Walckenaer, 1841)**

Figs 35A–H

*Epeira anastera* Walckenaer, 1841: 33. Female holotype from “New World”. Museum unknown, apparently lost.

*Epeira eustala* Walckenaer, 1841: 37. Female holotype from “New World”. Museum unknown, apparently lost. Synonymized by McCook (1894).

*Epeira apotroga* Walckenaer, 1841: 43. Female holotype from “New World”. Museum unknown, apparently lost.

*Epeira spatulata* Walckenaer, 1841: 44. Female holotype from “New World”. Museum unknown, apparently lost.

*Epeira illustrata* Walckenaer, 1841: 45. Male holotype from “New World”. Museum unknown, apparently lost.

*Epeira decolorata* Walckenaer, 1841: 49. Male and female syntypes from “New World”.

Museum unknown, apparently lost.

*Epeira vivida* Walckenaer, 1841: 54. Female holotype from “New World”. Museum

unknown, apparently lost.

*Epeira triflex* Walckenaer, 1841: 60. Male holotype from “New World”. Museum

unknown, apparently lost.

*Epeira trinotata* Walckenaer, 1841: 75. Female holotype from “New World”. Museum

unknown, apparently lost.

*Epeira subfusca* Walckenaer, 1841: 76. Female holotype from “New World”. Museum

unknown, apparently lost.

*Epeira prompta* Hentz, 1847: 473, pl. 31, figure 4. Female holotype from Massachusetts,

Alabama, United States of America. Museum unknown, apparently lost.

*Epeira hebes* Hentz, 1847: 473, pl. 31, figure 7. Female holotype from “Southern Atlantic

States”. Museum unknown, apparently lost.

*Epeira bombycinaria* Hentz, 1847: 476, pl. 31, figure 16. Female holotype from Alabama,

United States of America (not examined, apparently lost); Keyserling 1892: 145, pl. 7, figure 107.

*Epeira anastera*; McCook 1894: 172, pl. 8, figures 1–4.

*Eustala anastera*; Simon 1895: 795, figure 860; F. O. Pickard-Cambridge 1904: 506, pl.

48, figures 7, 8; Petrunkevitch 1930: 331, figure 215; Comstock 1940: 524, figures 549–554; Chamberlin & Ivie 1944: 102; Kaston 1948: 233, figures 706–709, 727;

Archer 1951: 19, figure 46; Chickering 1955: 414, figures 24–29; Levi 1977: 114, figures 205–232, 280–285, 298–302, 314, 315; Coddington 1990: 14, figure 60;

Breene *et al.*, 1993: 104 figures 155A–C; Levi 2002: 533, figures 13–15, 208–210;

Dondale *et al.* 2003: 267, figures 600–611. WSC 2017.

Note. Although you can find specimens of *E. cepina* type-series similar to those illustrated as *E. anastera* (see Levi 1977, figure 217), which present a visible E (ventral view), unlike the illustrated as *E. cepina* (see Levi 1977, figure 250). The author also registered the variation into both species, where we can notice many features to separate them in two distinct species (see Levi 1977, figures 280–290; 298–302; 303–308; 314–316). Thus, although both species are related and morphologically similar, we agree with the author that they are not synonymous. Note 2. The material 5 #m, 1 #f, 2j, from Texas, Cameron County (Rangerville), 15.IX.1935, M. Welch & K. Lamb (AMNH, Levi det. 1975) presents males specimens with palp similar of those illustrated as *E. anastera* (see Levi 1977, figures 215, 217) but the E is partially hidden by the C (ventral view). Also, the males and females present a tuberculated abdomen (see Levi 1977, figures 223, 224). Yet, the females of “*E. anastera* from Texas” (see Levi 1977, figures 226–230) present the scapus distinct, from the one presented as “*E. anastera* from Pennsylvania” (see Levi 1977, figures 205–207). Thus, it seems that the specimens that correspond to the figures 226–227 from Levi (1977) are intermediaries.

Additional material examined. CANADA, *Quebec*: (La Maurice National Park, 46°39'02"N, 72°58'11"W) #m M. Toure, 03.VII.2013 (DEBU BIOUG11435-G04). UNITED STATES OF AMERICA, *Texas*: #m, #f, H. Wagner (AMNH); #f, 29°47'23"N, 98°25'12"W, 11.V.2010 (DEBU BBUSA247-10); Cameron County (Rangerville), 26°05'23"N, 97°44'54"W, 4 #m, #f, 15.IX.1935, M. Welch & K. Lamb (AMNH). MEXICO, *Oaxaca*: (Teotitlan), 17°01'48"N, 96°31'14"W, #f, IX.1944 (AMNH).

Diagnosis. Males of *Eustala anastera* (Figs 35A, B) are close to those of *E. cepina* (Figs 36A, B) by the palp with conductor with apical “white boss”. They can be differentiated by the embolus embolus fully exposed in *E. anastera* (Fig. 35A) (*vs.* partially covered by the

subterminal apophysis in *E. cepina*, Fig. 36A. Females of *E. anastera* (Figs 35C–E) present an elongated wrinkled scapus as *E. cepina* (Figs 36C–E). Yet, they can be distinguished by the median plate exposed in *E. anastera* (Fig. 35C) (vs. scapus basis overlapping the median plate in *E. cepina*, Fig. 36C).

Description. *Male* (AMNH). Carapace orange, MPE with dark borders. Sternum orange with gray border and white pigment. Abdomen oval, longer than wide, with one terminal tubercle; dorsum white with partial brown folium (Fig. 35F). Ventral surface light brown with white median patch. Legs orange with dark gray bands. Total length 4.80. Carapace length 2.39, width 2.14.

*Female* (AMNH). Carapace orange with decolored portion in thoracic area. PME with black borders. Sternum yellow with gray border and white pigment. Abdomen subtriangular, longer than wide with two terminal tubercles; dorsum colored as male (Figs 35G, H). Venter with well-defined dark gray band from epigastric furrow to spinnerets and median white patch. Legs yellowish-orange with dark gray bands. Total length 7.95. Carapace length 2.87, width 2.49.

Variation. See Levi (1977).

Distribution. Canada. United States of America.

### ***Eustala cepina* (Walckenaer, 1841)**

Figs 36A–G

*Epeira cepina* Walckenaer, 1841: 37. Female holotype from Georgia, United States of America (museum unknown, apparently lost).

*Epeira parvula* Keyserling, 1864: 131, pl. 6, figures 9, 10. Female holotype from North America (NHM; not examined, apparently lost); Emerton, 1884: 317, pl. 34, figure

12, pl. 37, figures 1, 2; Emerton, 1902: 179, figures 416–418. Synonymized by Levi 1977: 118, figures 233–252, 286–290, 303–308, 316.

*Eustala cepina*; Chamberlin & Ivie 1944: 103; Breene *et al.* 1993: 104, figures 156A-C; Dondale *et al.* 2003: 271, figures 622–631; Paquin *et al.* 2008: 29, figures 6–8; WSC 2017.

Additional material examined. CANADA, *Quebec*: Saint-Mathieu (La Maurice National Park), 46°43'27"N, 72°46'35"W, 1 #m, 03.vii.2013, M. Toure (BIOUG11435-G04). UNITED STATES OF AMERICA, *Texas*: Austin, 30°16'01"N, 97°44'35"W, 4 #f, VIII.1909, R.V. Chamberlin (MCZ 73107, 72998); San Patricio County (Waeldr Wild, Refuge-nr, Sinton), 43°49'04"N, 99°19'43"W, 1 #m, 22.III.1972, B. & J. Kaspar (ZMUC); Cameron County (Rangerville), 26°05'23"N, 97°44'54"W, 5 #m, 1 #f, 2j, 15.IX.1935, M. Welch & K. Lamb (AMNH, Levi det. 1975). *Florida* (Little Pine Key), 27°39'53"N, 81°30'56"W: 1 #f, 27.III.1939 (AMNH, Levi det. 1975); (Okeechobee) 27°14'38"N, 80°49'47"W, 2 #m, 2 #f, 26.III.1938, W.J. Gertsch (AMNH, Gertsch det. 1966; Levi 1975). MEXICO, *Oaxaca* (Teotitlan), 17°01'48"N, 96°31'14"W: 1 #m, 10 #f, IX.1944, H. Wagner (AMNH). No data: 3 #m; 1 #m; 1 #m (NHM). *Kansas*: (Meade State Park) 37°10'13"N, 100°26'01"W, 3 #m, 4 #f, 22.VIII.1961, H.S. Fitch (AMNH, Ivie det. 1964; Levi det. 1975).

Diagnosis. Males of *Eustala cepina* (Figs 36A, B) are close to those of *E. anastera* (Figs 35A, B) by the palp with conductor with apical “white boss”. It can be distinguished by the embolus partially covered by the subterminal apophysis in *E. cepina* (Fig. 36A) (*vs.* embolus fully exposed in *E. anastera*, Fig. 35A). The epigynum (Figs 36C–E) is similar to those of *E. anastera* by the long and wrinkled scapus (Figs 35C–E). They can be separated by the scapus basis overlapping the median plate in *E. cepina* (Fig. 36C) (*vs.*

median plate exposed in *E. anastera*, Fig. 35C). Also, *E. cepina* present a rounded abdomen (Fig. 36G), without projections, unlike *E. anastera* (Fig. 35G).

Description. *Male* (AMNH, paratype). Carapace orange with bit of white pigment. LE with long white setae, PME with dark borders. Sternum yellow. Abdomen subtriangular, longer than wide, dorsum brownish with dark brown folium, ventral surface discolored with small white median patch faint (Fig. 36F). Legs yellow banded. Total length 4.12. Carapace length 2.07, width 1.66. Leg formula 1243. Length leg I: femur 2.48; patella+tibia 3.13; metatarsus 1.90; tarsus 0.78; total 8.30. Patella+tibia II 2.32; III 1.22; IV 1.89.

*Female* (AMNH. paratype). Carapace yellow with white pigment in thoracic area. PME with black borders. Sternum pale yellow with white pigment. Abdomen oval, longer than wide, dorsum white (Fig. 36G). Venter white. Legs yellow, banded. Total length 4.90. Carapace length 1.70, width 1.52. Leg formula 1243. Length leg I: femur 2.18; patella+tibia 2.64; metatarsus 1.58; tarsus 0.67; total 7.07. Patella+tibia II 2.22; III 1.08; IV 1.81.

Variation. Male (n=3): total length 3.81–4.12; carapace length 1.90–2.05, width 1.63–1.66. Female (n=5): total length 4.90–6.26; carapace length 1.70–2.15, width 1.52–1.88. Male colored as the female.

Distribution. Canada: Quebec. United States of America: Texas, Florida. Mexico: Oaxaca.

### ***Eustala conchlea* (McCook, 1888)**

Figs 37A–H

*Epeira parvula conchlea* McCook, 1888: 199, figure 6. Female from Wisconsin, United States of America [43°47'03"N, 88°47'16"W]. Elevated to species by Levi 1977: 118,



figures 269–279, 296, 312, 318 (female “lectotype”, and males and females “paralectotypes”, ANSP, not examined, apparently lost).

*Epeira anastera conchlea* McCook, 1894: 174, pl. 8, figure 1n.

*Epeira emertoni* Banks, 1904: 111. Female syntypes from New York, Washington D.C, and Alabama, United States. (MCZ, not examined, apparently lost). Syn. nov.

*Araneus emertoni*; Petrunkevitch, 1911: 291.

*Eustala anastera buliafera* Chamberlin, 1924: 650. Female holotype from Gulf of California, Mexico [26°43'52"N, 110°42'44"W], 02.VII.1921, J.C. Chamberlin (CAS, not examined). Male and female paratypes from Las Galeras Island, Dominican Republic [19°16'45"N, 69°12'07"W], 13.VI.1921, J.C. Chamberlin (MCZ, examined – Levi det. 1975 as *E. conchlea*). Synonymized by Levi 1977.

*Eustala anastera leuca* Chamberlin, 1924: 650. Male holotype and two female paratypes from Santa Inez Island, Gulf of California, Mexico [27°02'16"N, 111°54'42"W], 13.V.1921, E.P. von Duzee (MCZ, examined). One female paratype from, Gulf of California, Mexico, United States of America [26°43'52"N, 110°42'44"W], 20.V.1921, J.C. Chamberlin (MCZ, examined). Synonymized by Levi 1977.

*Eustala anastera emertoni*; Archer 1940: 55 (assigned as subspecies based on *E. emertoni* Banks, 1904).

*Eustala triflex*; Chamberlin & Ivie 1944: 103 (Misdeterminating as *E. anastera*, according to Levi 1977: 120).

*Eustala arkansana* Archer, 1951: 19, figure 44. Male holotype and female allotype and paratypes from Berryville, Carroll County, Arkansas, United States of America [36°21'53"N, 93°34'04"W], June to September, Miss O.C. Wilton (AMNH, not examined). Female considered as *E. cepina* according to Levi 1977: 118).

*Eustala emertoni*; Levi 1977: 120, figures 253–268, 291–295, 309–311, 317; Dondale *et*

*al.* 2003: 269, figures 612–621.

Note. Synonymy based on the similarity of males and females' genitalia (see Levi figs 253–268; 269–279). As previous authors (Levi 1977, Dondale *et al.* 2003) we were able to notice only few small differences between the species as color pattern, body size and the presence of a small apical tubercle at the end of the abdomen of *E. conchlea* – which is considered as intraspecific variation (see Levi 1977, figures 291–294; 309–312).

Note. The female paratype of *Eustala anastera leuca* from Santa Inez Island, Mexico (MCZ), belongs to *E. cepina*. 2. *Eustala triflex* emerge in the synonymic list of *E. anastera*, *E. emertoni* and *E. conchlea*. The type-material is apparently lost and the authors (e.g. Chamberlin & Ivie 1944; Levi 1977) had access just to the Abbot manuscript's "Spider of Georgia". However, we analyzed two males and six females labeled as "*Eustala triflex* paratypes" from Pennsylvania, N.E. of Jamison (Horseshoe Bend, Neshaminy Cr.), United States of America, V.1955, W. Ivie (AMNH, examined). Additional material examined. UNITED STATES OF AMERICA, *Pennsylvania*: (Horseshoe Bend, Neshaminy Cr.) 40°29'52"N, 78°29'02"W, 4 #m, 1 #f, N.E. of Jamison, V.1955 (AMNH, labeled as "*E. triflex* Paratype"; Ivie det. 1960 as *E. triflex*; Levi det. 1975 as *E. emertoni*). *Georgia*: Waycross, 31°10'08"N, 82°15'42"W, 1 #m, 16–18.VII.1916 (AMNH, Gertsch det. as *E. anastera*; Levi det. 1975 as *E. emertoni*). *California*: Laguna Beach, 33°32'33"N, 117°47'07"W, 1 #m, 3 #f, 3j, VII.1931, R.V. Chamberlin (AMNH, Levi det. 1975); Santa Monica Mountains (Old Topanga Canyons), 34°06'20"N, 118°38'14"W, 1 #m, 2 #f, 29.V.1955, R. Schick (AMNH, Levi det. 1975;

female similar to Levi 1977, figure 227). *Alabama*: Silverhill, 30°32'43"N, 87°45'05"W, 1 #m, 2 #f, IX.1945, G. Nelson (NHM, Levi det. 1975 as *E. triflex*). *Texas*: Austin, 30°16'01"N, 97°44'35"W, 1 #f, VIII.1909, R.V. Chamberlin (MCZ 73107, 72998).

Diagnosis. Males of *E. conchlea* (Figs 37A, B) resemble those of *E. cepina* (Figs 36A, B) by the palp with conductor with apical 'white boss' and paramedian apophysis. Alternatively, they can be separated from each other by the median portion of the conductor flat in *E. conchlea* (Fig. 37A) (*vs.* bulged in *E. cepina*, Fig. 36A). The females of *E. conchlea* (Figs 37C–E) and *E. cepina* (Figs 36C–E) have similar epigynum by the basis of the scapus overlapping the median plate. However, they can be distinguished from each other by the wrinkled median plate in *E. conchlea* (Fig. 37C) (*vs.* median plate smooth in *E. cepina*, Fig. 36C).

Description. *Male* (AMNH, "*E. triflex* paratypes"). Carapace orange, yellow in thoracic area, with some white pigment. PME with dark borders. Sternum brown with white pigmentgray border. Abdomen rounded, almost oval, longer than wide. Dorsum light brown, with just brown border of folium demarcated (Fig. 37F). Ventral surface yellowish with median brown band with white elongated median patch. Legs orange with brown bands. Total length 4.20. Carapace length 2.18, width 1.85. Leg formula 1243. Length leg I: femur 2.78; patella+tibia 3.14; metatarsus 1.97; tarsus 0.79; total 8.67. Patella+tibia II 2.31; III 1.24; IV 1.93.

