

A NEW SPECIES OF *ALESA* (RIODINIDAE: EURYBIINI) FROM EASTERN ECUADOR

Jason P. W. Hall¹ and David H. Ahrenholz²

¹Department of Entomology, National Museum of Natural History, Smithsonian Institution, Washington, DC 20560-0127, USA;

²Regions Hospital, 640 Jackson Street, St. Paul, MN 55101, USA

Abstract- A new riordinid species in the tribe Eurybiini, *Alesa suzana* Ahrenholz & Hall n. sp., is described from the lowlands of eastern Ecuador. The new species appears to be sister to the widespread Amazonian species *A. telephae* (Boisduval, 1836). Based on the study of external morphology and male genitalia, a new species-group classification is proposed for *Alesa* Doubleday, 1847. The genus is divided into the *amesis*, *telephae*, and *prema* groups.

Key words: *Alesa*, Amazon, Ecuador, Eurybiini, Riordinidae, South America, taxonomy

The riordinid tribe Eurybiini is one of the most basal groups in the Neotropical subfamily Riordininae, and its members possess five forewing radial veins along with those of the tribe Mesosemiini (Hall, 2003). Members of the Eurybiini are most notable for having a metallic blue-green gloss to the living adult eyes, bristles on the medial surface of certain labial palpal segments, and myrmecophilous caterpillars (Reuter, 1896; Harvey, 1987; DeVries & Penz, 2000; Hall, 2003). The tribe contains just two well-differentiated genera, *Eurybia* [Illiger], 1807, and *Alesa* Doubleday, 1847. The members of *Eurybia* are morphologically characterized by their uniformly large size, the presence of bristles on labial palpal segments one and two, a large eyespot at the end of the discal cell on the forewing, round submarginal spots on both wings, an elongate patch of pale androconial scales along vein 2A on the ventral forewing, and very long bifurcate male genital valvae. In contrast, the members of *Alesa* are small to medium-sized species, with bristles on labial palpal segment one only, dark intervenal rays in the distal half of the forewing, rectangular submarginal spots on the hindwing only, and predominantly short male genital valve processes. There are also several ecological differences between the two genera. Most *Eurybia* species are relatively common and often encountered in large numbers perching under leaves with their wings fully open in flat shady forest areas close to their larval foodplants, which predominantly belong to the Marantaceae (DeVries, 1997). However, the majority of *Alesa* species are uncommon to rare and typically encountered singly or in small groups perching on top of leaves with their wings partially to fully open on hilltops, and the known caterpillars are carnivorous (DeVries & Penz, 2000). *Eurybia* contains at least 25 species that are distributed throughout the Neotropics, including several that are undescribed, whereas *Alesa* contains only nine described species that are all confined to Amazonia (Hall, unpubl. data). A preliminary review of *Eurybia* was produced recently by Hanner (1998), as part of an unpublished molecular biology Ph.D. thesis, but *Alesa* has never been reviewed. In this paper, we describe a distinctive new species of *Alesa* from the base of the eastern Andes in Ecuador, in the context of a morphological overview of the genus.

The terminology for male genital structures follows Klots (1956), Eliot (1973), and Harvey (1987), and nomenclature for venation follows Comstock & Needham (1918), with cells named for the vein above. The dissection methods used

followed those outlined in Hall (2005). The following collection acronyms are used in the text: DA - Collection of David H. Ahrenholz, St. Paul, MN, USA; JHKW - Collection of Jason P. W. Hall and Keith R. Willmott, Washington, DC, USA; USNM - National Museum of Natural History, Smithsonian Institution, Washington, DC, USA.

Alesa suzana Ahrenholz & Hall, new species

(Figs. 1; 3)

