



## Taxonomy and Systematic

# A new species of *Euplocania* Enderlein (Psocodea, 'Psocoptera', Ptiloneuridae), from the Atlantic Rainforest, Brazil

Registered on ZooBank: [urn:lsid:zoobank.org/pub:CF97DE62-A5A3-41EF-92EC-F515C66B1B4D](https://zoobank.org/pub:CF97DE62-A5A3-41EF-92EC-F515C66B1B4D)

Alberto Moreira da Silva-Neto

Instituto Nacional de Pesquisas da Amazônia, Manaus, Amazonas, Brazil.

*EntomoBrasilis* 14: e941 (2021)

### Edited by:

William Costa Rodrigues

### Article History:

Received: 11.ii.2021

Accepted: 19.iv.2021

Published: 03.v.2021

### ✉ Corresponding author:

Alberto Moreira Silva-Neto

[psocodea@gmail.com](mailto:psocodea@gmail.com)

### Funding agencies:

↳ Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES); Fundação de Amparo à Pesquisa do Estado do Amazonas (FAPEAM)

**Abstract.** A new species of *Euplocania* belonging in the *Marginata* species group, collected in an area of the Atlantic Rainforest in Brazilian states of Bahia is described and illustrated. It differs from all the other species in the *Marginata* species group in details of the hypandrium and phallosome. This is the first record of a species in the *Marginata* species group for the Atlantic Rainforest biome and the first record of a *Euplocania* species for Brazilian states of Bahia.

**Keywords:** Epipsocetae; neotropics; psocids; taxonomy.

*Euplocania* Enderlein, 1910 is one of 12 extant genera in the psocopteran family Ptiloneuridae (SILVA-NETO *et al.* 2019). At present includes forty-seven described species, organized into fourteen species groups based on wing pigmentation, number of veins M in forewing, shape of pterostigma and hypandrium structure (GARCÍA ALDRETE *et al.* 2013; OBANDO *et al.* 2015; OBANDO *et al.* 2017; VINASCO-MONDRAGÓN *et al.* 2018; OBANDO *et al.* 2018; SILVA-NETO *et al.* 2019).

The *Marginata* species group, of GARCÍA ALDRETE *et al.* (2013), is one of these fourteen *Euplocania* species groups, and is diagnosed by having forewing with pigmented marginal band from  $R_{4+5}$  to  $A_1$  and  $Cu_2$  cells, pterostigma rounded, not angulate nor extended towards  $R_s$ , hindwing with pigmented marginal band from  $R_{4+5}$  to  $A$  and  $Cu_2$  cells and hypandrium of three sclerites, central one large, with two medians, stout, acuminate posterior projections. Actually includes only two species: *Euplocania marginata* New & Thonton, 1988 and *Euplocania uariniensis* Silva-Neto, García Aldrete & Rafael, 2019.

*Euplocania* is strictly neotropical, and its species there are in Nicaragua, Colombia, Peru, Brazil, Ecuador and Paraguay (SILVA-NETO *et al.* 2019). Brazil is the second most species-rich country for *Euplocania* species, with fifteen species distributed in five Brazilian States (SILVA-NETO & GARCÍA ALDRETE 2020).

Recently, was found one specimen belonging of the species group *Marginata* Garcia Aldrete, Obando & Carrejo, 2013,

collected in an area of the Atlantic Rainforest in Brazilian states of Bahia, not assignable to any of the known species this group. The purpose of this paper is to describe and illustrate that specimen as the third species known of *Marginata* species group.

### MATERIAL AND METHODS

One male specimen (Figure 1) was available for study. It was dissected in 80% ethanol and their parts were mounted on glass slides in Canada balsam. Standard measurements (in  $\mu\text{m}$ ) were taken with a filar micrometer. Abbreviations of parts measured are as follows: FW and HW: right fore- and hind- wings lengths; F, T, t1, t2 and t3: lengths of femur, tibia and tarsomeres 1, 2 and 3 of right hind leg; f1...fn: lengths of flagellomeres 1...n of right antenna; Mx4: length of fourth segment of right maxillary palpus; IO: minimum distance between compound eyes in dorsal view of head; D and d: antero-posterior and transverse diameter, respectively, of right compound eye in dorsal view of head; PO: d/D.