*Female* (AMNH, "*E. triflex* paratypes"). General features as male (Fig. 37G). Total length 6.31. Carapace length 2.47, width 2.31. Length leg I: femur 4.25; patella+tibia 4.99; metatarsus 2.78; tarsus 1.09; total 13.11. Patella+tibia II 4.13; III 2.20; IV 3.52.

Variation. Male (n=2): total length 4.20–4.35; carapace length 1.70–2.12, width 1.68–1.85. Female (n=5): total length 6.31–8.68; carapace length 2.47–3.41, width 2.31–2.91.

Distribution. United States of America: Georgia, California, Alabama, Texas.

***Eustala rosae* Chamberlain & Ivie, 1935**

Figs 38A–I

*Eustala rosae* Chamberlin & Ivie, 1935: 22, pl. 15, figure 124. Female holotype from Roosevelt Dam, Arizona, United States of America [33°51'29"N, 120°55'16"W], W. Ivie, V.1935 (museum unknown, apparently lost). Gertsch & Davis 1936: 14, figures 11–12; Levi 1977: 112, figures 192–204, 297, 313; WSC 2017.

Additional material examined. UNITED STATES OF AMERICA, *Florida*: Okeechobee, 27°14'38"N, 80°49'47"W, 4 #m, 26.III.1938, Gertsch (Gertsch det. 1966; Levi det. 1975 as *E. cepina*) (AMNH, mixed with *E. cepina*). *California*: Madera County, 37°15'06"N, 119°41'46"W, 2 #f, 08.VII.1958, Gertsch & Roth (AMNH, Levi det. 1975); Tuolumne County, 38°01'45"N 119°58'26"W, 1 #m, 08.VII.1958, Gertsch & Roth (AMNH, Levi det. 1975); 2 #f, 08.VII.1958, Priest, (AMNH); Shasta County (Castella), 41°08'18"N, 122°19'04"W, 1 #f, 26.VII.1956, W.J. & J.W. Gertsch (AMNH, Levi 1975 det.); Tehama County (Red Bluff), 40°10'42"N, 122°14'08"W, 1 #m, 22.V.1952, E. Schlmger (AMNH, Levi det. 1975); San Diego County (The Willows), 32°50'05"N, 116°43'21"W, 2 #f, 14.VI.1957, Schick & Hogue (AMNH, Levi det. 1975); 1 #f, Ventura County (Wheeler Springs), 34°30'28"N, 119°17'29" W, 02.VII.1958, W. Gertsch & V. Roth (AMNH, Levi det. 1975).

Diagnosis. Males of *Eustala rosae* (Figs 38A, B) are close to those of *E. anastera* (Figs 35A, B) by the palp with conductor with apical “white boss”. At the same time, can be distinguished by the terminal apophysis with a tip larger than its neck in *E. rosae* (Fig. 38A) (*vs.* linear terminal apophysis in *E. anastera*, Fig. 35A). Additionally, *E. rosae* (Figs

38C–E) has an epigynum with an elongated and wrinkled scapus, similar to those of the *E. anastera* (Figs 35C–E). Yet, they can be separated from each other by the folded lateral plates on *E. rosae* (posterior view, Fig. 38D, arrow) (*vs.* not folded in *E. anastera*, Fig. 35D).

Description. *Male* (AMNH). Carapace brownish orange, covered with white setae, muscle lateral strip between carapace and legs black (Fig. 38F). MPE with dark borders. Sternum pale yellow with gray border, anterior suture apparent. Abdomen subtriangular, longer than wide, with two terminal tubercles; dorsum pale yellow with dark gray folium (Fig. 3F). Ventral surface discolored with faint white pigment (median white patch inconspicuous). Spinneret surrounded by black ring. Legs brownish orange banded. Total length 5.60. Carapace length 2.80, width 2.47. Leg formula 1243. Leg I missing. Patella+tibia II 4.35; III 2.01; IV 3.08.

*Female* (AMNH). Carapace as male (Figs 38G, H). Posterior median eyes with black borders. Sternum pale yellow with gray border. Abdomen subtriangular with one dorsal tubercle and two posteriors; dorsum pale yellow with dusk marks and greenish folium yellow, with dark gray band that extends vertically through abdomen, and partial folium (Figs 38G, I). Venter pale-yellow, with gray band from the epigastric furrow to spinnerets and white pigment. Spinneret and legs as male. Total length 4.37. Carapace length 1.74, width 1.58. Leg formula 1243. Length leg I: femur 3.84; patella+tibia 4.80; metatarsus 2.77; tarsus 1.16; total 12.56. Patella+tibia II 3.96; III 2.19; IV 3.41.

Variation. Males and females may have the dorsum of the abdomen with a longitudinal dark brown band. Front of carapace dark brown.

Distribution. United States of America: Florida, California.

*Eustala banksi* Chickering, 1955

Figs 22A–C

*Eustala banksi* Chickering, 1955: 417, figures 30–34. Male paratype from Turrialba, Costa Rica [09°54'24"N, 83°40'48"W], J.F. Tristan, (MCZ 24513, Nathan Banks collection, examined, damaged). WSC 2017.

Additional material examined. COSTA RICA, *Santa Clara*: (Humburg Farm) 10°21'43"N, 84°30'51"W, 2 #m, VII.1931, Nevermann (NHMW).

Diagnosis. Chickering (1955) confessed that he and other researchers had erroneously determinate specimens of *E. banksi* (Figs 22A, B) as *E. bifida* (Figs 33A, B). Both species present a similar embolus, with a projected median portion, yet they can be distinguished from one another by the straight terminal apophysis (mesal view, Fig. 22A) and by the “S”-shaped conductor (ventral view, Fig. 22B) in *E. banksi* (vs. sinuous terminal apophysis and conductor bulged in *E. bifida*, Figs 33A, B).

Description. *Male* (NHMW). Carapace yellow, with white pigment in the cephalic area. MOA with conical projection; MPE with dark borders. Sternum pale yellow. Abdomen oval longer than wide, dorsum whitish with brown folium and a partial longitudinal white band (Fig. 22C). Venter decolorated with faint vestigial white median patch Total length 6.45. Carapace length 3.40, width 2.95. Leg formula 1243. Length leg I: femur 3.50; patella+tibia 3.65; metatarsus 3.35; tarsus 1.20; total 11.70. Patella+tibia II 3.65; III 1.85; IV 3.55.

Variation. Male (n=2): carapace length 3.35–3.40, width 2.95–3.05. Abdomen may be subtriangular, longer then wide, dorsum decolorated with faint folium

Distribution. Costa Rica: Santa Clara, Turrialba.

***Eustala trinitatis* (Hogg, 1918)**

Figs 27D–F, I

*Araneus trinitatis* Hogg, 1918: 166, figure 1. Female holotype from “South Trinidad”, Trinidad Island, Espírito Santo, Brazil [20°31'29"S, 29°19'29"W]. Three females and one male paratypes, same data as holotype (museum unknown, apparently lost).

*Eustala trinitatis*; Levi 1991: 178; WSC 2017.

Additional material examined. BRAZIL, *Espírito Santo*: Trinidad Island (Praia dos Portugueses), 20°30'29"S, 29°19'51"W, 6 #f, and many males and females juveniles, M.R. da Costa, IV–V.1992 (MCTP 1674); 1 #f, XI.1995, D. Lewis (MCTP 7599).

Diagnosis. Females of *Eustala trinitatis* (Figs 27D–F) resemble those of *E. rosae* (Figs 38C–E) by the wrinkled scapus and the lateral plates folded (posterior view). It differs from this species by the tip of the scapus projected forward (lateral view, Fig. 27F) and by the smooth median plate in *E. trinitatis* (ventral view, Fig. 27D) (*vs.* scapus not projected and wrinkled median plate in *E. rosae*, Figs 38C, E).

Description. *Female* (MCTP 1674). Carapace orange. PME with black borders. Sternum yellow with gray border and white pigment. Abdomen subtriangular, longer than wide, with two terminal projections. Dorsum pale yellow, dusk dark gray pigment, and partial folium (Fig. 27I). Venter with well-defined dark gray band from epigastric furrow to spinnerets and faint median white patch. Legs pale yellow. Total length 10.35. Carapace length 3.95, width 3.35. Leg formula 1243. Length leg I: femur 5.25; patella+tibia 6.50; metatarsus 4.80; tarsus 1.10; total 17.65. Patella+tibia II 6.10; III 3.00; IV 5.10.

*Male*. Unknown.

Distribution. Brazil: Espírito Santo.

### ***Eustala cuia* Poeta, 2014**

*Eustala cuia* Poeta, 2014: 450, figures 47–55. Male holotype from Lagoa do Capivari, Capivari do Sul, Rio Grande do Sul, Brazil [22°59'49"S, 47°30'46"W], 20.V.2004, Equipe Probio (MCN 37373). Male paratype from Raiz da Serra, Cubatão, São Paulo, Brazil [23°50'03"S, 46°22'36"W], Biugo (MZSP 8054); male and female paratypes from Hortobotânico Irmão Teodoro Luis, Capão do Leão, Rio Grande do Sul, Brazil [31°50'12"S 52°34'28"W], 25.V.2001, E.N.L. Rodrigues (MCN 49062); male paratype from Reserva Biológica do Lami, Porto Alegre, Rio Grande do Sul, Brazil [30°13'16"S 51°05'39"W], 19.X.2001, E.L.C. Silva & C.E. Ferro (MCN 37721).

Diagnosis and descriptions. See Poeta (2014).

**Distribution.** Brazil: São Paulo and Rio Grande do Sul (See Poeta 2014, Figure 86).

### ***Eustala ulecebrosa* (Keyserling, 1892)**

*Epeira ulecebrosa* Keyserling 1892: 104, est. 5, figures 77 and 77a, female holotype from Taquara, Rio Grande do Sul, Brazil [29°39'03"S, 50°46'32"W], H. von Ihering, deposited in The Natural History Museum, London (NHM). (not examined, probably lost).

*Araneus ulecebrosus*; Petrunkevitch 1911: 321.

*Eustala ulecebrosa*; Mello-Leitão 1919: 470; Roewer 1942: 766; Mello-Leitão 1943: 179; 1947: 243; Bonnet 1956: 1842; Levi 2007; Buckup et al. 2010: 489; Poeta 2014; WSC 2017.



Diagnosis and descriptions. See Poeta (2014).

**Distribution.** Brazil: Paraná and Rio Grande do Sul (See Poeta 2014, Figure 87).

*Eustala tribrachiata* Badcock, 1932

Figs 7D–F, H, I

*Eustala tribrachiata* Badcock, 1932: 20, figure 15. Female holotype from Nanawa, Paraguay [25°17'43"S 57°41'00"W], Carter, III.1927 (NHM, examined). Roewer 1942: 766; WSC 2017.

Additional material examined. PARAGUAY, *Puerto Foncière* (“Territ. Foncière”), 22°29'12"S, 57°50'17"W: 1 #f, 1930, Raimoser (NHMW, det. as *E. tridentata*). BRAZIL, *Paraná*: Bituruna, 26°09'30"S, 51°33'17"W, 1 #f, 1935, Stawiarski (MNRJ 6492a). *Rio Grande do Sul*: São Borja (Reserva Biológica São Donato), 29°13'14"S, 57°26'16"W: 3 #f, 2013, M. Machado (MCTP 37043).

Diagnosis. Females of *Eustala tribrachiata* (Figs 7D–F) present distinct genitalia, based on the well developed and sclerotized scapus basis, which arises laterally, and projects forward, covering most of the lateral plates (Fig. 7D–F).

Description. *Female* (MCTP 37043). Carapace pale yellow with dark brown bands and many white setae. PME and LE with black borders. MOA with median cone-shaped projection. Sternum brownish with brown border and white pigment. Abdomen subtriangular, with shoulders, one three terminal tubercles; dorsum dark brown with white white pigment (Figs 7H, I). Venter with defined brown band from epigastric furrow to spinnerets and elongated median white patch. Legs pale yellow with dark brown bands. Total length 10.61. Carapace length 4.09, width 3.14. Leg formula 1243. Length leg I:

femur 3.55; patella+tibia 4.32; metatarsus 2.55; tarsus 1.00; total 11.42. Patella+tibia II 4.20; III 2.50; IV 3.70.

*Male*. Unknown.

Variation. Female (n=2): total length 9.95–10.61; carapace length 3.25–4.09, width 2.95–3.14. Carapace pale orange, with some white pigment, wide thoracic furrow, PME with little black pigment; legs pale orange without bands (NHMW). Abdomen dorsum white, venter discolored with large rounded white patch. Sternum yellow with white pigment. Carapace dark orange with pale yellow bands, abdomen black with white marks (from MCTP).

Distribution. Brazil: Paraná and Rio Grande do Sul. Paraguay: Nanawa, Puerto Foncière (Fig. 41C).

*Eustala mimica* Chickering, 1955

Figs 19D–F

*Eustala mimica* Chickering, 1955: 467, figures 90–93. Male holotype from Barro Colorado Island Panamá, [09°09'07"N, 79°50'47"W], P. Rau (MCZ 22081, examined). Male paratype, same holotype locality (MCZ 24529, examined, poor conditions). WSC 2017.

Additional material examined. VENEZUELA, *Pozon*, 06°02'46"N, 67°24'34"W: 1 #m, Wiedenmeyer leb (NMB 24350, det. as *E. vegeta*).

Diagnosis. Males of *Eustala mimica* (Figs 19D, E) are similar to *E. bifida* (Figs 33A, B) by the conductor with longitudinal section, forming an apical concavity. They are easily separated from each other by the bubble-shaped subterminal apophysis with a basal

constriction in *E. mimica* (Fig. 19D).

Description. *Male* (NMB 24350). Carapace orange, with pair of brown dots on cephalic area and transversal line of dots on thoracic area. PME eyes with black borders. Sternum yellow. Abdomen oval, longer than wide, with two apical tubercle tubercles. Venter discolored with dark brown band from epigastric furrow to spinnerets, and central decolorated rounded area (Fig. 19F). Legs pale yellow with some light brown bands. Femura III, IV with two rows of stout setae. Total length 7.8. Carapace length 4.00, width 3.30. Leg I: missing. Patella+tibia II 8.03; III patella 3.04; IV articles missing.

Note. This exemplar has a dorsal spine-like projection on the right femur III.

*Female*. Unknown.

Variation. Male (n=3): total length 7.80–8.50; carapace length 4.00–4.50, width 3.30–4.00. Carapace and legs yellow or orange, with no dots on cephalic area; abdomen yellow, and its marks may be greynish. Venter with median circular white patch.

Distribution. Panamá: Barro Colorado Island. Venezuela: Pozon (Fig. 41B).

### ***Eustala clavispina* (O. Pickard-Cambridge, 1889)**

Figs 39A–H

*Epeira clavispina* O. Pickard-Cambridge, 1889: 37, pl. 7, figure 11. Female holotype and paratype from Cubilhuitz, Alta Verapaz, Guatemala [15°40'03"N, 90°25'45"W], Sarg. (NHM, examined); Keyserling 1892: 102, pl. 5, figure 75.

*Amamra nigromaculata* O. Pickard-Cambridge, 1895: 155, pl. 19, figure 5. Female holotype from Teapa, Tebasco, Mexico [17°33'39"N, 92°57'07"W], H.H. Smith (NHM, examined). Synonymized by F. O. Pickard-Cambridge 1904: 509, pl. 48, figure 19.

*Eustala clavispina*; Roewer 1942:764; Chickering 1955: 428, figures 45–48; Levi 1977: 106, figures 159–166, 176, 177; WSC 2017.

Additional material examined. UNITED STATES OF AMERICA, *Texas*: Edinburg, 26°18'06"N, 98°09'48"W, 3 #m, 3 #f, XII.1939, D. & S. Mulaik (AMNH, Levi det. 1975). COSTA RICA, *Santa Clara*: (Hamburg Farm) 21 #f, 1930, Reimoser (NHMW); 2 #f, VII.1931, Nevermann (NHMW). MEXICO, *Tabasco*: Teapa, 17°33'39"N, 92°57'07"W, 2 #f, H.H. Smith (NHM).

