BioOne COMPLETE

A New Species of Eurybia (Lepidoptera: Riodinidae: Eurybiini) from Northeastern Brazil

Authors: Dolibaina, Diego Rodrigo, Dias, Fernando Maia Silva, Mielke, Olaf Hermann Hendrik, and Casagrande, Mirna Martins

Source: Florida Entomologist, 97(3) : 1208-1212

Published By: Florida Entomological Society

URL: https://doi.org/10.1653/024.097.0328

BioOne Complete (complete.BioOne.org) is a full-text database of 200 subscribed and open-access titles in the biological, ecological, and environmental sciences published by nonprofit societies, associations, museums, institutions, and presses.

Your use of this PDF, the BioOne Complete website, and all posted and associated content indicates your acceptance of BioOne's Terms of Use, available at www.bioone.org/terms-of-use.

Usage of BioOne Complete content is strictly limited to personal, educational, and non - commercial use. Commercial inquiries or rights and permissions requests should be directed to the individual publisher as copyright holder.

BioOne sees sustainable scholarly publishing as an inherently collaborative enterprise connecting authors, nonprofit publishers, academic institutions, research libraries, and research funders in the common goal of maximizing access to critical research.

Downloaded From: https://complete.bioone.org/journals/Florida-Entomologist on 28 Mar 2024
Terms of Use: https://complete.bioone.org/terms-of-use

A NEW SPECIES OF *EURYBIA* (LEPIDOPTERA: RIODINIDAE: EURYBIINI) FROM NORTHEASTERN BRAZIL

Diego Rodrigo Dolibaina*, Fernando Maia Silva Dias, Olaf Hermann Hendrik Mielke and Mirna Martins Casagrande
Laboratório de Estudos de Lepidoptera Neotropical, Departamento de Zoologia, Universidade Federal do Paraná, P.O. Box 19.020, 81.531-980, Curitiba, Paraná, Brasil.

*Corresponding author; E-mail: dirodrido@hotmail.com

Abstract

A new species of *Eurybia* [Illiger], 1807 (Lepidoptera: Riodinidae: Eurybiini), *Eurybia gonzaga* **sp. nov.**, is described from the state of Pernambuco, Northeastern Brazil and compared with its closest ally, *Eurybia pergaea* (Geyer, 1832). Taxonomic comments, illustrations of the adults and male genitalia are provided.

Key Words: taxonomy, Atlantic forest, Pernambuco.

Resumo

Uma nova espécie de *Eurybia* [Illiger], 1807 (Lepidoptera: Riodinidae: Eurybiini), *Eurybia gonzaga* **sp. nov.**, é descrita do estado de Pernambuco, Nordeste do Brasil e comparada com sua espécie mais próxima, *Eurybia pergaea* (Geyer, 1832). Comentários taxonômicos, ilustrações dos adultos e das genitálias dos machos são fornecidas.

Palavras Chave: taxonomia, Floresta Atlântica, Pernambuco

Eurybia [Illiger], 1807 (Lepidoptera: Riodinidae: Eurybiini) is a Neotropical genus with 21 recognized species (Callaghan & Lamas 2004), characterized chiefly by the presence of a narrow androconial patch along 2A on the underside of the forewing of the males (Harvey 1987). *Eurybia* represents more than two thirds of the diversity of the tribe Eurybiini, which encompasses only 2 genera: *Eurybia* and *Alesa* Doubleday, 1847 (Callaghan & Lamas 2004). The tribe, 1 of the 2 Riodininae tribes characterized by 5 radial veins in the forewing, is considered "basal" and was recovered as a sister to all tribes with 4 or 3 radial veins in the forewing (Hall 2003). Its monophyly were first tested by Harvey (1987) and further confirmed by Hall (2003). The monophyly of Eurybiini is supported by the presence of tentacle nectary organs (TNO) on the larva, dorsal confinement of the intersegmental membrane between the eighth and the ninth segments of the pupa, presence of bristle-like scales on the medial surface of the palpi, metallic bluish-green compound eyes, and further 3 characters from the male genitalia (Harvey 1987; Hall 2003).