The specimen studied was stored in CD boxes, as described by SILVA-NETO *et al.* (2016). Photographs of the parts mounted were taken with a Leica DFC500 digital camera attached to a Leica M205C stereomicroscope, connected to a computer with the Leica Application Suite LAS V3.6 software, which includes an Auto-Montage module (Syncroscopy software). A map of the species locality was made with SimpleMapp (SHORTHOUSE 2010).

The type will be deposited in the Entomological collection Prof. Johann Becker of the Museu de Zoologia da Universidade Estadual de Feira de Santana, in Feira de Santana, Bahia, Brazil (MZFS).



**Figure 1.** *Euplocania atlantica* n. sp. (Holotype male). 1. Lateral view. Scale in mm.

## RESULTS

*Euplocania atlantica* n. sp. Male  
(Figures 1-8)

### Nomenclatural Act Registered in ZooBank:

[urn:lsid:zoobank.org:act:72C3B2D5-81EF-411C-8D0A-4E4BDC9BC314](https://zoobank.org/act:72C3B2D5-81EF-411C-8D0A-4E4BDC9BC314)

**Diagnosis.** Belonging in *Marginata* species group of GARCÍA ALDRETE *et al.* (2013). Close to *E. uariniensis* from which differs by having hypandrium with posterior corners almost square and side sclerites almost triangular; phallosome with side struts widening posteriorly and distally almost triangular, mesal sclerite almost U-shaped, anteriorly convex in the middle, with antero-lateral corners projected, these with irregularly shaped, distally triangular; posteriorly with a convex area in the middle, V-shaped, with two rectangular postero-lateral projections, and by having the antero-lateral pair of endophallic sclerite, elongated, curved inward, posteriorly wide, shoe shaped, and distally curved outward.

**Color** (in 80% ethanol). Compound eyes black, ocelli hyaline, with ochre centripetal crescents, head pattern (Figure 2). Scape and pedicel brown, f1-f3 pale brown. Legs with coxae and trochanters brown, femora pale brown; tibiae proximally dark brown, then pale brown; tarsomere 1 pale brown, tarsomeres 2-3 brown. Forewings veins brown, a wide, marginal pigmented band from  $R_{4+5}$  to  $A_1$  and  $Cu_2$  cells, with a small, hyaline area on each side of vein ends, at wing

margin, from  $M_1$  to  $M_4$ ; Rs and crossvein Rs-M dark brown. Pterostigma peripherally pale brown, with small irregular brown spots (Figure 3). Hindwings with a homogeneous brown band from  $R_{4+5}$  to  $A_1$ ; veins brown (Figure 4).

**Morphology.** Head with vertex slightly concave, emarginated; compound eyes without interommatidial setae (Figure 1). Outer cusp of lacinial tip broad, with seven denticles (Figure 5). Forewing pterostigma basally narrow, wider in the middle, narrowing posteriorly, areola postica tall, wide, with round apex, slanted and sinuous posteriorly. M stem slightly concave proximally, then almost straight, with four primary branches,  $M_1$  almost straight,  $M_2$ - $M_3$  sinuous (Figure 3). Hindwing Rs,  $R_{2+3}$  and  $R_{4+5}$  straight,  $M$  sinuous (Figure 4). Hypandrium of three sclerites, a large central sclerite convex anteriorly, with posterior corners almost square, posteriorly with a median stout process, narrowing distally, apically rounded, underlaid by a bifid posterior process, each arm distally curved outwards; side sclerites almost triangular, narrowing at the ends and, distally acuminate, setae as illustrated (Figure 6). Phallosome (Figure 7) with side struts basally fused, U-shaped, widening posteriorly and distally almost triangular. External parameres stout, golf club-shaped, with a field of pores distally. Mesal sclerite wide, strongly sclerotized, except on the antero-lateral corners, almost U-shaped, anteriorly convex in the middle, with antero-lateral corners projected, these with irregularly shaped, distally triangular; posteriorly with a convex area in the middle, V-shaped, with two rectangular postero-lateral projections. Two pairs of endophallic sclerites, an antero-mesal pair, small, strongly sclerotized, with three small acuminate processes on inner margin; an antero-lateral pair, elongated, curved inward, posteriorly wide, shoe shaped, and distally curved outward. Epiproct (Figure 8) broad, sides converging to almost straight posterior border, three mesal setae near anterior border, setal fields on posterior edge and one macroseta on each side. Paraprocts broadly, elliptic; sensory fields with 32-33 trichobothria on basal rosettes, setae as illustrated (Figure 8).

