The jumping spider genus *Nycerella* Galiano, 1982 in Brazil, with description of the female of *Nycerella melanopygia* Galiano, 1982 (Araneae: Salticidae: Freyina)

O gênero de aranhas papa-moscas *Nycerella* Galiano, 1982 no Brasil, com descrição da fêmea de *Nycerella melanopygia* Galiano, 1982 (Araneae: Salticidae: Freyina)

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Abstract: Three species of *Nycerella* Galiano, 1982 have been recorded from Brazil: *N. aprica* (Peckham & Peckham, 1896), *N. melanopygia* Galiano, 1982 and *N. volucripes* Galiano, 1982. The female of *N. melanopygia*, however, remains undescribed. Herein, we describe the female of *N. melanopygia* for the first time, and give additional geographical records for the three species mentioned above, extending their distributions all the way to northeastern states of Brazil.

Keywords: Aellurillini. Amazon. *Cerrado*. Neotropical. Salticinae. Taxonomy.

Resumo: Três espécies de *Nycerella* Galiano, 1982 foram até hoje registradas no Brasil: *N. aprica* (Peckham & Peckham, 1896), *N. melanopygia* Galiano, 1982 e *N. volucripes* Galiano, 1982. A fêmea de *N. melanopygia*, entretanto, ainda permanece desconhecida. Aqui, descrevemos a fêmea de *N. melanopygia* pela primeira vez e damos registros geográficos adicionais para as três espécies mencionadas, estendendo suas distribuições até estados do Nordeste do Brasil.

Palavras-chave: Aellurillini. Amazônia. Cerrado. Neotropical. Salticinae. Taxonomia.

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INTRODUCTION

Salticinae Blackwall, 1841 is the most diverse subfamily of jumping spiders (Maddison, 2015). The group is divided into two large clades, the Amycoida, mostly restrict to the Neotropics, and the Salticoida, distributed worldwide. The Salticoida include almost 20 tribes, among which we find the Aelurillini Simon, 1901. This tribe gathers three subtribes: the Afro-Eurasian Aelurillina Simon, 1901; the Afrotropical Thiratoscirtina Bodner & Maddison, 2012; and the Neotropical Freyina Edwards, 2015. The Freyina include presently almost 30 genera, one of which, *Nycerella* Galiano, 1982, is targeted in this paper.

Nycerella was proposed (Galiano, 1982) as a replacement name for *Cyrene* Peckham y Peckham, 1893, preoccupied by *Cyrene* Lamarck, 1818 (Mollusca). Its type species is *Cyrene decorata* Peckham & Peckham, 1894.

The genus presently gathers nine species (World Spider Catalog, 2024) and was revised by Galiano (1982). According to Galiano (1982), the genus could be close to *Phiale* C. L. Koch, 1846, from which it would differ by the shape of the genitalia. The relationships among freyine genera, however, are still poorly understood. Presently, the genus is understood as including small, colorful spiders with the dorsum of the abdomen covered with red or yellow patterns, with many white markings (Edwards, 2015). The sexual dimorphism in color pattern is strong in some species (Galiano, 1982).

Among the nine species, three occur in Mexico and/or Central America: *N. delecta* (Peckham & Peckham, 1896) has been recorded from Mexico to Panama, *N. sanguinea* (Peckham & Peckham, 1896) from Guatemala to Panama, and *N. donaldi* (Chickering, 1946) from Panama (World Spider Catalog, 2024). Other three species occur in western South America and have not been recorded from Brazil: *N. decorata* (Peckham & Peckham, 1894), recorded from Panama, Colombia, and St. Vincent, *N. neglecta* Galiano, 1982 from Ecuador and Peru, and *N. vestita* (Taczanowski, 1878), recorded from Peru and Ecuador (Galapagos Islands). The remaining three species, namely *N. aprica* (Peckham & Peckham, 1896), *N. melanopygia* Galiano, 1982, and *N. volucripes* Galiano, 1982, have already been recorded from Brazil and neighbor countries (see distributions below).

Among all the nine species, only *N. donaldi* and *N. melanopygia* are known only by males, meaning that the females of all the other species have been properly described. Herein, we describe the female of *N. melanopygia* for the first time, and give additional geographical records for the three species already recorded from Brazil, extending their distributions all the way to northeastern states of Brazil.

MATERIAL AND METHODS

The material is deposited in the Museu Paraense Emílio Goeldi, Belém, Brazil (MPEG.ARA, curator: Alexandre Bonaldo) and in Instituto Butantan, São Paulo, Brazil (IBSP, curator: Antonio Brescovit). The photographs of fixed specimens were taken using a Leica DFC420 digital camera connected to an M205A stereomicroscope. Male palps were dissected and photographed in alcohol in different positions to show the diagnostic structures. Epigynes were also photographed in alcohol in ventral view. For the details of the epigyne of *N. melanopygia*, this was dissected, immersed in clove oil (Levi, 1965), and illustrated under a microscope with a camera lucida. The descriptions and lists of material examined were prepared using the spreadsheets developed by Magalhães (2019), with a few obvious modifications. The measurements are expressed in millimeters. Localities in bold and italic letters in the 'Distribution' paragraphs refer to new records. Geographic coordinates and elevation were taken directly from labels; in cases when the label did not give information about geographic coordinates, these were approximated with Google Earth® and marked with square brackets. The geographic distribution map was made using the software QGIS 3.16 Hannover and the plugin QuickMapServices (QGIS, n. d.).

RESULTS

TAXONOMY

Nycerella Galiano, 1982

Diagnosis update. According to Galiano (1982), the genus may be closely related to *Phiale* C. L. Koch, 1846, from which it differs by 1) epigynal plate smooth, bearing only the small copulatory openings, with a median coupling pocket on the posterior border; the copulatory ducts are cylindrical, slenderer than in *Phiale*; and 2) male palp with simple bulb, the embolus with no processes. Edwards (2015) gives a complex combination of male features as the genus diagnosis that does not help much further. As for the females, Edwards (2015) mentions small submedial copulation openings, a small, dorsal coupling pocket, and spherical submedial spermathecae with short narrow copulatory ducts connected anteriorly (but see diagnosis of *N. melanopygia* female below, with copulatory ducts connected posteriorly on the spermathecae).

Nycerella aprica (Peckham & Peckham, 1896)
(Figures 1-8, 25)

Cyrene aprica Peckham & Peckham, 1896, p. 66, pl. 6, figure 1 (description of male and female); F. O. Pickard-Cambridge, 1901, p. 239, pl. 20, figures 12-13 (description of male and female).

