**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

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

**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.

**Taxonomy and Systematic**

**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 R₄₊₅ to A, and Cu₄ cells, pterostigma rounded, not angulate nor extended towards Rs, hindwing with pigmented marginal band from R₄₊₅ to A and Cu₄ 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 uarinensis* 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 μm) 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 SimpleMappr (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).

**RESULTS**

_Euplocania atlantica_ n. sp. Male (Figures 1-8)

A new species of _Euplocania_ Enderlein (Psocodea, ‘Psocoptera’,... Silva-Neto (2021)

**Nomenclatural Act Registered in ZooBank:**

[urn:lsid:zoobank.org:act:72C38205-81EF-411C-8D0A-4E48D9C9BC314](urn:lsid:zoobank.org:act:72C38205-81EF-411C-8D0A-4E48D9C9BC314)

**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. Two pairs of endophallic sclerites, an antero-mesal pair, small, strongly sclerotized, with three small acuminated 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. 03.12.2020. 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 southwestern 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 described by _García Aldrete et al. (2013),_ included only the...
Figures 2-8. Euploconia 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.
A new species of Euplocania Enderlein (Psocodea, ‘Psocoptera’,... Silva-Neto (2021)

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 (Ryllands 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
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: Glyphorynchus spirurus). Molecular Phylogenetics and Evolution, 24: 153-167. DOI: 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’: 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: ‘Psocoptera’: 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/embrasilis.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, AM, R, 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

Silva-Neto, AM, AN García Aldrete, NS Carrejo-Gironza, 2015. New species of Euplocania Enderlein (Psocodea:Psocoptera: Ptiloneuridae) from Costa Rica, with a proposed classification of the genus. Zootaxa, 4033: 507-528. DOI: https://doi.org/10.11646/zootaxa.4033.4.3

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. Storage Method for “Psocoptera” (Insecta: Psocodea) in “CD Box”. EntomoBrasilis, 9: 220-223. DOI: https://doi.org/10.12741/embrasilis.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
A new species of *Euplocania* Enderlein (Psocodea, ‘Psocoptera’,... Silva-Neto (2021)