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Illustrated inventory of spiders from Amazonas state, Brazil: 94 understory species from a forest fragment in Manaus

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Resumo

Listas de espécies são o primeiro passo para o conhecimento das assembléias, mas elas são de utilidade limitada em regiões com megadiversidade, onde as identificações tendem a ser parciais. No entanto, em alguns grupos de animais, como aranhas, o uso de fotografias digitais de alta qualidade de espécimes e suas estruturas sexuais ilustrando inventários geralmente torna possível complementar as identificações ou verificar se as identificações publicadas estavam corretas posteriormente. Apresentamos um inventário ilustrado com fotografias de espécimes vivos e suas estruturas sexuais de 94 espécies de aranhas de 76 gêneros e 19 famílias, coletadas por 15 meses de 2011 a 2012 no sub-bosque, com método batedor em áreas de floresta primária e secundária no fragmento do campus da Universidade Federal do Amazonas em Manaus, Brasil. Todas as espécies foram identificadas ao nível de gênero e 44% foram identificadas ao nível específico. A aranha do gênero *Apollophanes*, Philodromidae, é registrada pela primeira vez na Amazônia central. Discutimos a importância dos inventários ilustrados para uma melhor caracterização da megadiversidade amazônica.

Palavras chave: Araneae, digitalização, assembléias de aranhas, macrofotografia.

Abstract

Species lists are the first step to the knowledge of assemblages, but they are of limited utility in regions with megadiversity, where identifications tend to be partial. However, in some animal groups, as spiders, the use of high quality digital photographs of specimens and their sexual structures illustrating inventories generally makes it possible to complement identifications or to check if the published identifications were correct. We present an illustrated inventory with photographs of living specimens and their sexual structures of 94 spider species of 78 genera and 19 families collected for 15 months in 2011 and 2012 in the understory with tree-beating method in a primary and a secondary forests at Universidade Federal do Amazonas campus in Manaus, Brazil. All species were identified at genus level and 44% were identified at species level. The genus *Apollophanes*, Philodromidae, is recorded for the first time in central Amazonia. We discuss the importance of illustrated inventories towards a better characterization of the Amazonian megadiversity.

Keywords: Araneae, digitization, spider assemblage, macrophotography.

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1. Introduction

Spiders are extremely abundant in all terrestrial environments and belong to one of the most diverse arthropod groups (CODDINGTON & LEVI 1991, CODDINGTON *et al*., 2009). Using simple sampling methods such as manual collection, tree-beating, litter sampling and pitfall traps, it is possible to collect a high number of spiders in a short period of time. This makes the order Araneae a group with great potential as bio-indicators of environmental quality (CLAUSEN 1986, MAELFERT *et al*., 1990, CHURCHILL 1997) and model organisms for conservation studies (CRISTOFOLI 2010, BORCHARD 2014). However, the study of spiders assemblages is a challenge in areas of high diversity such as the Amazon rain forest. Identification is frequently very difficult because many species are still not described and many genera need to be reviewed. In this context, the disclosure of illustrated inventories with high quality photographs are of great help to accelerate the characterization of fauna (WHEELER 2009, LA SALLE *et al*., 2009, GODFRAY 2002, COLEMAN 2006, AGUIAR *et al*., 2017). In most spider families, images of the live specimens along with images of its sexual structures usually is sufficient for reliable identification even for non-specialists (BERQUIST *et al*., 2012).

Digital image is a powerful tool that has been increasingly used in taxonomic studies (ANG *et al*., 2013, COLEMAN 2006, BERQUIST *et al*., 2012, FERNÁNDEZ-TRIANA *et al*., 2017). Photographs of type specimens deposited in official research collection (as museums and similar institutions) are extremely important as identification source material (AGUIAR *et al*., 2017, BERQUIST *et al*., 2012, ANG *et al*., 2013). Publications including high quality photographs of other identified specimens of official research collections are also important. Especially if they include specific characters for the diagnosis as they may serve as a guide to help identification in subsequent studies. Furthermore, published photographs may also be a way to show potentially undescribed species. For decades, most descriptions of spider species illustrated the specimens only with drawings of sexual structures or scanning electron microscope photos. Fortunately, photographs of the habitus of specimens deposited in collections are becoming more common, although photos of alive specimens that will be part of a scientific zoological collection are extremely rare. Photographs of the live specimens show relevant information of the animal's natural color patterns and posture. In this paper we present an inventory of spider species from the understory of a tropical rainforest fragment captured with tree-beating with photos of the living individuals, which were later preserved, their genitals also photographed and they are now part of the Zoological Collection Paulo Buhrhein (CZPB), at the Universidade Federal do Amazonas, Manaus, Brazil.

2. Materials and methods

The spiders were collected in the Manaus campus of the Universidade Federal do Amazonas (UFAM-Manaus) in the city of Manaus, Amazonas, Brazil. The campus is a 700 ha forest fragment in urban area covered mostly with primary and secondary forests on clay soils, swamp forest near the streams, small areas of heath forest on sandy soils and anthropized areas (COUTINHO 1994). The climate is tropical humid with average temperature about 28 °C, annual rainfall between 1 900 to 2 300 mm, with the raining season usually from December to May (INMET 2018). We collected spiders monthly from September 2011 until December 2012, in two areas in the campus, a well preserved primary forest area of about 10800 m2 (3° 5.83'S; 59° 58.01'W) and a secondary forest connected to the primary forest (3° 5.78'S; 59° 58.33'W) with about 35-40 years of regrowth with similar size.

All spiders were collected using the tree-beating technique adapted from HARRIS *et al*., (1972). We spent 40 minutes vigorously shaking various bushes and branches, and another 20 minutes on palm trees. To be able to collect the animals we put a white sheet of cloth measuring 1 by 1.5 meters beneath those trees. The total time of the survey was divided into six intervals of 10 minutes shaking and collecting. Some of the spiders collected were fixed in 70% alcohol immediately, while others were kept alive to be photographed in the laboratory before being fixed. At last, the male palps and female epigyna of the specimens were also photographed.

The identifications were based on identification keys for family and genera (BRESCOVIT *et al*., 2002, UBICK *et al*., 2005), reviews of genera available in World Spider

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Catalog (2019), Jumping spiders (Arachnida: Araneae: Salticidae) of the world (2019), and Global Species Database of Salticidae (2019). We consulted some experts to check and complement the identification of some specimens as follows: Adalberto J. Santos: identification of *Oxyopes incertus* Mello-Leitão 1929 (Oxyopidae), *Verrucosa* sp. (Araneidae), *Rhomphaea* sp. (Theridiidae) and *Dossenus marginatus* Simon 1898 (Trechaleidae); Alexandre B. Bonaldo: identification of *Simonestus* sp. (Corinnidae); Erika L.S Costa: identification of *Scopocira tenella* Simon 1900 (Salticidae); Gustavo S. Ruiz identification of *Maeota* sp. (Salticidae); Regiane Saturnino: identification of *Elaver multinotata* Chickering 1937 (Clubionidae); Pedro H. Martins: identification of *Parawixia kochi* Taczanowski, 1873, *Micrathena aureola* C. L. Koch, 1836, *Wagneriana jelskii* Taczanowski, 1873 and *Wagneriana turrigera* Schenkel, 1953 (Araneidae). We used the abreviation "CF" (confer) to indicate that the specimen apparently belongs to genus or species, but we are not certain.

Photographs of the living spiders were taken by the first author after few hours of the capture, using a Canon EF f/2.8L 100 mm macro and a MP-e 65 mm 1-5x macro lens mounted on a Canon EOS 60D in an improvised studio in a laboratory at the UFAM campus. The scenes were illuminated using a Canon speedlite 580EX II flash with a softbox that diffuses the light into a soft and even light. Also, natural substrates similar to those where each spider was found were used. The sexual structures of these spiders were photographed with the Canon MP-e 65 mm or a 10x microscope acromatic lens attached to the Canon 60D and mounted on a microscope basis. The pictures of the sexual structures were combined with a focus staking technique, that allows enhancement of the field depth in the final processed image by staking many images with different focus layer into one all-focused picture using Zerene Stacker (Zerene Systems LLC). Also, all photographs of the males sexual structures were taken from the ventral view of the left palpal bulb. The spiders shown here are deposited in Coleção Zoológica Paulo Buhrnheim in the campus of UFAM-Manaus, Amazonas, Brazil. The macrophotographs are organized in alphabetic order based on the families and numbered in sequence with 6 images per plate. The process of digitization of organisms deposited in physical collections is already a reality in some institutions (GODFRAY *et al*., 2007, SCHMIDT *et al*., 2012).

3. Results

During 2011 and 2012, we collected a total of 3.281 spiders, from which 1.080 were adults. Taking in consideration just the adults, we obtained 94 morphospecies of 76 genera and 19 families (Table 1). All specimens were identified at genus level and 42 specimens at the species level. We photographed males and females for 37 species, only males in 28 species and only females 30 species (Plates 1-44). Many genera were represented by only one species in our collection, and genera with more than one species in a genus had species sufficiently different to permit the discrimination. Some species had sexual dimorphism, but they could be paired because *Hypognatha scutata* Perty, 1833 (Plate 5) and *Architis tenuis* Simon, 1898 (Plate 19) have both sexes described, and the couple of *Olios* sp01 (Plates 33/34) was collected together. We have chosen two images from each specimen to illustrate this inventory in plates, one from the alive individual and a second one from it is sexual structure of the same individual. Most of the pictures that were chosen shown the animal in dorsal view as it is one of the most informative views to compare with other images.

Table 1 - **List of species of spiders from understory vegetation from Manaus campus of UFAM collected in 2011/2012 collected with tree-beating method**. We divided by family along with the plate number, collection tag (voucher) and the information about the animal's sex. To represent that a given species have both sexes collected and are tagged at the same voucher we used both sex symbol.

Family	Specimen	Plate	Voucher	Sex
Anyphaenidae	*Hibana* sp.	3	CZPB-ar000065	♀
	Iguarima sp.	1/2	CZPB-ar000058 CZPB-ar000073	♂ ♀
	CF *Katissa* sp.	2	CZPB-ar000062	♂

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			CZPB-ar000060	♀
	Patrera sp.	1	CZPB-ar000063	♂♀
	Wulfila sp.	3	CZPB-ar000061	♀
Araneidae	*Alpaida* sp.	3/4	CZPB-ar000075	♂♀
	Alpaida truncata Keyserling, 1865	4	CZPB-ar000076 CZPB-ar000379	♂ ♀
	Alpaida octolobata Levi, 1988	6	CZPB-ar000079	♀
	Eustala sp.	5	CZPB-ar000094	♂
	Hypognatha scutata Perty, 1833	5	CZPB-ar000097 CZPB-ar000098	♂ ♀
	Mangora sp.	7	CZPB-ar000099	♀
	Micrathena aureola C. L. Koch, 1836	6	CZPB-ar000087	♂
	Micrathena kirbyi Perty, 1833	7/8	CZPB-ar000103 CZPB-ar000107	♂ ♀
	Parawixia kochi Taczanowski, 1873	6	CZPB-ar000113	♀
	Verrucosa sp.	7	CZPB-ar000136	♂
	Wagneriana jelskii Taczanowski, 1873	8	CZPB-ar000115	♂
	Wagneriana turrigera Schenkel, 1953	8	CZPB-ar000380	♀
Clubionidae	*Elaver multinotata* Chickering, 1937	9	CZPB-ar000116	♂
Corinnidae	*Castianeira* sp.	9	CZPB-ar000382	♂
	CF *Erendira* sp.	9	CZPB-ar000381	♀
	Myrmecium bifasciatum Taczanowski, 1874	11/12	CZPB-ar000122	♂♀
	Myrmecotypus niger Chickering, 1937	13	CZPB-ar000123	♂
	Myrmecotypus olympus Reiskind, 1969	10	CZPB-ar000118	♂♀
	Parachemmis hassleri Gertsch, 1942	11	CZPB-ar000383	♂♀
	Stethorrhagus lupulus Simon, 1896	10	CZPB-ar000124	♀
	Simonestus sp.	12	CZPB-ar000384	♂
	Tupirinna sp.	12	CZPB-ar000385	♂
Gnaphosidae	*Zimiromus syenus* Buckup & Brescovit, 1993	13	CZPB-ar000130 CZPB-ar000131	♂ ♀
Hersillidae	*Ypypuera* CF *crucifera* Vellard, 1924	14	CZPB-ar000134	♂
Oxyopidae	*Oxyopes incertus* Mello-Leitão, 1929	15	CZPB-ar000138	♂♀
	Peucetia rubrolineata Keyserling, 1877	15 16	CZPB-ar000386 CZPB-ar000387	♂ ♀
	Tapinillus longipes Taczanowski, 1872	14	CZPB-ar000140	♂♀
Palpimanidae	*Otiothops oblongus* Simon, 1892	16	CZPB-ar000142	♂♀
Philodromidae	CF *Apollophanes* sp.	17	CZPB-ar000145	♂
Pholcidae	*Carapoia fowleri* Huber, 2000	17	CZPB-ar000148	♀
	Litoporus dimona Huber, 2000	19	CZPB-ar000152	♀
	Mesabolivar aurantiacus Mello-Leitão, 1930	17/18	CZPB-ar000150	♂♀
	Metagonia taruma Huber, 2000	18	CZPB-ar000154	♂♀
Pisauridae	*Architis tenuis* Simon, 1898	19	CZPB-ar000163 CZPB-ar000162	♂ ♀
Salticidae	*Acragas longimanus* Simon, 1900	21	CZPB-ar000389	♀
	Beata maccuni Peckham & Peckham, 1895	20	CZPB-ar000338 CZPB-ar000388	♂ ♀
	Ceriomura CF *cruenta* Peckham & Peckham, 1894	23	CZPB-ar000390	♂
	Chira trivitata Taczanowski, 1871	20	CZPB-ar000339	♂
	Chinoscopus gracilis Taczanowski, 1872	25	CZPB-ar000394	♀

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	Colonus pseustes Chamberlin & Ivie, 1936	32	CZPB-ar000378	♀
	Cotinusa septempuctata Simon, 1900	22	CZPB-ar000343	♂♀
	Corythalia sp.	21	CZPB-ar000341	♂
	Erica sp.	23	CZPB-ar000347	♀
	Eustiromastix sp.	23/24	CZPB-ar000348	♂♀
	Hypaeus frontosus Simon, 1900	26	CZPB-ar000355	♂
	Hypaeus miles Simon, 1900	26	CZPB-ar000354	♀
	Itata sp.	26	CZPB-ar000396	♀
	Lyssomanes longipes Taczanowski, 1871	24	CZPB-ar000391 CZPB-ar000392	♂ ♀
	Lyssomanes amazonicus Peckham, Peckham & Wheeler, 1889	25	CZPB-ar000393	♂
	Lyssomanes nigropictus Peckham, Peckham & Wheeler,1889	25	CZPB-ar000395	♂
	Maeota sp.	27	CZPB-ar000356	♀
	Mago acutidens Simon, 1900	28	CZPB-ar000397 CZPB-ar000398	♂ ♀
	Noegus actinosus Simon, 1900	27	CZPB-ar000359	♂
	Noegus niveomarginatus Simon, 1900	27/28	CZPB-ar000360 CZPB-ar000362	♂ ♀
	Psecas sp.	29	CZPB-ar000370 CZPB-ar000369	♂ ♀
	Scopocira tenella Simon, 1900	31	CZPB-ar000402	♂
	Sidusa anguilitarsis Simon, 1902	29/30	CZPB-ar000371	♂♀
	Sidusa sp.	30	CZPB-ar000374 CZPB-ar000373	♂ ♀
	Sidusa viridiaurea Simon, 1902	21/22	CZPB-ar000340	♂♀
	Synemosyna paraensis Galiano, 1967	32	CZPB-ar000376	♀
	Soesilarishius amrishi Makhan, 2007	32	CZPB-ar000399	♂
	Soesilarishius sp.	31	CZPB-ar000400 CZPB-ar000401	♂ ♀
Scytodidae	*Scytodes* sp.	33	CZPB-ar000174	♂♀
Sparassidae	*Olios* sp01.	33 34	CZPB-ar000184 CZPB-ar000183	♂ ♀
	Nungara sp01	34	CZPB-ar000187	♀
	Nungara sp02	34	CZPB-ar000185	♀
Tetragnatidae	*Leucauge* sp01.	35	CZPB-ar000190	♂
	Leucauge sp02.	35	CZPB-ar000189	♀
Theridiidae	*Achaearanea* sp.	37	CZPB-ar000408	♀
	Achaearanea CF*hieroglyphica* Mello-Leitão, 1940	40	CZPB-ar000416	♀
	Ariamnes sp.	35 36	CZPB-ar000403 CZPB-ar000404	♂ ♀
	Dipoena sp.	37	CZPB-ar000407	♂
	Janula sp	36	CZPB-ar000405 CZPB-ar000406	♂ ♀
	Helvibis sp.	37 38	CZPB-ar000409 CZPB-ar000410	♂ ♀
	Rhomphaea sp.	39	CZPB-ar000413 CZPB-ar000414	♂ ♀

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	Spintharus gracilis Keyserling, 1886	38	CZPB-ar000411 CZPB-ar000412	♂ ♀
	Steatoda sp.	39	CZPB-ar000415	♀
Thomisidae	*Bucranium taurifrons* O. Pickard-Cambridge, 1881	40	CZPB-ar000199	♂♀
	Epicadus taczanowskii Roewer, 1951	41	CZPB-ar000201	♂
	CF *Synema* sp.	41	CZPB-ar000202	♀
	Stephanopis sp.	41	CZPB-ar000206	♂
	Tmarus sp.	42	CZPB-ar000203	♀
	Titidius CF *urucu* Esmerio & Lise, 1996	42	CZPB-ar000205	♀
Trachelidae	*Trachelas* sp.	42	CZPB-ar000125	♂♀
Trechaleidae	*Dossenus marginatus* Simon, 1898	43	CZPB-ar000197	♂
Uloboridae	*Miagrammopes* sp01.	43	CZPB-ar000222	♂
	Miagrammopes sp02.	43	CZPB-ar000218	♀
	Philoponella sp01	44	CZPB-ar000224	♂
	Philoponella sp02.	44	CZPB-ar000226	♀

4. Discussion

We believe that some spiders identified in this paper represent the first record of the species or genera for Amazonas state based on the literature available in the World Spider Catalog (2019). *Alpaida octolobata* Levi, 1988 (Plate 6) had its distribution records only for the state of Rio Grande do Sul in Brazil, and Buenos Aires in Argentina (Rodrigues & Mendonça 2011); *Myrmecotypus olympus* Reiskind, 1969 (Plate 10) and *Myrmecotypus niger* Chickering, 1937 (Plate 13) both have records for Panama (Reiskind 1969); *Cotinusa septempunctata* Simon, 1900 (Plate 22) had official records only for Venezuela (GALIANO 1963), and an external database that has its occurrence in South America (Prószyński 2016). We identified a spider as *Erendira* sp., (Plate 9) based on diagnosis in BONALDO (2000), witch was found in Panama, Venezuela, Puerto Rico and St. Vincent, and another spider as *Apollophanes* sp., (Plate 17) based on DONDALE & REDNER (1975), witch is the first record for Amazonia. The only known species of the genus for Brazil is *Apollophanes gaucho* from southern Brazil, Rio Grande do Sul state (FRANCISCO, OTT, TEIXEIRA 2016). Only one individual of *Apollophanes* was collected during 15 months of sampling. Therefore, we believe that this animal may be a canopy species.

HOFER & BRESCOVIT (2001), BONALDO *et al.*, (2009) listed more than 500 species of spiders collected in a forest reserve close to the city of Manaus during a study including many sampling techniques, such as manual collection, litter quadrat sampling, tree-beating of vegetation, fogging the tree canopy, pitfall traps and ground and trunk eclectors during more than five years. Our survey was only diurnal with one method, along with time and habitat limitations, therefore, it is natural that we captured only about 20% of the diversity that they registered with seven sampling methods. However, we collected more species with this method with less time than HOFER & BRESCOVIT (2001) collected with each different method alone that they used, except tree trunk eclectors, which are structures relatively complicated to install. Diversity of sampling methods are essential for the characterization of the spider assemblage, but the tree-beating proved to be an efficient method to start the characterization in our area. Therefore, we believe that the photographic characterization of these 94 species will probably facilitate future studies in the region. We hope that illustrated inventories like the one we are presenting become more common, because they help identify, improve the level of the presented identification and correct eventual errors even after publication. Following this trend, the digital format would enable access to the information of zoological collection making possible virtual visits and, in some cases, even morphological examinations of several specimens through the available images (BLAGODEROV *et al*., 2012).

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References

AGUIAR, J.J.M.; SANTOR, J.C.; URSO-GUIMARÃES, M.V. **On the use of photography in science and taxonomy: how images can provide a basis for their own authentication**. Bionomina, 2017. 12: 44-47. doi: https://doi.org/10.11646/bionomina.12.1.4.

ANG, Y.; WONG, L.J.; MEIER, R. Using seemingly unnecessary illustrations to improve the diagnostic usefulness of descriptions in taxonomy–a case study on Perochaeta orientalis (Diptera, Sepsidae). **ZooKeys,** 2013. 355: 9–27.