Diagnosis. The male palp of *E. clavispina* (Figs 39A, B) resembles those of *E. banksi* (Figs 22A, B) by the “S”-shaped conductor (ventral view). They differ from one another by the embolus without a median projection in *E. clavispina* (mesal view, Fig. 39A) (vs. embolus with median projection in *E. banksi*, Fig. 22A). The epigynum of *E. clavispina* (Figs 39C–E) are similar to the ones of *E. sedula* (Figs 30D–E) by wrinkled scapus, wide, in lateral view. Yet, they can be distinguished from each other by the distance between the copulatory openings, not forming a septum in the median plate in *E. clavispina* (ventral view, Fig. 39C) (vs. median plate with septum in *E. sedula*, Fig. 30D).

Description. *Male* (AMNH). Carapace orange with some white marks, MOA projected and elevated. PME black bordered. Clypeus with “black mask to the LE. Sternum pale yellow with white pigment. Abdomen elongated with terminal projection, dorsum white with dusk green stained, with fainted folium (Fig. 39F). Venter discolored, with wide white central patch. Legs yellow, black and dark-brown ringed. Total length 8.73. Carapace length 4.29, width 3.53. Leg formula 1243. Length leg I: femur 4.15; patella+tibia 5.18; metatarsus 3.68; tarsus 1.20; total 14.21. Patella+tibia II 3.97; III. 2.12; IV 3.66.

*Female* (AMNH). Carapace yellow with white “V”-shaped mark, wide thoracic furrow.

MOA as male. Clypeus mask brown. Sternum and legs colored as male. Abdomen subtriangular longer than wide. Dorsum white with thin longitudinal grey band; three terminal projections (Figs 39G, H). Venter as male. Total length 11.18. Carapace length 4.63, width 3.68. Leg formula 1243. Length leg I: femur 5.50; patella+tibia 6.50; metatarsus 4.20 tarus 1.45; total 17.65. Patella+tibia II 5.85; III 1.80; IV 3.25.

Variation. Female (n=4): total length 7.45–9.75; carapace length 2.20–4.25, width 2.40–3.75. Carapace and legs orange. White marking on the carapace faded or absent.

Distribution. United States of America: Texas. Costa Rica: Santa Clara. Mexico: Tabasco.

*Eustala viridipedata* (Roewer, 1942)

Figs 31A–C, G

*Epeira viridipes* Taczanowski, 1878: 155, pl. 1, figure 8. Female lectotype and two juveniles paralectotypes from Amable Maria, Junin, Peru [11°20'08"N, 75°20'28"W], K. Jelski (MZPW 225791–225793, examined, poor conditions).

*Araneus viridipes*; Petrunkevitch 1911: 324.

*Aranea viridipedata*; Roewer 1942: 856.

*Eustala viridipedata*; Levi 1991: 177; WSC 2017.

Diagnosis. The epigynum of *E. viridipedata* (Figs 31A–C) is similar to those of *E. palmares* by the triangular wrinkled scapus in ventral view (see Poeta, Marques & Buckup. 2010a, figure 16). However, the median plate is not visible in lateral in *E. viridipedata* (Fig. 31C) (vs. projected in *E. palmares*, see Poeta, Marques & Buckup.

2010a, figure 18).

Description. *Female* (MZPW 225791–225793, lectotype). Carapace orange, with many long white setae all over. PME and LE with black border; PME diamond-shaped black borders. Brown mask through LE to AME. Abdomen subtriangular with two apical tubercles, dorsum white with dark-brown marks laterally, and central partial folium (Fig. 31G). Venter pale-yellow and decolored with rounded median white patch. Legs yellow with brow rings (femura almost completely dark brown). Legs orange, banded. Total length: 10.14. Leg formula 1243. Length leg I: femur 4.10; patella+tibia 5.01; metatarsus and tarsus missing. Patella+tibia II 5.00; III 2.70; IV 5.00.

Distribution. Peru: Junin.

### ***Eustala novemmamillata* Mello-Leitão, 1941**

Figs 40A, B

*Eustala 9-mamillata* Mello-Leitão, 1941: 212, figures 16, 17. Female holotype from El Rabón, Santa Fé, Argentina [28°13'38"S, 59°15'46"W], M. Birabém (MCL 15120, examined).

*Eustala novemmamillata*; Brignoli 1983: 270; WSC 2017.

Note. The female holotype was in poor conditions. The epigynum and most of the legs are lost, thus, the measurements presented here are an estimative. Diagnosis was based in Levi (2007) illustrations.

Diagnosis. *Eustala novemmamillata* present the epigynum with a pyramidal ringed scapus (see Levi 2007, figures) similar with *E. taquara* (see Poeta, Marques & Buckup. 2010a, figures 27–28), but they can be separated by the abdomen shape of *E.*

*novemmamillata* which presents many tubercles laterally and posteriorly (vs. absence of lateral tubercles in *E. taquara*).

Description. *Female* (MCL 15120, holotype). Carapace pale yellow, damage. Sternum pale yellow, with a cone-shaped projection in the MOA (Figs 40A, B). Abdomen elongated, dorsum whitish, with shoulders and many lateral small tubercles; one dorsal tubercle and two apical ones. Legs pale yellow. Total length 6.93. Carapace length 2.64, width 1.93. Legs damaged.

*Male*. Unknown.

Distribution. Argentina: Salta.

### ***Eustala sedula* Chickering, 1955**

Figs 21D–F, I, J

*Eustala sedula* Chickering, 1955: 500, figures 124–126. Female holotype from Barro Colorado Island Panamá [09°09'07"N, 79°50'47"W], A.M. Chickering (MCZ 23031, examined). Female paratype from Chichen-Itzá, Yucatan, Mexico [20°40'55"N, 88°33'54"W], VI.1948, Goodnight (AMNH, examined). WSC 2017.

Diagnosis. *Eustala sedula* (Figs 30D–F) presents the epigynum similar to those of *E. lata*, by the wrinkled scapus, wide in lateral view (Fig. 34A, C). However, this species may be separated from one another by the deep copulatory openings, forming a narrow septum in *E. sedula* (Fig. 30D) (vs. copulatory openings not forming a septum in *E. lata*, Fig. 36A).

Description. *Female* (AMNH, paratype). Carapace yellow with white “V”-shaped mark,

with white setae (Fig. 30I). PME with black borders. MOA elevated and projected, with median cone-shaped projection. Sternum pale yellow with white pigment. Abdomen subtriangular, with anterior invagination, lateral humps and two terminal projections, dorsum white, with faint longitudinal grey band (Fig. 30I). Venter discolored with white pigment laterally and elongated median white patch. Legs yellow with dark brown bands. Total length 7.88, carapace length 4.05, width 3.42. Leg formula 1243. Length leg I: femur 3.52; patella+tibia 4.52; metatarsus 2.66; tarsus 1.17; total 11.87. Patella+ tibia II 4.06; III 2.10; IV 3.38.

*Male.* Unknown.

*Distribution.* Mexico: Yucatan. Panamá: Barro Colorado.

#### ***Eustala eldorado* Poeta, 2014**

*Eustala eldorado* Poeta, 2014: 452, figures 65–68. Male holotype from, Fazenda São José, Eldorado do Sul, Rio Grande do Sul, Brazil [29°59'50"S 51°18'29"W], 12.X.1998, L. Moura (MCN 29742). Male paratype from Cachoeira do Sul, Rio Grande do Sul, Brazil [29°53'S, 52°55'W], 02.XII.1992, R.G. Buss (MCTP 3674).

**Diagnosis and descriptions.** See Poeta (2014).

**Distribution.** Brazil: Rio Grande do Sul (See Poeta 2014, Figure 86).

#### ***Eustala nasuta* Mello-Leitão, 1939**

Figs 40C–H

*Eustala nasuta* Mello-Leitão, 1939: 107, figures 5, 6. Female holotype from Mazaruni Settlement, Mazaruni, Guyana (*Trypoxylon* sp. nest) [06°04'02"N, 59°36'52"W],



17.VIII.1939, Dr. O.W. Richards (NHM, examined). Roewer 1942:766; Poeta, Marques & Buckup. 2010b: 273, figures 32, 33.

*Eustala tumida* Chickering, 1955: 508, figures 131–132. Female holotype from Summit, Canal Zone, Panamá [09°03'54"N, 79°38'43"W], VIII.1950 (MCZ 23372, examined). Synonymized by Levi & Santos 2013: 222.

Note. *Eustala tumida* and *E. nasuta* present a significant size difference (*E. tumida* is much smaller), but the features but features from genitalia and cephalothorax are similar. Additional material examined. COSTA RICA, *Santa Clara*: 10°21'43"N, 84°30'51"W: (Humburg Farm), 1 #f, 1930, Reimoser (NHMW).

Diagnosis and Descriptions. See Poeta, Marques & Buckup. (2010b).

Distribution. Costa Rica: Santa Clara. Guyana. Brazil: Pará, Goiás, Bahia, Mato Grosso do Sul (Fig. 41A).

#### ***Eustala perfida* Mello-Leitão, 1947**

*Eustala perfida* Mello-Leitão, 1947b: 243, figure 11. Female holotype from Volta Grande, Paraná, Brazil [25°15'00"S, 49°05'00"W], B. Hertel (MHNCI 2495, not found). Poeta, Marques & Buckup, 2010b: 271, figures 22–26. WSC 2017.

**Diagnosis and description.** See Poeta, Marques & Buckup (2010b).

**Distribution.** Brazil: Rio de Janeiro, São Paulo, Paraná (type-locality, Mello-Leitao 1947), Santa Catarina, and Rio Grande do Sul (Poeta et al. 2010b). Uruguay: Ciudad de Minas (See Poeta 2014, Figure 90).

#### ***Eustala itapocuensis* Strand, 1916**

*Eustala itapocuensis* Strand, 1916b: 107. Male holotype from Joinville, Santa Catarina, Brazil (SMF, not examined). Poeta, Marques & Buckup, 2010b: 270, figures 16–21.

**Diagnosis and description.** See Poeta, Marques & Buckup, 2010b.

**Distribution.** Brazil: Paraná, Santa Catarina, and Rio Grande do Sul (See Poeta 2014, Figure 87).

***Eustala semifoliata* (O. Pickard-Cambridge)**

Figs 34D–F, H, I

*Epeira semifoliata* O. Pickard-Cambridge, 1899: 301, plate 36, figure 3. Female holotype and juvenile from Costa Rica [09°44'56"N, 83°45'12"W], Sarg. (NHM, examined, damaged).

*Eustala semifoliata*; F. O. Pickard-Cambridge 1904: 510, plate 48, figure 21; Roewer 1942:765; Chickering 1955: 502, figure 127; WSC 2017.

Note. According to Chickering (1955) the holotype material is from Panamá (not Costa Rica). Thus, we believe that this might be a *lapsus* or he may have examined a different material at the time.

Additional material examined. PANAMÁ, *Barro Colorado Island*, 09°09'07"N, 79°50'47"W: 1 #f, 1928, A.M. Chickering (AMNH). GUATEMALA, 15°47'00"N, 90°13'50"W: 1 #f, Sarg. (NHM).

Diagnosis. Females of *E. semifoliata* (Figs 34D–F) have an epigynum similar to those of *E. rosae* (Figs 38C–E) by the long and wrinkled scapus and by the wrinkled median plate. However, *E. semifoliata* can be distinguished by the parallel inner borders of the lateral plates, in posterior view (Fig. 34D) (*vs.* “V”-like in *E. rosae*, Fig. 38D).

Description. *Female* (AMNH). Carapace orange-yellowish heavily covered by white hair, and some white pigment. MOA elevated and projected, high clypeus (Fig. 34H, I). Cone-shaped projection between the MOA, PME black bordered. Chelicerae pale with strong sclerotized median part. Sternum dark brown almost completely covered by white pigment. Abdomen subtriangular, with shoulders, as long as wide; dorsum whitish (Fig. 36H). Venter dark brown with two white rounded patches. Legs yellow, brown ringed. Total length 11.17, carapace length 4.65, width 4.03. Leg formula 1243. Length leg I: femur 5.04; patella+tibia 5.93; metatarsus 3.90; tarsus 1.40; total 16.26. Patella+tibia II 4.38; III 3.09; IV 5.68.

*Male*. Unknown.

Distribution. Costa Rica. Panamá: Barro Colorado Island. Guatemala.

Other synonymies

***Metazygia isabelae* Levi, 1995**

*Metazygia isabelae* Levi 1995, 96, figures 91–93. Male holotype from Santa Isabel do Morro, Ilha do Bananal, Tocantins, Brazil [11°34'36"S, 50°39'33"W], VI. 1961, M. Alvarenga (AMNH, not examined)

*Metazygia chenevo* Levi, 1995, 110, f. 177-180. Female holotype from Finca Chenevo, El Porvenir, Meta, Colombia [03°16'19"S, 73°05'15"W], 1978 (MCZ, not examined). **Syn. nov.**

Note. Synonymy based on several ordinary material, whose males and females were collected together and, therefore, being considered as conspecifics.

Additional material examined.

## Acknowledgement

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## Figures



FIGURES 1A–H. *Eustala fuscovittata* (Keyserling, 1864). A–C, Male palp (A, mesal; B, ventral; C, superior). G, Male habitus, dorsal. D–F, Epigynum (D, ventral; E, posterior; F, lateral). H, Female habitus, dorsal. Abbreviations: A, Terminal apophysis; C, Conductor; E, Embolus; LP, Lateral plate; M, Median apophysis; MP, Median plate; p, Paracymbium; r, Radix; S, Subterminal apophysis; Sc, Scapus; st, Stipes; T, Tegulum; Y, Cymbium.



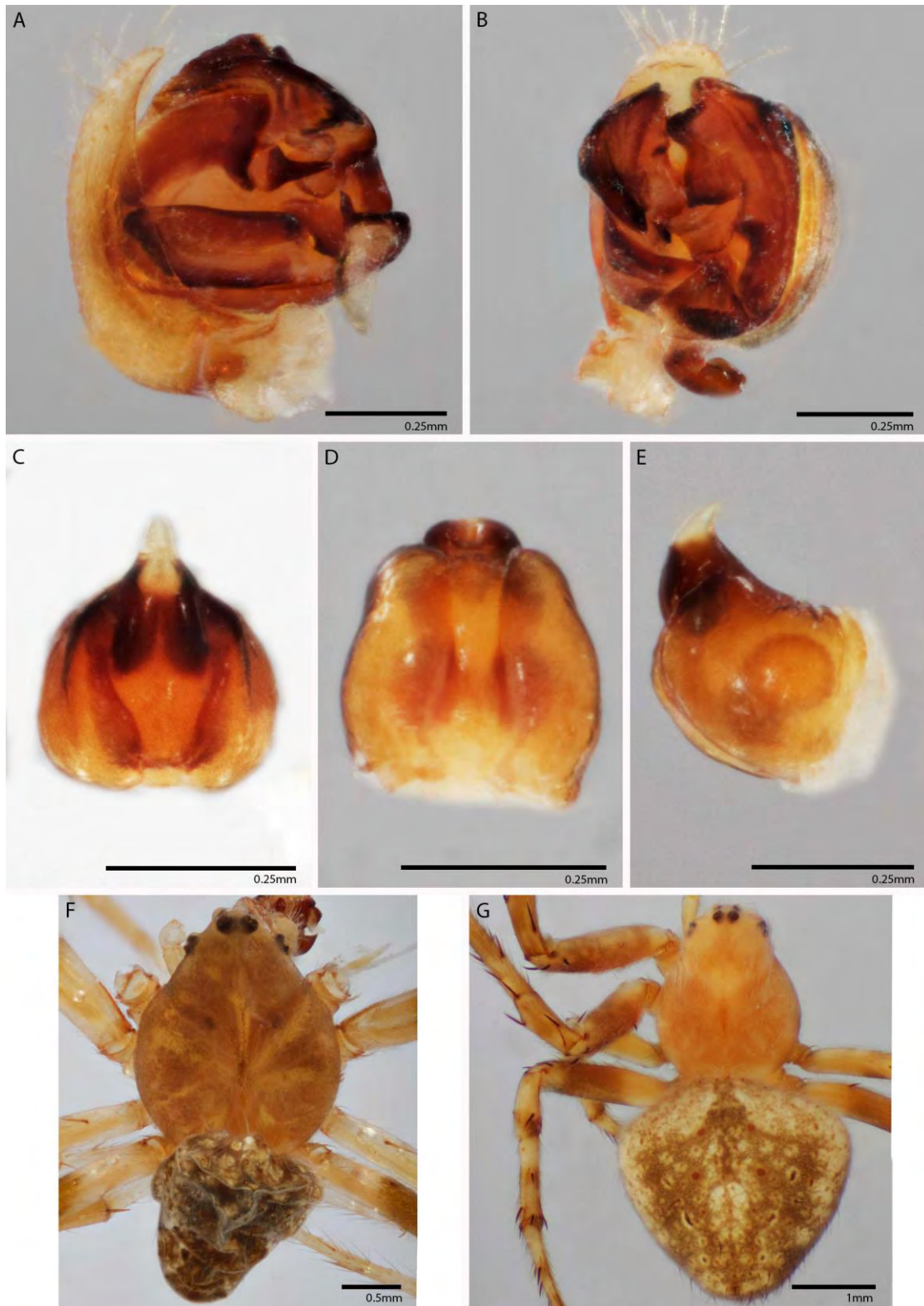
FIGURES 2A–G. *Eustala oblonga* Chickering, 1955. A, B, Male palp (A, mesal; B, ventral). F, Male habitus, dorsal. C–E, Epigynum (C, ventral; D, posterior; E, lateral). G, Female habitus, dorsal.