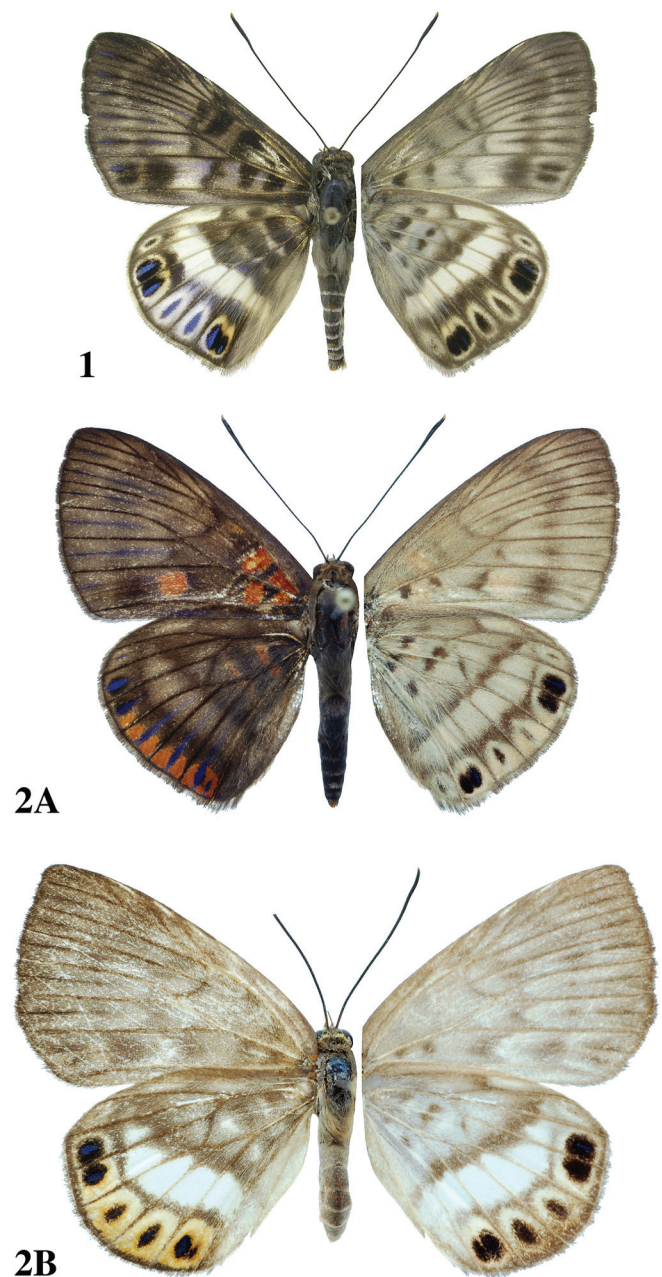
Description: MALE: Forewing length 20 mm. *Wing shape:* Both wings, but particularly forewing, slightly elongate; base of forewing costa and anal margin approximately straight, and distal margin convex; forewing with five radial veins; hindwing rounded, with a rounded tornus and apex, a convex anal margin, and a distal margin that is convex across cells M_3 and M_2 and weakly concave across cells Cu_2 and Cu_1 . *Dorsal surface:* Forewing ground color brown; basal third of forewing pale brown, with narrow areas of dark brown scaling along costal and anal margins and across wing base, two large rectangular dark brown spots in discal cell, one similar spot across discal cell end, and two similar spots at base of cell Cu_2 ; a somewhat narrow dark brown forewing postdiscal band consists of an inwardly diagonal and proximally displaced element in cell Cu_2 , a slightly concave vertical element in cell Cu_1 , an inwardly diagonal element between cells M_3 and M_1 just beyond discal cell end, and a jagged series of smaller spots at costal margin; a broad band of pale brown scaling immediately distal to dark postdiscal band becomes dirty white in cell Cu_2 and includes a narrow outwardly diagonal element in cell 2A, band elements in cells Cu_1 to R_{4+5} partially medially divided by a thin line of dark brown scaling entering from distal margin; a series of narrow dark brown forewing submarginal spots partially to entirely ringed with a broad line of pale brown scaling extends from tornus to apex, with two partially coalesced dark spots present in cell Cu_2 , pale brown scaling proximal to dark spots in cells Cu_1 to R_{4+5} medially divided by a thin line of dark brown scaling; an iridescent pale purple sheen visible across most of forewing when wings viewed at an oblique angle, but only predominantly through middle of cells Cu_2 to M_1 when wings viewed horizontally, with purple scaling slightly darker within dark submarginal spots; forewing fringe brown, becoming slightly paler in tornus; hindwing ground color brown, with