Species of *Eurybia* are usually large, mostly gray or brown butterflies, usually with an eyespot at the end of the discal cell on the forewing and submarginal spots or occeli along the outer margin on both wings (Hall & Ahrenholz 2010); many species have iridescent scales at least on the hind wing. The genus can be further distinguished from *Alesa* Doubleday, 1847 by the presence of bristle-like scales on the first and second labial palpi segments, and a characteristic long and bifurcate valva (Hall 2003). *Eurybia* holds the record of the greatest length in butterfly proboscis, up to twice the length of the body in some species (Kunte 2007; Bauder et al. 2011). In the pupal stage, the proboscis extends beyond the terminal abdominal segments (Horvitz et al. 1987). Adults perch under leaves with their wings open, in damp and shady forest areas, where their preferred imaginal nectar plants and larval host plants can be found (DeVries 1997; Hall & Ahrenholz 2010; Bauder et al. 2011). Those are predominantly in the Zingiberales (Beccaloni et al. 2008; Hall & Ahrenholz 2010). In some cases, the same plant used as host plant by the immature are also used as preferred nectar source by the adults, which use their long proboscis to obtain nectar from the very deep corolla tubes present in the inflorescences of some of the families cited above (Bauder et al. 2011). In contrast to most of the Riodinidae, immature stages of Eurybiini usually feed on flowers instead on leaves (Horvitz et al. 1987; Beccaloni et al. 2008). Although not specialized in specific ant taxa, immature stages of *Eurybia* are tended by ants, and one myrmecophilous organ is present, the TNO (Harvey 1987; Hall & Harvey 2002). Some authors report that some

Downloaded From: https://complete.bioone.org/journals/Florida-Entomologist on 28 Mar 2024
Terms of Use: https://complete.bioone.org/terms-of-use

Eurybia larvae produce substrate-borne sounds by oscillating its head laterally, scraping small teeth that cover the cervical membrane against epicranial granulations (DeVries 1991; Travassos et al. 2008).

The aim of this study is to describe a new species from the northeastern Brazil (state of Pernambuco), *Eurybia gonzaga* **sp. nov.**, and to provide distinction from its closest ally.

Material and Methods

In the drawings, full lines represent sclerotized structures; thin lines, membranous structures; and dotted lines, structures visible through transparency. Habitus of the adult are pictured in actual size and scale bars are provided for other figures; to highlight iridescent scales of the holotype, an additional source of light was positioned directed to the specimen at an angle of roughly 45 degrees. Higher taxonomy follows Hall (2003) and Callaghan & Lamas (2004); the terminology of Kristensen (2003) is employed for structures of the genitalia. Dissected specimen was marked with an asterisk in the type material section. Specimens from the following collections were studied and the collection acronyms used throughout the text are listed below:

DZUP – Coleção Entomológica Pe. Jesus Santiago Moure, Curitiba, Paraná, Brazil.

MGCL – McGuire Center for Lepidoptera and Biodiversity, Gainesville, Florida, USA.

Eurybia gonzaga **sp. nov.**
Dolibaina, Dias, Mielke & Casagrande
(Figs. 1-2, 7, 9)

Diagnosis

Eurybia gonzaga **sp. nov.** can be distinguished from the majority of the species of *Eurybia* by the absence of an eyespot at the end of the discal cell on the forewing (Fig. 1). It can be distinguished from other species of the genus without eyespots, namely *E. halimede* (Hübner, [1807]), *E. albiserriata* Weymer, 1890 and *E. elvina* Stichel, 1910, by the shape of the hindwing outer margin, angled at M_3-CuA_1 in *E. gonzaga* **sp. nov.** and rounded in the above cited species. Only two species have a hindwing outer margin angled as in *E. gonzaga* **sp. nov.**: *E. carolina* Godart, [1824] and *E. pergaea* (Geyer, 1832), however, it differs from the former by its smaller size and the absence of whitish and reddish markings on the upper side of the wings (Fig. 1); and from the latter chiefly by the presence of a purplish iridescence on the upper side of the wings (Figs. 3-6); the shape of the forewing apex, only slightly pointed; and the absence of any markings or lines on both sides of the wings, except by the marginal occeli (Figs. 1 and 2). The marginal occeli on the wings of the new species are larger than in either *E. pergaea* and *E. carolina*. The male genitalia differs from *E. pergaea* by the larger development of the inferior portion of the valva in lateral view (Figs. 7 and 8).