BERQUIST, R.M.; GLEDHILL, K.M.; PETERSON, M.W.; DOAN, A.H.; BAXTER, G.T.; YOPAK, K.E.; KANG, N.; WALKER, H.J.; HASTINGS, P.A.; FRANK, L.R. The Digital Fish Library: Using MRI to digitize, database, and document the morphological diversity of fish. **PLoS ONE**, 2012. 7(4): e34499. doi: https://doi.org/10.1371/journal.pone.0034499.

BLAGODEROV, V.; KITCHING, I.J.; LIVERMORE, L.; SIMONSEN, T.J.; SMITH, V.S. No specimen left behind: industrial scale digitization of natural history collections. In: Blagoderov, V.; Smith, V.S. (Ed) **No specimen left behind: mass digitization of natural history collections**. ZooKeys, 2012. 209: 133–146. doi: https://doi.org/10.3897/zookeys.209.3178

BONALDO, A.B. **Taxonomia da subfamília Corinninae (Araneae, Corinnidae) nas regiões Neotropica e Neárctica**. Iheringia, Série Zoologia, 2000. 89: 3-148.

HOFER, H.; BRESCOVIT, A.D. **Species and guild structure of a Neotropical spider assemblage (Araneae) from Reserva Ducke, Amazonas, Brazil**. Andrias, 2001. 15: 99-119. Available in: <https://www.researchgate.net/profile/Hubert_Hofer/publication/233924185_Species_and_guild_structure_of_a_Neotropical_spider_assemblage_Araneae_Reserva_Ducke_Amazonas_Brazil/links/00b4951857cf12b21b000000/Species-and-guild-structure-of-a-Neotropical-spider-assemblage-Araneae-Reserva-Ducke-Amazonas-Brazil.pdf>. Access 10/2018.

BONALDO, A.B.; CARVALHO, L.; PINTO-DA-ROCHA, R.; TOURINHO, A.L.; MIGLIO, L.; CANDIANI, D.; LO MAN HUNG, N.F.; ABRAHIM, N.; RODRIGUES, B.; BRESCOVIT, A.D.; SATURNINO, R.; BASTOS, N.C.; DIAS, S.C.; SILVA, B.J.F.; PEREIRA-FILHO, J.M.B.; RHEIMS, C.A.; LUCAS, S.M.; POLOTOW, D.; RUIZ, G.R.S.; INDICATTI, R.P. Inventário e história natural dos aracnídeos da Floresta Nacional de Caxiuanã. In: Lisboa, P.L.B. (Org.). **Caxiuanã: desafios para a conservação de uma Floresta Nacional na Amazônia**. 1st ed. Belém, 2009. pp. 577-621.

BORCHARD, F.; BUCHHOLZ, S.; HELBING, F.; FARTMANN, T. Carabid beetles and spiders as bioindicators for the evaluation of montane heathland restoration on former spruce forests. **Elsevier**, 2014. Biological Conservation. 178: 185–192.

BRESCOVIT, A.D.; RHEIMS, C.A.; BONALDO, A.B. **Chave de identificação para famílias de aranhas brasileiras.** Available in: <http://pt.scribd.com/doc/123853696/Chave-de-Familias-de-Aranhas>. Access 10/2018.

CHURCHILL ,T.B. **Spiders as ecological indicators in the Australian tropics: family distribution patterns along rainfall and**

Scientia Amazonia, v. 8, n.2, CB1-CB53, 2019
Revista on-line http://www.scientia-amazonia.org
ISSN:2238.1910

grazing gradients. Proceedings of the 17th European Colloquium of Arachnology, 1997. Available in: <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.475.3668&rep=rep1&type=pdf>. Access 10/2018.

CLAUSEN, I.H.S. **The use of spiders (Araneae) as ecological indicators**. Bull.Br.arachnol.Soc, 1986. 7(3): 83-86.

COLEMAN, C.O. **Substituting time-consuming pencil drawings in arthropod taxonomy using stacks of digital photographs**. Zootaxa, 2006. 1360: ISSN 1175-5334. 61–68. Available in: http://www.mapress.com/j/zt/article/view/zootaxa.1360.1.4. Access 10/2018.

CODDINGTON, J.A.; AGNARSSON, I.; MILLER, J.A.; KUNTNER, M.; HORMIGA, G. **Undersampling bias: the null hypothesis for singleton species in tropical arthropod surveys**. Journal of Animal Ecology, 2009. 78: 573–584.

CODDINGTON, J.A.; LEVI, H.W. **Systematics and evolution of spiders (Araneae)**. Annual Review of Ecology and Systematics, 1991. 22: 565-592.

CRISTOFOLI, S.; MAHY, G.; KEKENBOSCH, R.; LAMBEETS, K. **Spider communities as evaluation tools for wet heathland restoration**. Elsevier. Ecological Indicators, 2010. 10: 773–780.

COUTINHO, E. **Carta da vegetação da área do Campus Universitário**. folha 2. Manaus, Brasil: Universidade do Amazonas, 1994.

DONDALE, C.D.; REDNER, J.H. Revision of the spider genus Apollophanes (Araneida: Thomisidae). **The Canadian Entomologist**, 1975. 107(11): 1175-1192.

FRANCISCO, R.C.; OTT, R.; TEIXEIRA, R.A. A new species of the genus Apollophanes O. Pickard-Cambridge, 1898 (Araneae: Philodromidae) with the first record to the Atlantic rainforest. **Zootaxa**, 2016. 4171(1): 178-182. doi: http://dx.doi.org/10.11646/zootaxa.4171.1.9

FERNÁNDEZ-TRIANA, J.; BUFFAM, J.; BEAUDIN, M.; DAVIS, H.; FERNANDEZ-GALLIANO, A.; GRIFFIN, E.; LIN, S-Y.; MCAULAY, M.K.; RICHTER, R.; RODRIGUEZ, F.; VÁRKONYI, G. An annotated and illustrated checklist of Microgastrinae wasps (Hymenoptera, Braconidae) from the Canadian Arctic Archipelago and Greenland. **ZooKeys**, 2017. 691: 49–101.

GALIANO, M.E. **Las especies americanas de arañas de la familia Salticidae descriptas por Eugène Simon: Redescripciones basadas en los ejemplares típicos.** Physis, Revista de la Sociedad Argentina de Ciencias Naturales, 1963. (C) 23: 273-470.

GODFRAY, H.C.J. Challenges for taxonomy: the discipline will have to reinvent itself if it is to survive and flourish. **NATURE**, 2002. 417: 17-19.

GODFRAY, H.C.J.; CLARK, B.R.; KITCHING, I.J.; MAYO, S.J.; SCOBLE, M.J. The Web and the Structure of Taxonomy. **Society of Systematic Biologists**, 2007. 56(6):943–955. doi: https://doi.org/10.1080/10635150701777521.

Global Species Database of Salticidae (2019) - Part II Global Species Database of Salticidae (Araneae). Available from: <http://peckhamia.com/salticidae>. Accessed February 2019.

HARRIS, J.; COLLIS, D.; MAGAR, K. EVALUATION OF THE TREE-BEATING METHOD FOR SAMPLING DEFOLIATING FOREST INSECTS. **The Canadian Entomologist**, 1972. 104(5), 723-729.

INMET - Instituto Nacional de Meteorologia. Avaliable at: <http://www.inmet.gov.br/portal/> . Access 01/2018.

Jumping spiders (Arachnida: Araneae: Salticidae) of the world (2019) - Worldwide database of jumping spiders (Arachnida, Araneae, Salticidae). Available from: <http://www.jumping-spiders.com/>. accessed February 2019.

LA SALLE, J.; WHEELER, Q.; JACKWAY, P.; WINTERTON, S.; HOBERN, D.; LOVELL, D. Accelerating taxonomic discovery through automated character extraction. **Zootaxa**, 2009. 2217: ISSN 1175-5334. 43-55.

MAELFERT, J.; JOCQUÉ, R.; BAERT, L.; DESCENDER, K. **Heathland management and spiders.** Acta Zoologica Fennica, 1990. 190: 261-266.

PRÓSZYŃSKI, J. Monograph of Salticidae (Araneae) of the World 1995-2015. Part II. Global Species Database of Salticidae (Araneae). V. May 5th. 2016, Available online at <http://www.peckhamia.com/salticidae/index.html>

REISKIND, J. **The spider subfamily Castianeirinae of North and Central America (Araneae, Clubionidae).** Bulletin of the Museum

Scientia Amazonia, v. 8, n.2, CB1-CB53, 2019
Revista on-line http://www.scientia-amazonia.org
ISSN:2238.1910

of Comparative Zoology at Harvard College, 1969. 138: 163-325.

RODRIGUES, E.N.L.; MENDONÇA, M.S.J.R. Araneid orb-weavers (Araneae, Araneidae) associated with riparian forests in southern Brazil: a new species, complementary descriptions and new records. **Zootaxa**, 2011. 2759: 60 – 68.

SCHMIDT, S.; BALKE, M.; LAFOGLER, S. DScan – a high-performance digital scanning system for entomological collections. In: Blagoderov, V.; Smith, V.S. (Ed) **No specimen left behind: mass digitization of natural history collections**. ZooKeys, 2012. 209: 183–191.

.

UBICK, D.; PAQUIN, P.; CUSHING, P.E.; ROTH, V. **Spiders of North America: an Identification manual.** American Arachnological Society, 2005. 377p.

WHEELER, Q.D. **Revolutionary thoughts on taxonomy: declarations of independence and interdependence.** Zoologia (Curitiba), 2009. 26(1): 1-4. doi: http://dx.doi.org/10.1590/S1984-46702009000100001.

World Spider Catalog (2018) - World Spider Catalog. Version 20.0. **Natural History Museum Bern.** Available from: <http://wsc.nmbe.ch>. accessed February 2019

CIÊNCIAS BIOLÓGICAS

Scientia Amazonia, v. 8, n.2, CB1-CB53, 2019
Revista on-line http://www.scientia-amazonia.org
ISSN:2238.1910

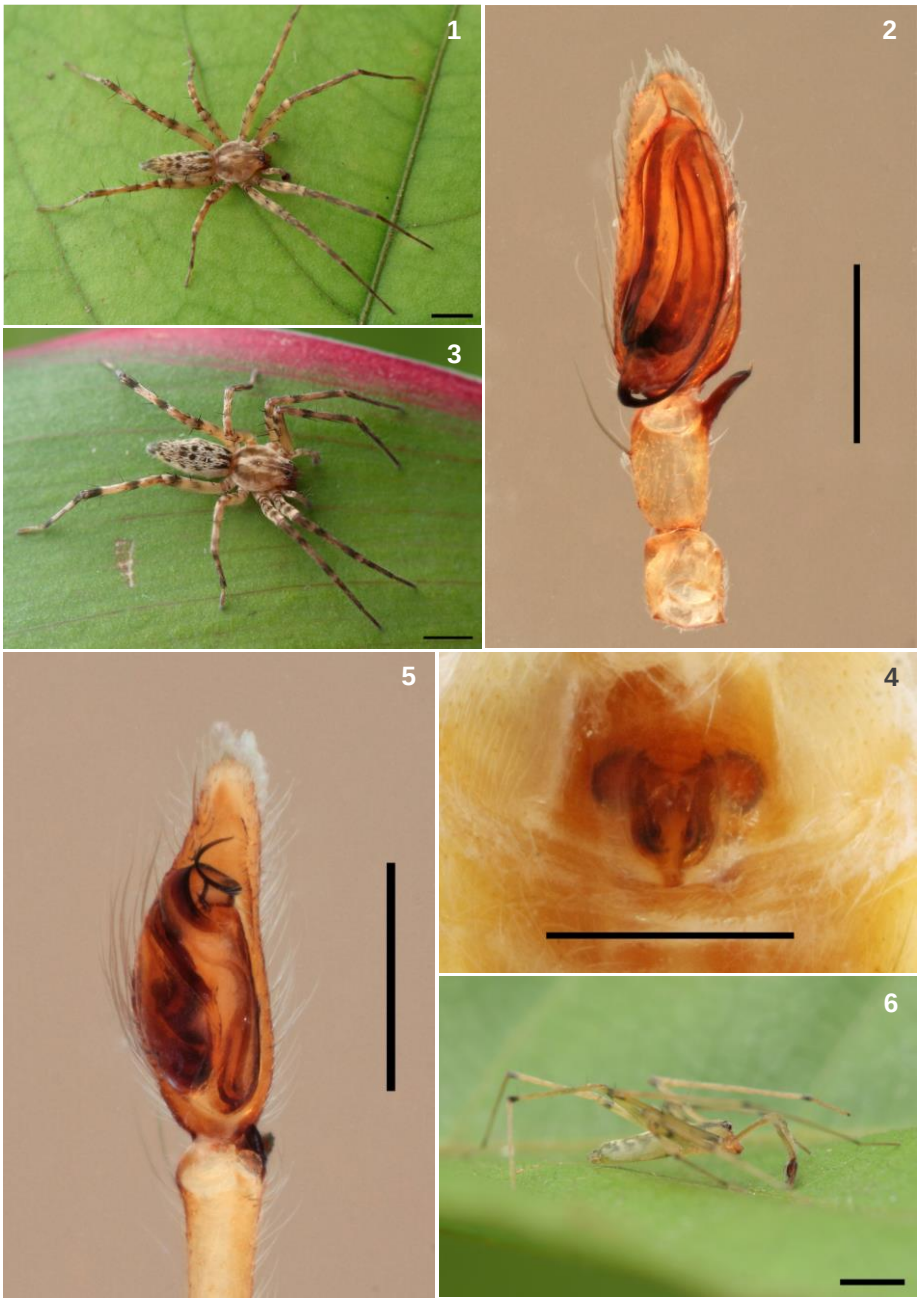

Plate one. Anyphaenidae. 1-6. *Patrera* sp., male 1 and 2, female 3 and 4 (CZPB-ar000063); *Iguarima* sp., male 5 and 6 (CZPB-ar000058). Scales: 2 mm animals, 0,5 mm sexual structures.

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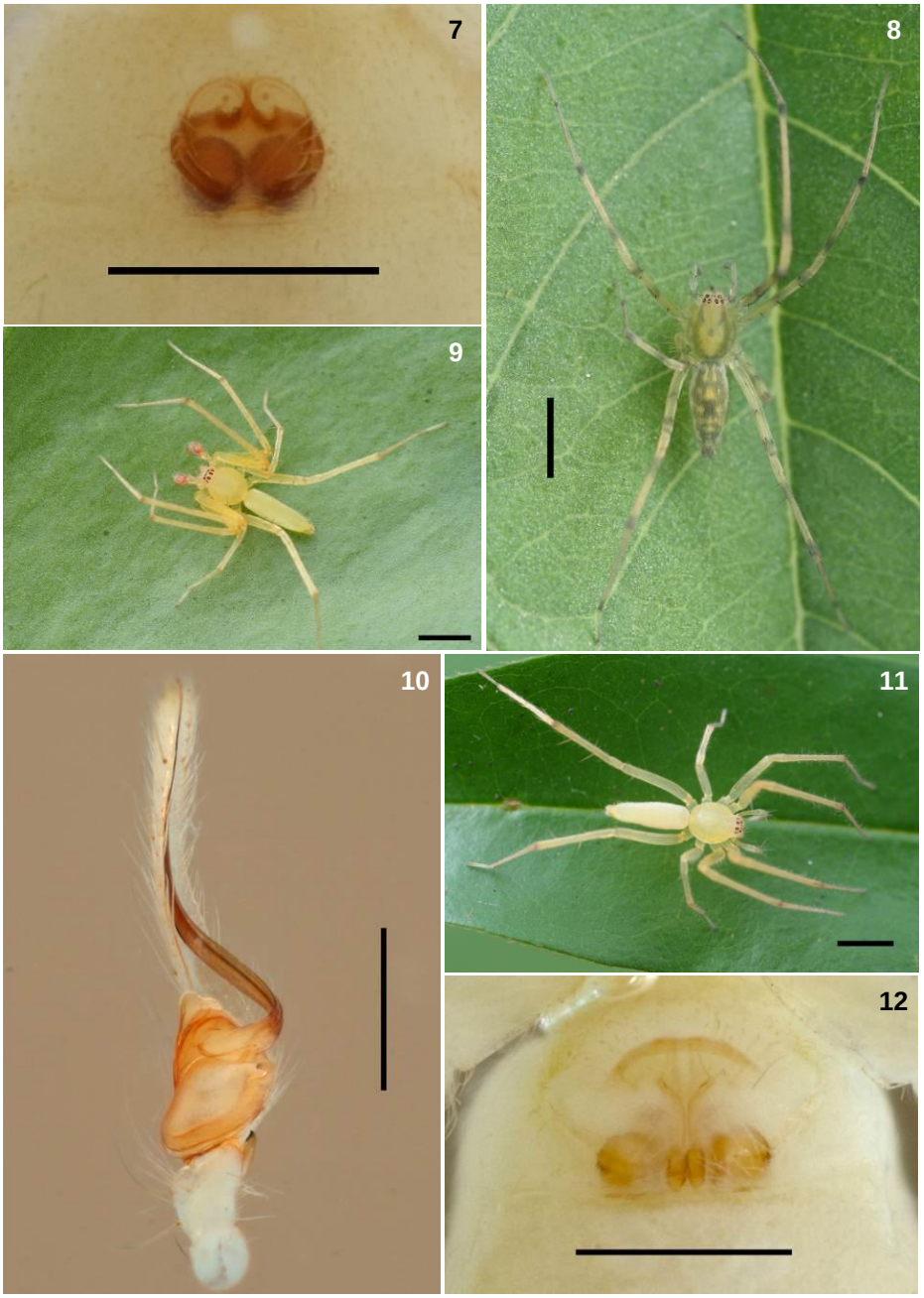

Plate two. Anyphaenidae. 7-12. *Iguarima* sp., female 7 and 8 (CZPB-ar000073); CF *Katissa* sp., male 9 and 10 (CZPB-ar000062), female 11 and 12 (CZPB-ar000060). Scales: 2 mm animals, 0,5 mm sexual structures.

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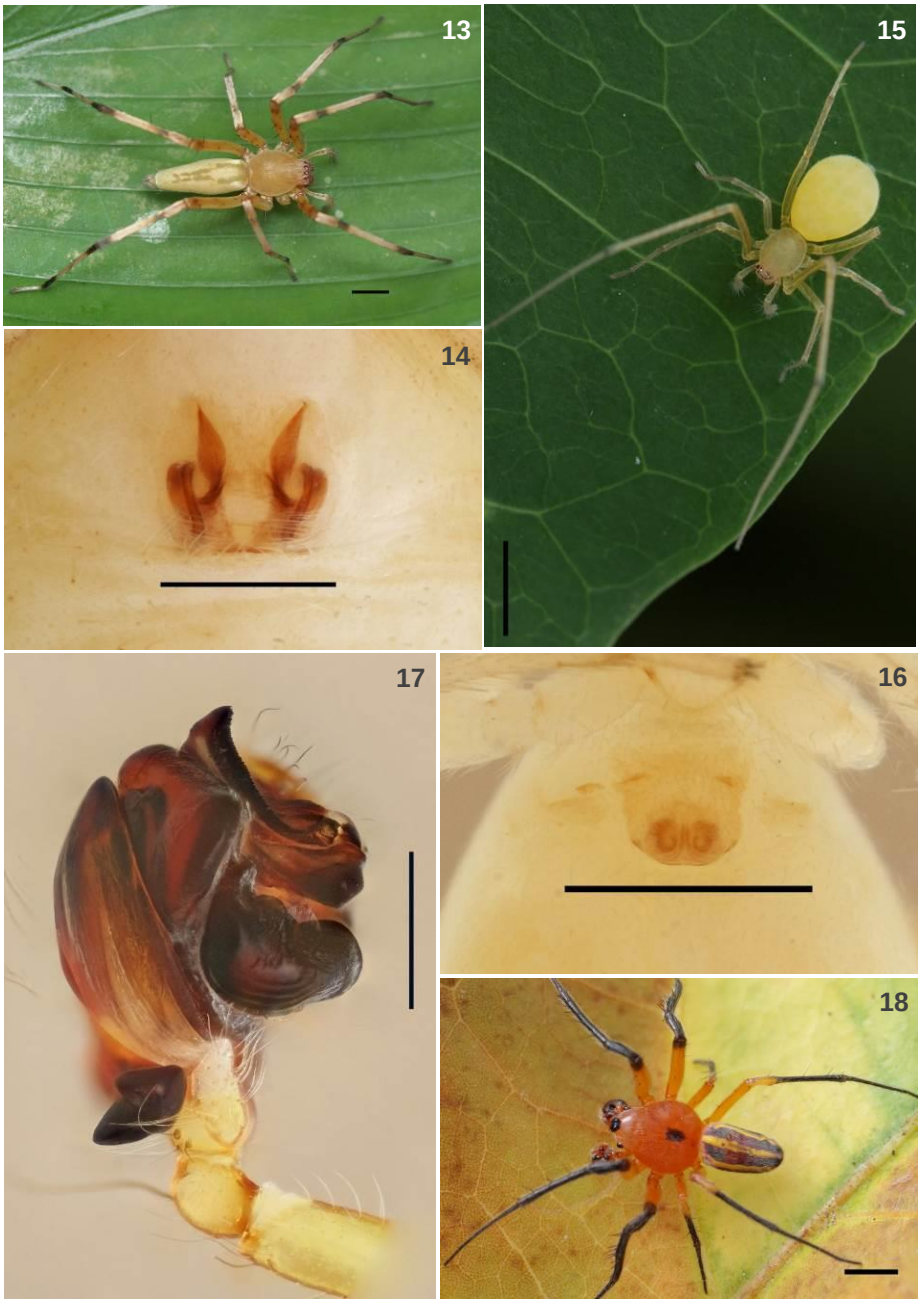

Plate three. Anyphaenidae. 13-16. *Hibana* sp., female 13 and 14 (CZPB-ar000065); *Wulfila* sp., female 15 and 16 (CZPB-ar000061). Araneidae. 17-18. *Alpaida* sp., male 17 and 18 (CZPB-ar000075). Scales: 2 mm animals, 0,5 mm sexual structures.