FIGURES 3A–G. *Eustala saga* (Keyserling, 1893). A, B, Male palp (A, mesal; B, ventral). F, Male habitus, dorsal. C–E, Epigynum (C, ventral; D, posterior; E, lateral). G, Female habitus, dorsal.



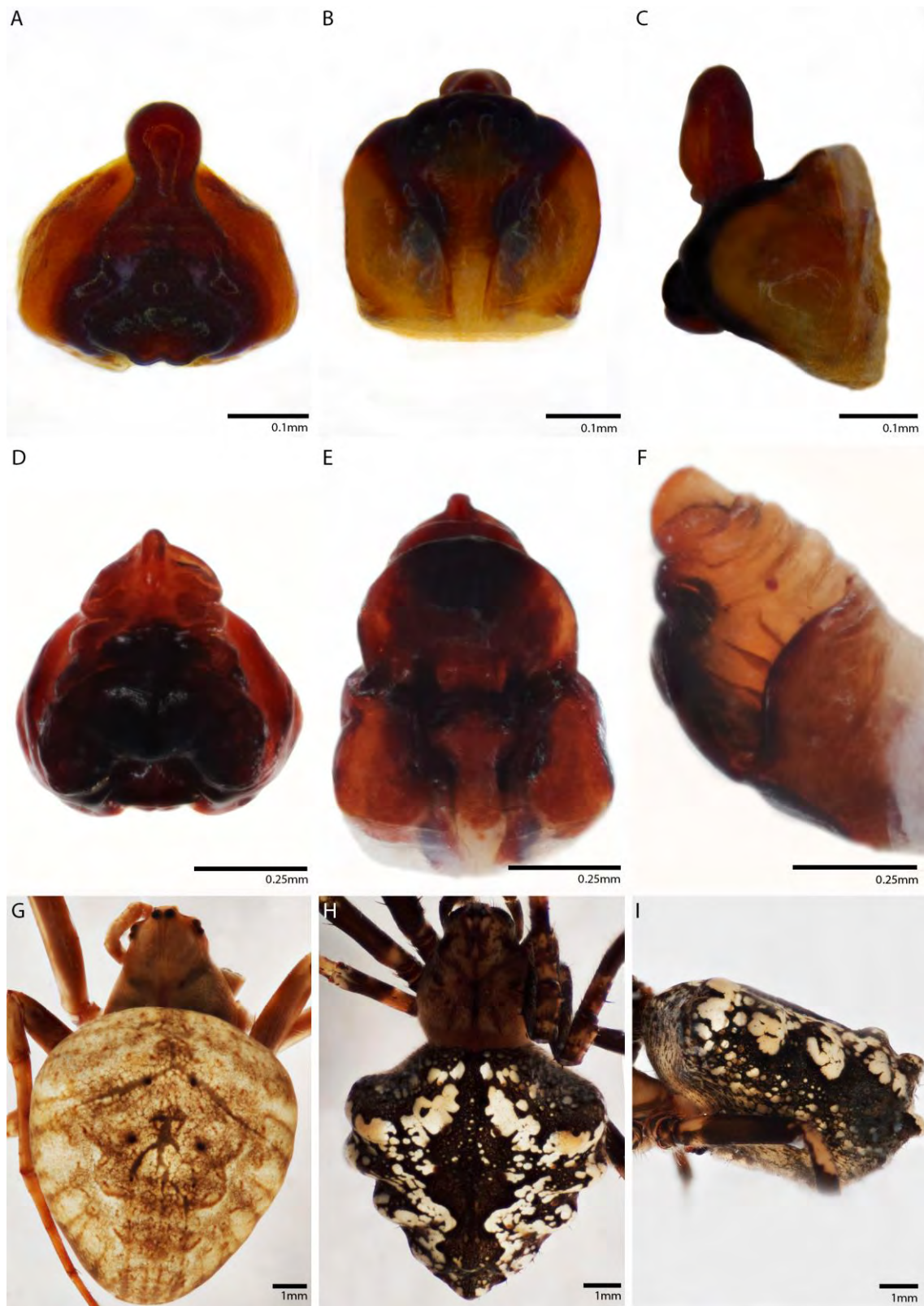
FIGURES 4A–G. *Eustala sagana* (Keyserling, 1893). A, B, Male palp (A, mesal; B, ventral). F, Male habitus, dorsal. C–E, Epigynum (C, ventral; D, posterior; E, lateral). G, Female habitus, dorsal.



FIGURES 5A–G. *Eustala unimaculata* Franganillo, 1930. A, B, Male palp (A, mesal; B, ventral). F, Male habitus, dorsal. C–E, Epigynum (C, ventral; D, posterior; E, lateral). G, Female habitus, dorsal.

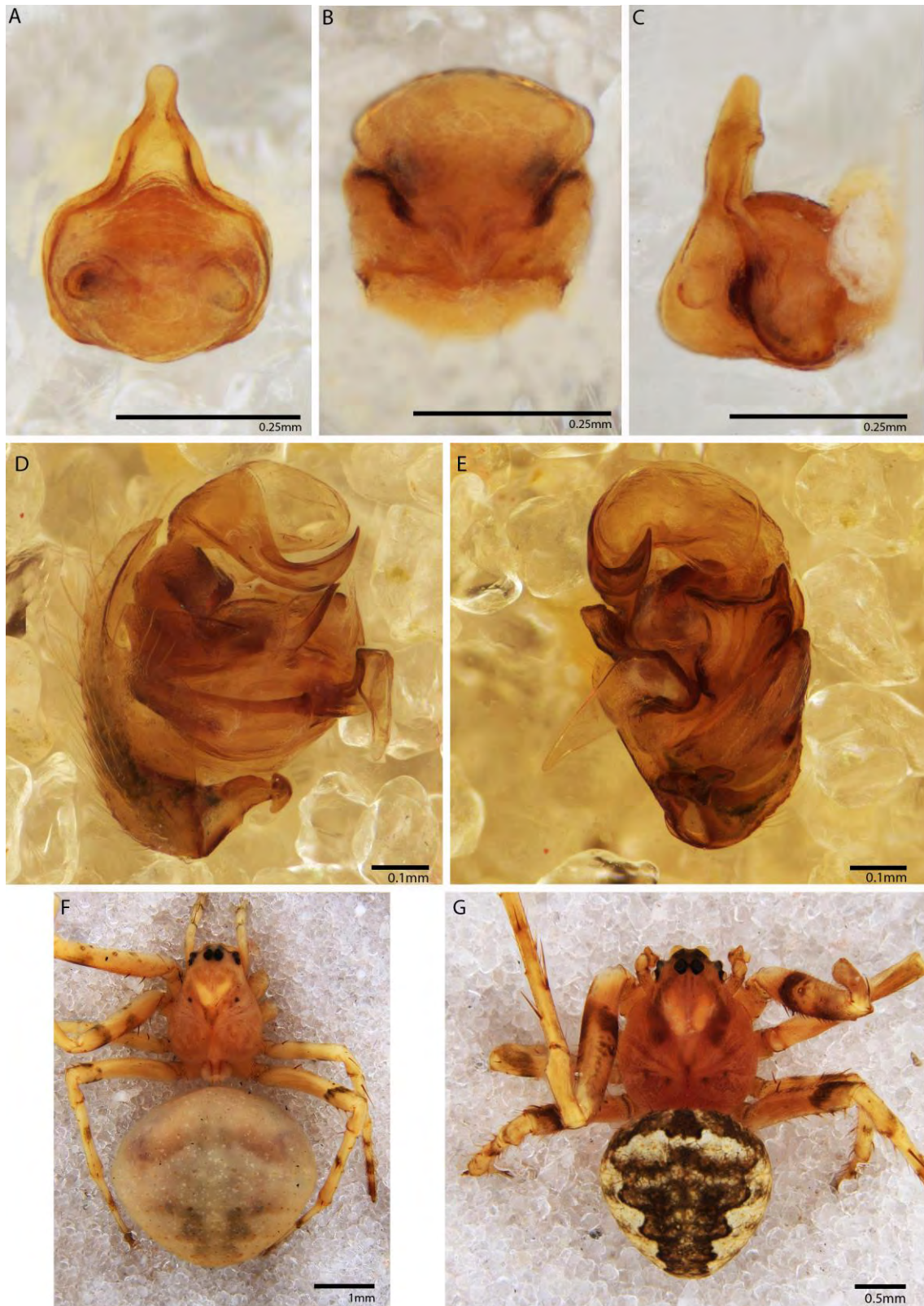


FIGURES 6A–H. *Eustala cazieri* Levi, 1977. A, B, Male palp (A, mesal; B, ventral). G, Male habitus, dorsal. C–F, Epigynum (C, D, ventral; E, posterior; F, lateral). H, Female habitus, dorsal.



FIGURES 7A–I. *Eustala latebricola* (O. Pickard-Cambridge, 1889). A–C, Epigynum (A, ventral; B, posterior; C, lateral). G, Female habitus, dorsal. *Eustala tribrachiata* Badcock, 1932. D–F, Epigynum (D, ventral; E, posterior; F, lateral). H, Female habitus, dorsal; I, abdomen, lateral.

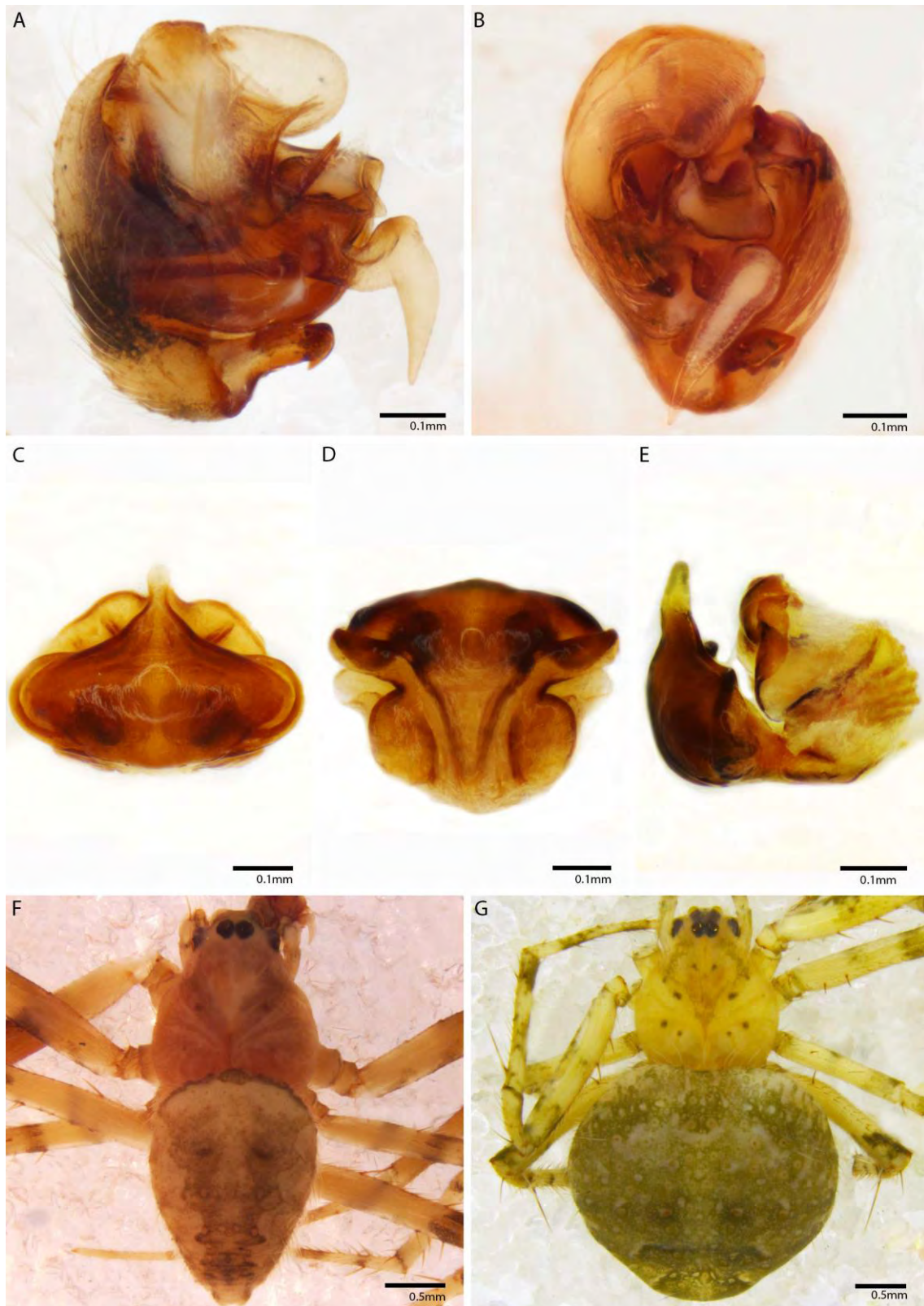




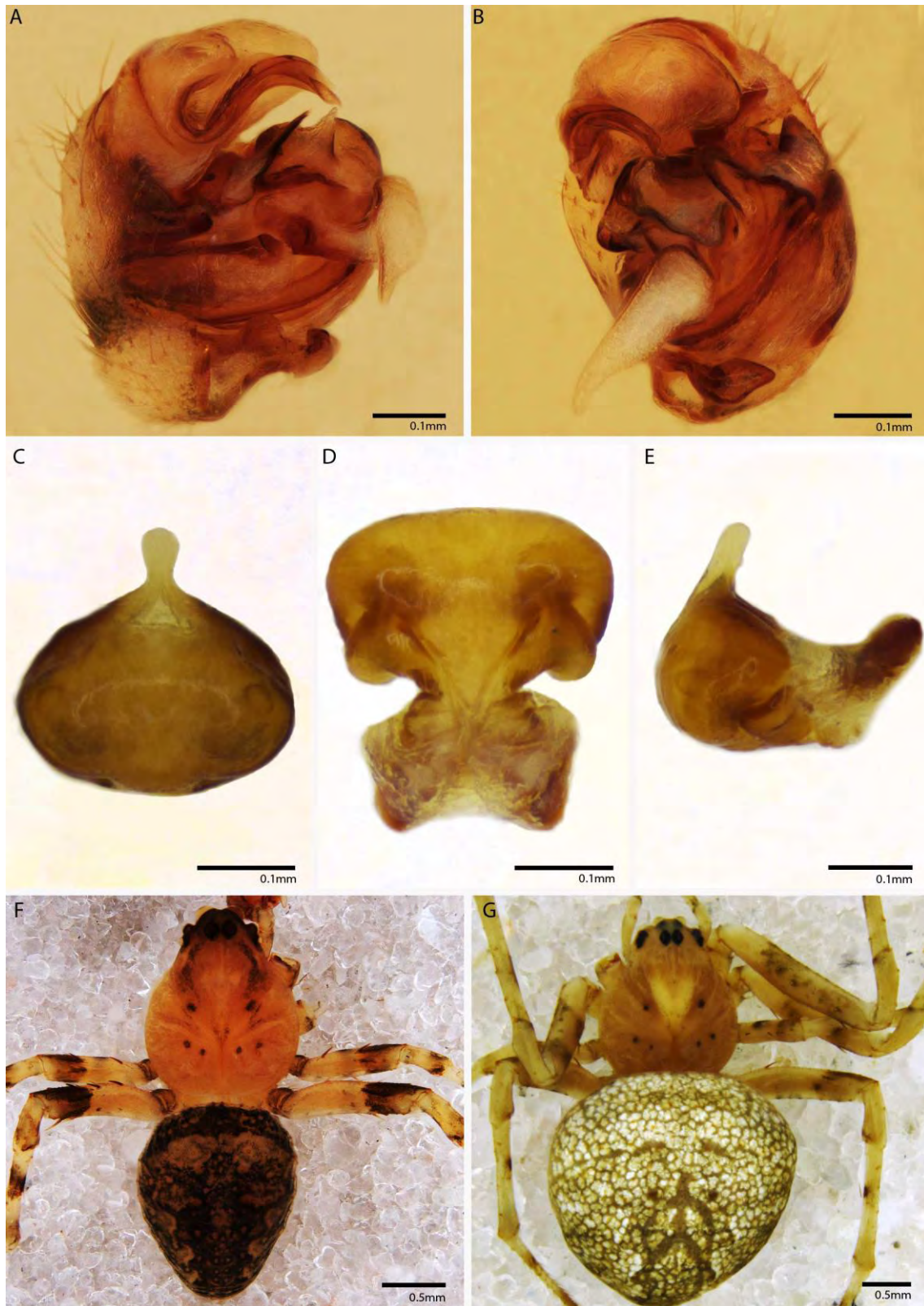
FIGURES 8A–G. *Eustala innoxia* Chickering, 1955. A–C, Epigynum (A, ventral; B, posterior; C, lateral). F, Female habitus, dorsal. *Eustala exigua* Chickering, 1955. D, E, Male palp (D, mesal; E, ventral). G, Male habitus, dorsal.