**Measurements** (in microns). FW: 4470, HW: 2970, F: 1203, T: 1915, t1: 729, t2: 85, t3: 154, f1: 821, f2: 788, f3: 679, Mx4: 288, IO: 494, D: 502, d: 347, PO: 0.69.

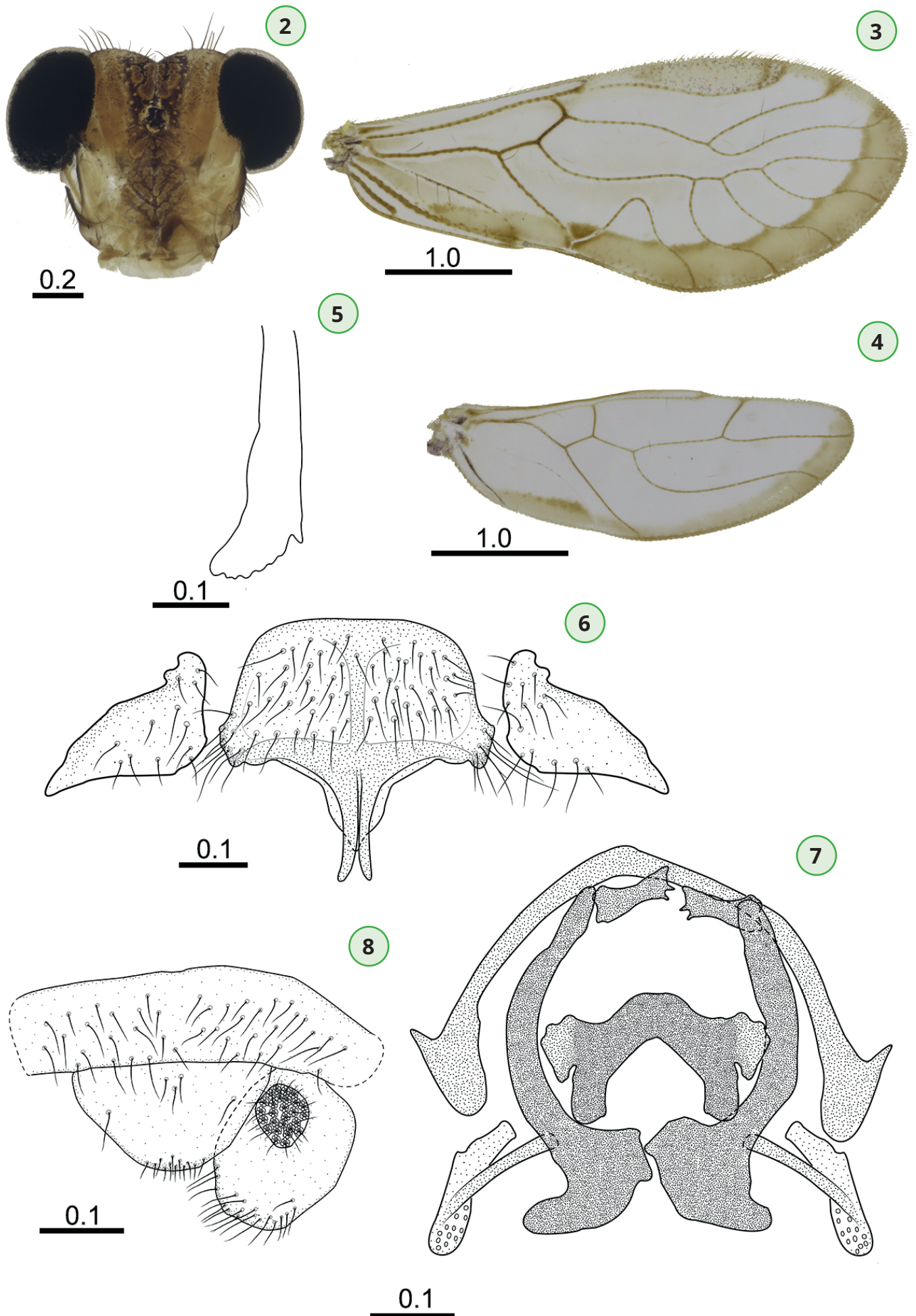
**Material examined.** Holotype male (MZFS). BRAZIL. Bahia. Ituberá. Cachoeira da Pancada Grande. 13°43'55" S 39°08'56" W. 03.i.2020. Beating tree branches with dead leaves. Silva-Neto. A.M.