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Plate four. Araneidae. 19-24. *Alpaida* sp., female 19 and 20 (CZPB-ar000075); *Alpaida trunkata* Keyserling, 1865, male 21 and 22 (CZPB-ar000076), female 23 and 24 (CZPB-ar000379). Scales: 2 mm animals, 0,5 mm sexual structures.

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Plate five. Araneidae. 25-30. *Hypognatha scutata* Perty, 1833, male 25 and 26 (CZPB-ar000097), female 27 and 28 (CZPB-ar000098); *Eustala* sp., male 29 and 30 (CZPB-ar000094). Scales: 2 mm animals, 0,5 mm sexual structures.

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ISSN:2238.1910

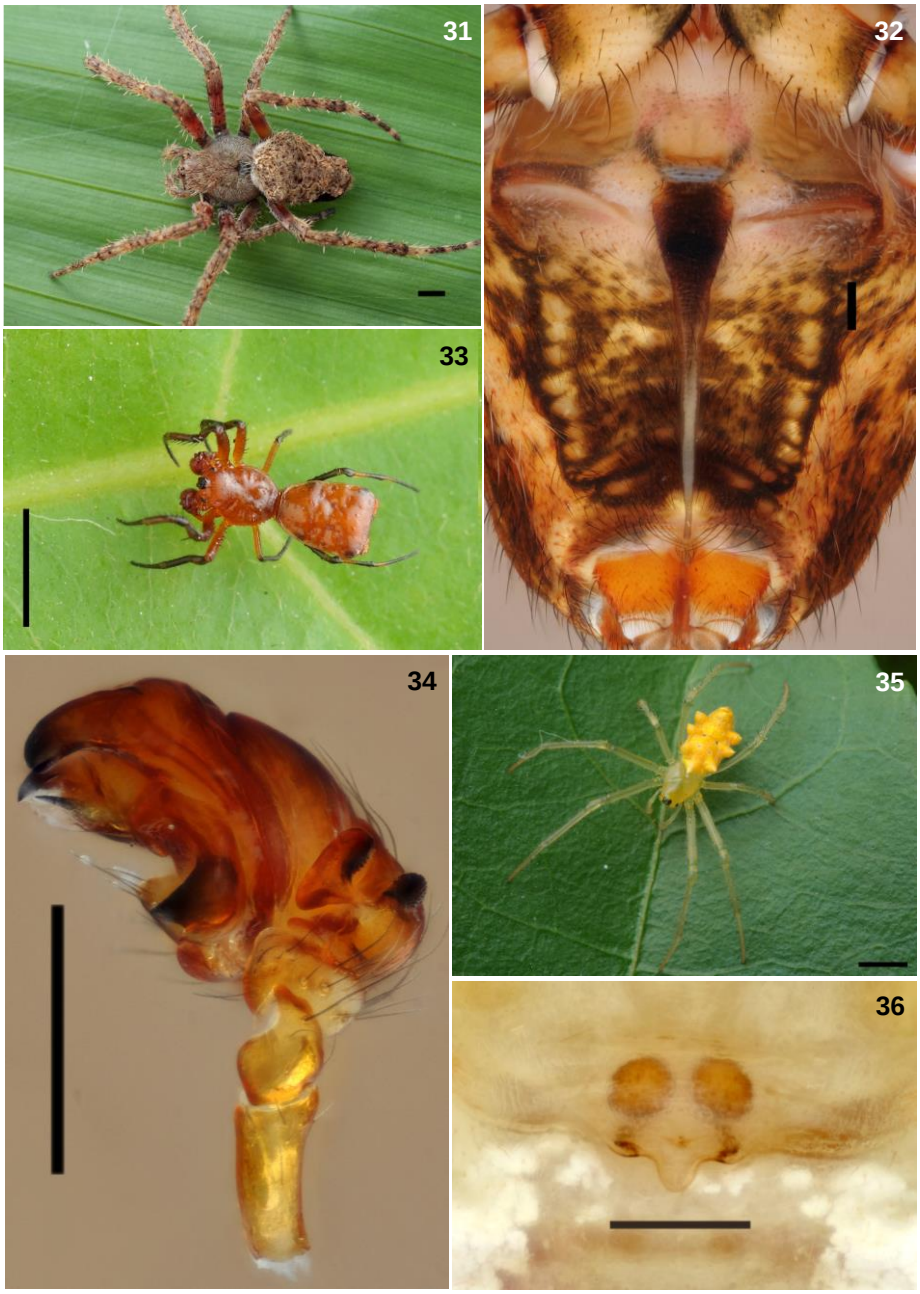

Plate six. Araneidae. 31-36. *Parawixia kochi* Taczanowski, 1873, female 31 and 32 (CZPB-ar000113); *Micrathena aureula* C. L. Koch, 1836, male 33 and 34 (CZPB-ar000087); *Alpaida octolobata* Levi, 1988, female 35 and 36 (CZPB-ar000079). Scales: 2 mm animals, 0,5 mm sexual structures.

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Plate seven. Araneidae. 37-42. *Verrucosa* sp., male 37 and 38 (CZPB-ar000136); *Mangora* sp., female 39 and 40 (CZPB-ar000099); *Micrathena kirbyi* Perty, 1833, male 41 and 42 (CZPB-ar000103). Scales: 2 mm animals, 0,5 mm genitals.

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Plate eight. Araneidae. 43-48. *Micrathena kirbyi* Perty, 1833, female 43 and 44 (CZPB-ar000107); *Wagneriana jelskii* Taczanowski, 1873, male 45 and 46 (CZPB-ar000115); *Wagneriana turrigera* Schenkel, 1953, female 47 and 48 (CZPB-ar000380). Scales: 2 mm animals, 0,5 mm genitals.

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Revista on-line http://www.scientia-amazonia.org
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CIÊNCIAS BIOLÓGICAS

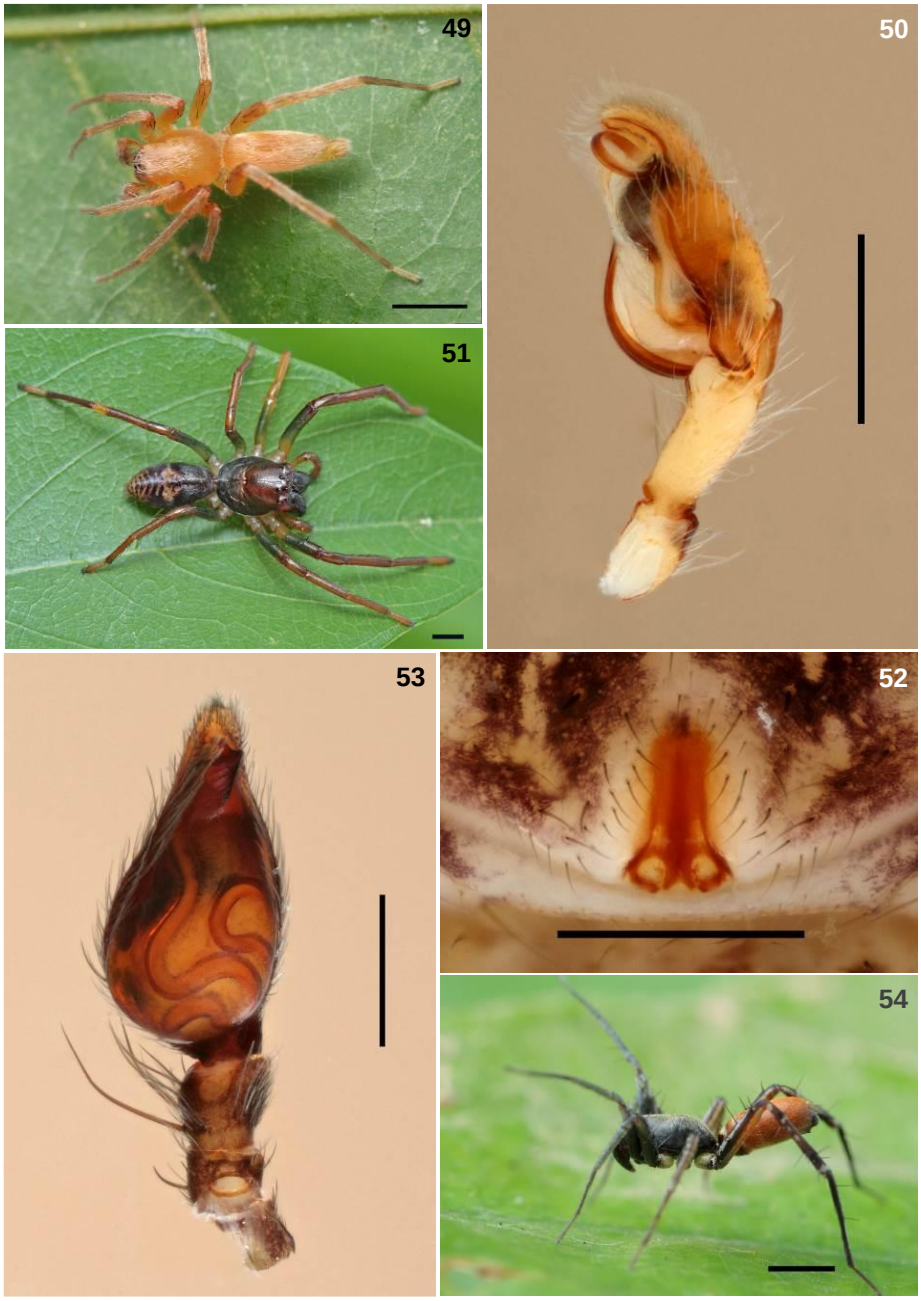

Plate nine. Clubionidae. 49-50. *Elaver multinotata* Chickering, 1937, female 49 and 50 (CZPB-ar000116); Corinnidae. 51-54. CF *Erendira* sp., female 51 and 52 (CZPB-ar000381); *Castianeira* sp., male 53 and 54 (CZPB-ar000382). Scales: 2 mm animals, 0,5 mm genitals.

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Plate ten. Corinnidae. 55-60. *Stethorrhagus lupulus* Simon, 1896, female 55 and 56 (CZPB-ar000124); *Myrmecotypus olympus* Reiskind, 1969, male 57 and 58, female 59 and 60 (CZPB-ar000118). Scales: 2 mm animals, 0,5 mm genitals.

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ISSN:2238.1910

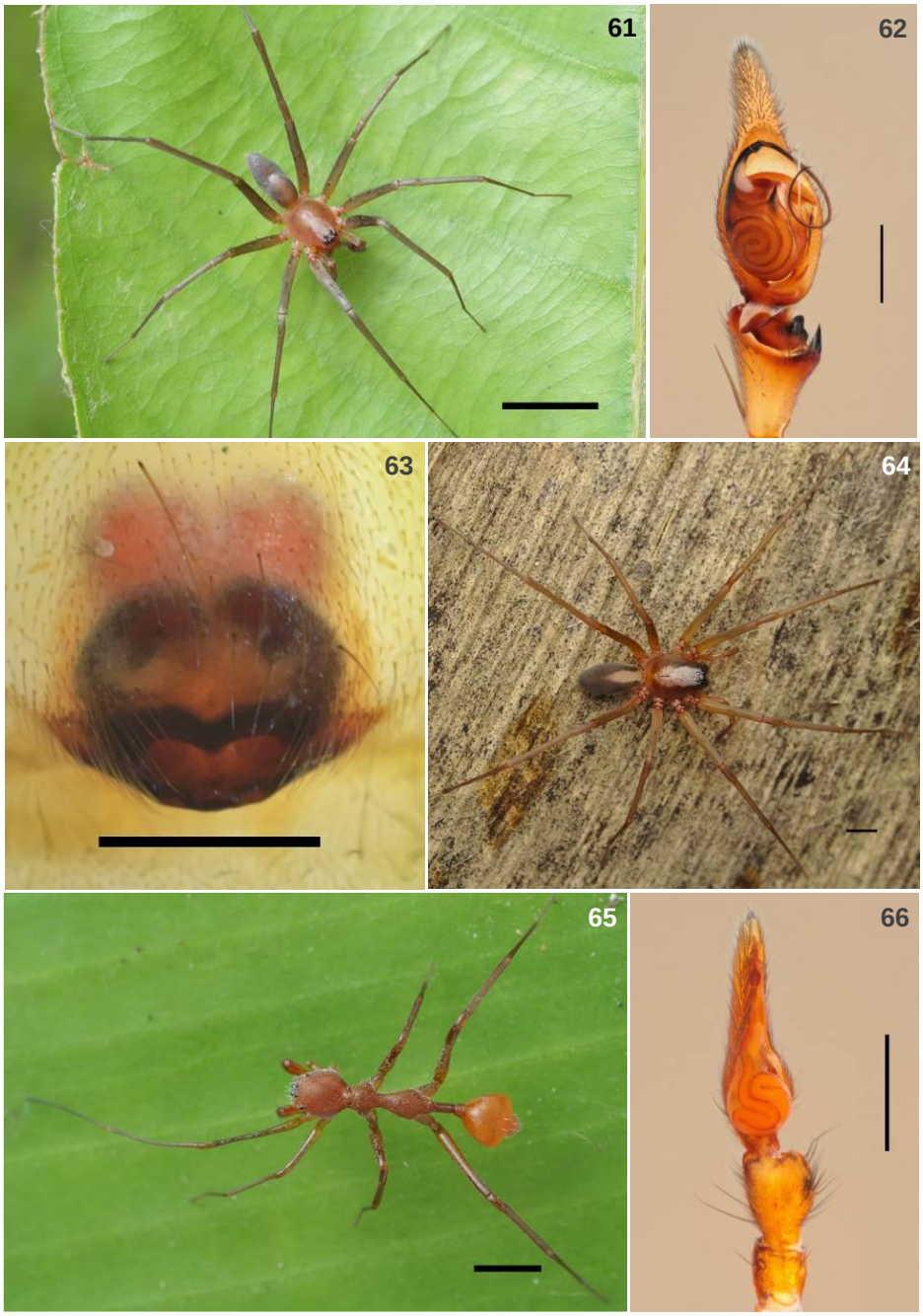

Plate eleven. Corinnidae. 61-66. *Parachemmis hassleri* Gertsch, 1942, male 61 and 62, female 63 and 64 (CZPB-ar000385); *Myrmecium bifasciatum* Taczanowski, 1874, male 65 and 66 (CZPB-ar000122). Scales: 2 mm animals, 0,5 mm genitals.

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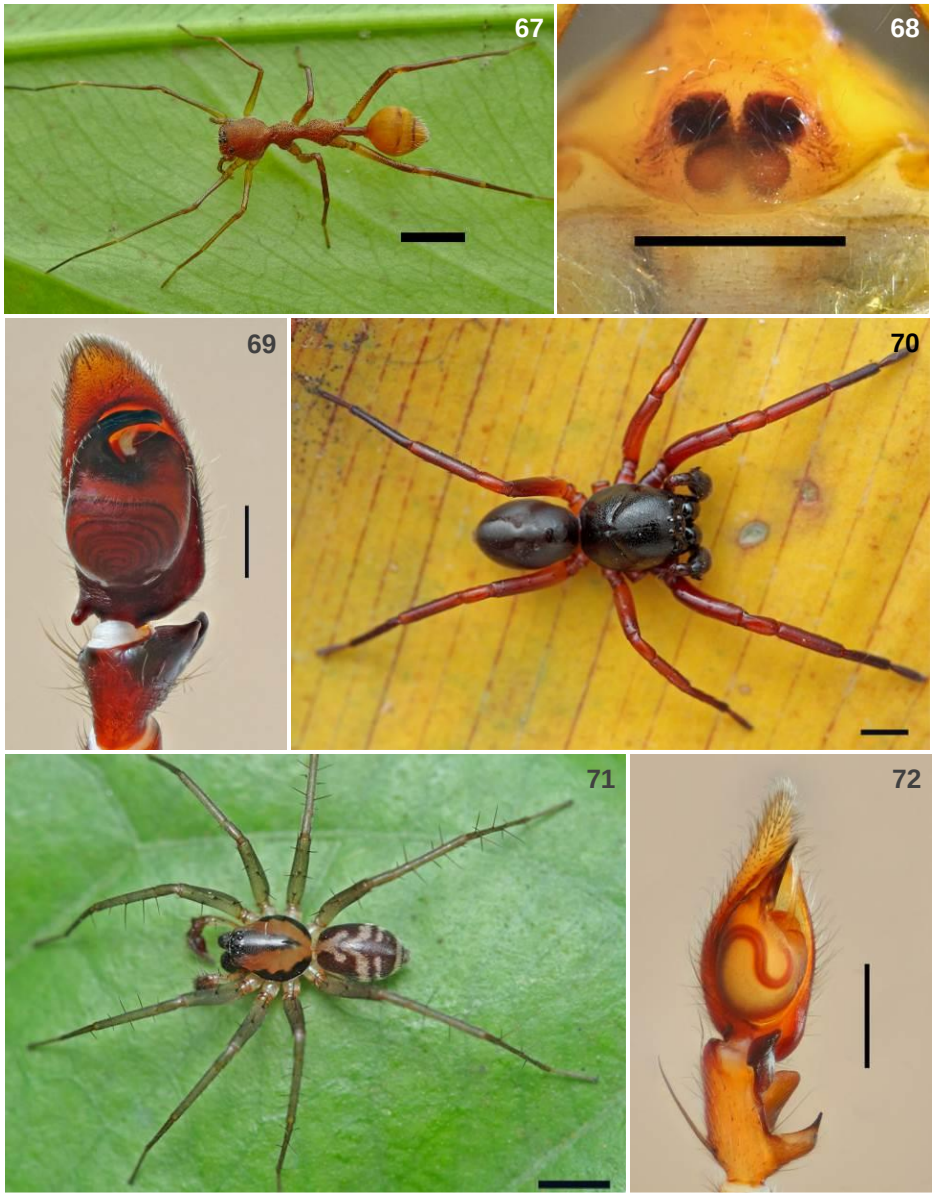

Plate twelve. Corinnidae. 67-72. *Myrmecium bifasciatum* Taczanowski, 1874, female 67 and 68 (CZPB-ar000122); *Simonestus* sp., male 69 and 70 (CZPB-ar000383); *Tupirinna* sp., male 71 and 72 (CZPB-ar000384). Scales: 2 mm animals, 0,5 mm genitals.

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Plate thirteen. Corinnidae. 73-74. *Myrmecotypus niger* Chickering, 1937, male 73 and 74 (CZPB-ar000123). Gnaphosidae. 75-78. *Zimiromus syenus* Buckup & Brescovit, 1993, male 75 and 76 (CZPB-ar000130), female 77 and 78 (CZPB-ar000131). Scales: 2 mm animals, 0,5 mm genitals.