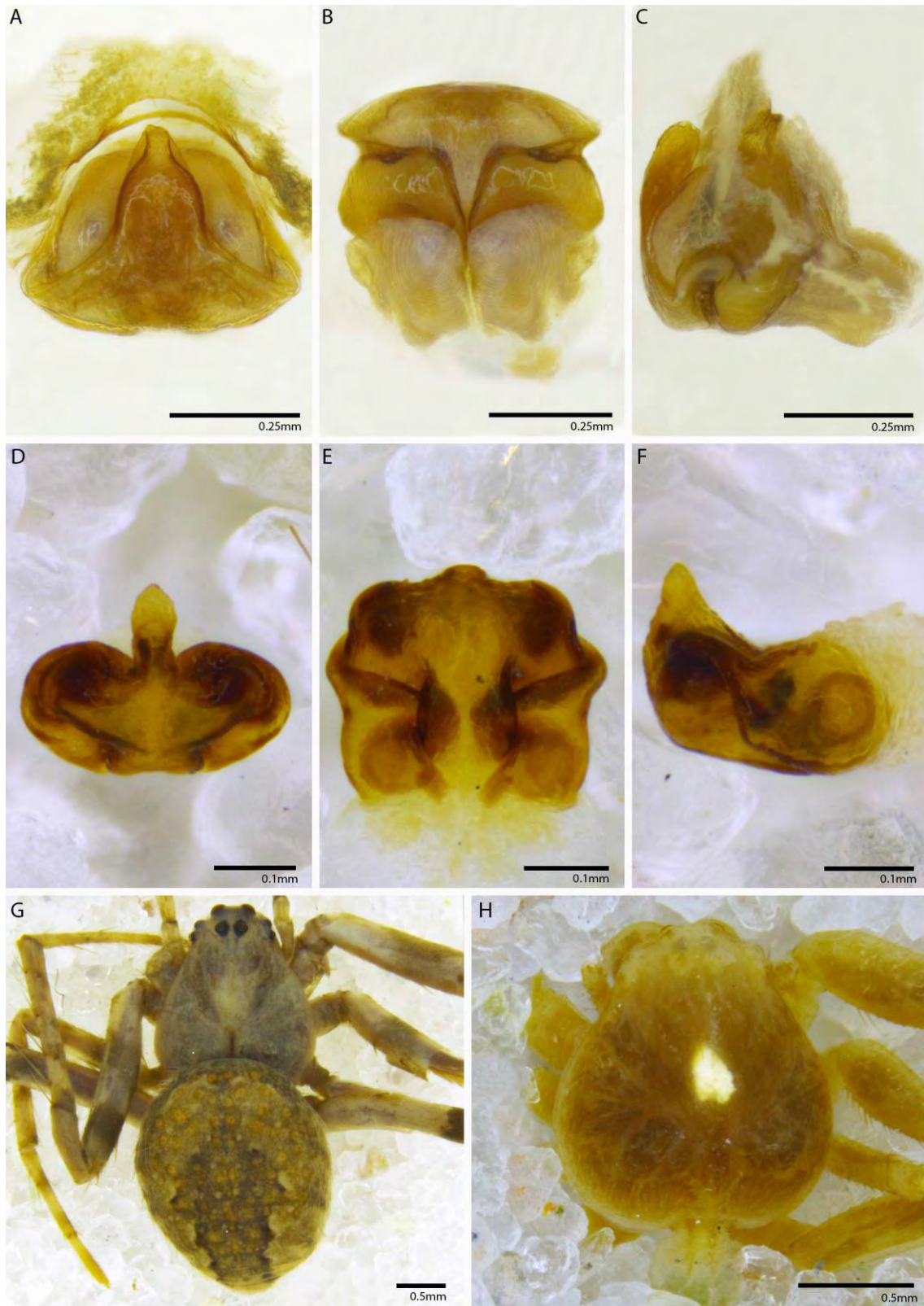
FIGURES 9A–G. *Eustala devia* (Gertsch & Mulaik, 1936). A, B, Male palp (A, mesal; B, ventral). F, Male habitus, dorsal. C–E, Epigynum (C, ventral; D, posterior; E, lateral). G, Female habitus, dorsal.



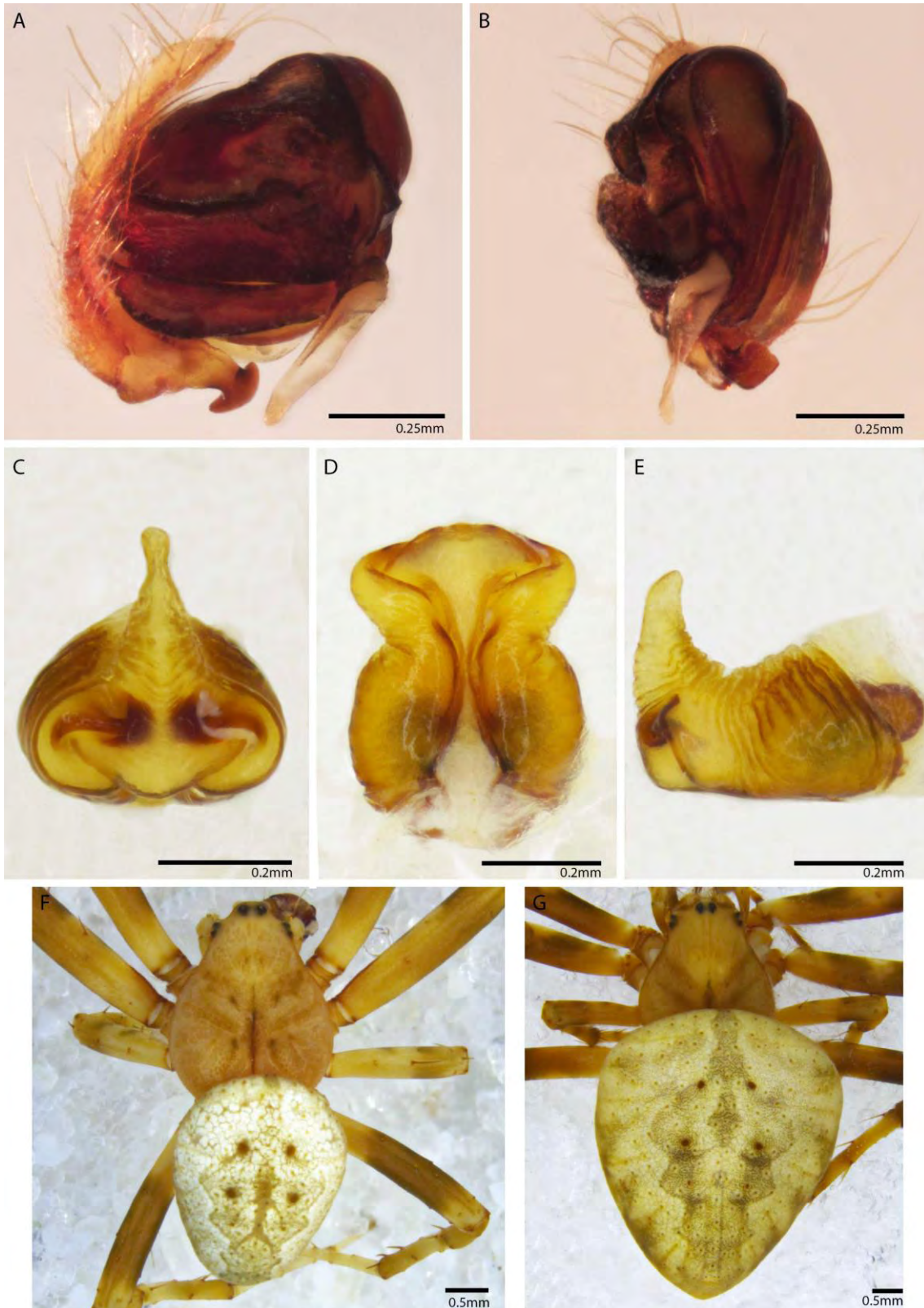
FIGURES 10A–G. *Eustala tantula* Chickering, 1955. A, B, Male palp (A, mesal; B, ventral). F, Male habitus, dorsal. C–E, Epigynum (C, ventral; D, posterior; E, lateral). G, Female habitus, dorsal.



FIGURES 11A–G. *Eustala perditia* Bryant, 1945. A, B, Male palp (A, mesal; B, ventral). F, Male habitus, dorsal. C–E, Epigynum (C, ventral; D, posterior; E, lateral). G, Female habitus, dorsal.



FIGURES 12A–H. *Eustala rubroguttulata* (Keyserling, 1879). A–C, Epigynum (A, ventral; B, posterior; C, lateral). G, Female habitus, dorsal. *Eustala fragilis* (O. Pickard-Cambridge, 1889). D–F, Epigynum (D, ventral; E, posterior; F, lateral). H, Female carapace, dorsal.



FIGURES 13A–G. *Eustala californiensis* (Keyserling, 1885). A, B, Male palp (A, mesal; B, ventral). F, Male habitus, dorsal. C–E, Epigynum (C, ventral; D, posterior; E, lateral). G, Female habitus, dorsal.



FIGURES 14A–H. *Eustala venusta* Chickering, 1955. A–C, Epigynum (A, ventral; B, posterior; C, lateral). G, Female habitus, dorsal. *Eustala redundans* Chickering, 1955. D–F, Epigynum (D, ventral; E, posterior; F, lateral). G, Female habitus, dorsal.

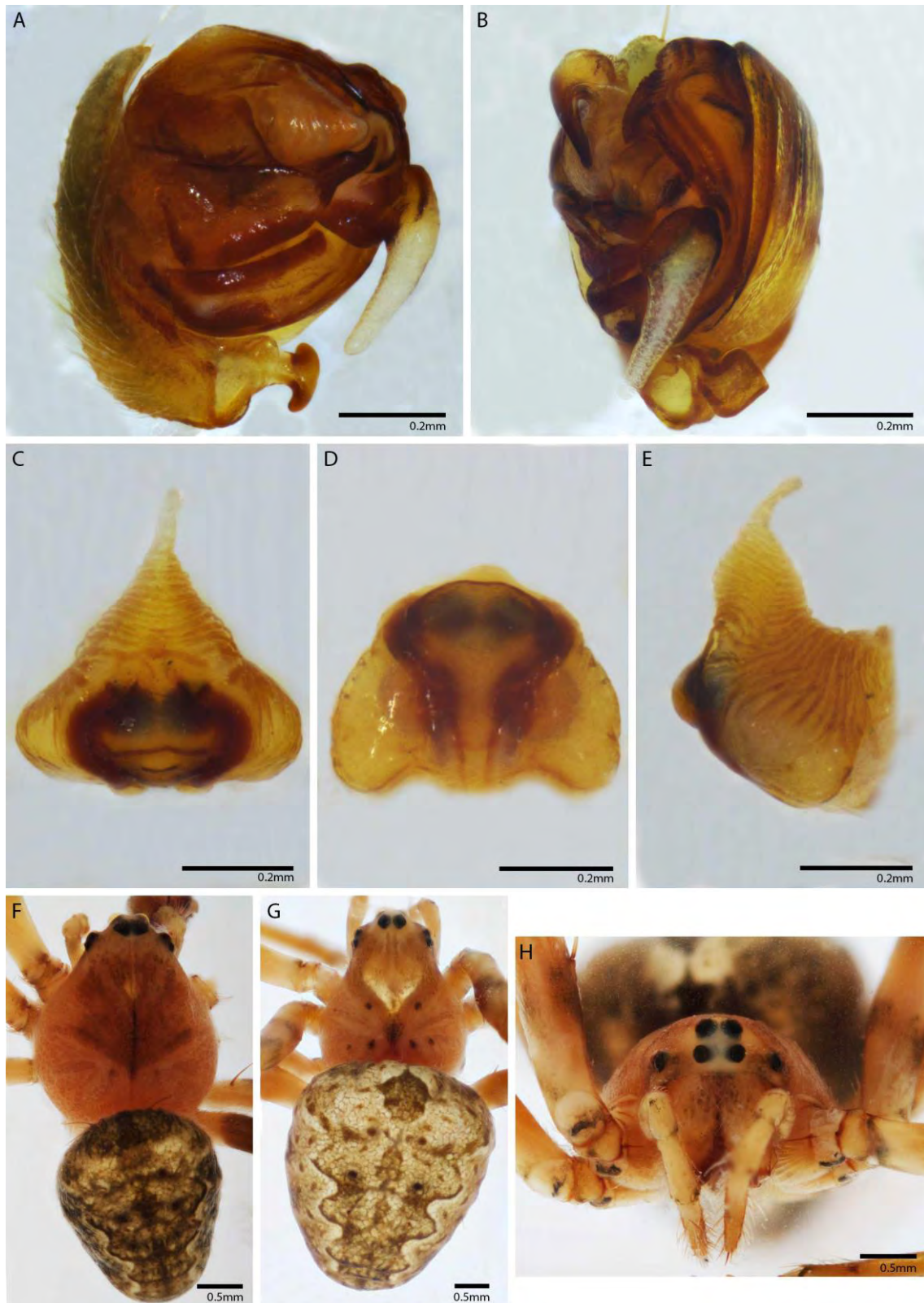


FIGURES 15A–G. *Eustala minuscula* (Keyserling, 1892). A, B, Male palp (A, mesal; B, ventral). F, Male habitus, dorsal. C–E, Epigynum (C, ventral; D, posterior; E, lateral). G, Female habitus, dorsal.





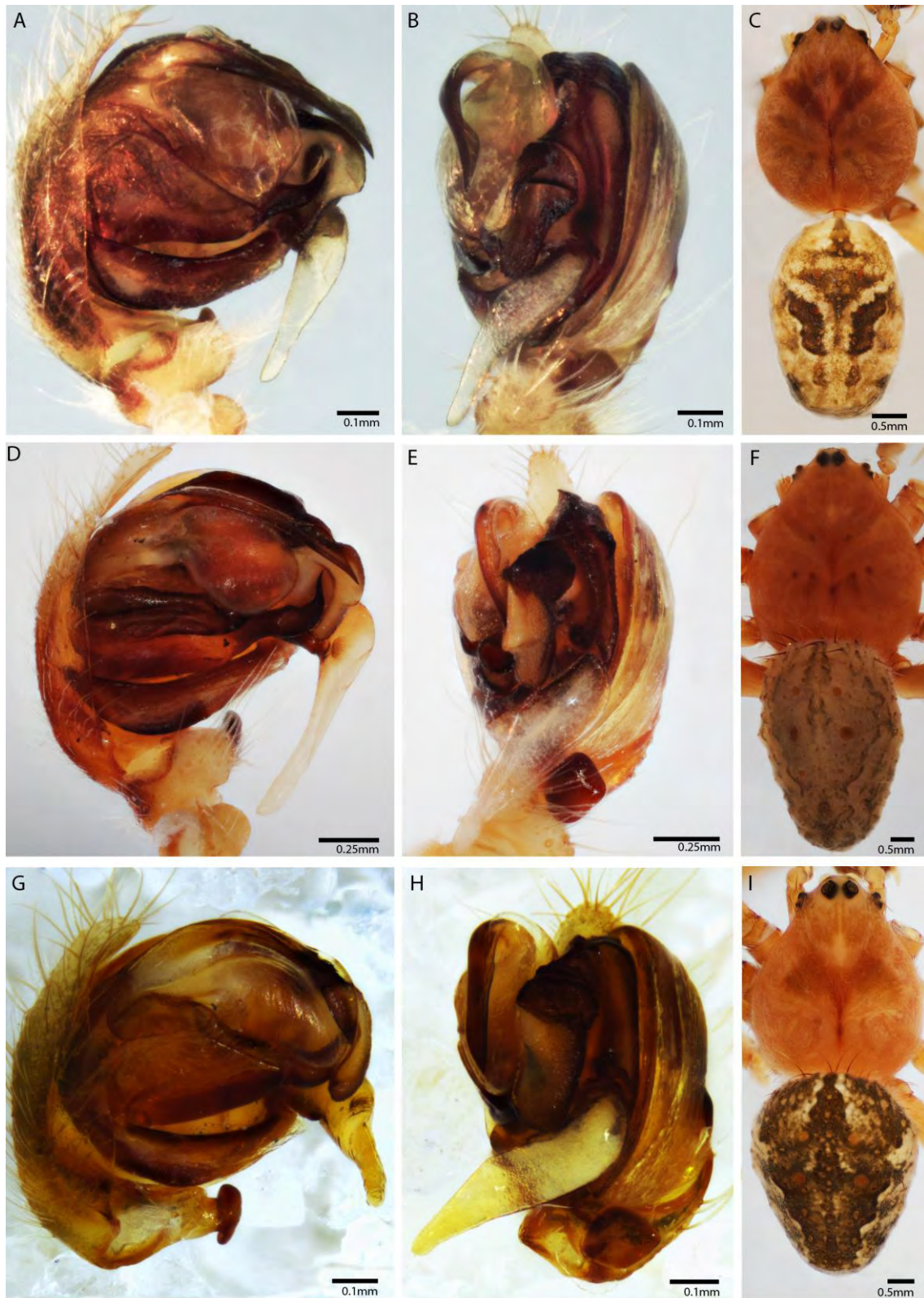
FIGURES 16A–I. *Eustala guianensis* (Taczanowski, 1873). A, B, Male palp (A, mesal; B, ventral). F, Male habitus, dorsal. C–E, Epigynum (C, ventral; D, posterior; E, lateral). G, Female habitus, dorsal; H, carapace, frontal; I, carapace, lateral.