**Etymology.** The specific epithet is given to this species as a noun in apposition, and makes reference to the Atlantic Rainforest, where the holotype was collected.

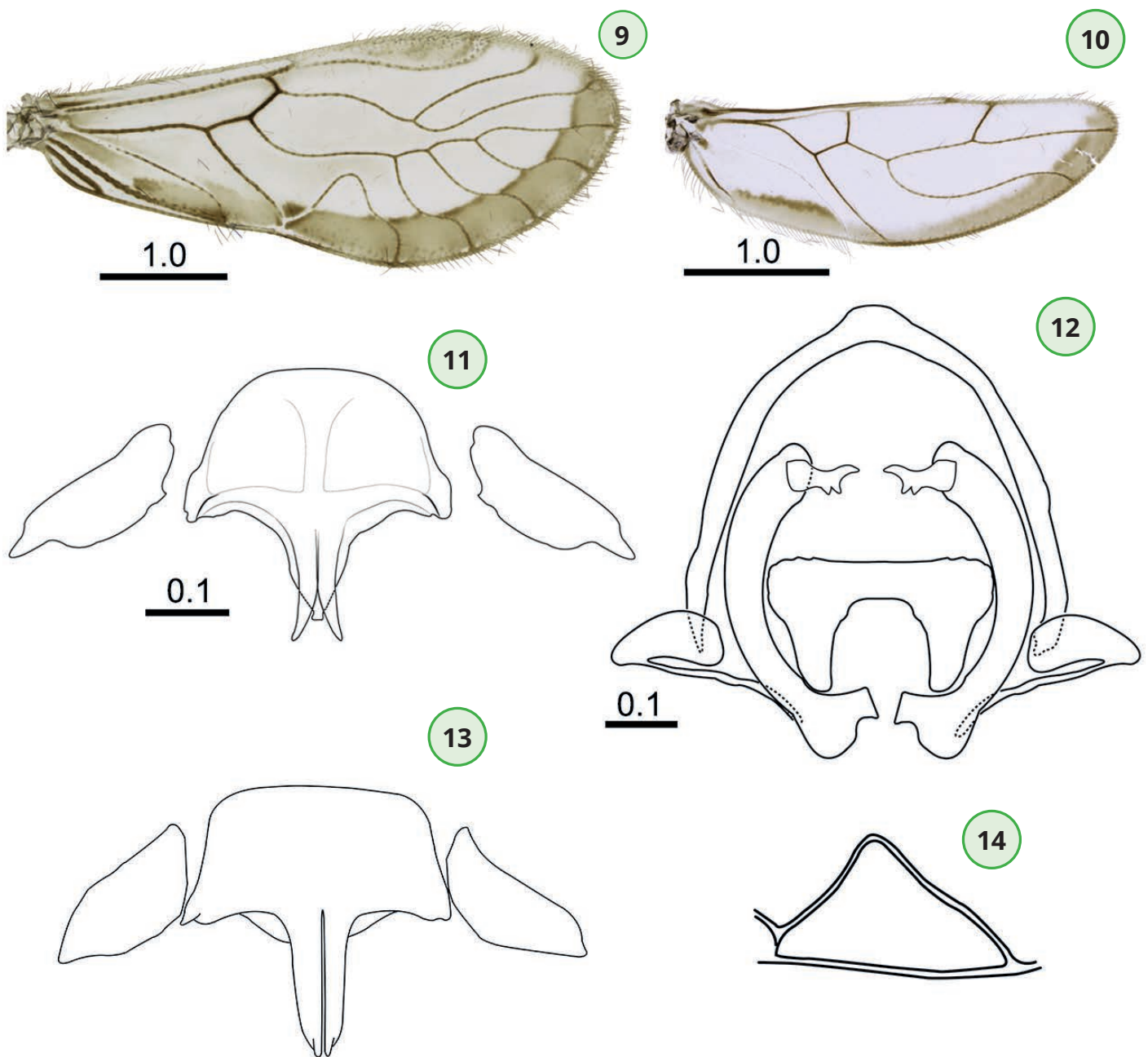
## DISCUSSION

*Euplocania atlantica* n. sp. here described increases to forty-eight the amount of species in the genus *Euplocania* and increases to three the number of species in the *Marginata* group. The distribution of the previously described species of *Marginata* group was restricted to northwestern South America, in Peru (Madre de Dios) and Brasil (Amazonas). The new record for the Brazilian state of Bahia extends the distribution of this species group to the southeast, in 3120 km (Figure 15). *E. atlantica* n. sp. is the second species of *Euplocania* species described for the Northeast region of Brazil and the first *Euplocania* species described for the state of Bahia.

The *Marginata* species group is diagnosed by characteristics of the wings and by characteristics of hypandrium (see diagnose above). However, when this species group was created by GARCÍA ALDRETE *et al.* (2013), included only the



**Figures 2-8.** *Euplocania atlantica* n. sp. (Holotype male). 2. Front view of head. 3. Forewing. 4. Hindwing. 5. Lacinial tip. 6. Hypandrium. 7. Phallosome. 8. Clunium, right paraproct and epiproct. Scales in mm.



**Figures 9-14.** *Euplocania uariniensis* Silva-Neto, García Aldrete & Rafael (Holotype). 9. Forewing. 10. Hindwing. 11. Hypandrium. 12. Phallosome. *Euplocania marginata* New & Thornton (Male). 13. Hypandrium. 14. Forewing areola postica. Figures 13 and 14 adapted from García Aldrete *et al.* (2013). Scales in mm.

species *E. marginata* and the male was unknown. GARCÍA ALDRETE *et al.* (2013) illustrated the hypandrium and the forewing of the unknown male of *E. marginata* (see Figures 16, 17 in GARCÍA ALDRETE *et al.* 2013), but the authors did not provide a taxonomic description of this male. In this way the phallosome and other morphological details of the *E. marginata* male remains unknown. SILVA-NETO *et al.* (2019) described the second species of the *Marginata* species group and used the illustration of the hypandrium of the male of *E. marginata* for the diagnosis of *E. uariniensis*.