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CIÊNCIAS BIOLÓGICAS

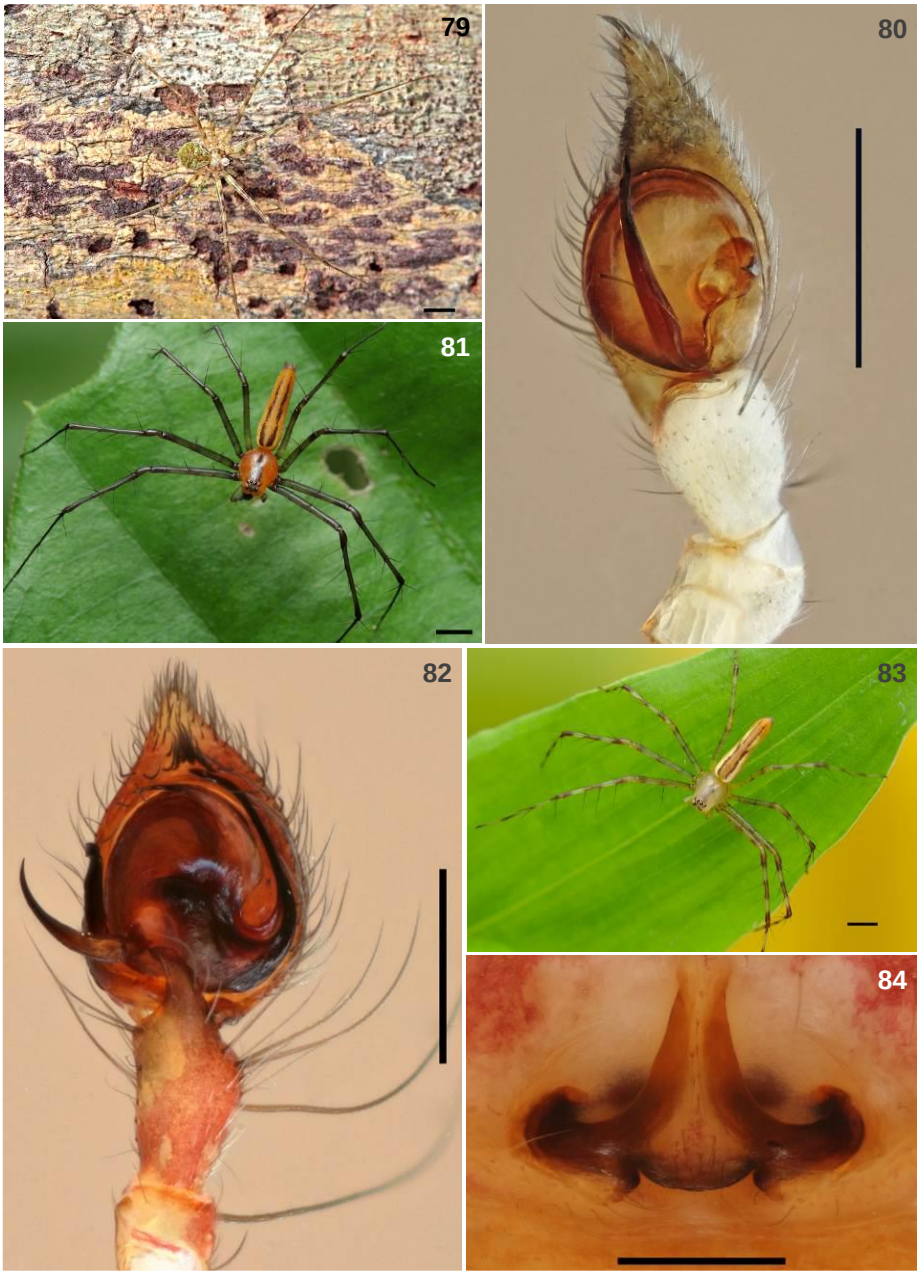

Plate fourteen. Hersillidae. 79-80. *Ypypuera* CF *crucifera* Vellard, 1924, male 79 and 80 (CZPB-ar000134). Oxyopidae. 81-84. *Tapinillus longipes* Taczanowski, 1872, male 81 and 82, female 83 and 84 (CZPB-ar000140). Scales: 2 mm animals, 0,5 mm genitals.

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Scientia Amazonia, v. 8, n.2, CB1-CB53, 2019
Revista on-line http://www.scientia-amazonia.org
ISSN:2238.1910

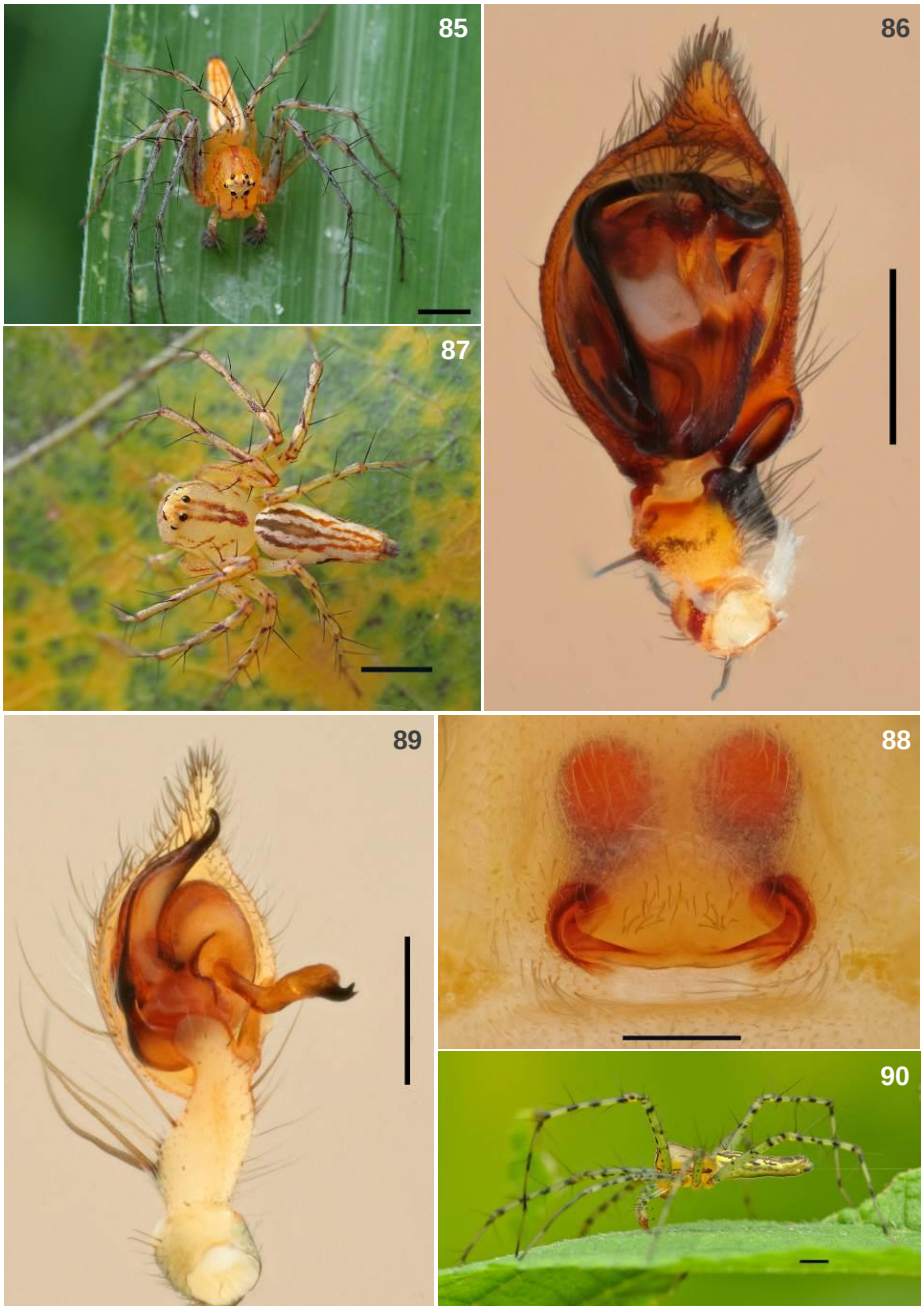

Plate fifteen. Oxyopidae. 85-90. *Oxyopes incertus* Mello-Leitão, 1929, male 85 and 86, female 87 and 88 (CZPB-ar000138); *Peucetia rubrolineata* Keyserling, 1877, male 89 and 90 (CZPB-ar000386). Scales: 2 mm animals, 0,5 mm genitals.

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Revista on-line http://www.scientia-amazonia.org
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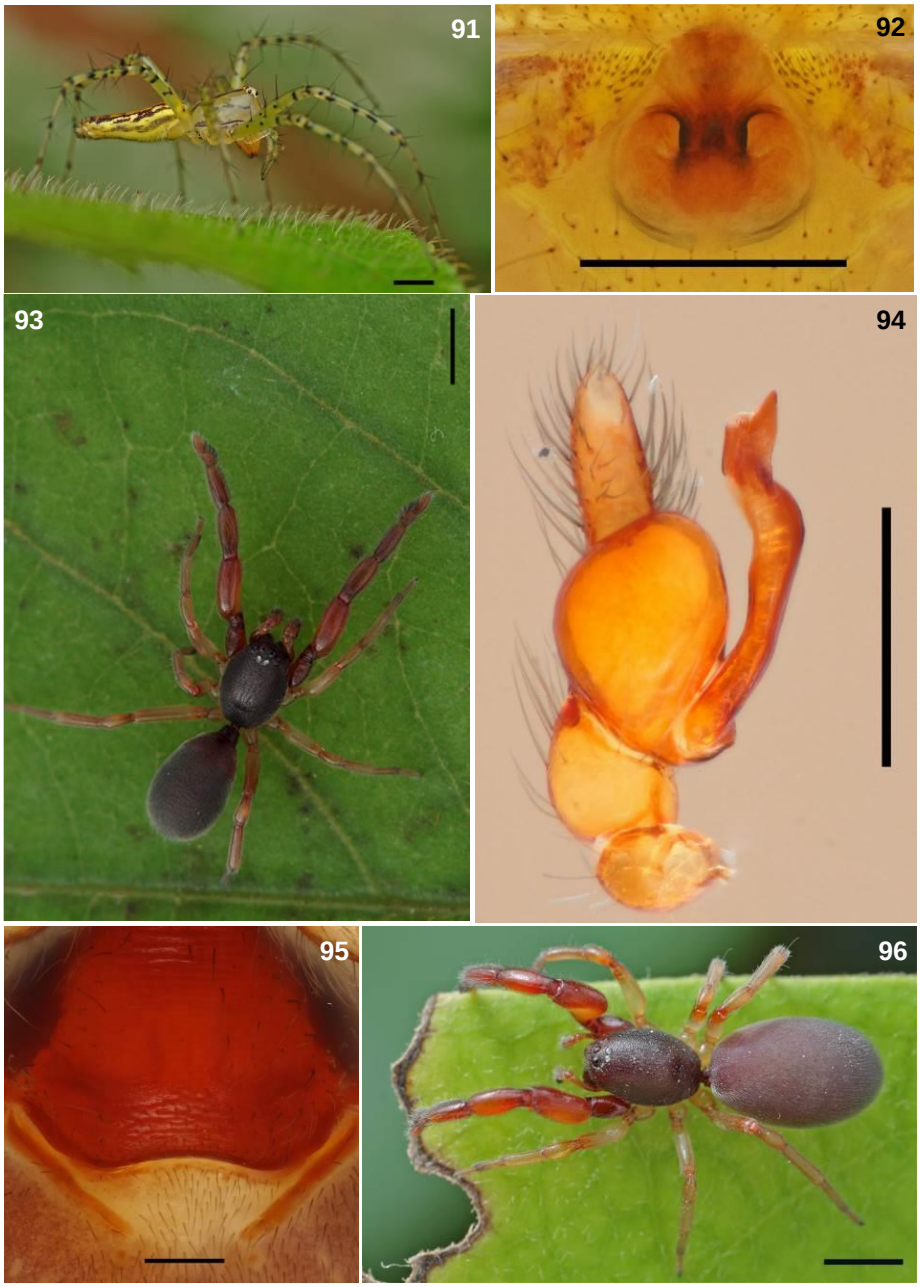

Plate sixteen. Oxyopidae. 91-92. *Peucetia rubrolineata* Keyserling, 1877, female 91 and 92 (CZPB-ar000387). Palpimanidae. 93-96. *Otiothops oblongus* Simon, 1892, male 93 and 94, female 95 and 96 (CZPB-ar000142). Scales: 2 mm animals, 0,5 mm genitals.

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Revista on-line http://www.scientia-amazonia.org
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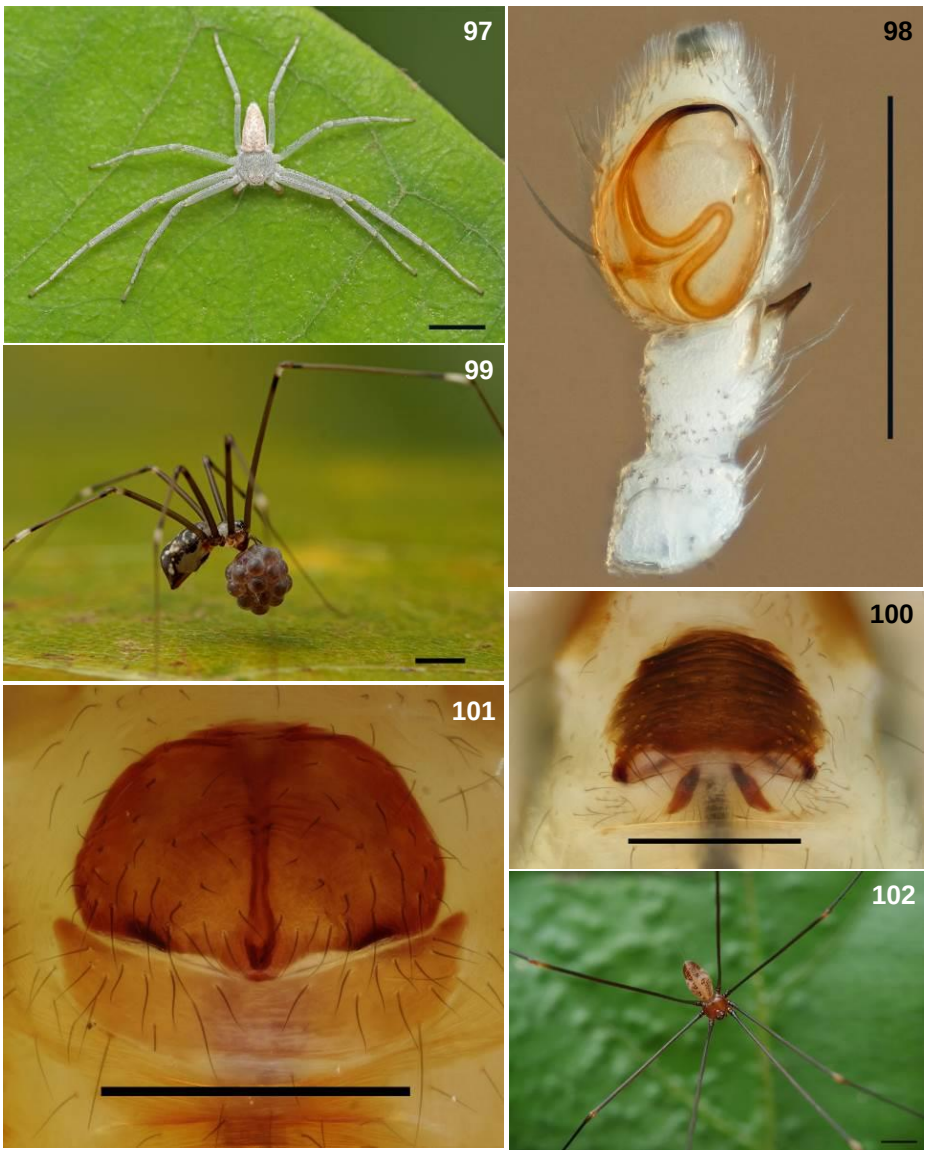

Plate seventeen. Philodromidae. 97-98. *Apollophanes* sp., male 97 and 98 (CZPB-ar000145). Pholcidae. 99-102. *Carapoia fowleri* Huber, 2000, female 99 and 100 (CZPB-ar000148); *Mesabolivar aurantiacus* Mello-Leitão, 1930, female 101 and 102 (CZPB-ar000150). Scales: 2 mm animals, 0,5 mm genitals.

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Scientia Amazonia, v. 8, n.2, CB1-CB53, 2019
Revista on-line http://www.scientia-amazonia.org
ISSN:2238.1910

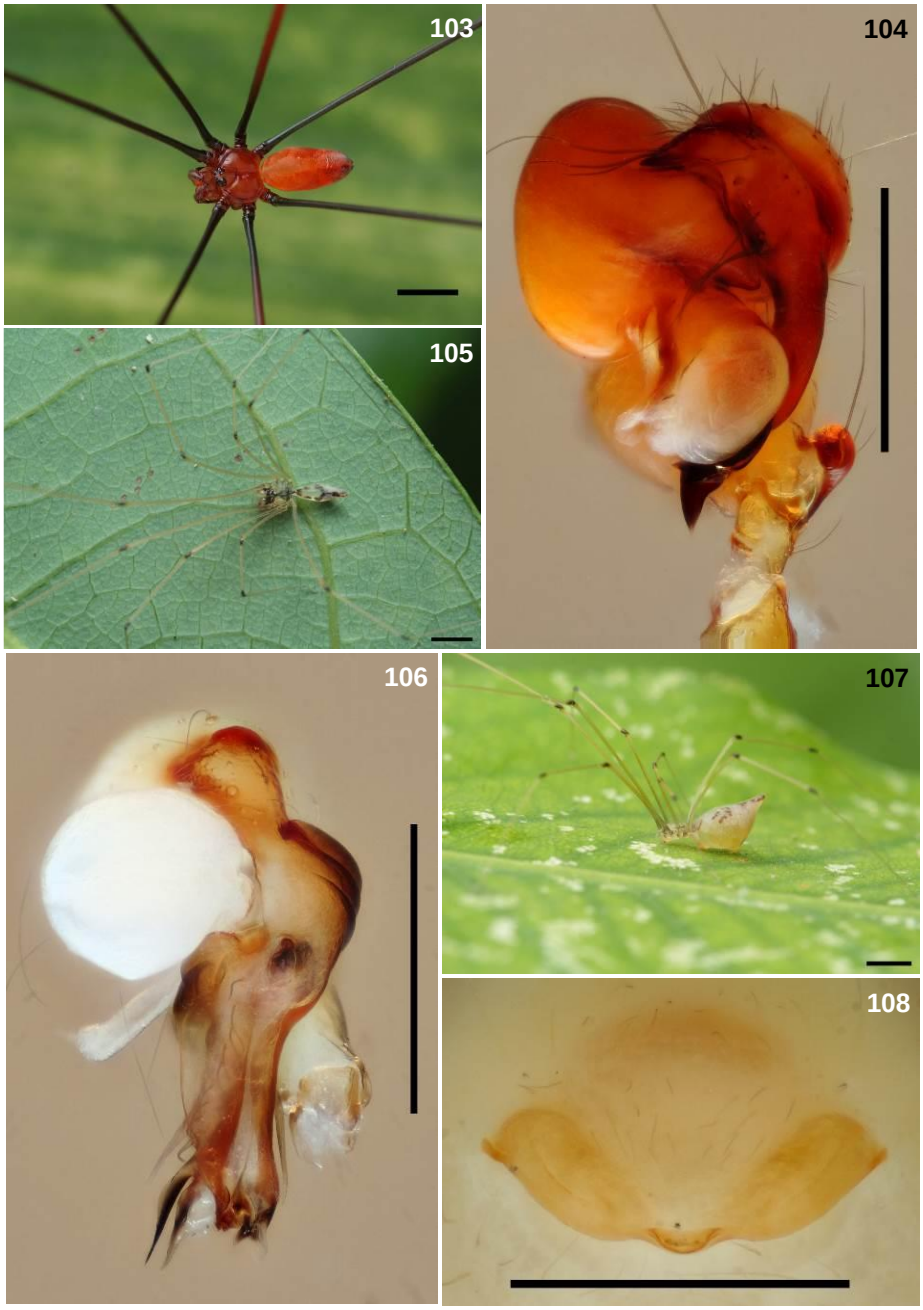

Plate eighteen. Pholcidae. 103-108. *Mesabolivar aurantiacus* Mello-Leitão, 1930, male 103 and 104 (CZPB-ar000150); *Metagonia taruma* Huber, 2000, male 105 and 106, female 107 and 108 (CZPB-ara000154). Scales: 2 mm animals, 0,5 mm genitals.

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Revista on-line http://www.scientia-amazonia.org
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CIÊNCIAS BIOLÓGICAS

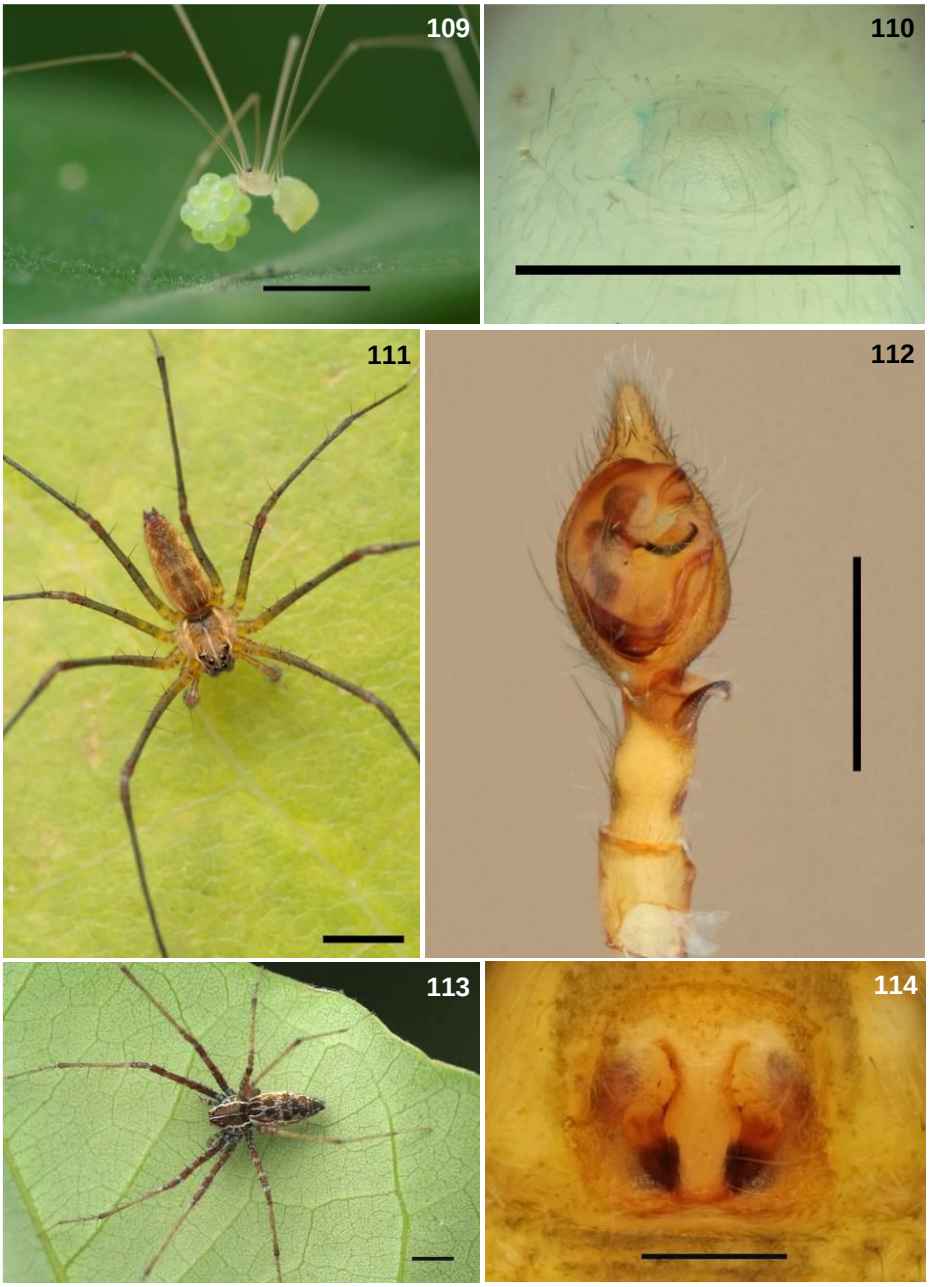

Plate nineteen. Pholcidae. 109-110. *Litoporus dimona* Huber, 2000, female 109 and 110 (CZPB-ar000152). Pisauridae. 111-114. A*rchitis tenuis* Simon, 1898, male 111 and 112 (CZPB-ar000163), female 113 and 114 (CZPB-ar000162). Scales: 2 mm animals, 0,5 mm genitals.