Ilargus albomaculatus Mello-Leitão, 1939, p. 86, figure 76 (description of female; synonymized by Galiano, 1982).

Phiale pseudaprica Caporiacco, 1947, p. 31 (description of male; synonymized by Galiano, 1982).

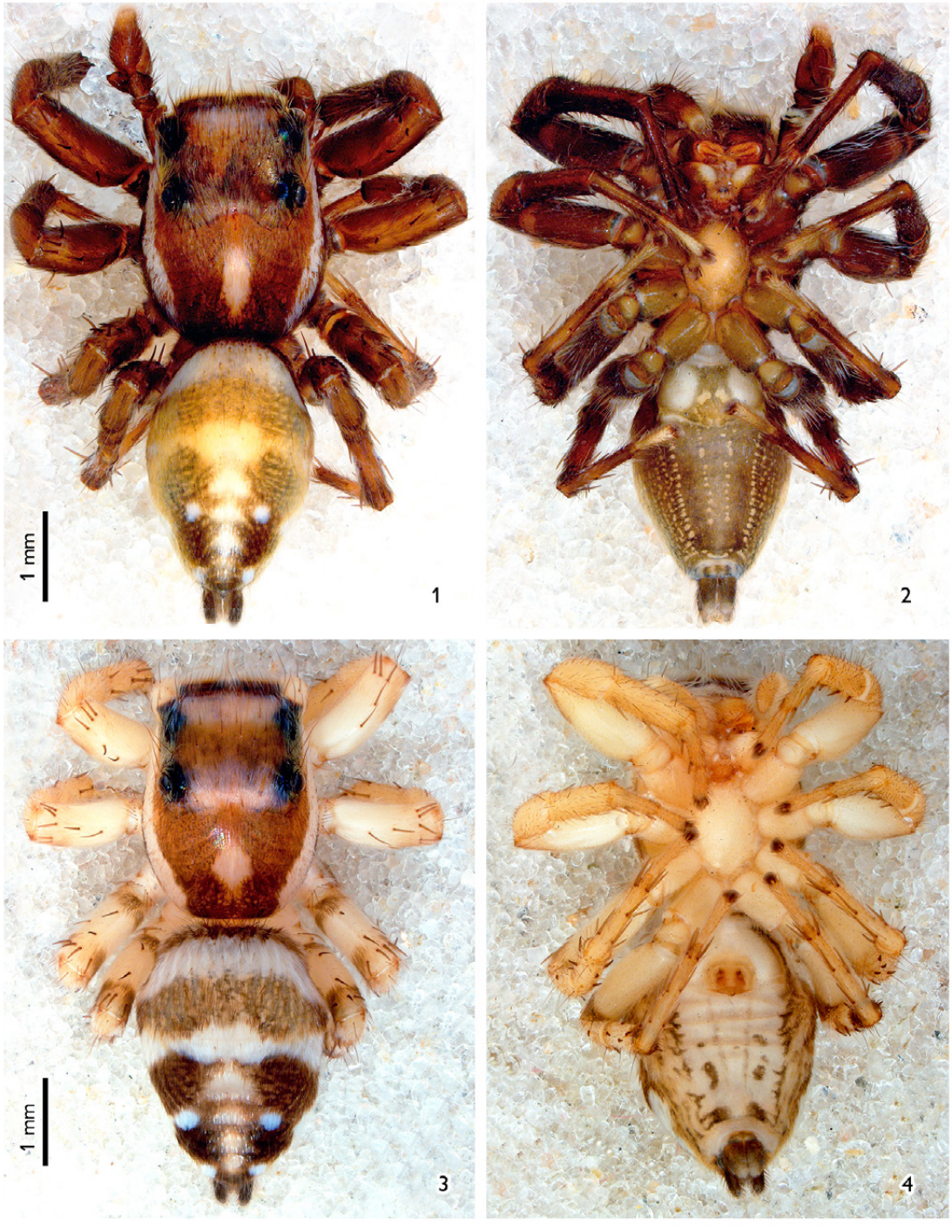
Phiale bristowei Caporiacco, 1948, p. 709, figure 135 (description of male; synonymized by Galiano, 1982).

Nycerella aprica: Galiano, 1982, p. 56, figures 1-3, 27-28, 43-44 (new combination, synonyms, redescription of male and female).

Description and diagnoses for both sexes. See Galiano (1982) and Figures 1-8 of fresh material for comparison.