FIGURES 17A–H. *Eustala bucolica* Chickering, 1955. A, B, Male palp (A, mesal; B, ventral). F, Male habitus, dorsal. C–E, Epigynum (C, ventral; D, posterior; E, lateral). F, Female habitus, dorsal; H, carapace, frontal.



FIGURES 18A–I. *Eustala scutigera* (O. Pickard-Cambridge, 1898). A, B, Male palp (A, mesal; B, ventral). G, Male habitus, dorsal. C–F, Epigynum (C, D, ventral; E, posterior; F, lateral). H, Female carapace, dorsal; I, abdomen, dorsal.



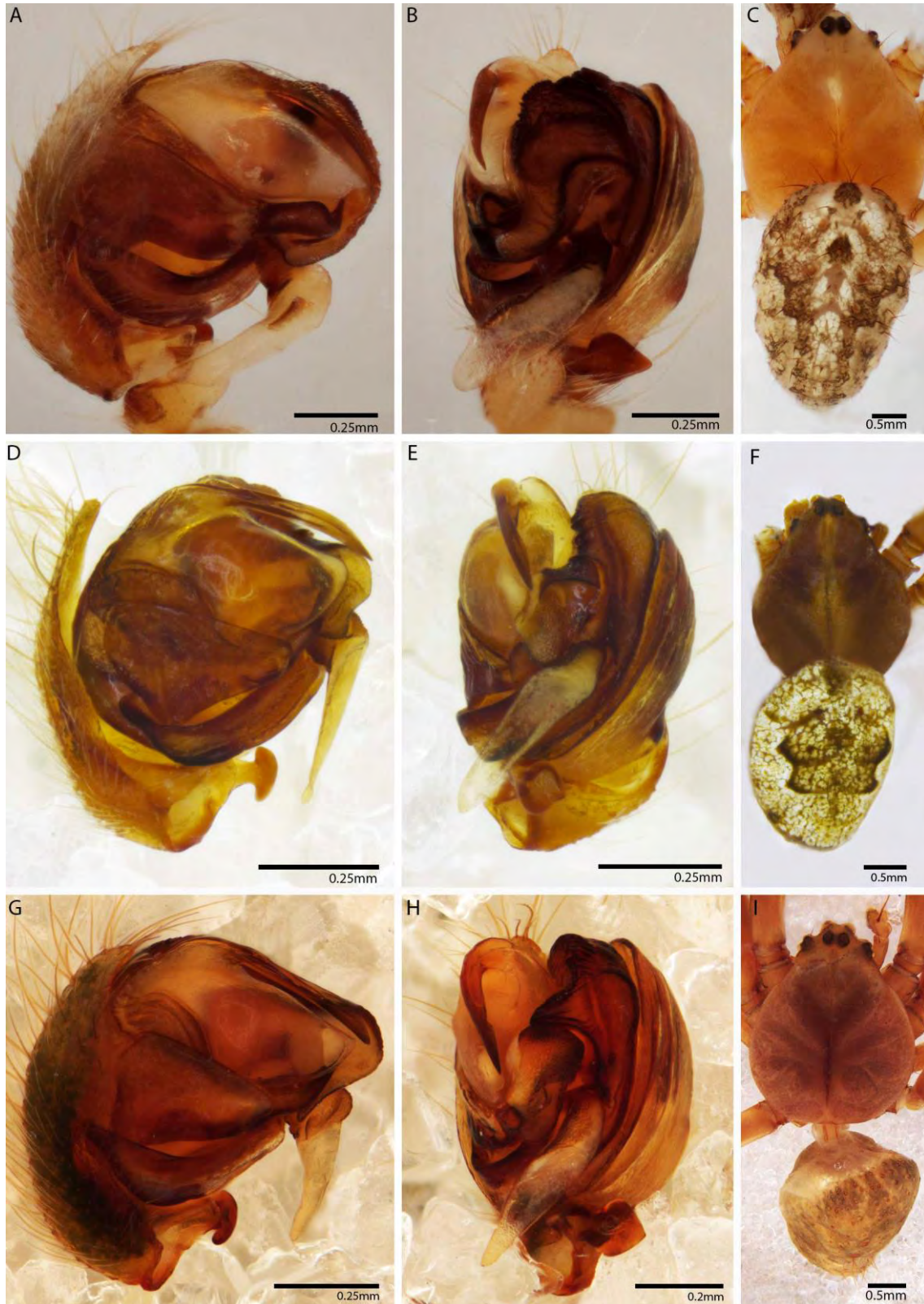
FIGURES 19A–I. *Eustala scitula* Chickering, 1955. A, B, Male palp (A, mesal; B, ventral). C, Male habitus, dorsal. *Eustala mimica* Chickering, 1955. D, E, Male palp (D, mesal; E, ventral). F, Male habitus, dorsal. *Eustala delecta* Chickering, 1955. G, H, Male palp (G, mesal; H, ventral). I, Male habitus, dorsal.



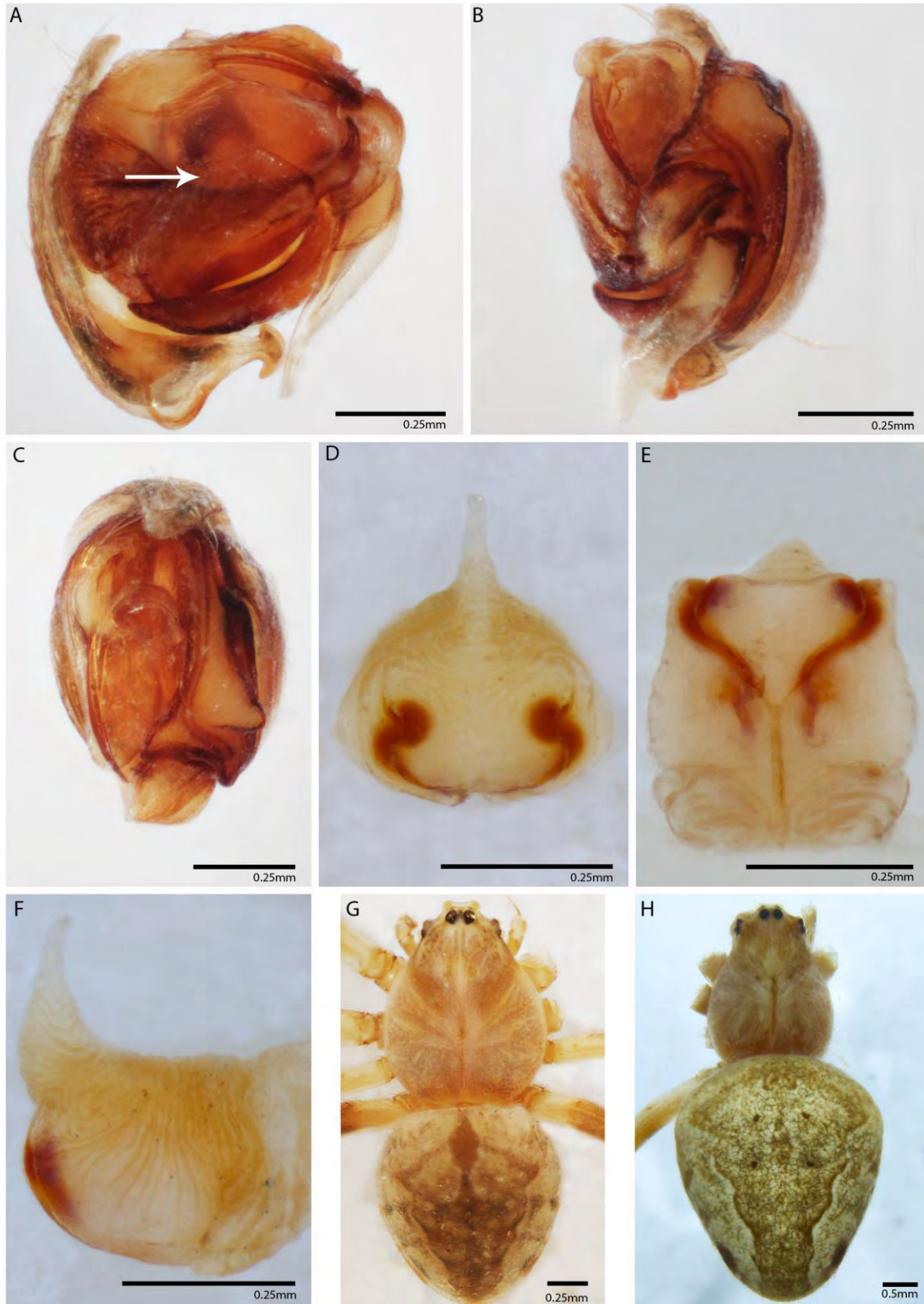
FIGURES 20A–G. *Eustala histrio* Mello-Leitão, 1948. A–C, Epigynum (A, ventral; B, posterior; C, lateral). D, Female carapace, dorsal; E, abdomen, dorsal; F, lateral; G, tibiae II, setae.



FIGURES 21A–G. *Eustala montivaga* Chickering, 1955. A, B, Male palp (A, mesal; B, ventral). F, Male habitus, dorsal. C–E, Epigynum (C, ventral; D, posterior; E, lateral). G, Female habitus, dorsal.



FIGURES 22A–I. *Eustala banksi* Chickering, 1955. A, B, Male palp (A, mesal; B, ventral). C, Male habitus, dorsal. *Eustala cameronensis* Gertsch & Davis, 1936. D, E, Male palp (D, mesal; E, ventral). F, Male habitus, dorsal. *Eustala gonygaster* (C. L. Koch, 1838). G, H, Male palp (G, mesal; H, ventral). I, Male habitus, dorsal.



FIGURES 23A–H. *Eustala vegeta* (Keyserling, 1865). A–C, Male palp (A, mesal; B, ventral; C, superior). G, Male habitus, dorsal. D–F, Epigynum (D, ventral; E, posterior; F, lateral). H, Female habitus, dorsal.

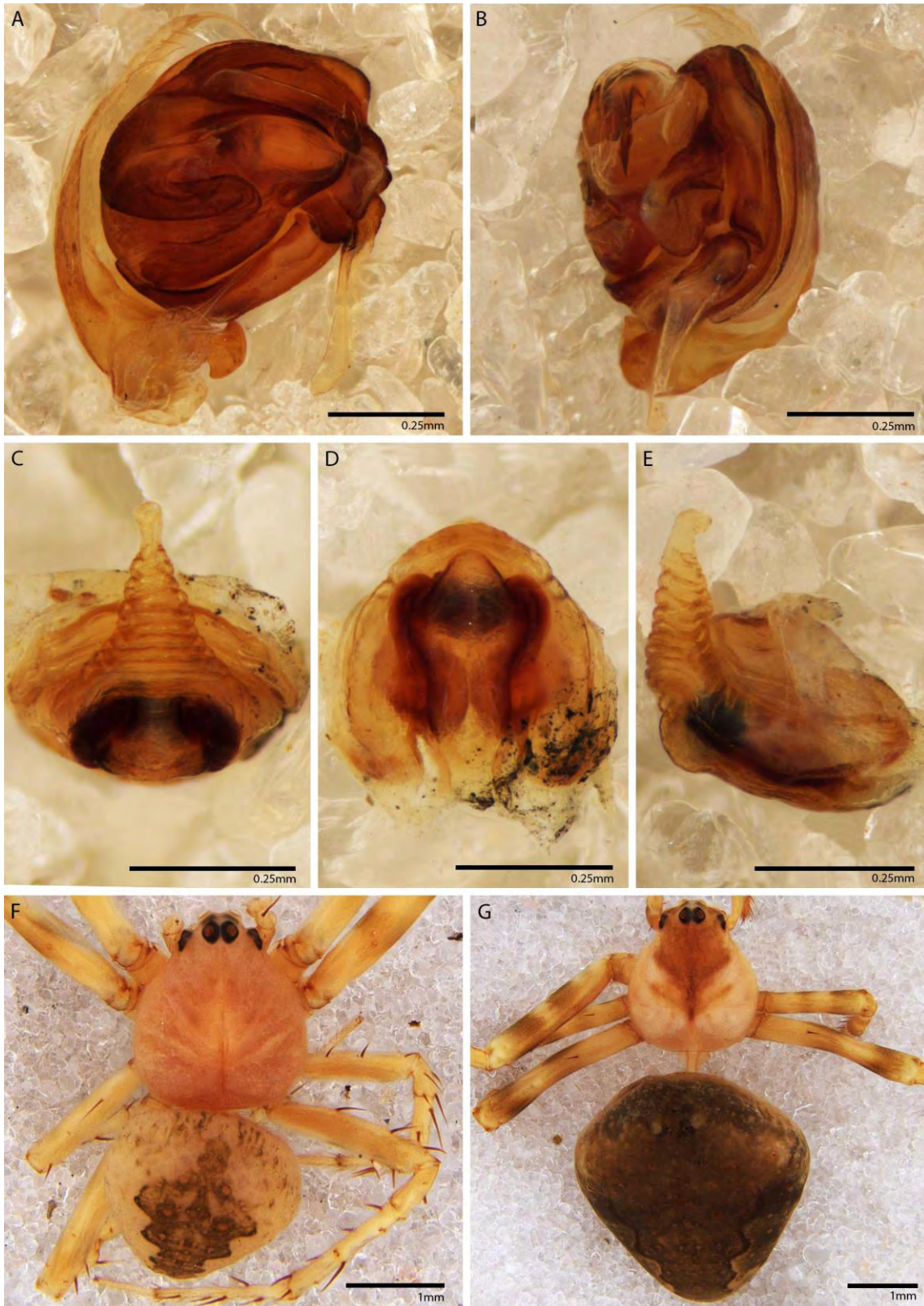




FIGURES 24A–H. *Eustala guttata* F. O. Pickard-Cambridge, 1904. A–C, Male palp (A, mesal; B, ventral; C, superior). G, Male habitus, dorsal. D–F, Epigynum (D, ventral; E, posterior; F, lateral). H, Female habitus, dorsal.



FIGURES 25A–G. *Eustala ingenua* Chickering, 1955. A, B, Male palp (A, mesal; B, ventral). F, Male habitus, dorsal. C–E, Epigynum (C, ventral; D, posterior; E, lateral). G, Female habitus, dorsal.