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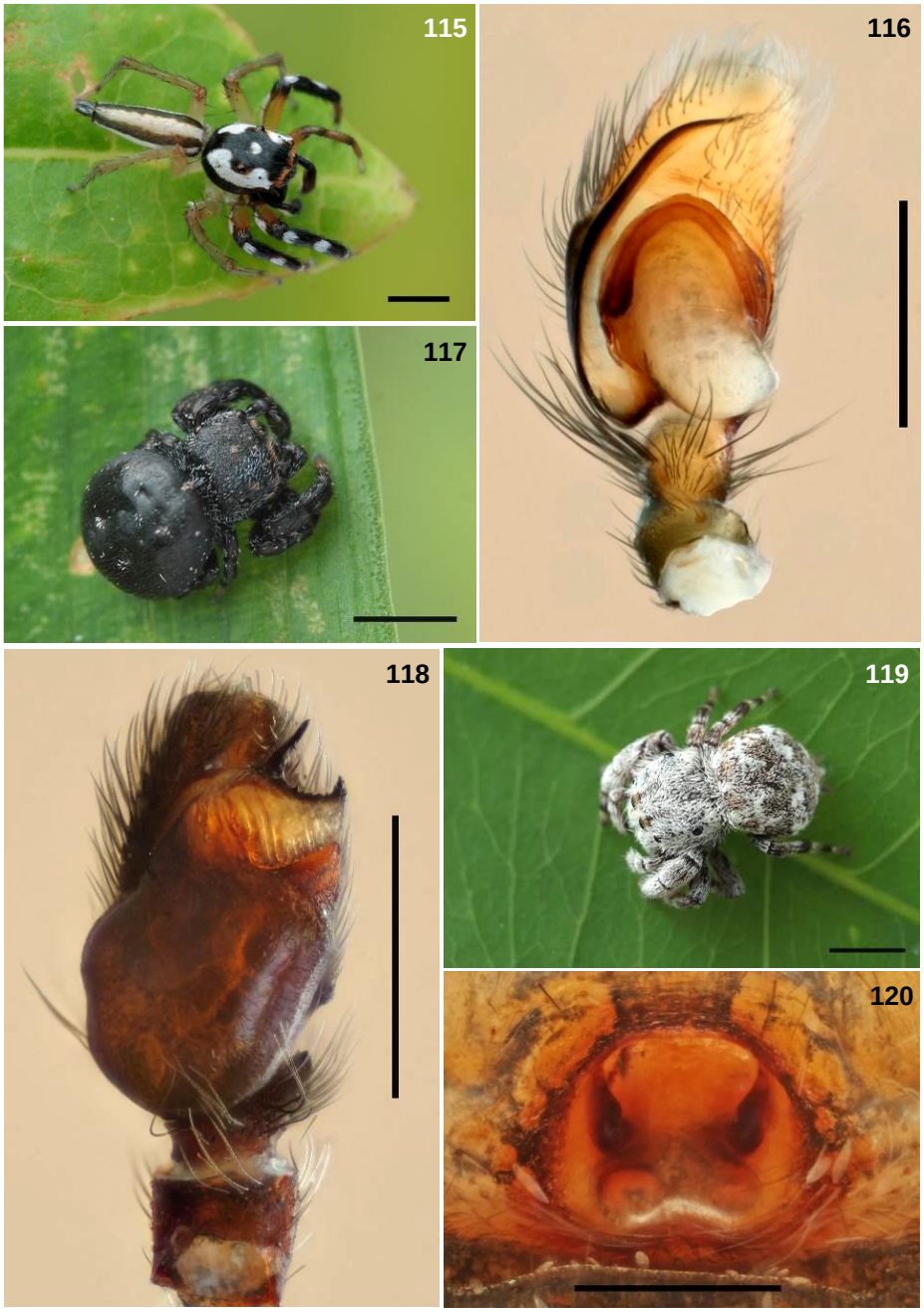

Plate twenty. Salticidae. 115-120. *Chira trivitata* Taczanowski, 1871, male 115 and 116 (CZPB-ar000339); *Beata maccuni* Peckham & Peckham, 1895, male 117 and 118 (CZPB-ar000338), female 119 and 120 (CZPB-ar000388). Scales: 2 mm animals, 0,5 mm genitals.

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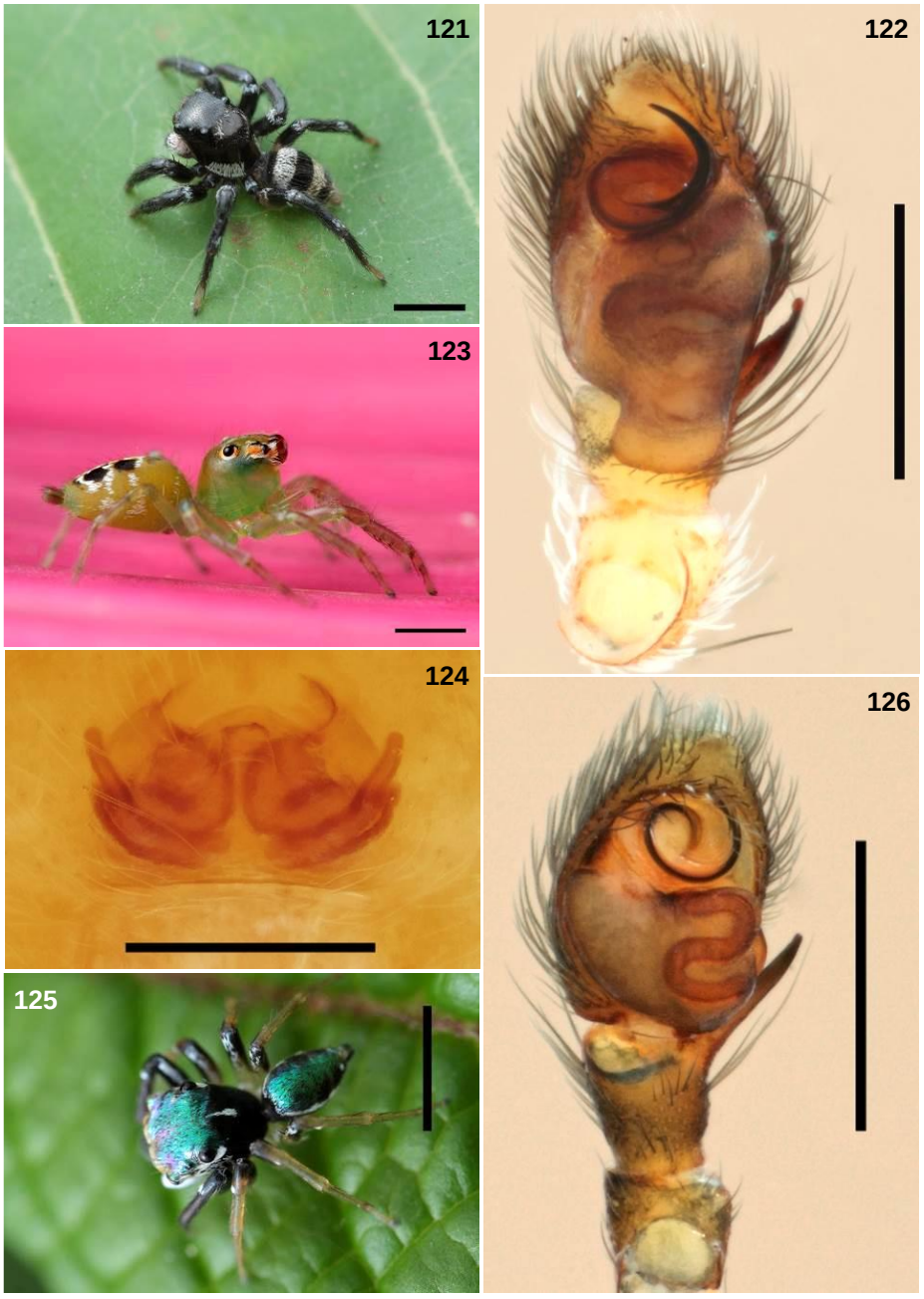

Plate twenty one. Salticidae. 121-126. *Corythalia* sp., male 121 and 122 (CZPB-ar000341); *Acragas longimanus* Simon, 1900, female 123 and 124 (CZPB-ar000389); *Sidusa viridiaurea* Simon, 1902, male 125 and 126 (CZPB-ar000340). Scales: 2 mm animals, 0,5 mm genitals.

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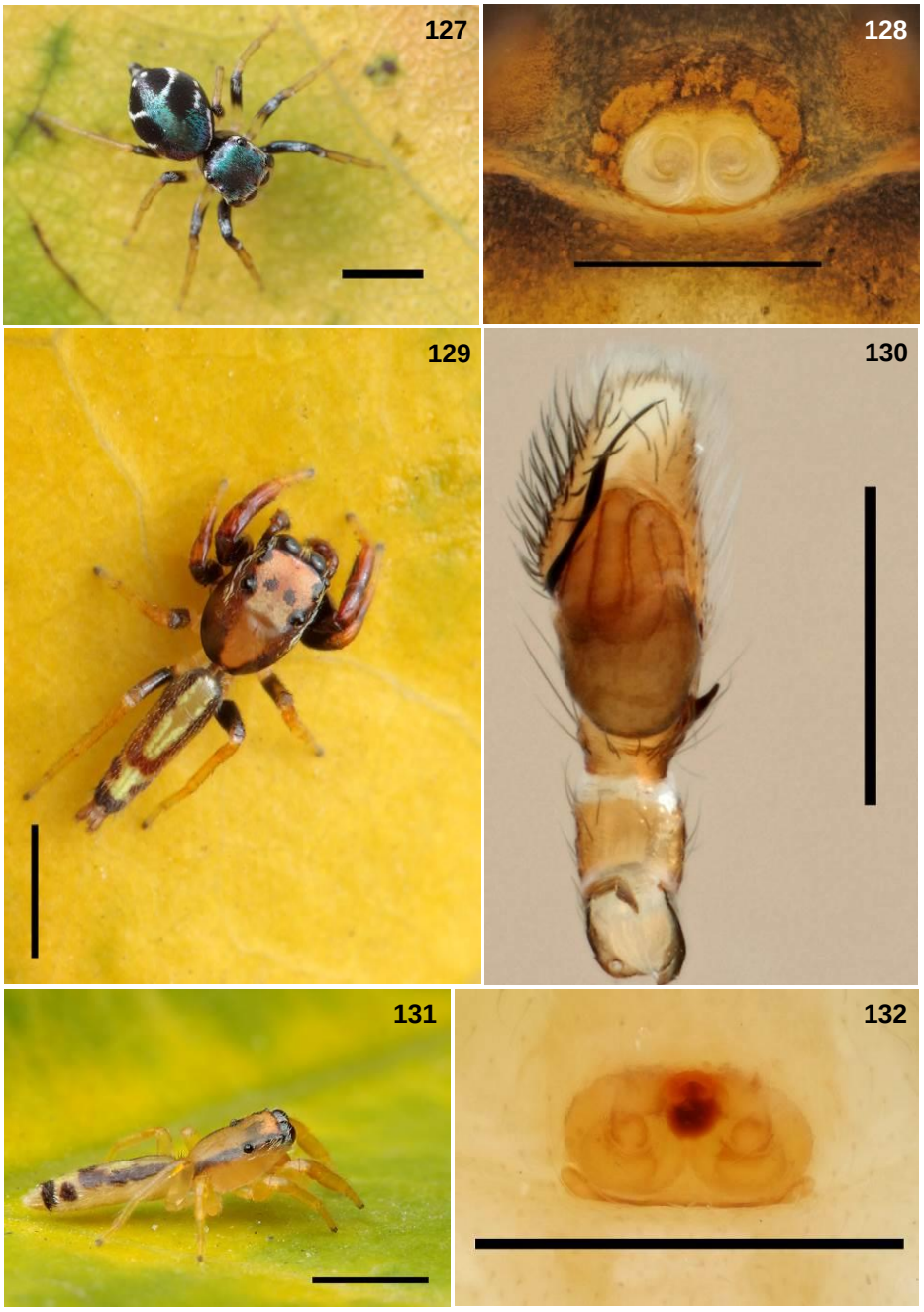

Plate twenty two. Salticidae. 127-132. *Sidusa viridiaurea* Simon, 1902, female 127 and 128 (CZPB-ar000340); *Cotinusa septempuctata* Simon, 1900, male 129 and 130, female 131 and 132 (CZPB-ar000343). Scales: 2 mm animals, 0,5 mm genitals.

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Plate twenty three. Salticidae. 133-138. *Ceriomura* CF *cruenta* Peckham & Peckham, 1894, male 133 and 134 (CZPB-ar000390); *Erica* sp., female 135 and 136 (CZPB-ara000347); *Eustiromastix* sp., male 137 and 138 (CZPB-ar000348). Scales: 2 mm animals, 0,5 mm genitals.

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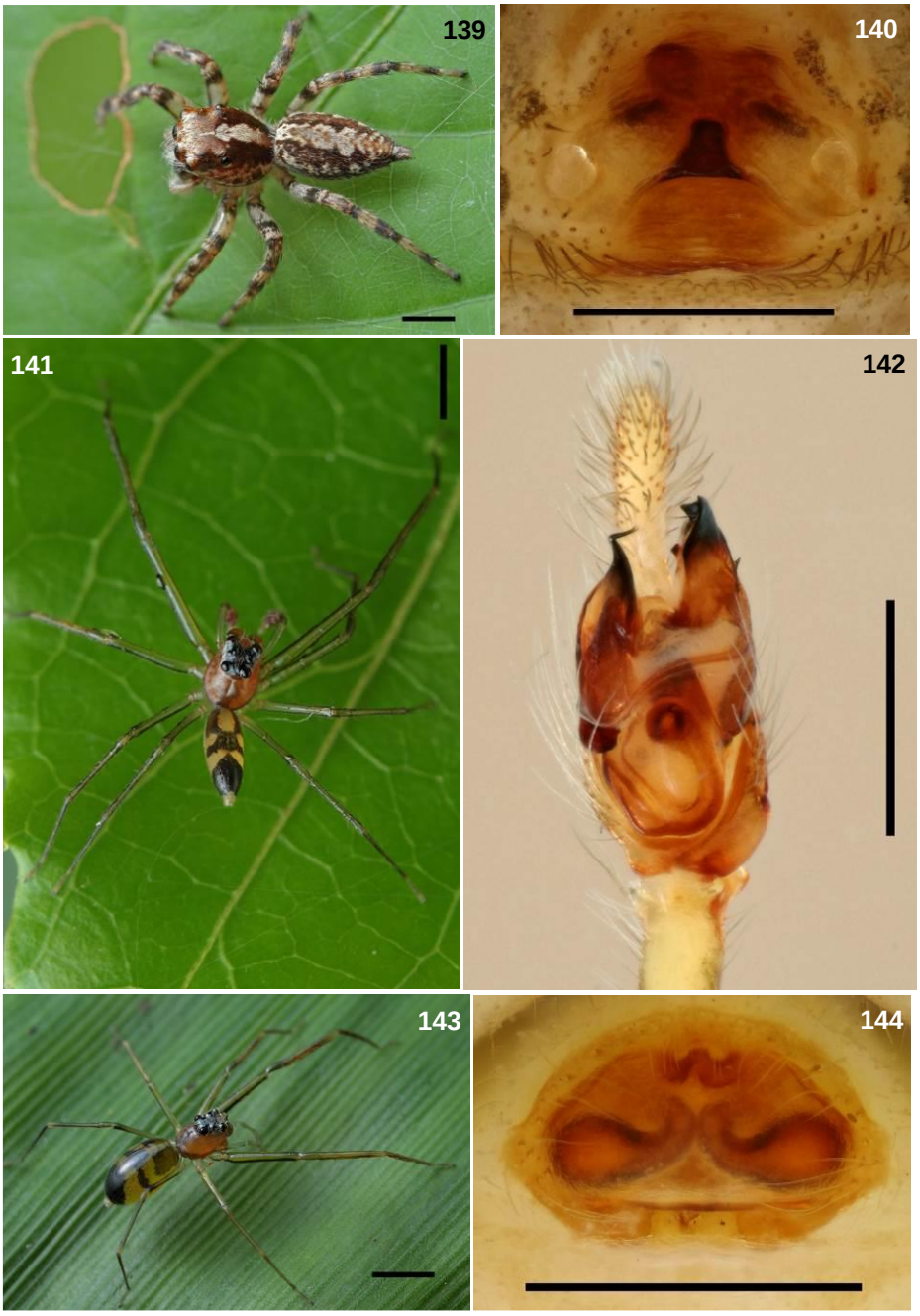

Plate twenty four. Salticidae. 139-144. *Eustiromastix* sp., female 139 and 140 (CZPB-ar000348); *Lyssomanes longipes* Taczanowski, 1871, male 141 and 142 (CZPB-ar000391), female 143 and 144 (CZPB-ar000392). Scales: 2 mm animals, 0,5 mm genitals.

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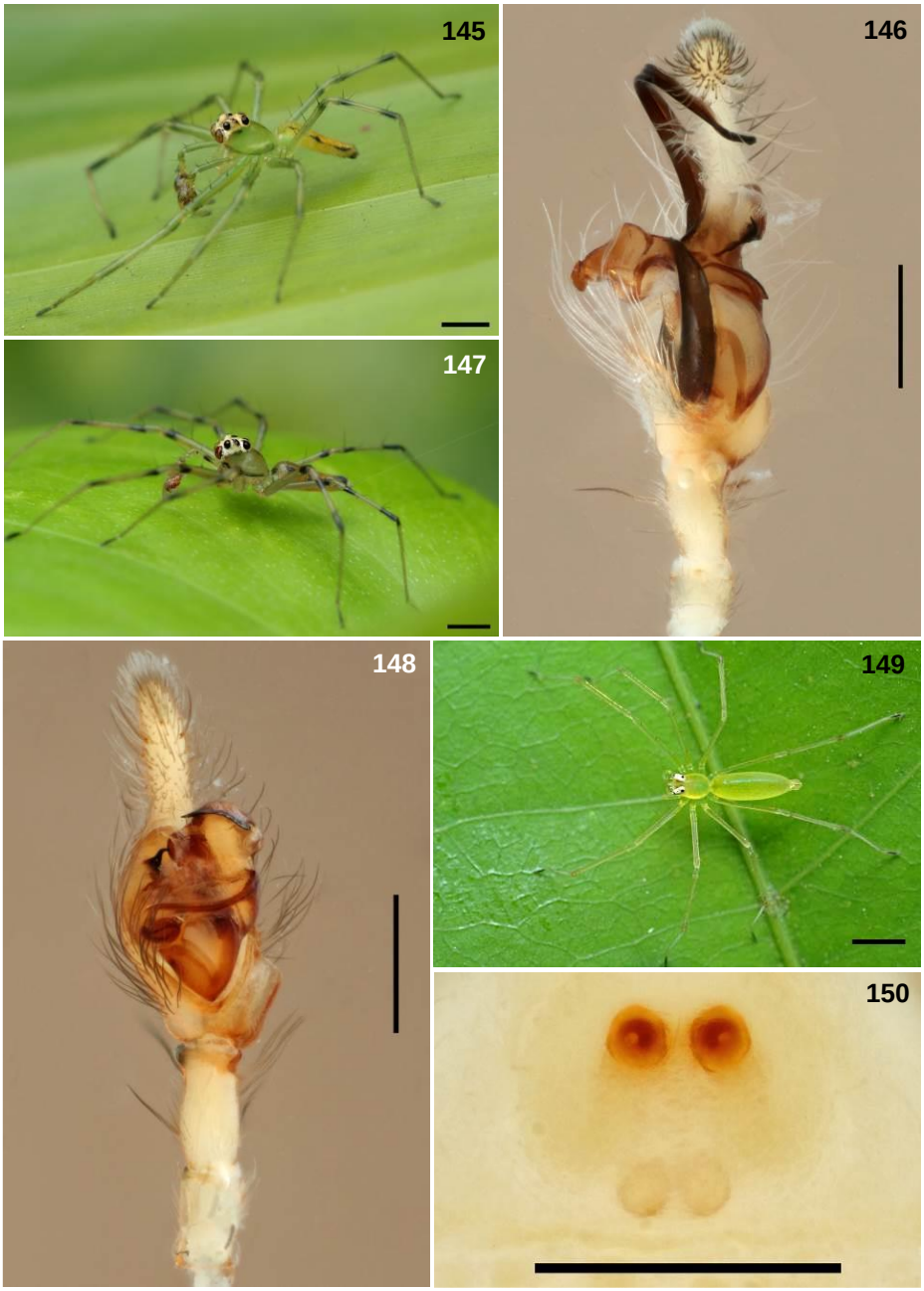

Plate twenty five. Salticidae. 145-150. *Lyssomanes amazonicus* Peckham, Peckham & Wheeler, 1889, male 145 and 146 (CZPB-ar000393); *Lyssomanes nigropcitus* Peckham, Peckham & Wheeler 1989, male 147 and 148 (CZPB-ar000395); *Chinoscopus gracilis* Taczanowski, 1872, female 149 and 150 (CZPB-ar000394). Scales: 2 mm animals, 0,5 mm genitals.