anal margin pale cream brown; basal third of hindwing pale cream brown, with narrow areas of dark brown scaling along costal margin and across wing base, two large rectangular dark brown spots in discal cell, two similar spots at base of cell Cu_2 , and a similar spot in middle of cell $Sc+R_1$; a somewhat broad dark brown hindwing postdiscal band consists of a slightly jagged outwardly diagonal element between cells 2A and Rs that crosses discal cell end, and a proximally displaced element in cell $Sc+R_1$; a broad and similarly slightly jagged band of cream-white scaling extends along entire distal margin of dark postdiscal band; a series of narrow black hindwing submarginal spots entirely ringed with a broad line of whitish to yellow scaling extends from tornus to apex, with two partially coalesced dark spots present in cell Cu_2 , spots in cells M_2 and M_1 contiguous, spots in cells Cu_1 and M_3 more proximally elongate than remaining spots, and pale scaling ringing dark spots whitish in cells Cu_1 and M_3 and cream to yellow in remaining cells; an iridescent pale purple sheen visible across most of hindwing when wings viewed at an oblique angle, but only predominantly through middle of cells Cu_2 to M_1 when wings viewed horizontally, with purple scaling forming dark purple pupils within black submarginal spots in cells Cu_2 , M_2 , and M_1 , and pale lavender-purple pupils entirely covering black submarginal spots in cells Cu_1 and M_3 ; hindwing fringe brown in tornus and pale brown in apex. *Ventral surface*: Differs from dorsal surface as follows: Forewing paler, with all pale scaling uniformly pale cream brown, dark brown markings in basal half of wing smaller, fainter, and more hazily defined, and an iridescent pale purple sheen absent; hindwing paler, with grayish-white setae distributed across basal third of wing, dark brown markings in basal half of wing smaller and more hazily defined, with those in discal cell medially divided, submarginal spots in cells Cu_1 and M_3 of similar length to remaining spots, pale scaling ringing dark submarginal spots more uniformly cream to pale yellow, an additional cream submarginal spot in cell 2A, and prominent iridescent dark purple scaling restricted to dark submarginal spots in cells Cu_2 , M_2 , and M_1 .

Head: Eyes brown and bare, with cream marginal scaling; frons dark brown dorsally, dark yellow laterally, and cream ventrally; first and second segments of labial palpi cream, third segment dark brown, second and third segments relatively elongate; antennal length approximately 70% of forewing length, segments entirely dark brown, nudum along inner ventral margin continuous, clubs dark brown, tips orange brown.

Body: Dorsal surface of thorax dark brown, with grayish setae along posterior margin, ventral surface grayish cream; dorsal surface of abdomen brown, with a narrow band of grayish scaling along posterior margin of each segment, ventral surface cream; all legs cream.

Genitalia (Fig. 3): Uncus approximately rectangular in lateral view, with a convex ventral margin and a shallow U-shaped indentation at middle of dorsal posterior margin; tegumen with a somewhat long and broad ventral lobe; falces somewhat short and compact, with an angular "elbow" and an upwardly curved posterior tip; vinculum predominantly approximately straight, with an abruptly broadened medial section and a short, triangular posteroventral section opposite



Figs. 1-2. *Alesa* adults (dorsal surface on left, ventral surface on right). **1.** Holotype male of *Alesa suzana* n. sp., km. 12 Tena-Puyo rd., E. Ecuador (USNM). **2A.** Male of *Alesa telephae* (Boisduval, 1836), lower Río Tiputini, E. Ecuador (JHKW). **2B.** Female of *Alesa telephae*, Pakitza, S.E. Peru (USNM).

sacculus, sacculus of medium length and width, with a rounded, slightly bulbous, and downwardly curved anterior tip; valvae in lateral view seen to be approximately rectangular basally, with a broadly triangular, slightly upwardly curved, and densely setose lower/outer posterior process, an inwardly and slightly dorsally positioned, very long, needle-shaped upper/inner posterior process that has several long setae situated at a point of slight constriction about one third distance from its base, and a broadly rounded, posteriorly projecting dorsal transtilla process that is slightly shorter than lower/outer posterior process and has a broad band of heavier sclerotization