Male

Head: mostly gray; 2 yellow lines around the eyes; chaetosema gray, with creamy white scaling; yellow scales ventrally and posterior to the eyes; eyes dark green, with short setae; antenna about three fourths of the length of the costal margin; mostly dark gray, with white scales at the base of each segment, club yellow; labial palpus mostly gray, thin and long, with bristle-like scales inside of the first and second segment; first segment short; second segment long, about four fifths the length of the palpus, with yellow and dark yellow tipped scales; third segment shorter than the first, conical, with yellow scales posteriorly.

Thorax: uniformly dark gray dorsally; creamy white ventrally, legs also creamy white.

Forewing, length and shape: 23.65 mm (n = 4) (holotype: 24.6 mm); triangular, costal margin convex, convexity sharper after the origin of R_3; apex slightly pointed, projecting slightly from the line of the outer margin; outer margin nearly straight; tornus rounded, connecting outer and inner margins almost in a right angle; inner margin straight.

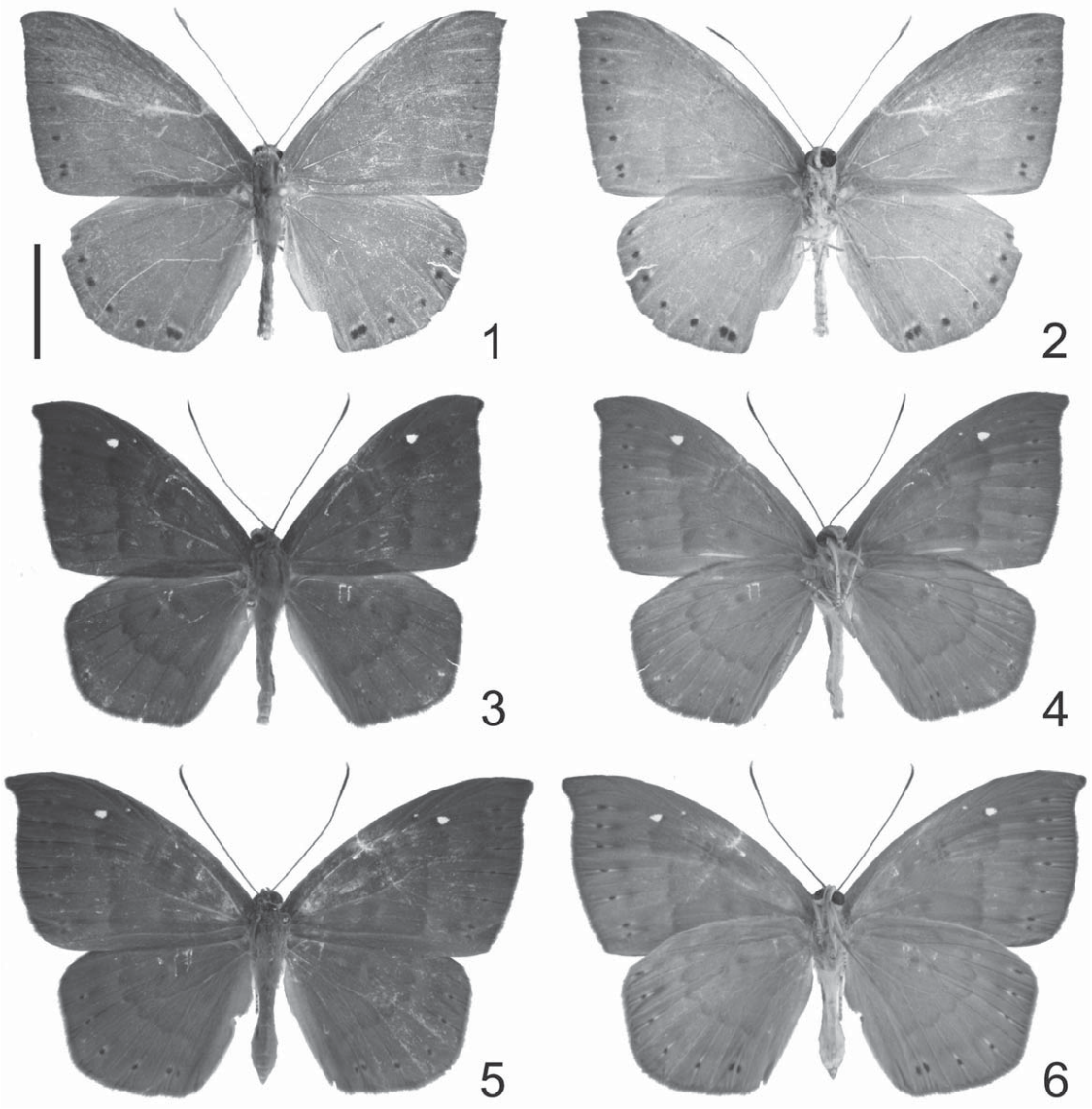
Forewing, upper side: ground color gray, with purplish iridescent scales covering most of the wing, except along the outer margin; one small black submarginal ocellus surrounded by yellowish scales in each space between R_5 and 2A along the outer margin, 2 occeli on CuA_2-2A; fringe gray. The iridescence is only visible when the wing is viewed at an angle.