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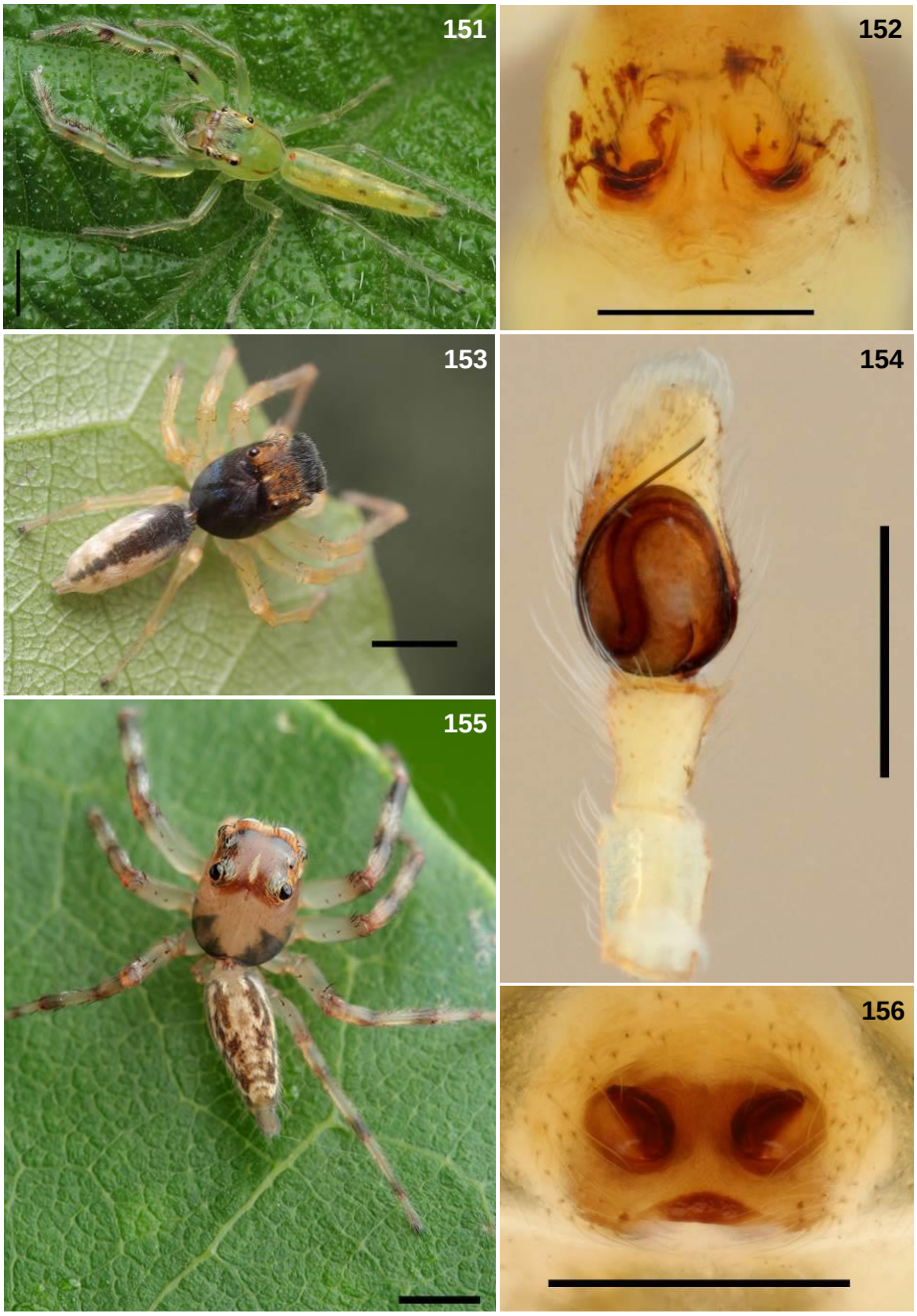

Plate twenty six. Salticidae. 151-156. *Itata* sp., female 151 and 152 (CZPB-ar000396); *Hypaeus frontosus* Simon, 1900, male 153 and 154 (CZPB-ar000355); *Hypaeus miles* Simon, 1900, female 155 and 156 (CZPB-ar000354). Scales: 2 mm animals, 0,5 mm genitals.

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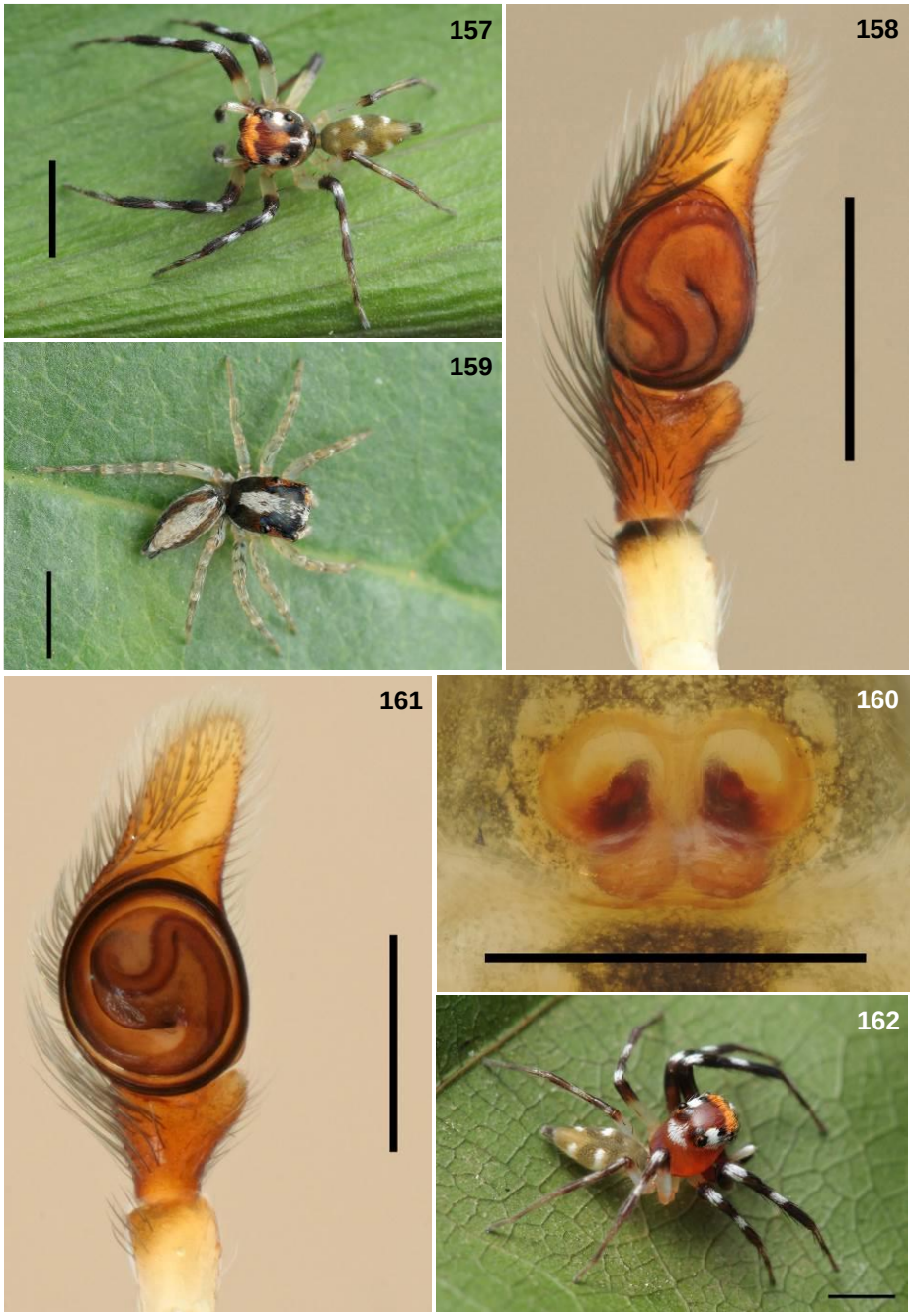

Plate twenty seven. Salticidae. 157-162. *Noegus actinosus* Simon, 1900, male 157 and 158 (CZPB-ar000359); *Maeota* sp., female 159 and 160 (CZPB-ar000356); *Noegus niveomarginatus* Simon, 1900, male 161 and 162 (CZPB-ar000360). Scales: 2 mm animals, 0,5 mm genitals.

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Plate twenty eight. Salticidae. 163-168. *Noegus niveomarginatus* Simon, 1900, female 163 and 164 (CZPB-ar000362); *Mago acutidens* Simon, 1900, male 165 and 166 (CZPB-ar000397), female 167 and 168 (CZPB-ar000398). Scales: 2 mm animals, 0,5 mm genitals.

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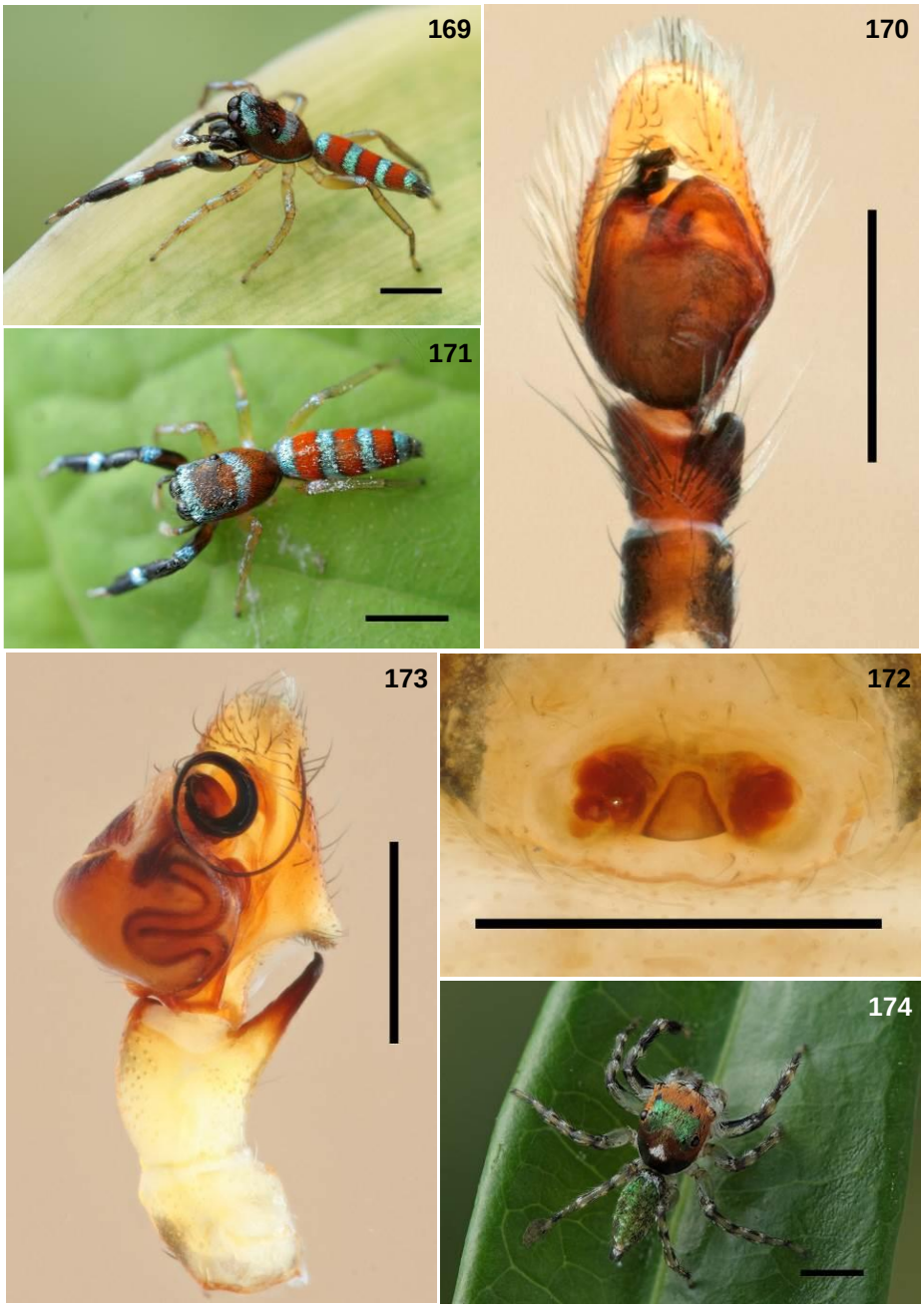

Plate twenty nine. Salticidae. 169-174. *Psecas* sp., male 169 and 170 (CZPB-ar000370), female 171 and 172 (CZPB-ar000369); *Sidusa anguilitarsis* Simon, 1902, male 173 and 174 (CZPB-ar000371). Scales: 2 mm animals, 0,5 mm genitals.

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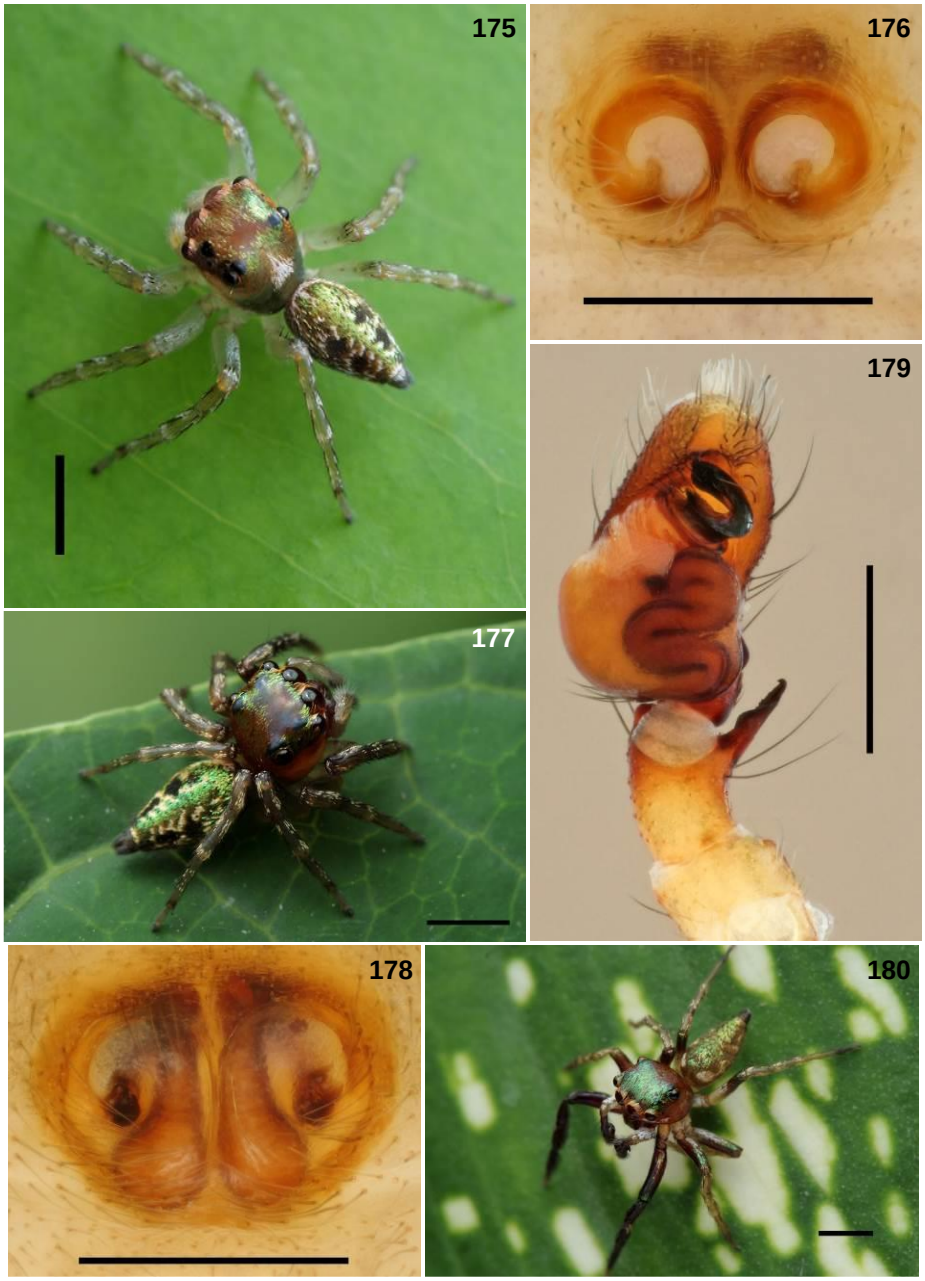

Plate thirty. Salticidae. 169-174. *Sidusa anguilitarsis* Simon, 1902, female 175 and 176 (CZPB-ar000371); *Sidusa* sp., female 177 and 178 (CZPB-ar000374), male 179 and 180 (CZPB-ar000373). Scales: 2 mm animals, 0,5 mm genitals.

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Plate thirty one. Salticidae. 181-186. *Soesilarishius* sp., male 181 and 182 (CZPB-ar000400), female 183 and 184 (CZPB-ar000401); *Scopocira tenella* Simon, 1900, male 185 and 186 (CZPB-ar000402). Scale 2 mm animals and 0,5 mm genitals.

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Plate thirty two. Salticidae. 187-192. *Synemosyna paraensis* Galiano, 1967, feamale 187 and 188 (CZPB-ar000376); *Soesilarishius amrishi* Makhan, 2007, male 189 and 190 (CZPB-ar000399); *Colonus pseustes* Chamberlin & Ivie, 1936, female 191 and 192 (CZPB-ar000378). Scales: 2 mm animals, 0,5 mm genitals.