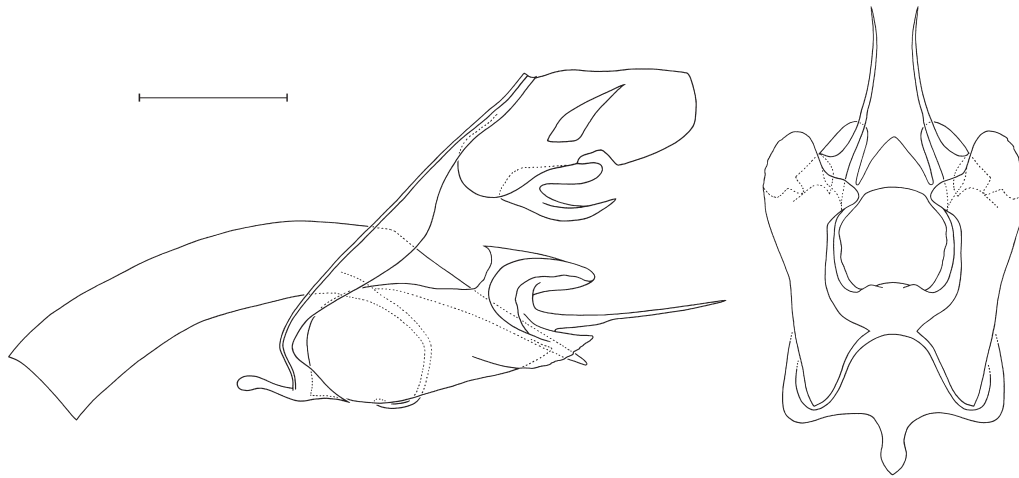


Fig. 3. Male genitalia of *Alesa suzana* in lateral view, with ventral view of valve complex. Scale bar = 0.5 mm.

around its anterodorsal rim, valvae in ventral view seen to have a broadly rounded and very slightly inwardly curved lower/outer posterior process that has a broadly triangular, inwardly pointed projection beyond middle of inner margin, a posteriorly slightly outwardly curved upper/inner posterior process, and a sclerotized transtilla complex fusing valvae dorsally that consists of a triangular medial section and a pair of slightly longer, inwardly directed, broadly rounded lateral processes; aedeagus of medium length, even medium width, and weakly convex, with a very long, gradually tapered ventral posterior tip, anterior end opens anteriorly and posterior tip broadly opens dorsally, vesica with numerous closely spaced creases throughout most of its length, but no cornuti; short, strap-like pedicel broadens gradually toward its base and joins aedeagus just posterior to its mid-point; eighth abdominal tergite and sternite approximately square.

FEMALE: Unknown.

Types: *Holotype male*, ECUADOR: *Napo*, Finca San Carlo, km. 12 Tena-Puyo rd., 1°05.59'S, 77°46.98'W, 550 m, 19 Feb 2008 (D. H. Ahrenholz) (USNM).

Paratypes: 1♂, same data as holotype (DA).

Etymology: This species is named for the second author's sister, Suzan Ahrenholz.

Systematic placement and diagnosis: Traditionally, the species now placed in *Alesa* were treated in two genera, with *rothschildi* Seitz, 1913, placed in the monotypic genus *Mimocastnia* Seitz, 1913, although recent morphological study has shown *rothschildi* to be a derived member of *Alesa* (Harvey, 1987; Hall, 2003; see below). *Alesa* has historically been recognized to contain as few as four species (e.g., Stichel, 1930-31), but the genus is now generally accepted to contain nine described species (Callaghan & Lamas 2004; Salazar & Constantino, 2007). However, the two most recently described species, *A. fourmiera* Lathy, 1958, and *A. esmeralda* Salazar & Constantino, 2007, are very similar to historically described congeners (*A. amesis* (Cramer, 1777) and *A. prema* (Godart, [1824]), respectively) and known to us only from the unique holotypes, so their status as valid species needs confirmation. Stichel (1930-31) divided *Alesa* into two sections, the

"Platycerae" (broad winged group) for *A. prema* and *A. telephae* (Boisduval, 1836), and the "Leptocerae" (narrow winged group) for *A. amesis* (including *A. lipara* Bates, 1867, and *A. hemiurga* Bates, 1867) and *A. thelydrias* Bates, 1867. Based on a study by the first author of the external morphology of all *Alesa* species and the male genitalia of all species except *A. fourmiera*, an alternative species-group classification for the genus is proposed here.

Alesa is here divided into three seemingly monophyletic species groups. Members of the *amesis* group, which is defined to include *A. amesis*, *A. fourmiera*, *A. hemiurga*, *A. thelydrias*, and *A. lipara*, are externally characterized by having white antennal tips, a relatively small wingspan, a narrowly elongate and rounded forewing, long black rays in the distal half of the forewing, and variably widespread dark purple iridescence on the dorsal wings of males. The male genitalia have spine-like posterior valve processes of similar length and a somewhat rectangular transtilla that has tiny dorsolateral projections. Members of the *telephae* group, which includes *A. telephae* and the new species *A. suzana*, are externally characterized by having black antennal tips, a medium-sized wingspan, a broadly rounded forewing, medium-length black rays in the distal half of the forewing, widespread pale purple iridescence on the dorsal wings of males, and a white postdiscal band on the hindwing of one or both sexes. The male genitalia have posterior valve processes of dissimilar length, including a very long and needle-like upper/inner process, a broadly triangular projection from the inner ventral margin of the lower/outer posterior valve process, and a transtilla complex consisting of a triangular medial section and a pair of large broadly rounded lateral processes. Members of the *prema* group, which includes *A. prema*, *A. esmeralda*, and *A. rothschildi*, are externally characterized by having black antennal tips, a relatively large wingspan, a broadly pointed forewing, short black rays in the distal half of the forewing, and green patterning on the dorsal wings of both sexes. The male genitalia have posterior valve processes of dissimilar length, including a long and rod-like upper/inner process, and a transtilla complex consisting of a triangular medial section and a pair of large broadly rounded