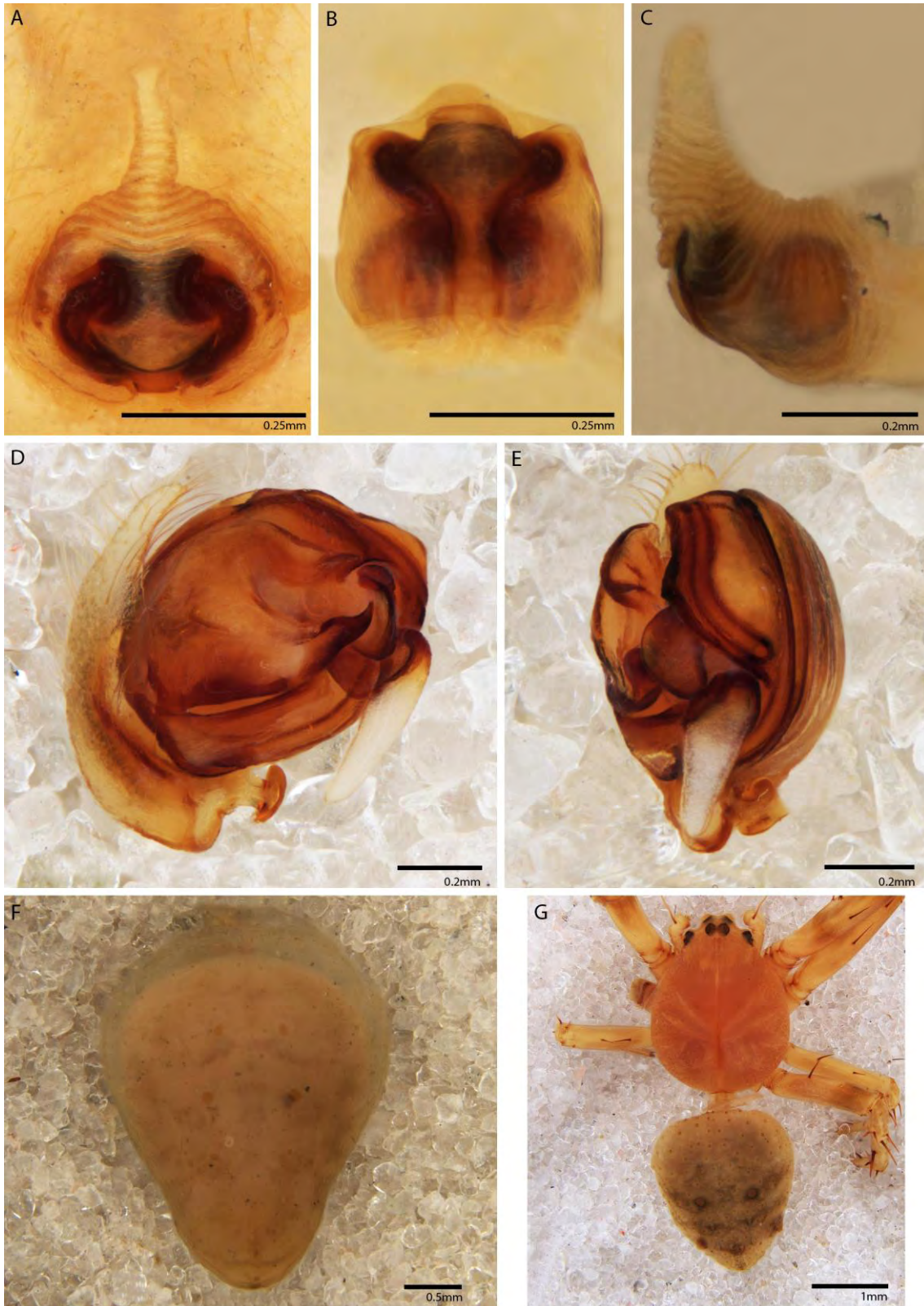
FIGURES 26A–G. *Eustala rustica* Chickering, 1955. A, B, Male palp (A, mesal; B, ventral). F, Male habitus, dorsal. C–E, Epigynum (C, ventral; D, posterior; E, lateral). G, Female habitus, dorsal.



FIGURES 27A–I. *Eustala brevispina* Gertsch & Davis, 1936. A–C, Epigynum (A, ventral; B, posterior; C, lateral). G, Female habitus, dorsal. H, Female abdômen, lateral. *Eustala trinitatis* (Hogg, 1918). D–F, Epigynum (D, ventral; E, posterior; F, lateral). I, Female habitus, dorsal.



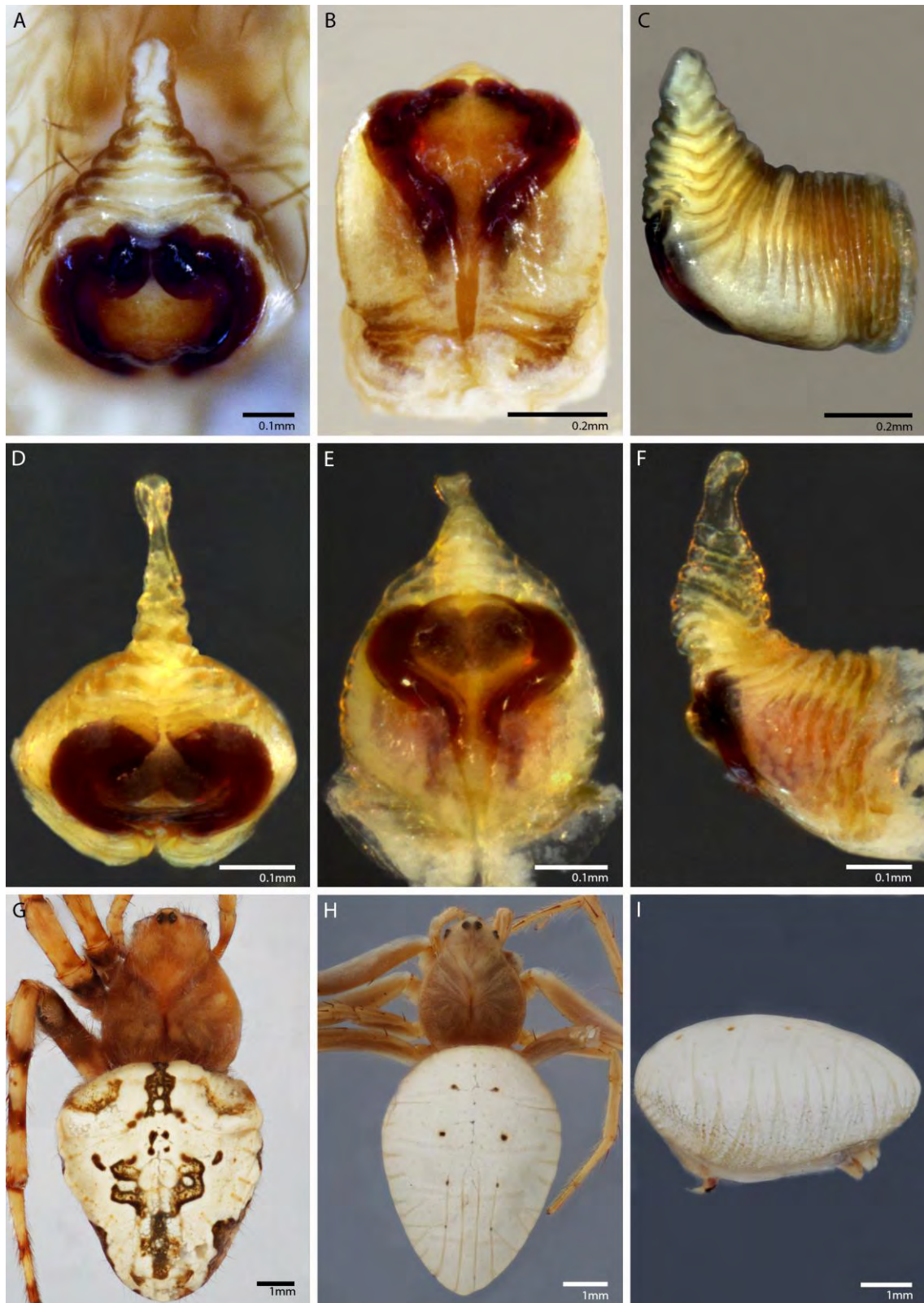
FIGURES 28A–I. *Eustala eleuthera* Levi, 1977. A, B, Male palp (A, mesal; B, ventral). F, Male habitus, dorsal. C–E, Epigynum (C, ventral; D, posterior; E, lateral). G, Female carapace dorsal; H, abdomen, dorsal; I, lateral.



FIGURES 29A–G. *Eustala pallida* Mello-Leitão, 1940. A–C, Epigynum (A, ventral; B, posterior; C, lateral). F, Female abdomen, dorsal. *Eustala inconstans* Chickering, 1955. D, E, Male palp (D, mesal; E, ventral). G, Male habitus, dorsal.

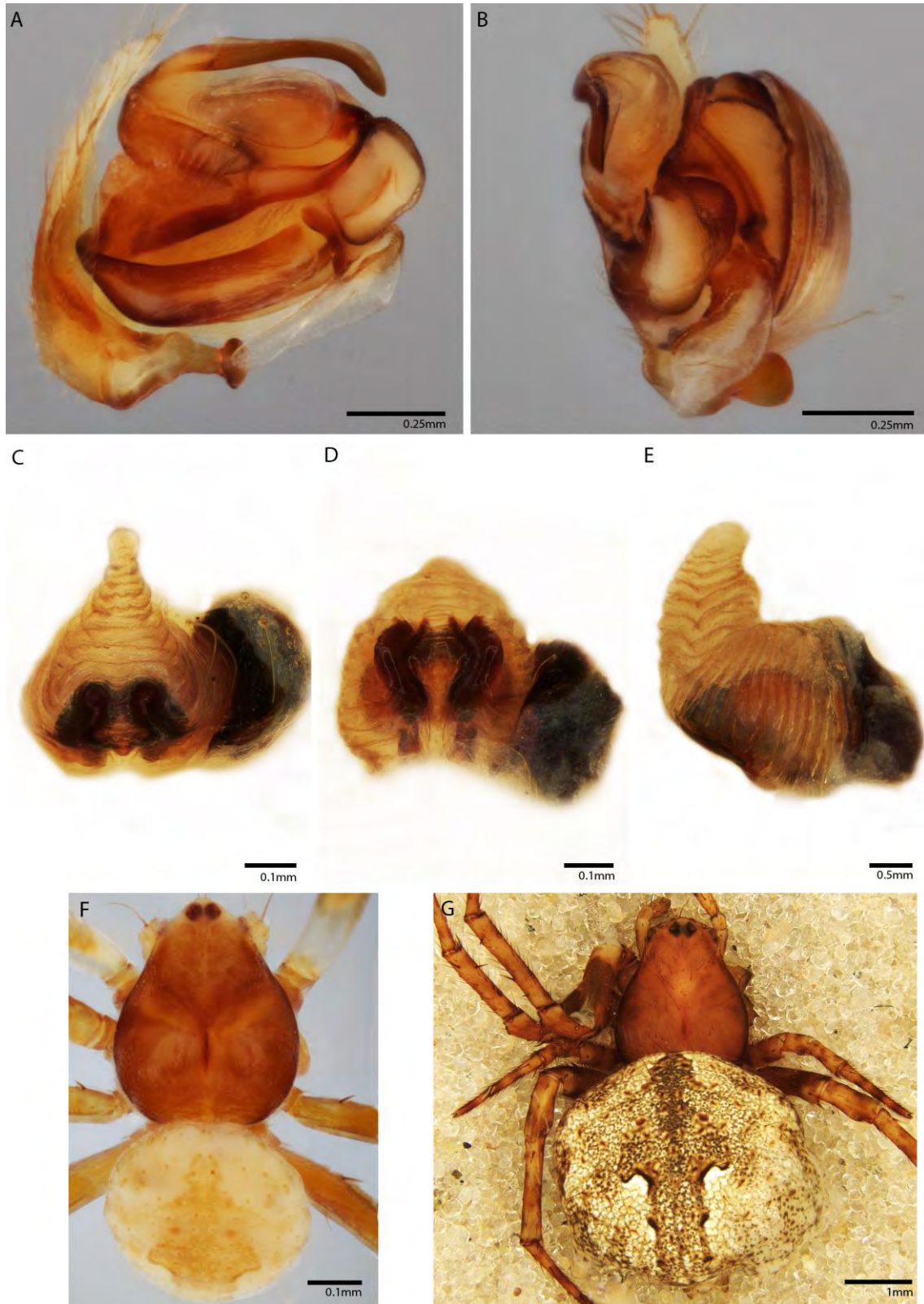


FIGURES 30A–J. *Eustala lunulifera* Mello-Leitão, 1939. A–C, Epigynum (A, ventral; B, posterior; C, lateral). G, Female carapace, dorsal; H, abdomen, dorsal. *Eustala sedula* Chickering, 1955. D–F, Epigynum (D, ventral; E, posterior; F, lateral). I, Female carapace, dorsal; J, abdomen, dorsal.

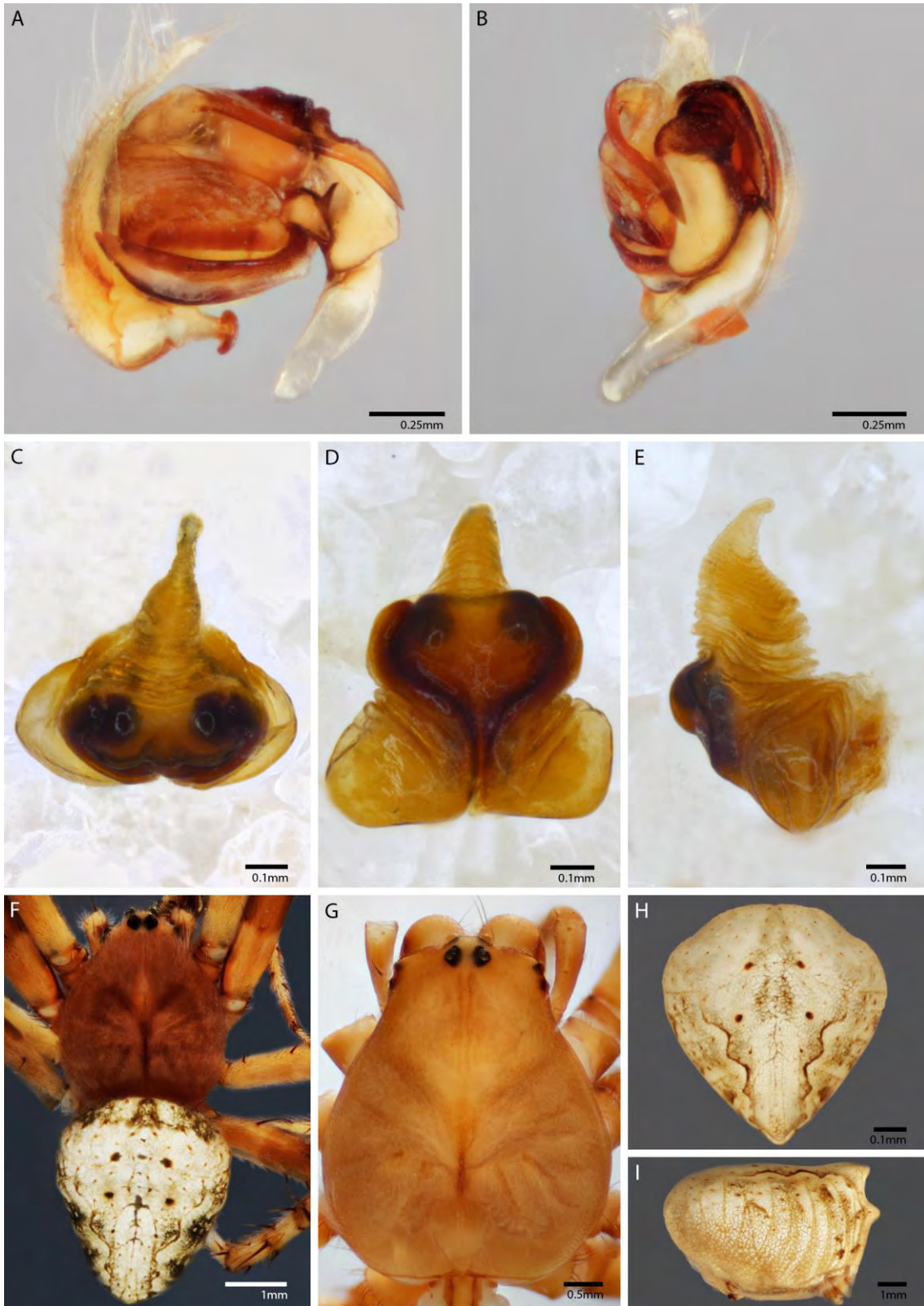


FIGURES 31A–I. *Eustala viridipedata* (Roewer, 1942). A–C, Epigynum (A, ventral; B, posterior; C, lateral). G, Female habitus, dorsal. *Eustala smaragdinea* (Taczanowski, 1878). D–F, Epigynum (D, ventral; E, posterior; F, lateral). H, Female habitus, dorsal; I, abdomen, lateral.