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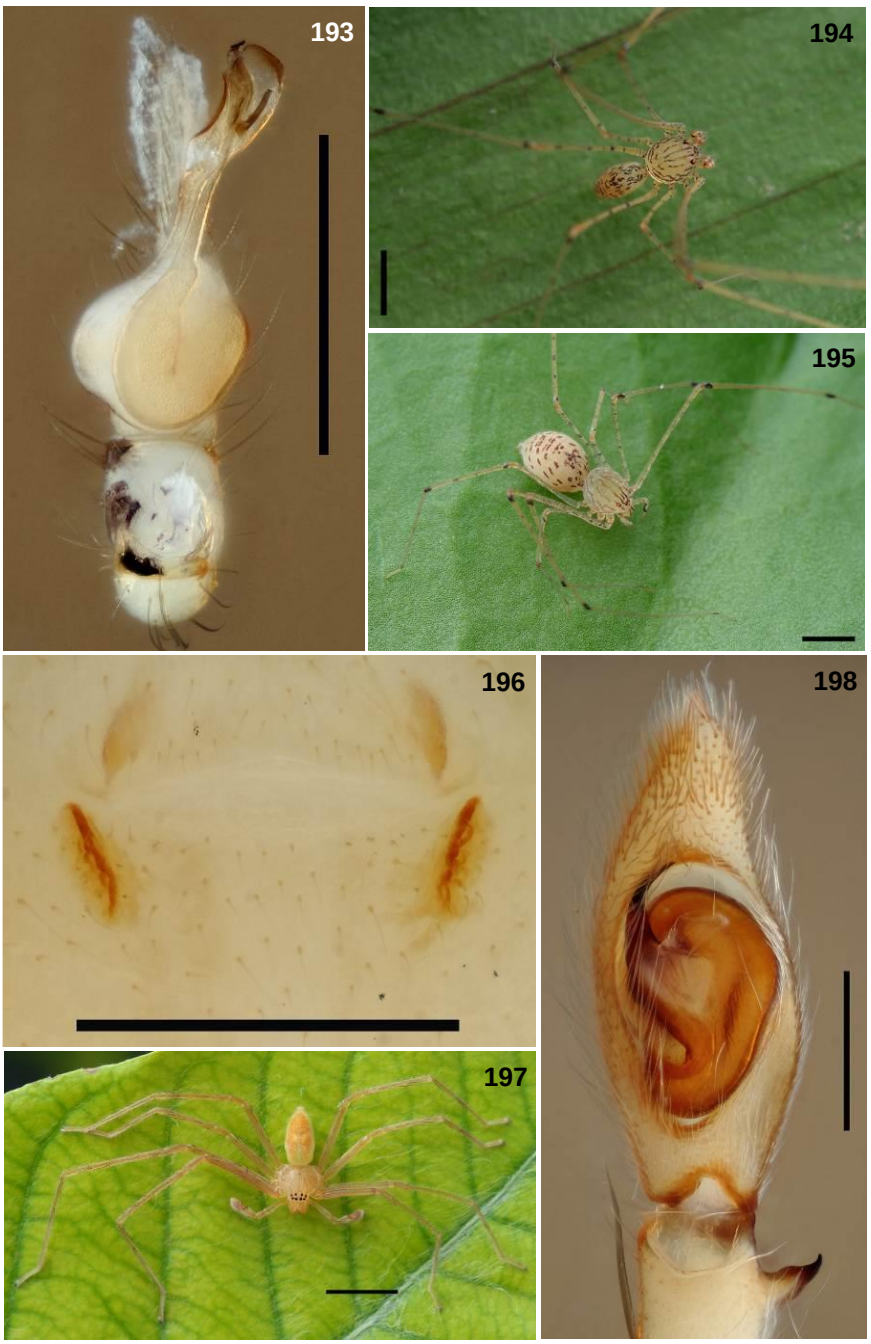

Plate thirty three. Scytodidae. 193-196. *Scytodes* sp., male 193 and 194, female 195 and 196 (CZPB-ar000174). Sparassidae. 197-198. *Olios* sp01., male 197 and 198 (CZPB-ar000184). Scales: 2 mm animals, 0,5 mm genitals (image 197 scale 5 mm).

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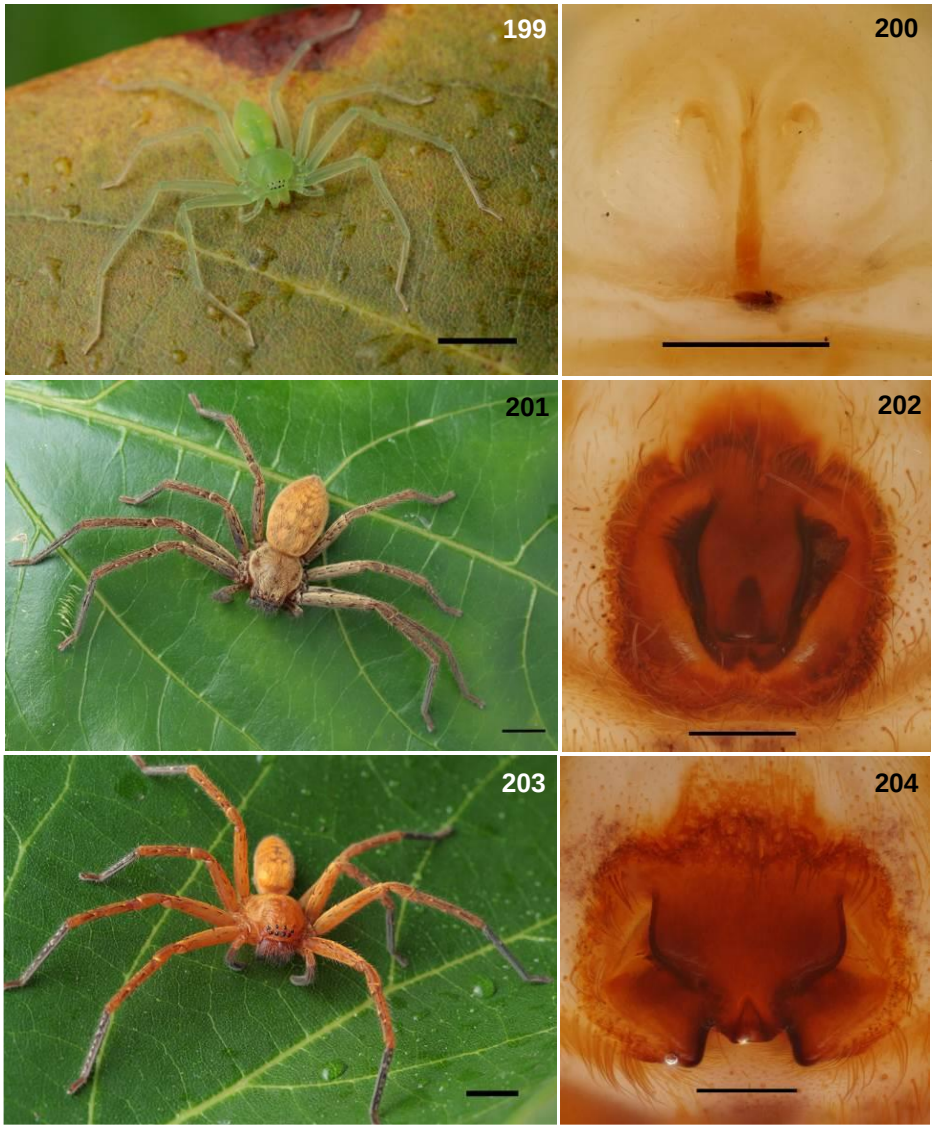

Plate thirty four. Sparassidae. 199-204. *Olios* sp01., female 199 and 200 (CZPB-ar000183); *Nungara* sp01, female 201 and 202 (CZPB-ar000187); *Nungara* sp02., female 203 and 204 (CZPB-ar000185). Scales: 5 mm animals, 0,5 mm genitals.

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Plate thirty five. Tetragnatidae. 205-208. *Leucauge* sp01., male 205 and 206 (CZPB-ar000190); *Leucauge* sp02., female 207 and 208 (CZPB-ar000189). Theridiidae. 209-210. *Ariamnes* sp., male 209 and 210 (CZPB-ar000403). Scales: 2 mm animals, 0,5 mm genitals.

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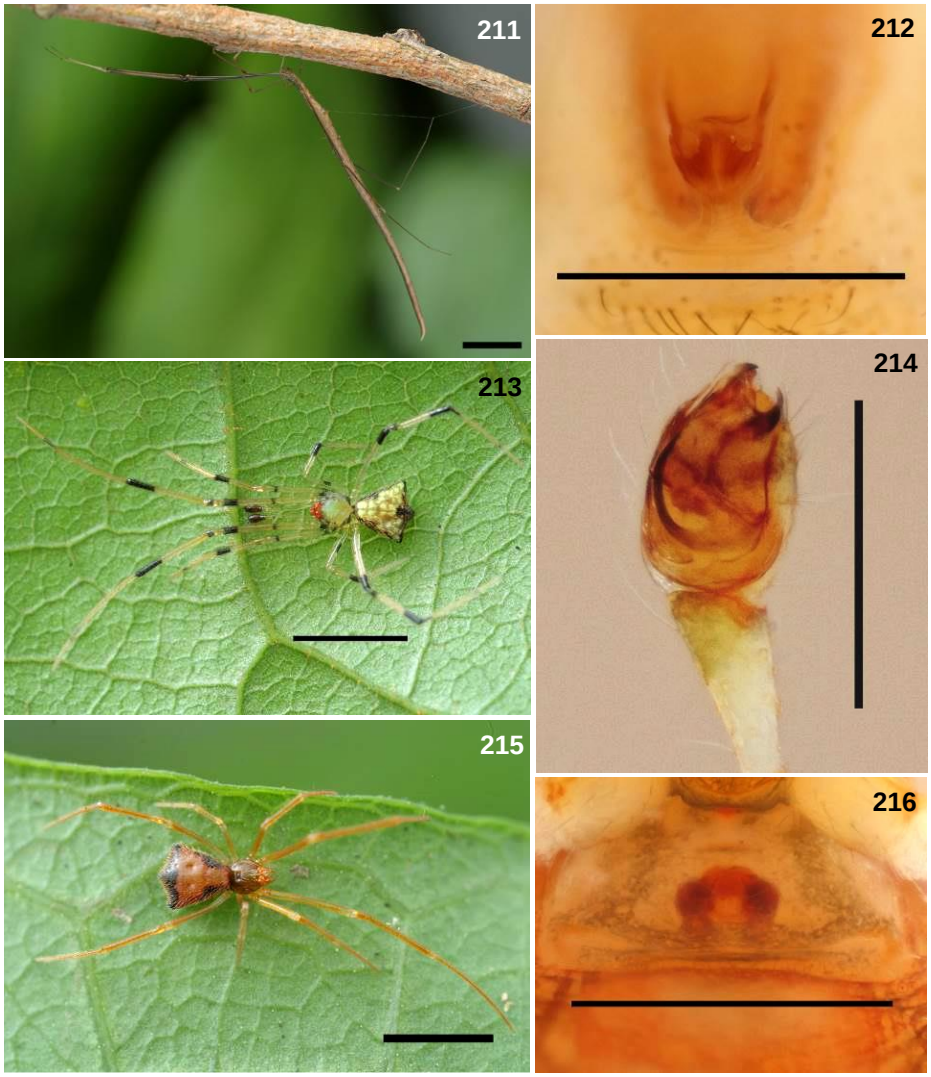

Plate thirty six. Theridiidae. 211-216. *Ariamnes* sp., female 211 and 212 (CZPB-ar000404); *Janula* sp., male 213 and 214 (CZPB-ar000405), female 215 and 216 (CZPB-ar000406). Scales: 2 mm animals, 0,5 mm genitals.

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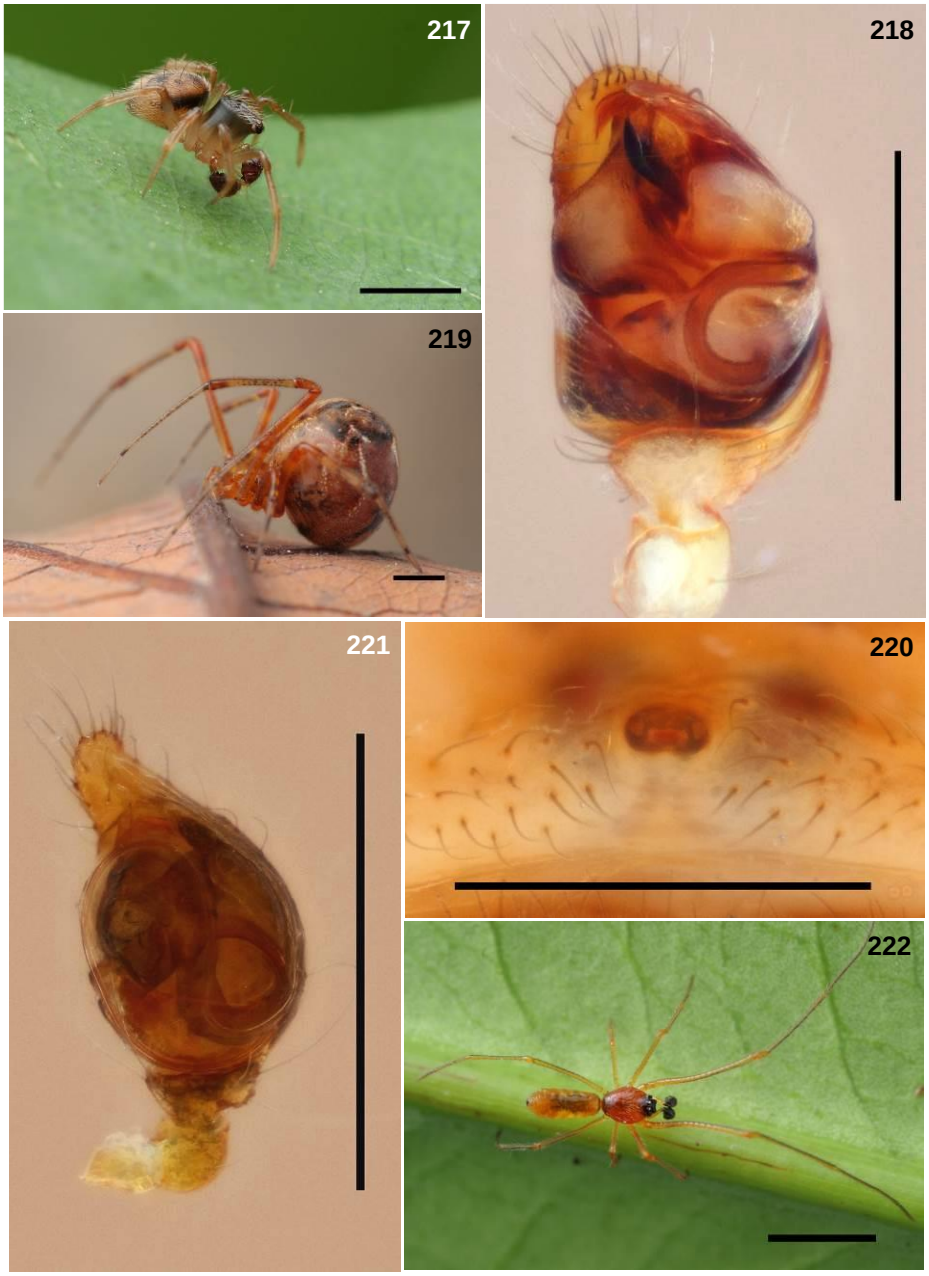

Plate thirty seven. Theridiidae. 217-222. *Dipoena* sp., male 217 and 218 (CZPB-ar000407); *Achaearanea* sp., female 219 and 220 (CZPB-ar000408); *Helvibis* sp., male 221 and 222 (CZPB-ar000409). Scales: 2 mm animals, 0,5 mm genitals.

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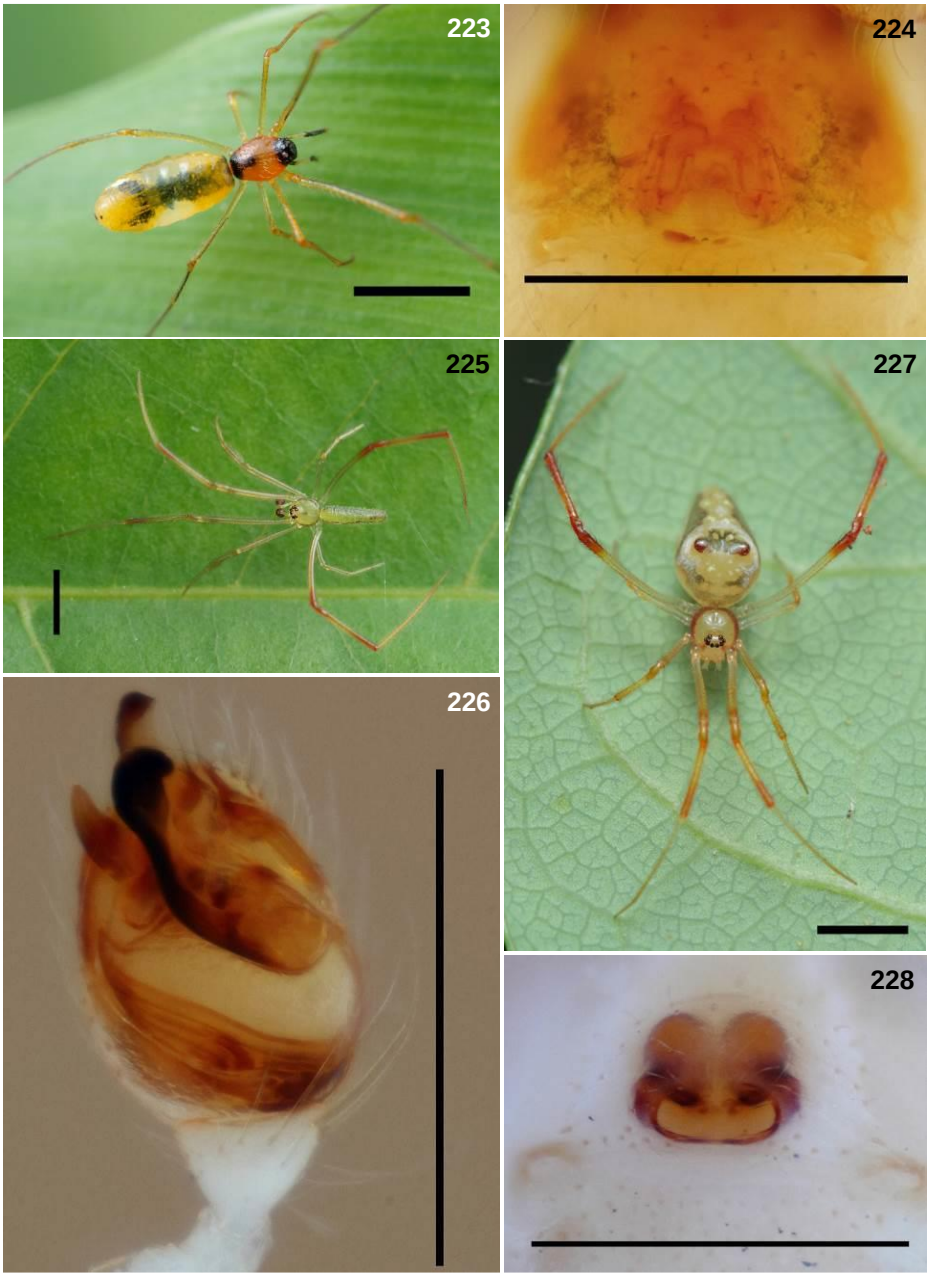

Plate thirty eight. Theridiidae. 221-236. *Helvibis* sp., female 223 and 224 (CZPB-ar000410); *Spintharus gracilis* Keyserling, 1886, male 225 and 226 (CZPB-ar000411), female 227 and 228 (CZPB-ar000412). Scales: 2 mm animals, 0,5 mm genitals.

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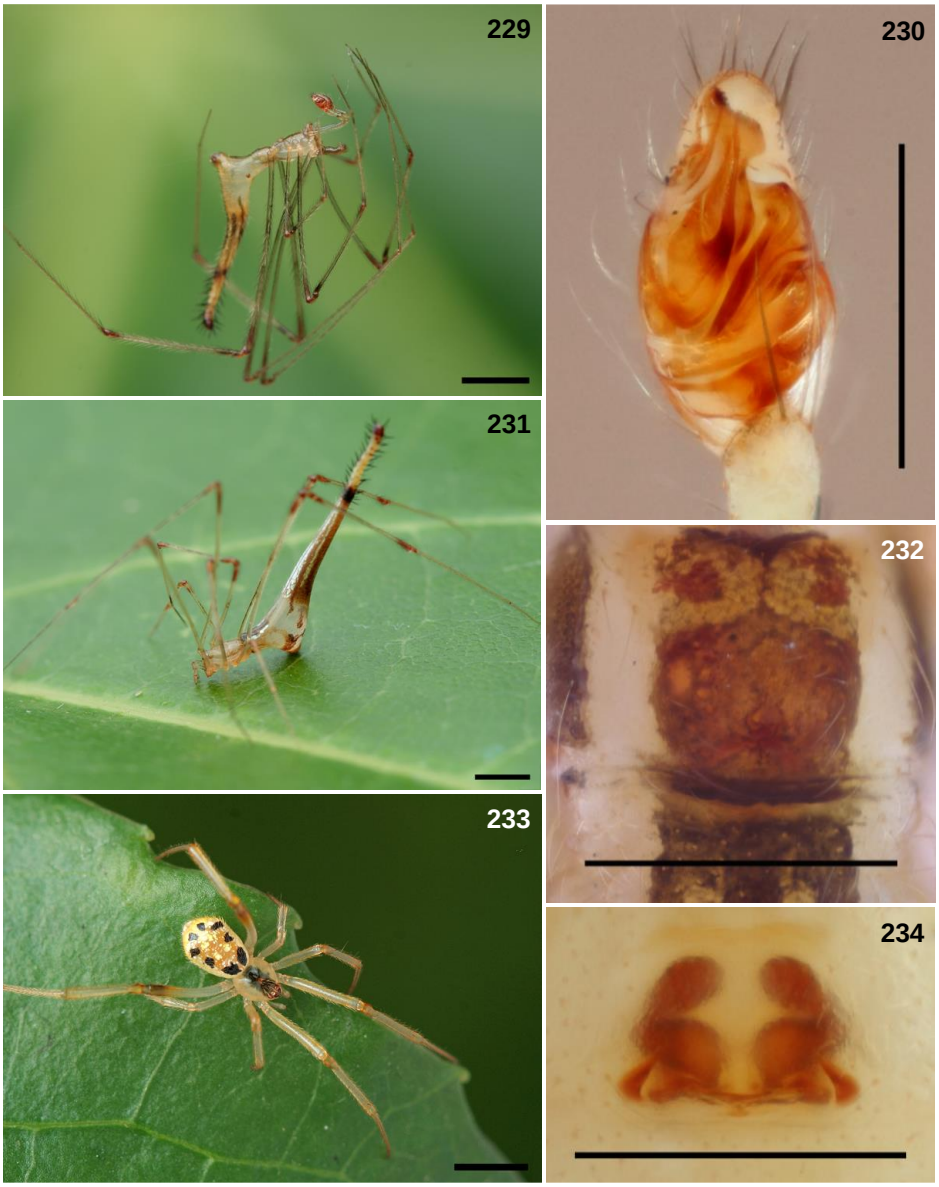

Plate thirty nine. Theridiidae. 229-234. *Rhomphaea* sp., male 229 and 230 (CZPB-ar000413), female 231 and 232 (CZPB-ar000414); *Steatoda* sp., female 233 and 234 (CZPB-ar000415). Scales: 2 mm animals, 0,5 mm genitals.