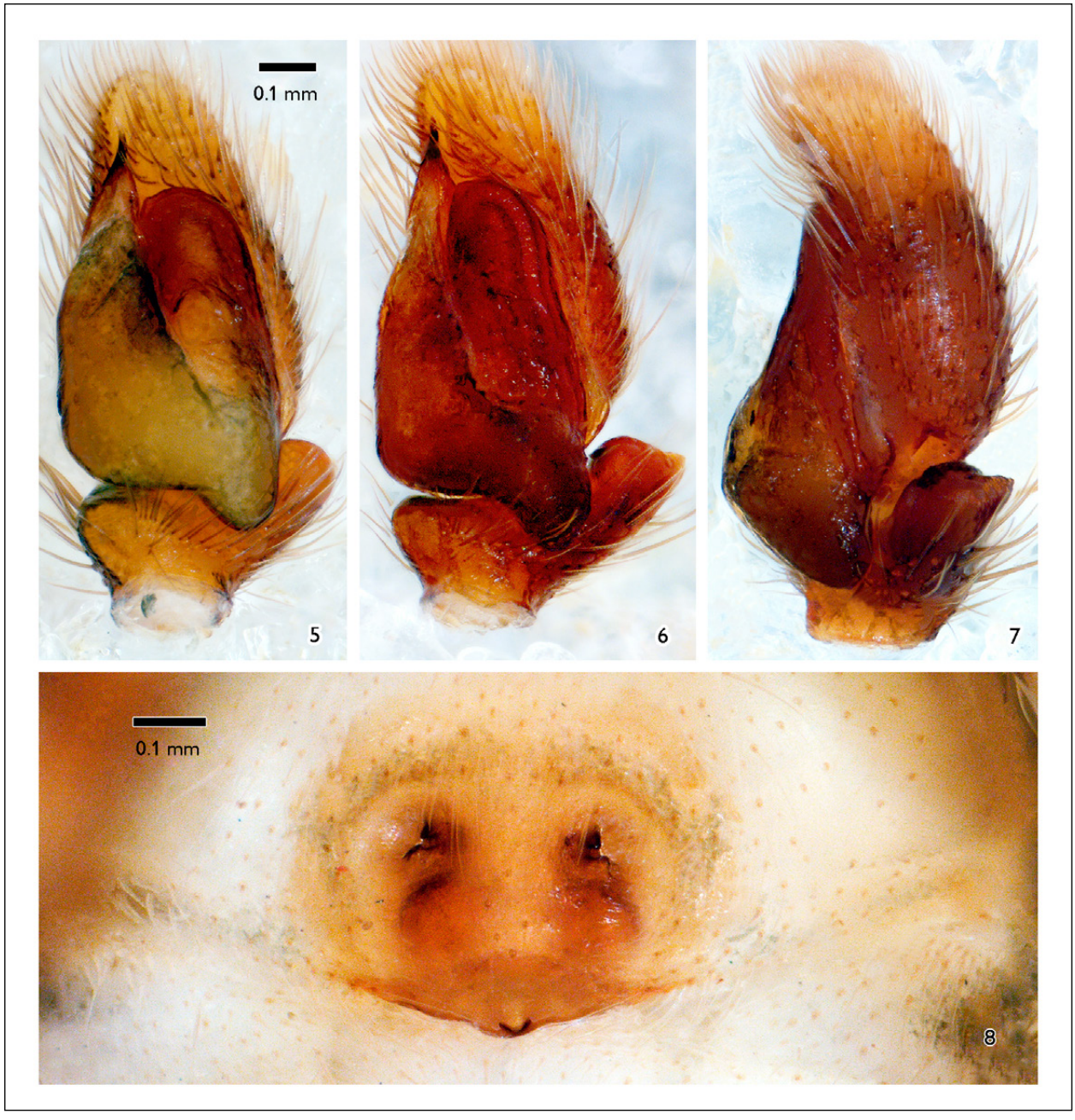
Note. Galiano (1982, figures 43-44) tried to synthetize the description of the dorsal coloration of the male and female abdomen of *N. aprica* in a scheme composed of tegument and scale coloration. The scheme, however, seems artificial when compared to freshly collected material (Figures 1, 3) and is of limited use.

Material examined (new records). BRAZIL: Pará: Marabá, Mina do Sossego, Serra Norte, Carajás (S6.450°, W50.092°), E. Wanzeler leg., 23.II-06.III.2004, 1 #m (MPEG.ARA 4078); Novo Progresso (S7.164°, W55.315°), A.A. Pinheiro leg., 25.XI.2005, 1 #f (MPEG.ARA 4350), J.O. Dias leg., 26.XI.2005, 1 #m (MPEG.ARA 2760), Castelo dos Sonhos (S8.218°, W55.016°), D.R. Santos-Souza leg., 16.XI.2005, 1 #f (MPEG.ARA 4355); Rondônia: Guajará Mirim [S10.78°, W65.33°], M. Carvalho leg., VII.2000, 1 #m (IBSP 80495), 1 #m (IBSP 80494); Maranhão: Caxias, Riacho Limpezaz, MA 349, 70 m.a.s.l. (S4.645°, W43.450°), beating sheet, G.S. Lustosa et al. leg., 10.XII.2021, 1 #m (MPEG.ARA 39492), 1 #m 1 #f (MPEG.ARA 39493); Aldeias Altas, Riacho Feijão, Fazenda Feijão, 78 m.a.s.l. (S4.709°, W43.395°), beating sheet, G.S. Lustosa et al. leg., 11.XII.2021, 1 #f (MPEG.ARA 39494); Caxias, Riacho Chapada, povoado Chapada, 104 m.a.s.l. (S4.945°, W43.506°), beating sheet, G.S. Lustosa et al. leg., 31.XII.2021, 1 #f (MPEG.ARA 39502), Riacho Arain, povoado Miranda, 95 m.a.s.l. (S4.951°, W43.544°), beating sheet, G.S. Lustosa et al. leg., 29.XII.2021, 1 #f (MPEG.ARA 39501); Sergipe: São Cristóvão, Campus UFSE [S10.92°, W37.10°], alunos UFSE leg., no date, 1 #f (IBSP 10344); Mato Grosso do Sul: Anaurilândia [S22.18°, W52.72°], F.S. Cunha & C.R. Souza leg., 05-11.III.2001, 6 #m 6 #f (IBSP 53356), same collector, 12-19.III.2001, 3 #m 2 #f (IBSP 53332); Corumbá, Morro do Azeite [S19.48°, W57.31°], J. Raizer et al.



Figures 1-4. *Nycerella aprica*. 1-2 male (MPEG.ARA 39492) (1 dorsal view, 2 ventral view); 3-4 female (MPEG.ARA 39493) (3 dorsal view, 4 ventral view).

leg., IV.1998, 1 #m (IBSP 22001), 1 #m (IBSP 22002); Santa Rita do Pardo [S21.3°, W52.83°], D. Candiani & F. Lini leg., 02-05.VII.2001, 1 #m 2 #f (IBSP 53296); São Paulo: Pereira Barreto, Usina Hidrelétrica Três Irmãos [S20.66°, W51.30°], Costa & Bertim leg., X.1990, 1 #m (IBSP 4818); Primavera, Usina Hidrelétrica Sérgio Motta [S22.53°, W52.94°], Equipe IBSP leg., 2001, 2 #f (IBSP 53043), 1 #m 1 #f (IBSP 53104), 1 #m (IBSP 53192).



Figures 5-8. *Nycerella aprica*. 5-7 left male palp (MPEG.ARA 39492) (5 ventral view, 6 retroventral view, 7 retrolateral view); 8 epigyne (MPEG.ARA 39493), ventral view.

Distribution. GUYANA: Demerara (Galiano, 1982). BRAZIL: Amapá, Amazonas, Pará, Mato Grosso, Espírito Santo (Galiano, 1982), Maranhão, Rondônia, Sergipe, Mato Grosso do Sul, São Paulo. PARAGUAY: San Pedro (Galiano, 1982). ARGENTINA: Misiones, Chaco, Formosa (Galiano, 1982) (Figure 25).