FIGURES 32A–G. *Eustala conformans* Chamberlin, 1925. A, B, Male palp (A, mesal; B, ventral). F, Male habitus, dorsal. C–E, Epigynum (C, ventral; D, posterior; E, lateral). G, Female habitus, dorsal.



FIGURES 33A–I. *Eustala bifida* F. O. Pickard-Cambridge, 1904. A, B, Male palp (A, mesal; B, ventral). F, Male habitus, dorsal. C–E, Epigynum (C, ventral; D, posterior; E, lateral). G, Female, carapace, dorsal; H, abdomen, dorsal; I, abdomen, lateral.



FIGURES 34A–I. *Eustala lata* Chickering, 1955. A–C, Epigynum (A, ventral; B, posterior; C, lateral). G, Female abdomen, dorsal. *Eustala semifoliata* (O. Pickard-Cambridge, 1899). D–F, Epigynum (D, ventral; E, posterior; F, lateral). H, Female habitus, dorsal; I, carapace, lateral.



FIGURES 35A–H. *Eustala anastera* (Walckenaer, 1841). A, B, Male palp (A, mesal; B, ventral). F, Male habitus, dorsal. C–E, Epigynum (C, ventral; D, posterior; E, lateral). G, Female habitus, dorsal; H, lateral.



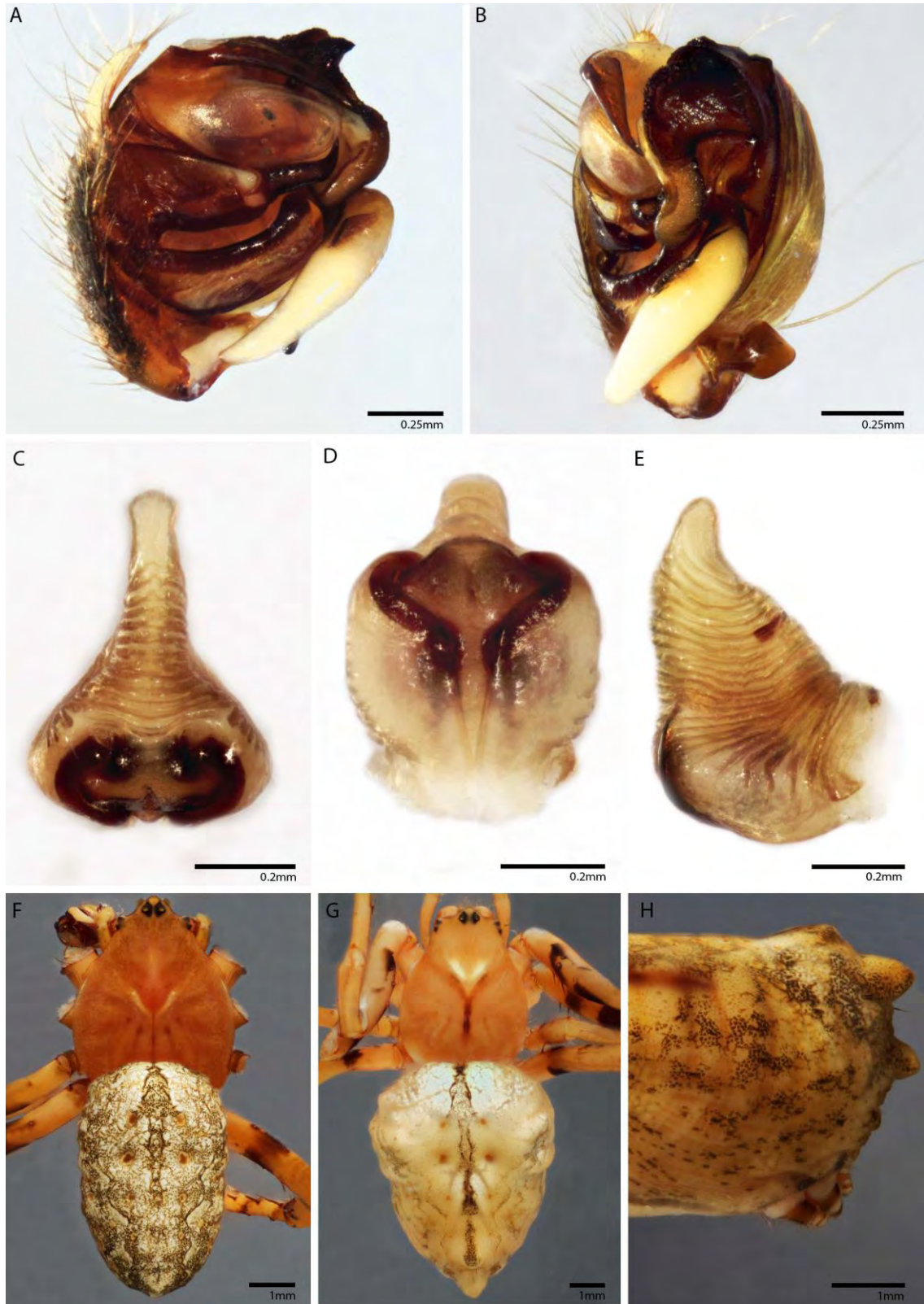
FIGURES 36A–G. *Eustala cepina* (Walckenaer, 1841). A, B, Male palp (A, mesal; B, ventral). F, Male habitus, dorsal. C–E, Epigynum (C, ventral; D, posterior; E, lateral). G, Female habitus, dorsal.



FIGURES 37A–H. *Eustala conchlea* (McCook, 1888). A, B, Male palp (A, mesal; B, ventral). F, Male habitus, dorsal. C–E, Epigynum (C, ventral; D, posterior; E, lateral). G, Female habitus, dorsal.

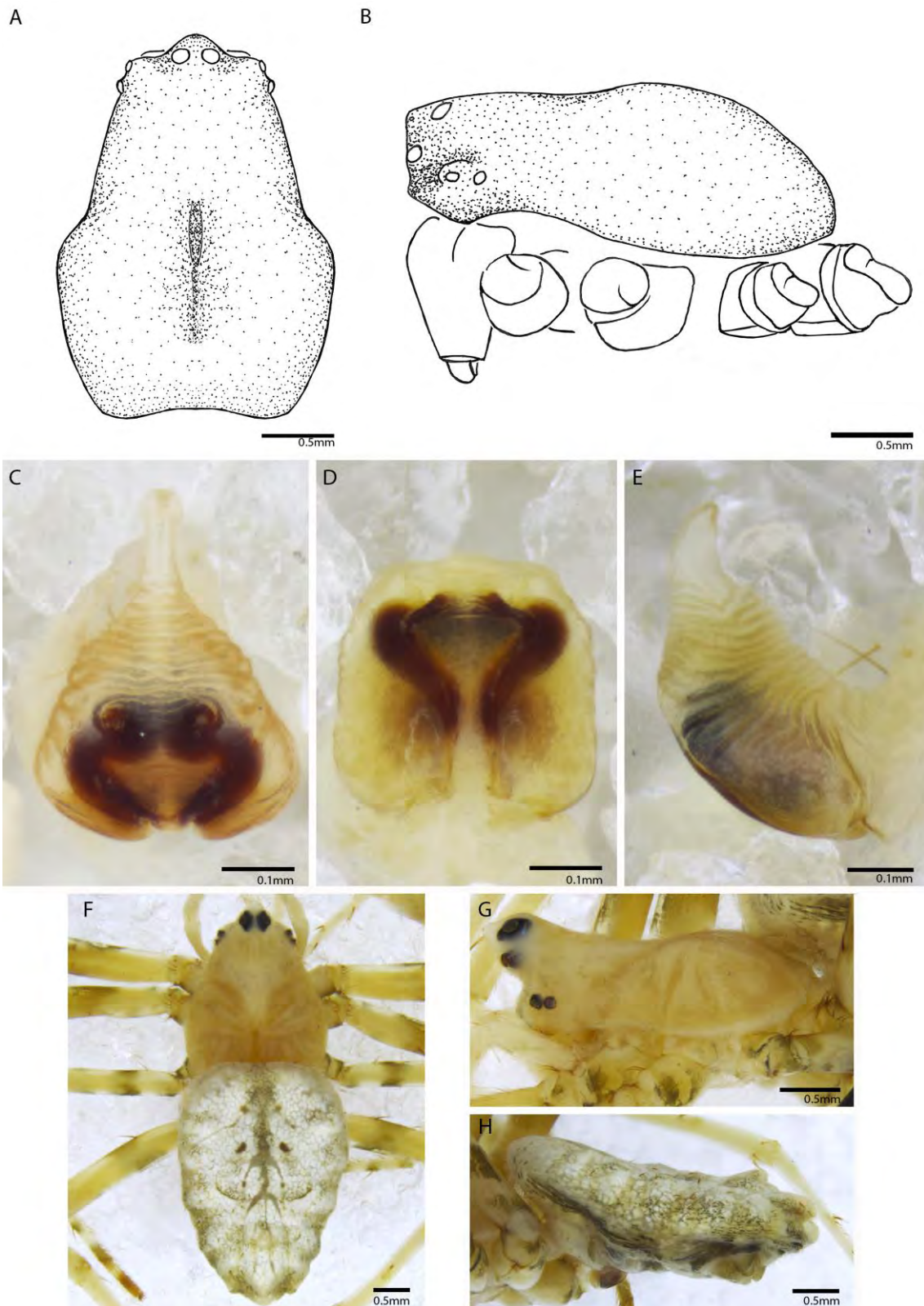


FIGURES 38A–I. *Eustala rosae* Chamberlin & Ivie, 1935. A, B, Male palp (A, mesal; B, ventral). F, Male habitus, dorsal. C–E, Epigynum (C, ventral; D, posterior; E, lateral). G, Female habitus, dorsal; H, carapace, frontal; I, abdomen, lateral.

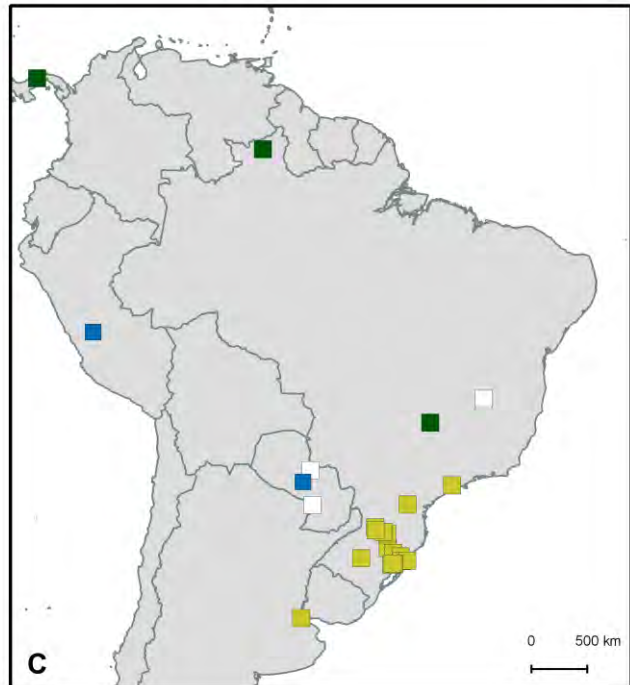
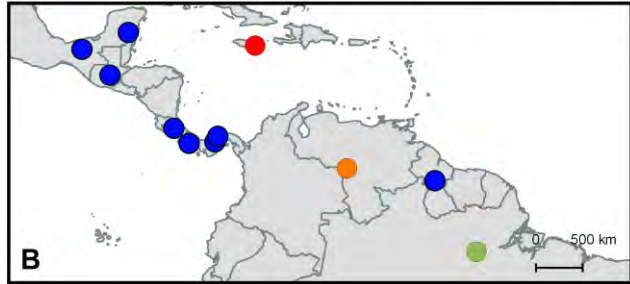
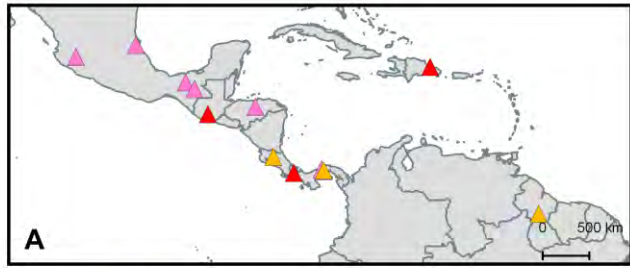


FIGURES 39A–H. *Eustala clavispina* (O. Pickard-Cambridge, 1889). A, B, Male palp (A, mesal; B, ventral). F, Male habitus, dorsal. C–E, Epigynum (C, ventral; D, posterior; E, lateral). G, Female habitus, dorsal; H, abdomen, lateral.





FIGURES 40A–H. *Eustala novemmamillata* Mello-Leitão, 1939. A, B, Female carapace (A, dorsal; B, lateral). *Eustala nasuta* Mello-Leitão, 1939. C–E, Epigynum (C, ventral; D, posterior; E, lateral). F, Female habitus, dorsal; G, carapace, lateral; H, abdomen, lateral.



**Map A**

- ▲ *E. montivaga*
- ▲ *E. nasuta*
- ▲ *E. scutigera*

**Map B**

- *E. guttata*
- *E. lata*
- *E. lunulifera*
- *E. mimica*

**Map C**

- *E. conformans*
- *E. minuscula*
- *E. smaragdinea*
- *E. tribrachiata*

FIGURES 41A–C. Eleven species of *Eustala* with range expansion its distribution.

**Description of the male of the spider *Eustala vellardi* Mello-Leitão, 1924, the female of *E. delasmata* Bryant, 1945 and seven species of *Eustala* Simon, 1895 declared as *nomina dubia* (Araneae, Araneidae)**

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**Abstract**

The male of *Eustala vellardi* Mello-Leitão, 1924 and the female of *E. delasmata* Bryant, 1945 are described for the first time and new distribution records are provided. The types of *E. tridentata* (C.L. Koch, 1838), *E. tristis* (Blackwall, 1862), *E. essequibensis* (Hingston, 1932), *E. unciurva* Franganillo, 1936, *E. nigerrima* Mello-Leitão, 1940, and *E. albicans* (Caporiacco, 1954), are apparently lost, and those names are therefore, considered *nomina dubia*. *Eustala andina* Chamberlin, 1916, which is based on an immature female is also considered a *nomen dubium*.

**Key words:** orb weaving, taxonomy, Neotropical region, new records

**Introduction**

The araneid genus *Eustala* Simon, 1895 occurs in the Nearctic and Neotropical regions and includes 93 accepted species, of which 59 are represented by both sexes, 10 only by males and 24 only by females (WSC 2017). Throughout the years, 20 species were synonymized and one was considered as a *nomen dubium* (Levi 1977, Kuntner & Levi 2007; Poeta *et al.* 2010; Levi & Santos 2013). These spiders commonly have a subtriangular abdomen, with folium, but may also have an elongated abdomen with longitudinal lines (Poeta 2014). Males of *Eustala* are easily differentiated from the other Araneidae genera by the palp with a hyaline cone-shaped median apophysis, hanging down the bulb and a bubble-shaped subterminal apophysis; the females present the epigynum with a scape oriented anteriorly, which may be annulated or smooth (Levi 1977; Poeta 2014).

In this study we describe the male of *Eustala vellardi* Mello-Leitão, 1924 and the female of *E. delasmata* Bryant, 1945. The female and male of these two species are redescribed. The geographic distribution of *E. vellardi* is extended to several new localities in Brazil and Paraguay, and *E. delasmata* is recorded from Puerto Rico. The following species are considered as *nomina dubia* because the type specimens are presumably lost and it is not possible to recognize the species with the information provided by the authors: *E. tridentata* (C.L. Koch, 1838), *E. tristis* (Blackwall, 1862), *E. essequibensis* (Hingston, 1932), *E. unciurva* Franganillo, 1936, *E. nigerrima* Mello-Leitão, 1940, and *E. albicans* (Caporiacco, 1954). *Eustala andina* Chamberlin, 1916, also is considered as *nomen dubium* because it was described based on an immature specimen.

**Materials and methods**

The following institutions either house material that was examined or were consulted in search of type-material (their curator's names are given after the institution acronym): American Museum of Natural History, New York (AMNH, L. Prendini); Museu de Ciências Naturais da Fundação Zoobotânica do Rio Grande do Sul, Porto Alegre (MCN, R. Ott); Museu de Ciências e Tecnologia da Pontifícia Universidade Católica do Rio Grande do Sul, Porto