*Euplocania atlantica* **n. sp.** differs from *E. marginata* by having hypandrium with central sclerite convex anteriorly, posteriorly with a median stout process, narrowing distally, apically rounded, underlaid by a bifid posterior process, each arm distally curved outwards (compare Figure 6 with Figure 13) and in details of forewing areola postica (compare Figure 3 with Figure 14). *E. atlantica* **n. sp.** and *E. uariniensis* constitute a pair of very similar species (compare Figures 3-7 with Figures 9-12) differing in details of the hypandrium and phallosome (compare Figures 6 and 7 with Figures 11 and 12)

as described in the diagnosis above.

Phylogenetic studies on the Atlantic Rainforest focusing on endemic species have indicated a high rate of endemism for animal and plant species, also a strong association between species of this biome with other South American forest regions, especially with species from the Amazon rainforest (SANTOS *et al.* 2007). A case of this strong association among species mentioned above is reported for Psocoptera by OLIVEIRA *et al.* (2017) for *Dictyopsocus pennicornis* (Burmeister, 1839), which has its distribution strongly correlated with the Amazon rainforest, Atlantic Rainforest and mixed forest enclaves of these two biomes.

Atlantic Rainforest and Amazon rainforest were connected at different periods of time in the Tertiary (RYLANDS *et al.* 1996) and in the Quaternary (MARKS *et al.* 2002). Possibly the ancestral population that gave rise to *E. atlantica* **n. sp.** and *E. uariniensis*, was existed in this unified biome of Amazon rainforest and Atlantic Rainforest, and with the posterior separation of these two forests, the allopatric speciation



**Figure 15.** Distribution of the *Euplocania* species of *Marginata* group.

occurred. This may explain the high similarity between *E. atlantica* n. sp. and *E. uariniensis* as well as the differences that make them distinct species.

### ACKNOWLEDGEMENTS

AMSN thanks the Instituto Nacional de Pesquisas da Amazônia (INPA) for research support and thanks the support for the Capes-INPA research grant (Process: 88887.312051/2018-00). This study was financed in part by the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior - Brazil (CAPES) - Finance Code 001" and by the Fundação de Amparo à Pesquisa do Estado do Amazonas (FAPEAM) - POSGRAD/ scholarship/ financial support".