Biology. Specimens from Maranhão were collected with beating sheet, meaning that they forage on lower vegetation. Given the broad distribution of the species, with records from the Amazon rainforest, Atlantic Forest and from the drier diagonal (Argentina/Paraguay to Brazil: Maranhão), this species does not seem to be endemic of any biome and may be expected to be found in several other localities in South America.

Nycerella melanopygia Galiano, 1982
(Figures 9-17, 26)

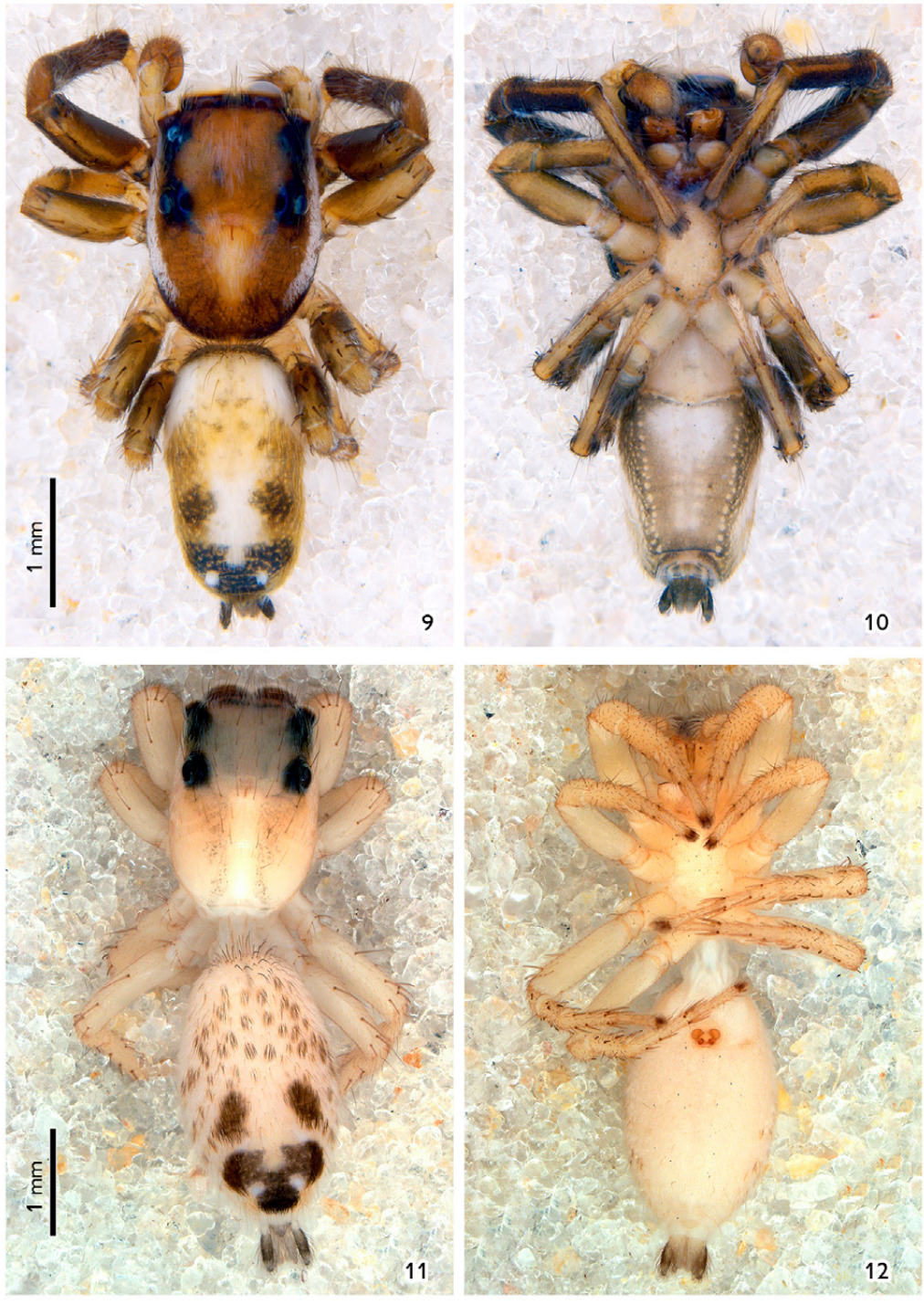
Nycerella melanopygia Galiano, 1982, p. 60, figures 4-6, 46 (description of male).

Description and diagnosis for the male. See Galiano (1982) and Figures 9-10, 13-14 of fresh material for comparison.