Forewing, underside: similar to the upper side, but lighter and without iridescence; with a narrow androconial patch along 2A, from its base to the half of its length (Fig. 9).

Hindwing, shape: outer margin angled at M_3-CuA_1; costal margin convex; apex rounded; outer margin convex and angled; tornus rounded and obtusely angled; inner margin slightly convex.

Hindwing, upper side: coloration similar to the forewing upper side; ground color gray, with purplish iridescent scales covering most of the wing, except along the costal, outer and inner margins; one small black submarginal ocellus surrounded by yellowish scales in each space between Rs and 2A, 2 almost completely fused occeli on CuA_2-2A; fringe gray. The iridescence is only visible when the wing is viewed at an angle, iridescence brighter than in forewing, in the area between the discal cell and M_1 and 2A.

Downloaded From: https://complete.bioone.org/journals/Florida-Entomologist on 28 Mar 2024
Terms of Use: https://complete.bioone.org/terms-of-use



Figs. 1-6. Habitus of species of *Eurybia* [Illiger], 1807. (1-2) *Eurybia gonzaga* **sp. nov.**, holotype male (DZUP); (1) Dorsal, right wings illuminated by an additional source of light directed to the specimen at an angle of roughly 45 degrees; (2) Ventral; 3–6; *Eurybia pergaea*; (3 and 4) Male from Rio de Janeiro, Rio de Janeiro, Brazil (DZUP); (3) Dorsal; (4) Ventral; (5 and 6) Female from Rio de Janeiro, Rio de Janeiro, Brazil (DZUP); (5) Dorsal; (6) Ventral. Scale bar = 1cm.

Hindwing, underside: similar to the upper side, but lighter and without iridescence.

Abdomen: uniformly dark gray dorsally; creamy white ventrally.

Genitalia: tegumen slightly longer than the uncus, laterally rectangular, with a broad ventral lobe, ventrally constricted by a posterior indentation dorsal to the ventral projection of the tegumen; uncus distally bilobed in dorsal view, with a ventrolateral indentation close to the gnathos; lateral narrow membranous areas between the tegumen and uncus; gnathos "c" shaped, anterior part large and flattened, beneath the tegumen; ventral projection of tegumen dorsally lobed, tapering and ventrally fused with the dorsal projection of the saccus which runs obliquely; anterior projection of the saccus short and thin; fultura superior small and thin; fultura inferior not connected to the saccus, but connected with and covering the anterior quarter of the aedeagus; valva with 2 distinct parts, divided by a small indentation: superior part of the valva laterally flattened,

Downloaded From: https://complete.bioone.org/journals/Florida-Entomologist on 28 Mar 2024
Terms of Use: https://complete.bioone.org/terms-of-use