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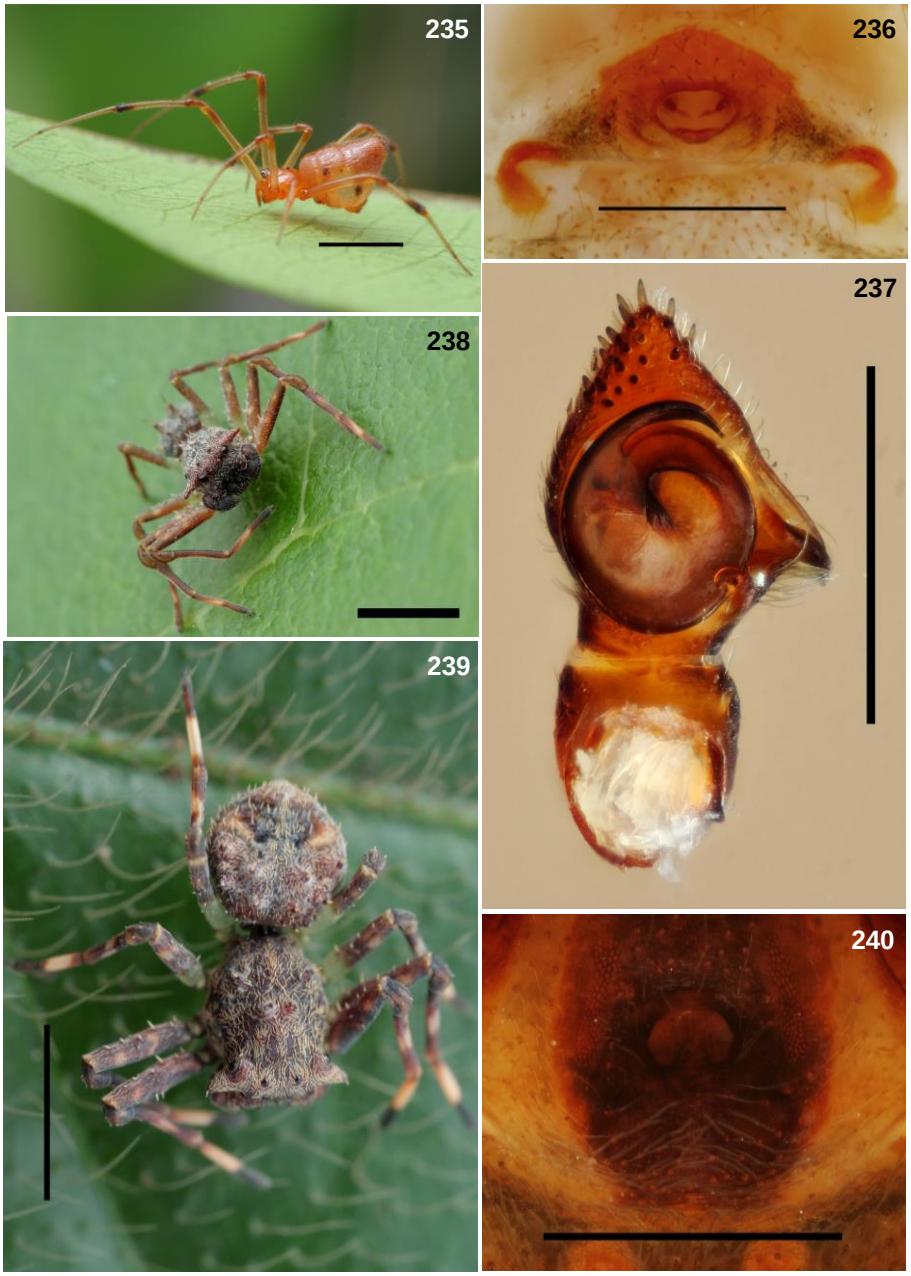

Plate forty. Theridiidae. 235-240. *Achaearanea*, CF *hieroglyphica* (Mello-Leitão, 1940) 235 and 236 (CZPB-ar000416). Thomisidae. 237-240. *Bucranium taurifrons* O. Pickard-Cambridge, 1881, male 237 and 238, female 239 and 240 (CZPB-ar000199). Scales: 2 mm animals, 0,5 mm genitals.

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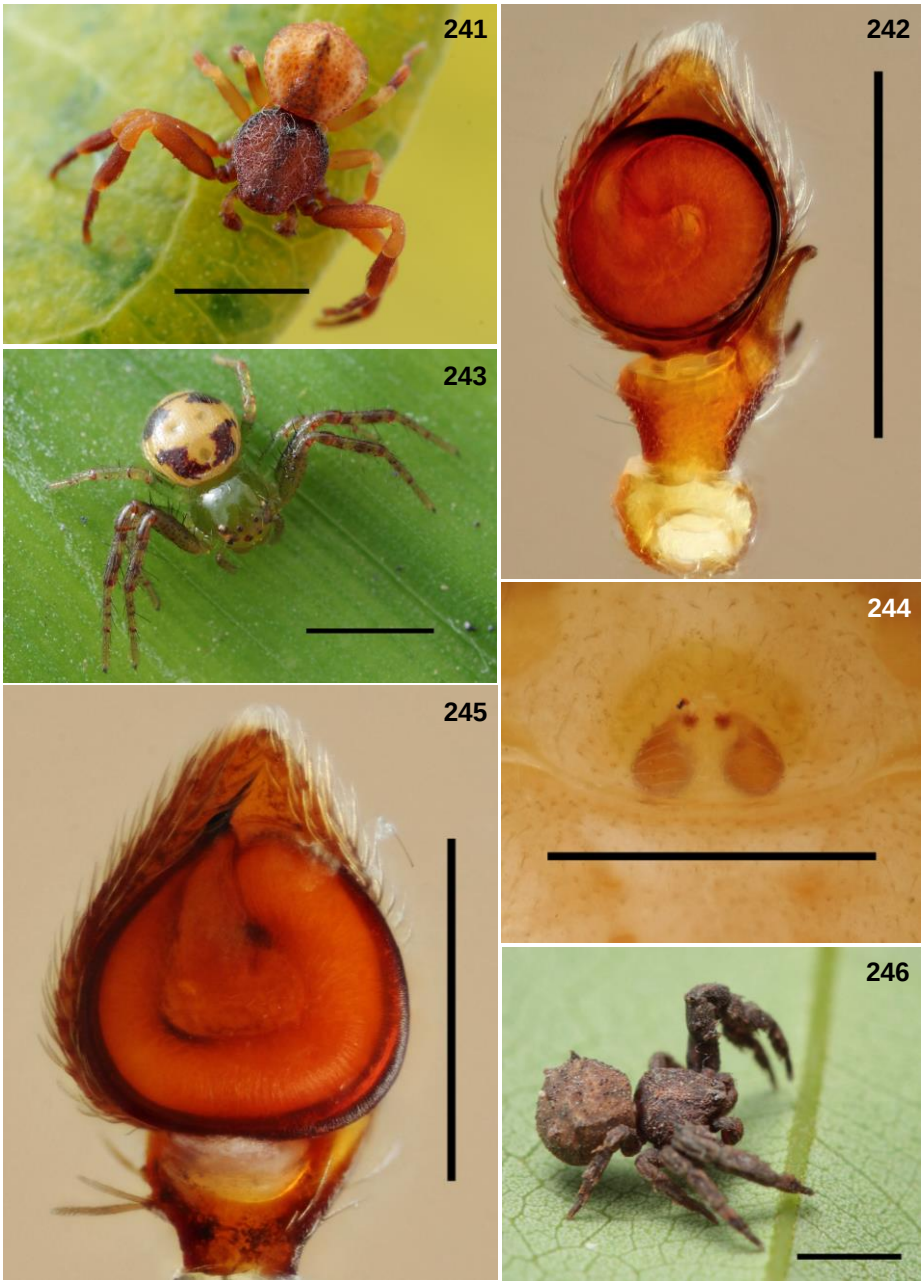

Plate forty one. Thomisidae. 241-246. *Epicadus taczanowskii* Roewer, 1951, male 241 and 242 (CZPB-ar000201). CF *Synema* sp., female 243 and 244 (CZPB-ar000202); *Stephanopis* sp., male 245 and 246 (CZPB-ar000206). Scales: 2 mm animals, 0,5 mm genitals.

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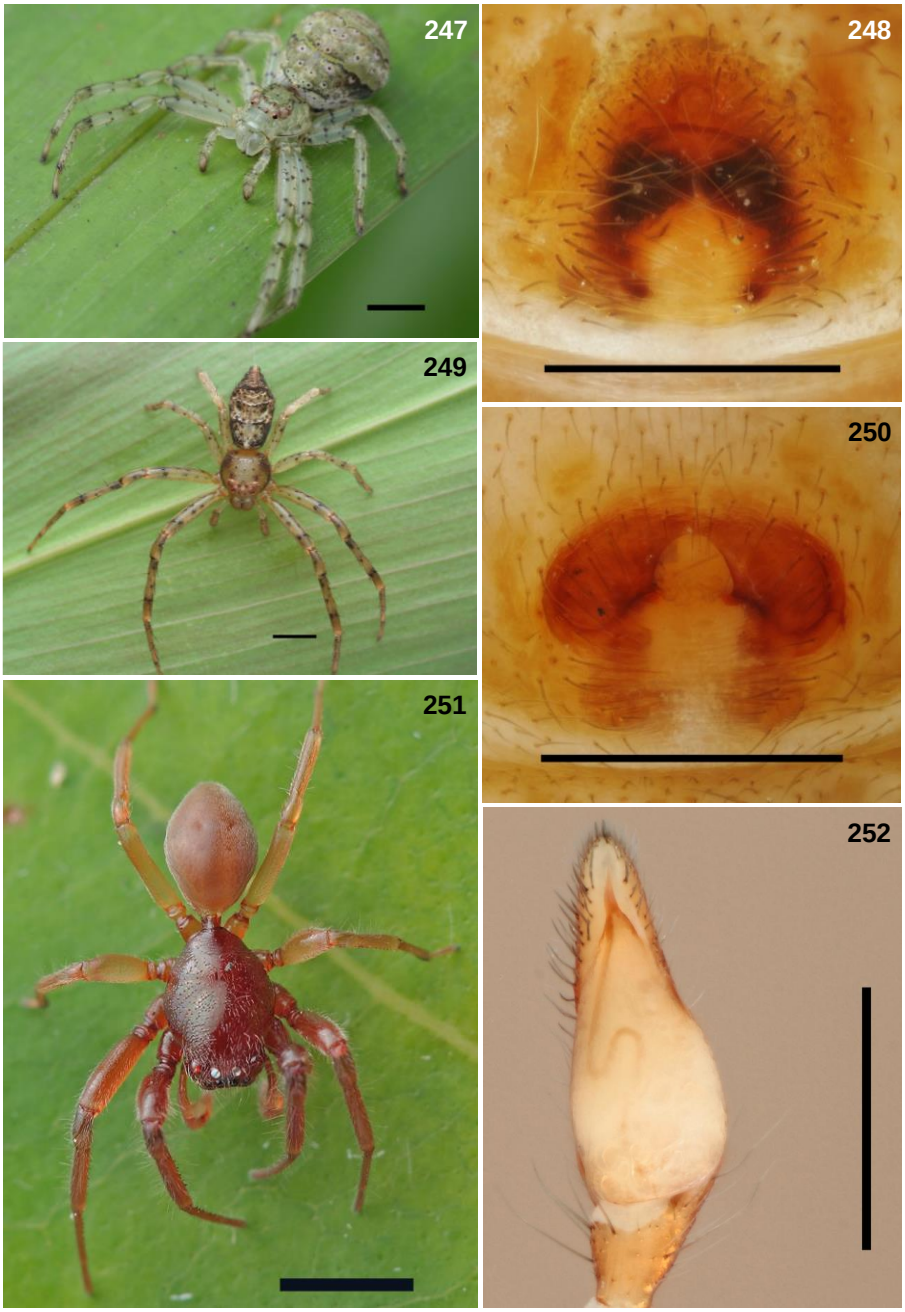

Plate forty two. Thomisidae. 247-250. *Tmarus* sp01., female 247 and 248 (CZPB-ar000203); *Titidius* CF *urucu* (Esmerio & Lise, 1996), female 249 and 250 (CZPB-ar000205). Trachelidae. 251-252. *Trachelas* sp., male 251 and 252 (CZPB-ar000125). Scales: 2 mm animals, 0,5 mm genitals.

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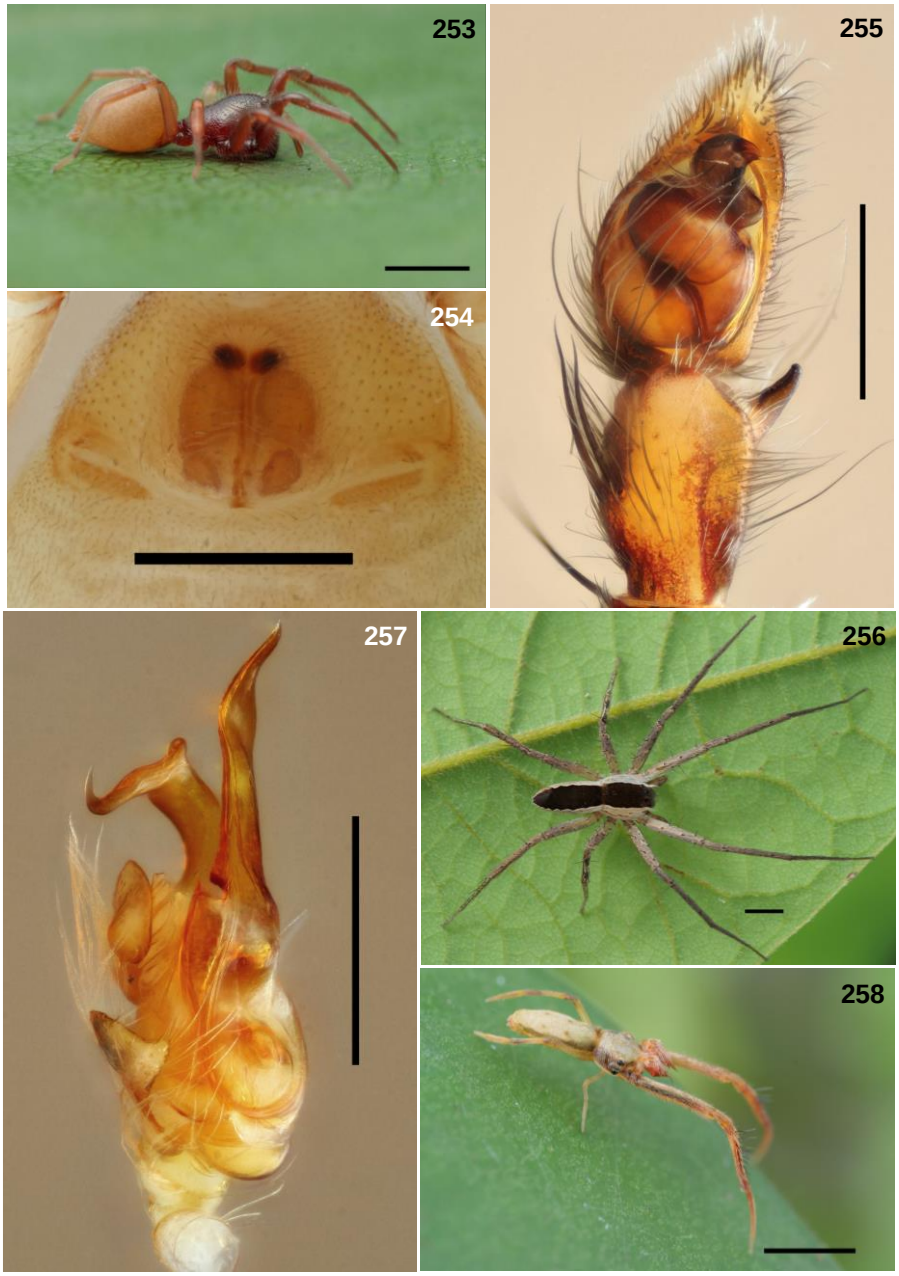

Plate forty three. Trachelidae. 253-254. *Trachelas* sp., female 253 and 254 (CZPB-ar000125). Trechaleidae. 255-256. *Dossenus marginatus* Simon, 1898, male 255 and 256 (CZPB-ar000197). Uloboridae. 257-258. *Miagrammopes* sp01., male 253 and 254 (CZPB-ar000222). Scales: 2 mm animals, 0,5 mm genitals.

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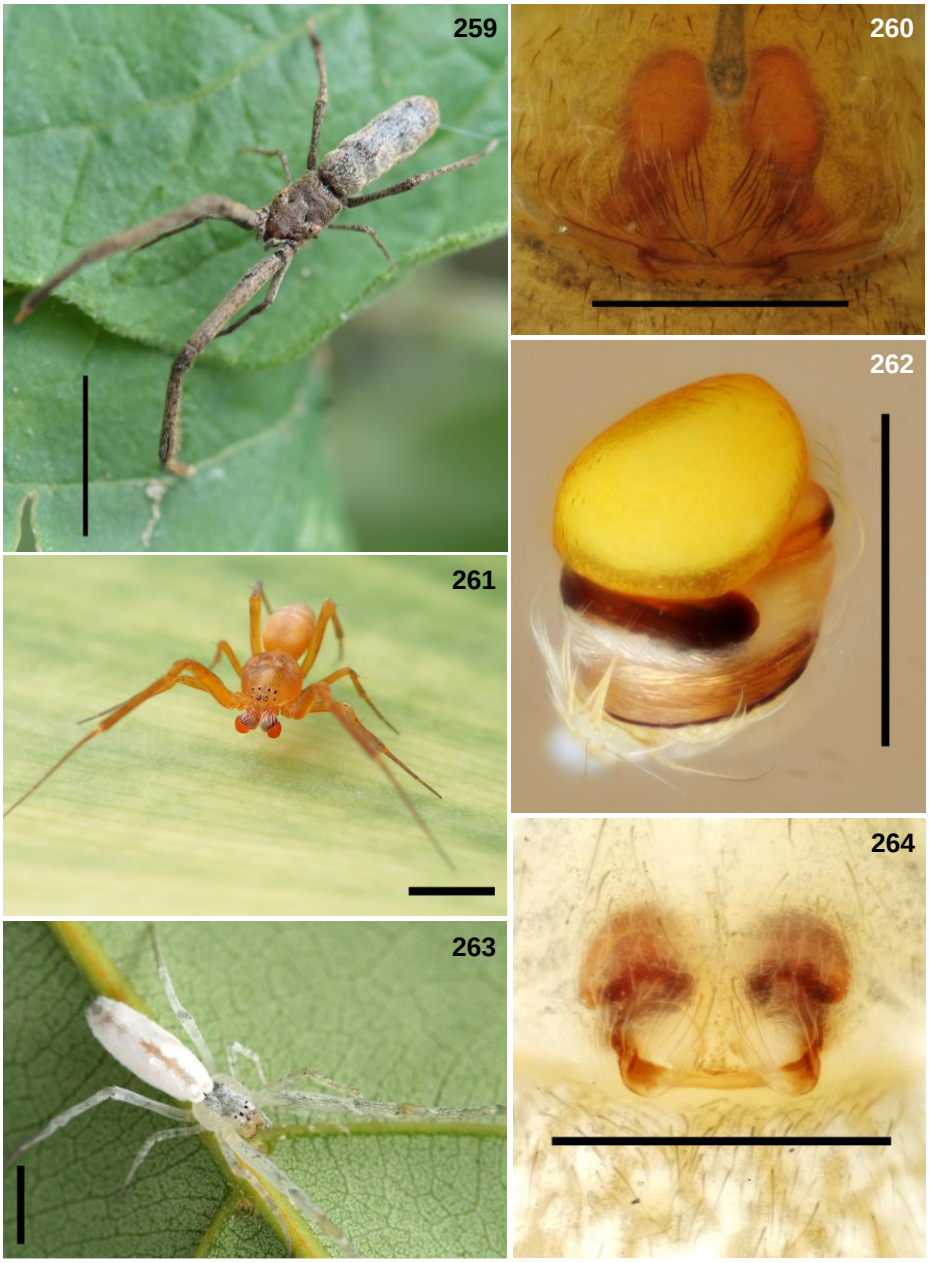

Plate forty four. Uloboridae. 258-260. *Miagrammopes* sp02., female 259 and 260 (CZPB-ar000218); *Philoponella* sp01., male 261 and 262 (CZPB-ar000224); *Philoponella* sp02., female 263 and 264 (CZPB-ar000226). Scales: 2 mm animals, 0,5 mm genitals.