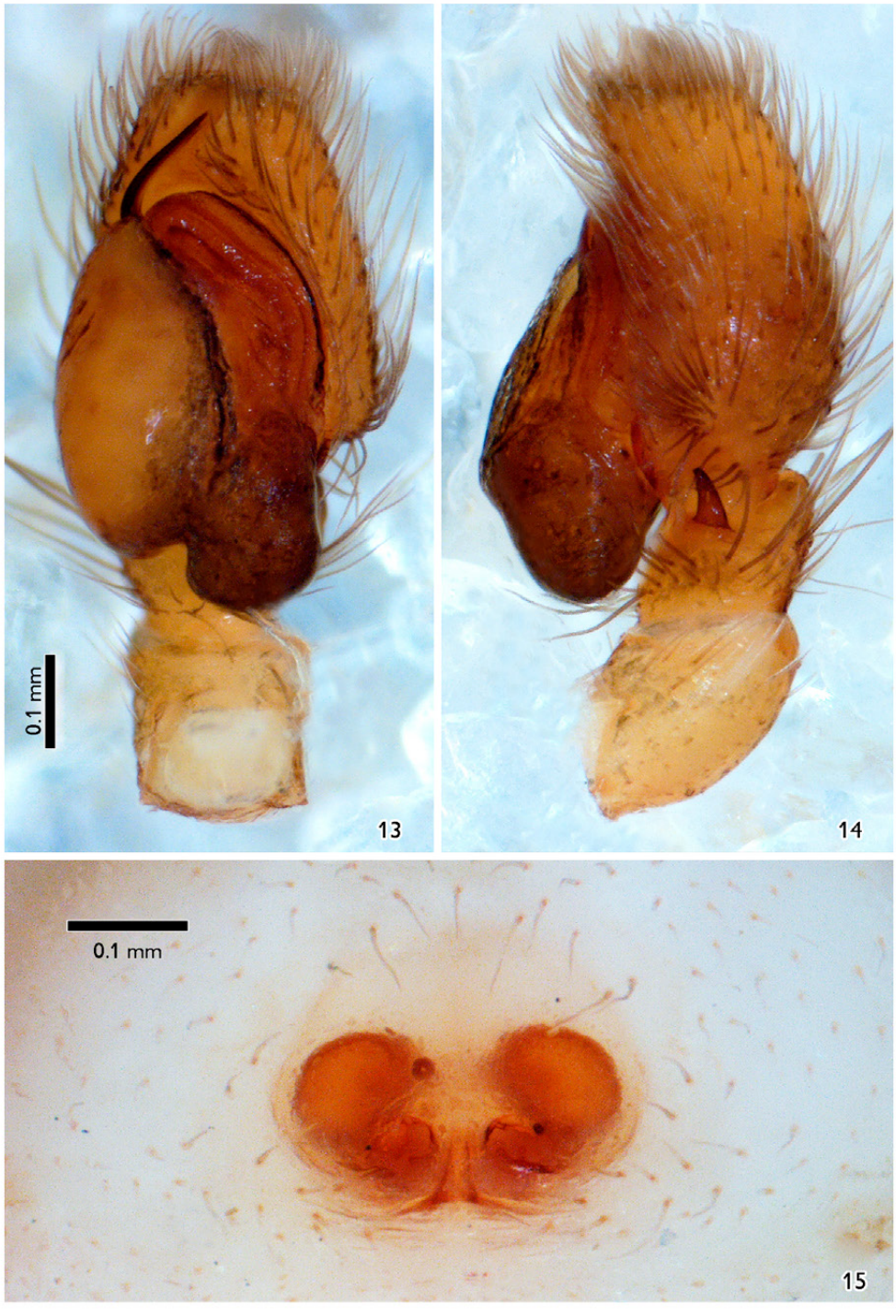
Note. Galiano (1982, figure 46) tried to synthetize the description of the male abdomen of *N. melanopygia* in a scheme composed of tegument and scale coloration. The coloration of the dorsum of the male abdomen observed in the new material does not agree completely with Galiano's (1982) description. In the two males she examined, from the Brazilian states of Amapá and Amazonas (i.e. Amazon rainforest), she described the dorsolateral portions as having blackish tegument covered with red scales and only the tip on the abdomen as shiny black. In our specimens, we can observe two additional pairs of dark markings on the abdomen (as in the distal marking described by her), one pair at the middle of the abdominal length and a second pair fused with the median distal dark portion described by Galiano (1982) (Figure 9). The examination of the male palp (Figures 13-14), however, does allow the identification of the species (compare with Galiano, 1982, figures 4-6).

Diagnosis for the female (Figures 11-12, 15-17). This female differs from those of all the remaining species (female of *N. donaldi* still undescribed) for having the copulatory openings completely posterior to the spermathecae (Figures 15-17) (copulatory openings anterior or at the same position than the spermathecae in the others). Unlike stated by Edwards (2015) for the genus, the coupling pocket is rather deep in this species and the copulatory ducts connect posteriorly on the spermathecae (Figures 16-17).

Description of the female (MPEG.ARA 39500). Measurements. Total length 4.41. Carapace length 1.95, width 1.29, height 0.75. Anterior median eye (AME) diameter 0.42. Ocular quadrangle length 1.02. Anterior eye row width 1.14. Posterior eye row width 1.17. Abdomen length 2.46. LEGS. Leg I: femur (fe) 0.95, patella (pa) 0.61, tibia (ti) 0.63, metatarsus (mt) 0.46, tarsus (ta) 0.35. II: fe 0.84, pa 0.50, ti 0.49, mt 0.40, ta 0.34. III: fe 1.05, pa 0.53, ti 0.61, mt 0.66, ta 0.41. IV: fe 1.07, pa 0.53, ti 0.75, mt 0.78, ta 0.44. Leg formula 4312. Coloration. The carapace is pale yellow with reminiscent of a pair of longitudinal stripes composed of tiny dark markings (Figure 11). Chelicera, endite, labium, sternum and legs pale yellow (Figures 11-12). The abdomen agrees in coloration with that of the male, but less colored, as follows: dorsally pale yellow, with the anterior half covered with several small clusters of black setae (Figure 11); one pair of dark markings at the middle of the abdominal length and a second pair fused with the median distal dark portion described by Galiano (1982) for the male (Figure 11); between the middle-length dark markings and the second pair of lateral dark markings there is a pair of small clusters of white scales, and a second pair right in front of the median dark marking at the end, composing the traditional four white dots present in the genus (Figure 11); ventrally pale yellow (Figure 12). Anal tubercle and posterior lateral spinnerets black;



Figures 9-12. *Nycerella melanopygia* (MPEG.ARA 39500). 9-10 male (9 dorsal view, 10 ventral view); 11-12 female (11 dorsal view, 12 ventral view).



Figures 13-15. *Nycerella melanopygia* (MPEG.ARA 39500). 13-14 left male palp (13 ventral view, 14 retrolateral view); 15 epigyne, ventral view.