Figs. 7 and 8. Male genitalia of species of *Eurybia* [Illiger], 1807, lateral view; (7) *Eurybia gonzaga* **sp. nov.**, paratype from São Lourenço da Mata, Pernambuco, Brazil (MGCL); (8) *Eurybia pergaea* from Rio de Janeiro, Rio de Janeiro, Brazil (DZUP). Scale bar = 0.5mm.

thin, long—about half the size of the aedeagus—and posteriorly projected, curved dorsally and distally pointed, base of this projection slightly wider with a small dorsal projection; inferior part of the valva stout, somewhat rounded but irregular shaped, larger dorsoventrally, dorsally lobed and smaller, ventrally more or less rounded and larger; aedeagus cylindrical, almost straight, 3 times longer than tegumen and the uncus combined; anterior opening of the aedeagus small and circular; posterior opening of the aedeagus dorsal and long, about one third the size of the aedeagus; vesica without cornuti.

Female - Unknown.

Distribution

The species is only known from a limited series of 4 specimens collected in the Atlantic forest areas of the state of Pernambuco, Brazil. This area is considered one of the major threatened areas within the Atlantic forest, and it is currently represented only by small and isolated fragments (MMA 2007). The holotype was collected in one of such areas, a private protected area in good condition of preservation.

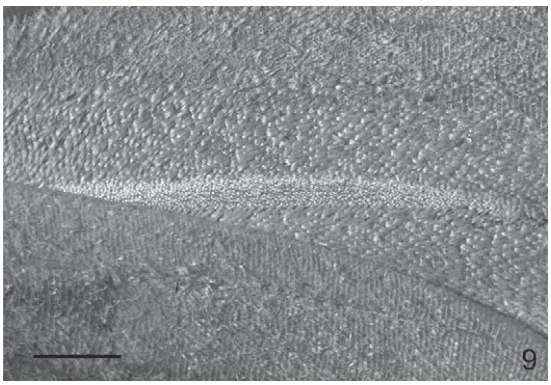


Fig. 9. Detail of the patch of androconial scales along 2A on the forewing underside of *Eurybia gonzaga* **sp. nov.**, holotype. Scale bar = 1mm.

Etymology

This species honors Luiz Gonzaga (1912-1989), a Brazilian composer and musician popularly known as the "king of *baião*" (a folk rhythm from northeastern Brazil) born in the state of Pernambuco, region of all known specimens.

Type Material

HOLOTYPE with the following labels: / HOLOTYPUS / 6-7.II.2006, RPPN [Reserva Particular do Patrimônio Natural, Private Reserve of the Natural Heritage] Frei Caneca, Jaqueira, Pernambuco, BRAZIL], 650m Mielke & Casagrande leg. / DZ 28.339 / HOLOTYPUS *Eurybia gonzaga* Dolibaina, Dias, Mielke & Casagrande det. 2013 / (DZUP).

Paratypes – 3 males. BRAZIL – *Pernambuco*: no locality, IX-1986, 1 male, Courtin leg. (MGCL); São Lourenço da Mata, 6-VI-1981, 1 male, R. Aronheim leg. (MGCL), 27-VI-1981, 1 male*, R. Aronheim leg. (MGCL).

Remarks

Eurybia gonzaga **sp. nov.** is morphologically similar to *E. pergaea* (Figs. 3-6), a common and widespread species from southern and southeastern Brazil. However, it is not known if these 2 species occur sympatrically as the record of *E. pergaea* provided by Paluch et al. (2011) to the

Downloaded From: https://complete.bioone.org/journals/Florida-Entomologist on 28 Mar 2024
Terms of Use: https://complete.bioone.org/terms-of-use

municipality of Caruaru, Pernambuco, may in fact represent *E. gonzaga* **sp. nov.** These 2 species are very distinct based on characters of shape and coloration of the wings. The rarity of *E. gonzaga* **sp. nov.** deposited in collections possibly reflects the small number of samplings in this Brazilian region (Santos et al. 2008).

Acknowledgments

We thank Dr. Andrew D. Warren for allowing DRD to study the MGCL riodinid collection; Vitor A. Nardino and Rede Paranaense de Coleções Biológicas - Taxonline (UFPR) for help taking some of the pictures; members of the Laboratório de Estudos em Lepidoptera Neotropical (LELN–UFPR) for additional help; and the Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq) and Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES) for the fellowship granted to the authors.