### REFERENCES

- García Aldrete, AN, R, González & NS Carrejo, 2013. A new species of *Euplocania* Enderlein (Psocodea: Psocoptera: Ptiloneuridae), from Magdalena, Colombia, with a proposed classification of the genus. *Dugesiana*, 20: 149-156.
- Marks, BD, SJ Hackett & AP Capparella, 2002. Historical relationships among Neotropical lowland forest areas of endemism as determined by mitochondrial DNA sequence variation within the Wedge-billed Woodcreeper (Aves: Dendrocolaptidae: *Glyphorhynchus spirurus*). *Molecular Phylogenetics and Evolution*, 24: 153-167. DOI: [https://doi.org/10.1016/s1055-7903\(02\)00233-6](https://doi.org/10.1016/s1055-7903(02)00233-6)
- Obando, RG, AN García Aldrete & NS Carrejo-Gironza, 2015. New species of *Euplocania* Enderlein (Psocodea: Psocoptera: Psocomorpha: Ptiloneuridae) from Colombia. *Zootaxa*, 4033: 507-528. DOI: <https://doi.org/10.11646/zootaxa.4033.4.3>
- Obando, RG, AN García Aldrete & NS Carrejo, 2017. Five new species of the genus *Euplocania*. *ZooKeys*, 711: 81-101. DOI: <https://doi.org/10.3897/zookeys.711.20683>
- Obando, RG, AN García Aldrete, NS Carrejo & J Panche, 2018. New species of *Euplocania* Enderlein (Psocodea: Psocomorpha), in three species groups, from Colombia and Ecuador. *Zootaxa*, 4483: 497-522. DOI: <https://doi.org/10.11646/zootaxa.4483.3.5>
- Oliveira, JA, AM Silva-Neto, DMM Mendes & AN García Aldrete, 2017. New records of *Dictyopsocus pennicornis* (Burmeister) (Psocodea: Psocoptera: Psocidae: Psocinae). *EntomoBrasilis*, 10: 127-130. DOI: <https://doi.org/10.12741/ebrasilis.v10i2.673>
- Rylands, AB, GAB Fonseca, YLR Leite & RA Mittermeier, 1996. Primates of the Atlantic Forest: origin, distributions, endemism, and communities, p. 21-51. *In*: Norconk MA, AL Rosenberger & PA. Garber (eds). *Adaptive radiations of neotropical primates*. Plenum, New York.
- Santos, AMM, DR Cavalcanti, JMC Silva & M Tabarelli, 2007. Biogeographical relationships among tropical forests in north-eastern Brazil. *Journal of Biogeography*, 34: 437-446. <https://doi.org/10.1111/j.1365-2699.2006.01604.x>
- Shorthouse, DP, 2010. SimpleMappr, an online tool to produce publication-quality point maps. Available in: <https://www.simplemappr.net>
- Silva-Neto AM, AN García Aldrete & JA Rafael, 2016. A Storage Method for "Psocoptera" (Insecta: Psocodea) in "CD Box". *EntomoBrasilis*, 9: 220-223. DOI: <https://doi.org/10.12741/ebrasilis.v9i3.656>
- Silva-Neto, AM, AN García Aldrete & JA Rafael, 2019. New species of *Euplocania* Enderlein (Psocodea, 'Psocoptera', Ptiloneuridae) from Brazil, with a checklist of all known species of the genus. *Zootaxa*, 4550: 374-390. DOI: <https://doi.org/10.11646/zootaxa.4550.3.5>
- Silva-Neto, AM & AN García Aldrete, 2020. A checklist of 'Psocoptera' (Psocodea) from Brazil: an update to the list of 2009 of García Aldrete and Mockford, with an identification key to the families. *Papéis Avulsos de Zoologia*, 60: 1-14. DOI: <https://doi.org/10.11606/1807-0205/2020.60.29>
- Vinasco-Mondragón, AF, RG Obando & A N García Aldrete, 2018. The species group *Amabilis* of the genus *Euplocania* Enderlein (Psocodea: Psocomorpha: Ptiloneuridae). *Zootaxa*, 4444: 43-65. DOI: <https://doi.org/10.11646/zootaxa.4444.1.3>