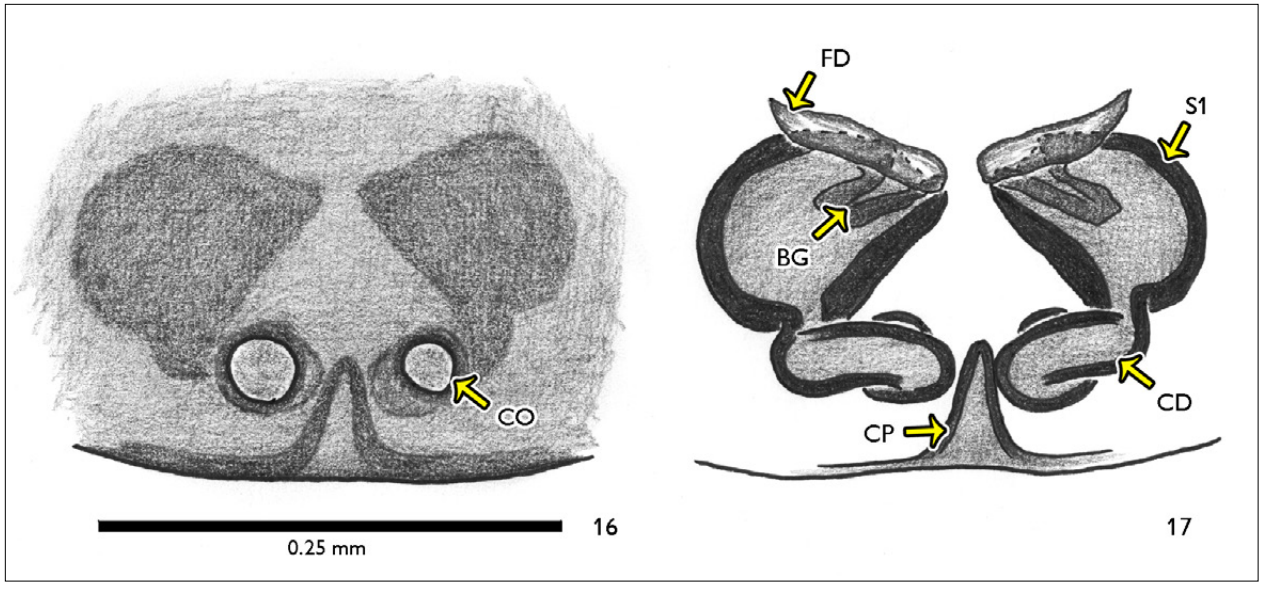
remaining spinnerets pale yellow (Figures 11-12). Epigyne. The plate is smooth (Figure 15), with a pair of roundish copulatory openings near the posterior margin, and a median, deep coupling pocket (similar in shape as the retrolateral tibial apophysis of the male; see Figures 14, 16); the copulatory ducts extend from the openings to the center briefly, then diverge transversally until they reach the drop-shaped spermathecae (Figure 17) (the length of the copulatory duct seems to agree with the embolus length in the male palp); at the tip of the spermatheca, there is a Bennett's gland that extends inside the lumen of the spermatheca, the extension apparently with no spikes or projections; right posteriorly to the extension of the Bennett's gland into the lumen there is a thin duct that leads to the fertilization duct, which is well developed and extends laterally and anteriorly (Figure 17).

Male-female matching. Besides having the same abdominal color pattern (see Figures 9, 11), the males and females mentioned below from Maranhão were collected side by side.

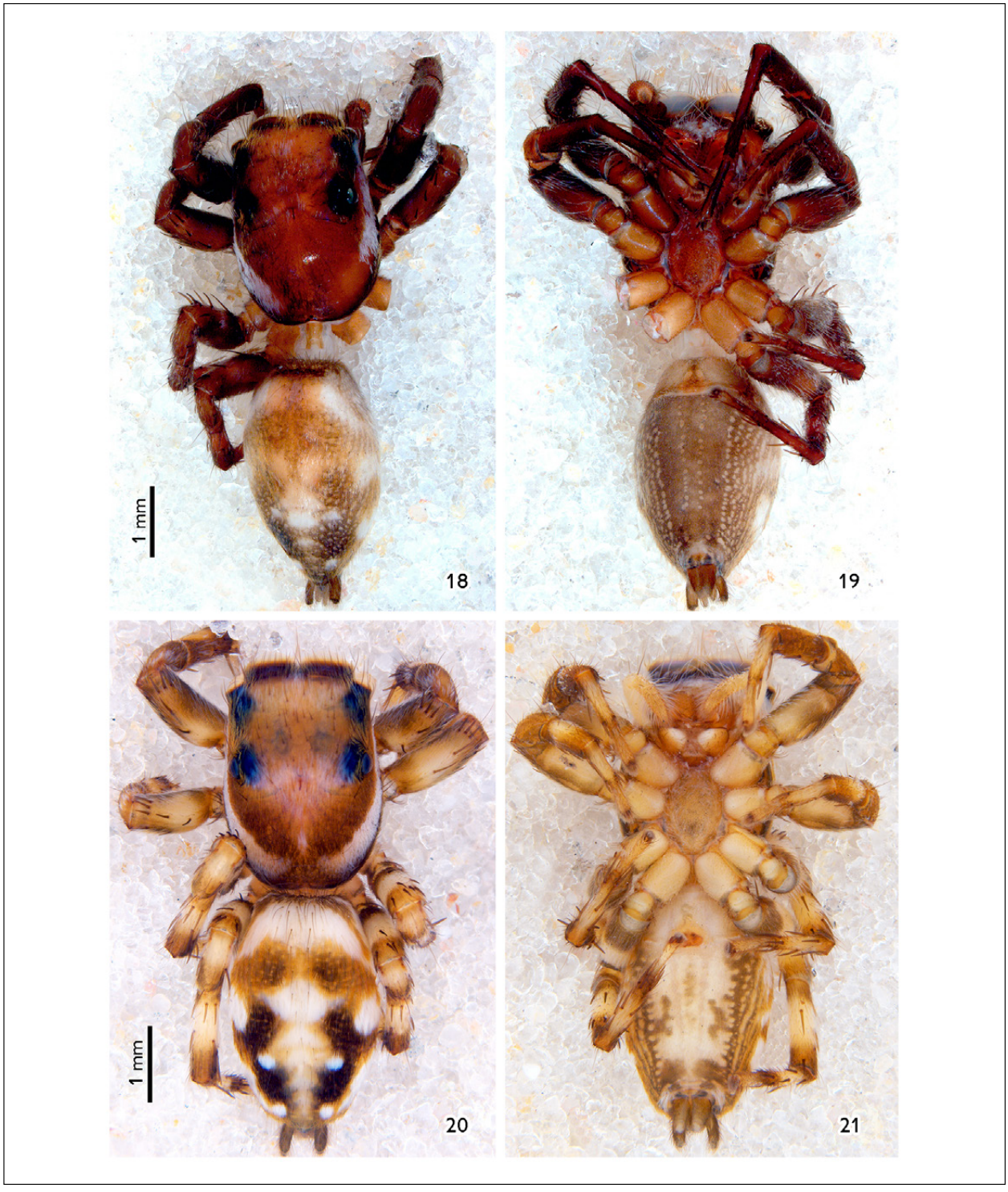
Material examined (new records): BRAZIL: Pará: Marabá, Mina do Sossego, Serra Norte, Carajás (S6.441°, W50.081°), E. Wanzeler leg., 23.II-06.III.2004, 1 #m (MPEG.ARA 4092); same locality but (S6.443°, W50.916°), A. Marreco-Pedroso leg., 05-06.III.2004, 3 #m (MPEG.ARA 4075). Maranhão: Caxias, Riacho Favaca, povoado Garrafas, 81 m.a.s.l. (S4.904°, W43.301°), beating sheet, G.S. Lustosa et al. leg., 27.XII.2021, 2 #m (MPEG.ARA 39498), 2 #f (MPEG.ARA 39499), 1 #m 1 #f (MPEG.ARA 39500); Caxias, Riacho Batatal, povoado Batatal, 66 m.a.s.l. (S4.951°, W43.386°), beating sheet, G.S. Lustosa et al. leg., 14.XII.2021, 1 #m (MPEG.ARA 39495). Piauí: José de Freitas, Riacho Gusmão, bairro Gusmão, 128 m.a.s.l. (S4.739°, W42.565°), beating sheet, G.S. Lustosa et al. leg., 6.VI.2021, 1 #m (MPEG.ARA 39490).