References Cited

Bauder, J. A. S., Lieskonig, N. R., and Krenn, H. W. 2011. The extremely long-tongued Neotropical butterfly *Eurybia lycisca* (Riodinidae): Proboscis morphology and flower handling. Arthropod Structure and Dev. 40(2): 122-127.

Beccaloni, G. W., Hall, S. K., Viloria, A. L., and Robinson, G. S. 2008. Catalogue of the host plants of the Neotropical butterflies. Catálogo de las plantas huésped de las mariposas neotropicales. Monografías Tercer Milenio, 8: 1-536.

Callaghan, C. J., and Lamas, G. 2004. Riodinidae, pp. 141-170 *In* G. Lamas, [ed.], Checklist: Part 4A. Hesperioidea – Papilionoidea, *In*: Heppner, J.B. [ed.], Atlas of Neotropical Lepidoptera 5A. Association for Tropical Lepidoptera/Scientific Publishers, Gainesville, FL.

Devries, P. 1991. Call production by myrmecophilous riodinid and lycaenid butterfly caterpillars (Lepidoptera): morphological, acoustical, functional, and evolutionary patterns. American Mus. Novit. (New York), 3025:,1-23.

Devries, P. 1997. The butterflies of Costa Rica and their natural history. Volume II. Riodinidae. Princeton Univ. Press, xxvii + 288 pp.

Hall, J. P. W. 2003. Phylogenetic reassessment of the five-forewing radial-veined tribes of Riodinidae (Lepidoptera: Riodinidae). Syst. Entomol. 28(1): 23-37.

Hall, J. P. W., and Ahrenholz, D. H. 2010. A new species of Alesa (Riodinidae: Eurybiini) from Eastern Ecuador. Trop. Lepidop. Res. 20(1): 19-22.

Hall, J. P. W., and Harvey, D. J. 2002. A survey of androconial organs in the Riodinidae (Lepidoptera). Zool. J. Linn. Soc. 136(2): 171-197.

Harvey, D. J. 1987. The Higher Classification of the Riodinidae (Lepidoptera). Ph.D Dissertation. Univ. Texas, Austin, 216 pp.

Horvitz, C. C., Turnbull, C., and Harvey, D. J. 1987. Biology of immature *Eurybia elvina* (Lepidoptera: Riodinidae), a myrmecophilous metalmark butterfly. Ann. Entomol. Soc. America 80(4): 513-519.

Kristensen, N. P. 2003. Lepidoptera, moths and butterflies. Volume 2: Morphology, physiology, and development. Handbuch der Zool. 4, xii + 564 pp.

Kunte, K. 2007. Allometry and functional constraints on proboscis lengths in butterflies. Funct. Ecol. 21(5): 982-987.

MMA (Ministério Do Meio Ambiente) 2007. Áreas prioritárias para conservação, uso sustentável e repartição de benefícios da biodiversidade brasileira: atualização, portaria MMA n° 9, de 23 de janeiro de 2007. Série Biodiversidade, Vol.31. Brasília, 301 pp.

Paluch, M., Mielke, O. H. H., Nobre, C. E. B., Casagrande, M. M., Melo, D. H. A., and Freitas, A. V. L. 2011. Butterflies (Lepidoptera: Papilionoidea and Hesperioidea) of the Parque Ecológico João Vasconcelos Sobrinho, Caruaru, Pernambuco, Brazil. Biota Neotrop. 11(4): 229-238.

Santos, E. C., Mielke, O. H. H., and Casagrande, M. M. 2008. Inventários de borboletas no Brasil: estado da arte e modelo de áreas prioritárias para pesquisa com vistas à conservação. Nat. Conserv. 6(2): 68-90, 178-198.

Travassos, M. A., Devries, D. J., and Pierce, N. E. 2008. A novel organ and mechanism for larval sound production in butterfly caterpillars: *Eurybia elvina* (Lepidoptera: Riodinidae). Trop. Lepidoptera Res. 18(1): 20-23.

Downloaded From: https://complete.bioone.org/journals/Florida-Entomologist on 28 Mar 2024
Terms of Use: https://complete.bioone.org/terms-of-use