Distribution. BRAZIL: Amapá, Amazonas (Galiano, 1982), Pará, Maranhão, Piauí (Figure 26).

Biology. Specimens from Maranhão and Piauí were collected with beating sheet, meaning that they forage on lower vegetation. This species has been recorded from the Amazon rainforest and is herein recorded from lower latitudes in the drier diagonal (Maranhão/Piauí), which correspond to the biome *Cerrado*.



Figures 16-17. *Nycerella melanopygia* (MPEG.ARA 39500), epigyne. 16 ventral view, 17 cleared, dorsal view. Abbreviations: BG: Bennett's gland; CD: copulatory duct; CO: copulatory opening; CP: coupling pocket; FD: fertilization duct; S1: primary spermatheca.



Figures 18-21. *Nycerella volucripes*. 18-19 male (MPEG.ARA 39497) (18 dorsal view, 19 ventral view); 20-21 female (MPEG.ARA 39491) (20 dorsal view, 21 ventral view).

No record of this species has been published or found from the Atlantic Forest of higher latitudes in South America, but hitherto we cannot tell whether the species is limited to more equatorial localities in South America or this is simply the result of poor collection.

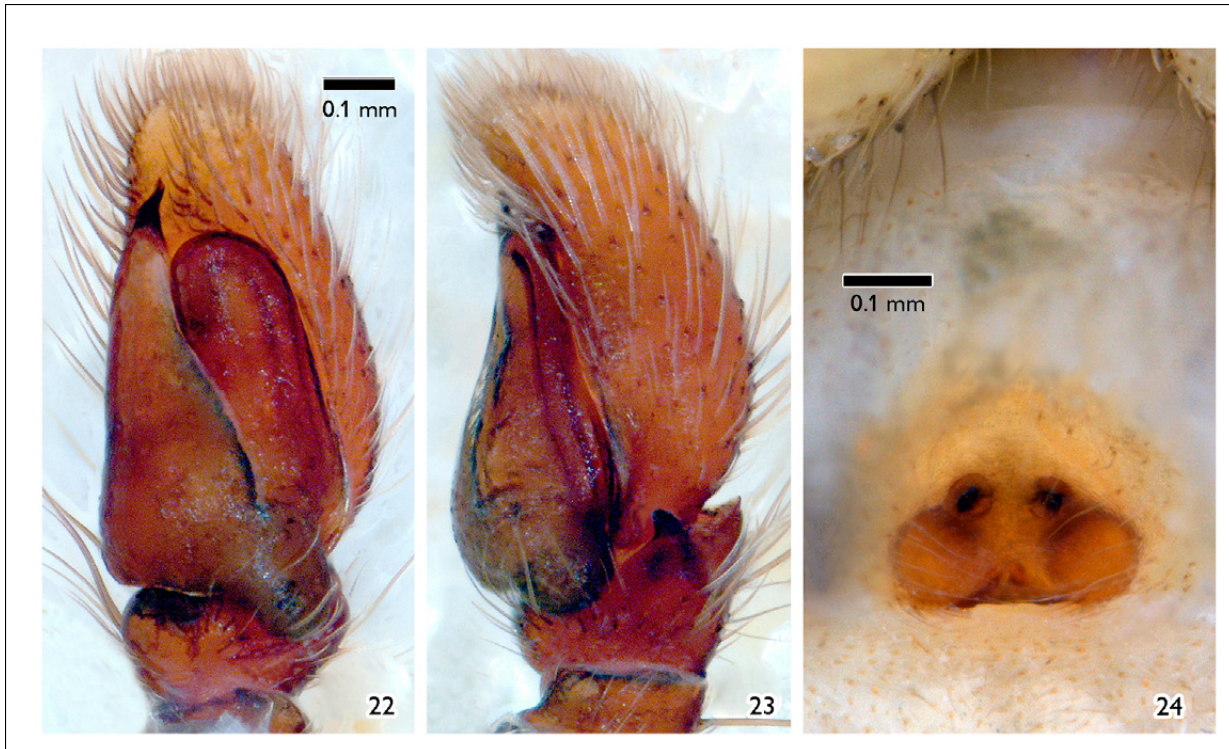
Nycerella volucripes Galiano, 1982
(Figures 18-24, 27)

Nycerella volucripes Galiano, 1982, p. 62, figures 20-22, 31-32, 45 (description of male and female).

Description and diagnoses for both sexes. See Galiano (1982) and Figures 18-21 of fresh material for comparison.

Note. Galiano (1982, figure 45) tried to synthetize the description the dorsal coloration of the male abdomen of *N. volucripes* in a scheme composed of tegument and scale coloration. The scheme, however, seems artificial when compared to freshly collected material (Figure 18) and is of limited use.

Material examined (new records). BRAZIL: Pará: Belém, Museu Paraense Emílio Goeldi - Campus de Pesquisa (S1.451°, W48.444°), P. Pantoja leg., 01.V.2016, 1 #f (MPEG.ARA 34105); Novo Progresso (S7.129°, W56.209°), J.O. Dias leg., 19.XI.2005, 1 #f (MPEG.ARA 2668); Marabá, Serra Norte, Pojuca (S5.963°, W50.400°), M. Zanuto leg., 26.X.1984, 1 #m (MPEG.ARA 4733); Novo Progresso, Campo de Provas Brigadeiro Velloso, Serra do Cachimbo (S9.271°, W54.940°), D.D. Guimarães leg., 20.III.2004, 1 #f (MPEG.ARA 5742); same locality (S9.375°, W55.034°), A.B. Bonaldo leg., 16.IX.2003, 1 #m (MPEG.ARA 5752). Maranhão: Caxias, Riacho Junco, povoado Junco, 93 m.a.s.l. (S4.797°, W43.265°), beating sheet, G.S. Lustosa et al. leg., 17.XII.2021, 1 #m



Figures 22-24. *Nycerella volucripes*. 22-23 left male palp (MPEG.ARA 39497) (22 ventral view, 23 retrolateral view); 24 epigyne (MPEG.ARA 39491), ventral view.

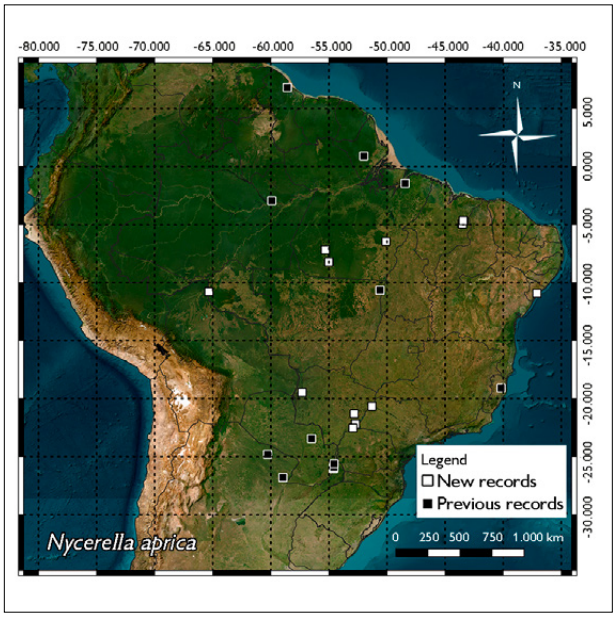


Figure 25. *Nycerella aprica* distribution in South America. Map: A. A. Bustamante & G. R. S. Ruiz (2024).

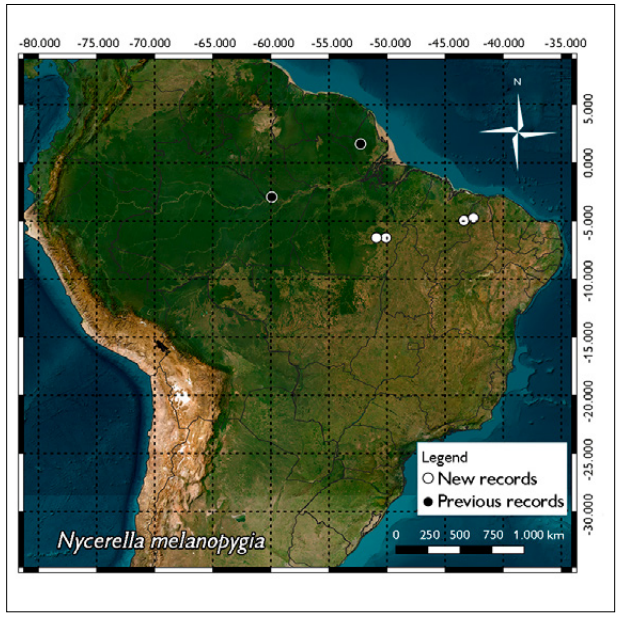


Figure 26. *Nycerella melanopygia* distribution in South America. Map: A. A. Bustamante & G. R. S. Ruiz (2024).

(MPEG.ARA 39496), Riacho Riachão, após entrada do balneário Veneza, 64 m.a.s.l. (S4.936°, W43.357°), beating sheet, G.S. Lustosa et al. leg., 3.VI.2021, 1 #f (MPEG.ARA 39489), Riacho Soledade, Área de proteção ambiental do Inhamum, 100 m.a.s.l. (S4.891°, W43.420°), beating sheet, G.S. Lustosa et al. leg., 1.VII.2021, 1 #f (MPEG.ARA 39491), Riacho Sumidouro do Padre, subestação de energia na MA 127, 99 m.a.s.l. (S4.880°, W43.427°), beating sheet, G.S. Lustosa et al. leg., 27.XII.2021, 1 #m (MPEG.ARA 39497). Mato Grosso do Sul: Brasilândia, Usina Hidrelétrica Sérgio Motta [S21.21°, W52.04°], Equipe IBSP leg., 2000, 1 #f (IBSP 30537).

Distribution. BRAZIL: Pará, Goiás (Galiano, 1982), Maranhão, Mato Grosso do Sul. PERU: Loreto (Galiano, 1982) (Figure 27).

Biology. Specimens from Maranhão were collected with beating sheet, meaning that they forage on lower vegetation. This species has been recorded from the Amazon rainforest (Loreto and Pará) and from the center (Mato Grosso do Sul/ Goiás) and north (Maranhão) of the drier diagonal, which correspond to the biome *Cerrado*. No record of this species has been published or found from the Atlantic Forest of higher latitudes in South America, but hitherto we cannot tell whether this is simply the result of poor collection.

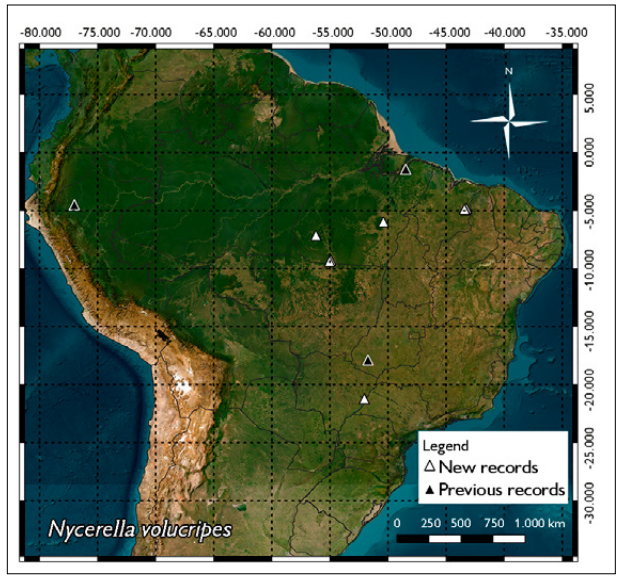


Figure 27. *Nycerella volucripes* distribution in South America. Map: A. A. Bustamante & G. R. S. Ruiz (2024).

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AUTHORS' CONTRIBUTIONS

G. R. S. Ruiz contributed to conceptualization, data curator, writing (original draft, revision and edition), research, methodology, supervision; A. V. Paz contributed to conceptualization, data curator, research, methodology; and A. A. Bustamante contributed to data curator, writing (revision and edition), research.