lateral processes. Although the members of the *amesis* group exhibit several derived external characters, as described above, of the three species groups their male genitalia exhibit by far the greatest similarity to those of members of the sister genus *Eurybia*. Similarities in the wing pattern and shape of the male genital valvae and transtilla suggest that the *telephae* and *prema* groups are more closely related to each other than either is to the *amesis* group.

Alesa suzana n. sp. is similar only to the widespread Amazonian species *A. telephae* (see Fig. 2), and appears to be its sister species. Externally, the male of *A. suzana* differs most notably from that of *A. telephae* by having a narrower forewing, a less prominent iridescent pale purple sheen across both dorsal wings, pale brown instead of pink and purple markings at the base of both dorsal wings, a more prominent pale brown postdiscal band on the dorsal forewing, a broad cream-white postdiscal band on the dorsal hindwing, and large oval black submarginal spots ringed with cream to yellow scaling on the dorsal hindwing instead of small square pink submarginal spots. In addition, the dark postdiscal spots between cells M_3 and M_1 on the ventral forewing curve/angle distally instead of proximally, and the dark postdiscal band on the hindwing is slightly more proximally positioned, over the discal cell end. The male of *A. suzana* actually bears a much closer resemblance to the female of *A. telephae*, but is still readily separated by the much narrower, pointed wings, and the iridescent pale purple sheen across both dorsal wings. The female of *A. suzana* remains unknown, but is likely to be very similar to that of *A. telephae* and best distinguished from it by the last mentioned dark postdiscal band characters. It is important to note that a cream-white postdiscal band on the dorsal hindwing is variably present even in sympatrically collected females of *A. telephae*. The form without such a band was named as form *sapphirina* Biedermann, 1936. The male genitalia of the two species are similar, but those of *A. suzana* differ significantly from those of *A. telephae* by having a much larger and more elongate lower/outer posterior valve process, which is slightly inwardly and upwardly curved, a slightly larger projection from the inner ventral margin of the lower/outer posterior valve process, a slightly shorter and less posteriorly outwardly curved needle-like upper/inner posterior valve process, and a rounded instead of rather rectangular lateral process to the transtilla complex.

Biology: This evidently very rare species has only been recorded from a single lowland rainforest locality at 550 m. Both of the known males were found on the same day, perching on a prominent hilltop between 1410 and 1415 hrs. Within minutes of the first male being captured, a second male flew in very fast and hovered for a fraction of a second before landing on the same clump of leaves. Both males perched on top of sunlit leaves with their wings nearly fully open about 12 m above the ground at the edge of a small lightgap, where *Alesa suzana* was the highest perching riordinid species observed. The most common *Alesa* species, *A. amesis*, was regularly encountered in an adjacent lightgap perching 2 to 3 m above the ground.

Distribution: *Alesa suzana* is currently known only from the base of the eastern Ecuadorian Andes, but it presumably has a wider distribution across at least the western Amazon.

ACKNOWLEDGMENTS

JPWH thanks all those museum curators in Europe and the Americas who gave access to the riordinid collections in their care (see list in Hall, 1999, 2005); Don Harvey for access to his previous genital dissections of *Alesa*; and the National Science Foundation (DEB #0103746 and #0639977) for financial support of museum and field research; JPWH and DA thank the Ministerio del Ambiente and the Museo Ecuatoriano de Ciencias Naturales, in Quito, for arranging the necessary permits for research in Ecuador; and two anonymous reviewers for helpful comments on the manuscript.

REFERENCES CITED

- Callaghan, C. J., and G. Lamas
2004. Riordinidae, pp. 141-170. In: Lamas, G. (ed.), Checklist: Part 4A. Hesperioidea - Papilionoidea. In: Heppner, J. B. (ed.), Atlas of Neotropical Lepidoptera. Scientific Publishers, Gainesville, FL.
- Comstock, J. H., and J. G. Needham
1918. The wings of insects. *American Naturalist* 32: 231-257.
- DeVries, P. J.
1997. *The Butterflies of Costa Rica and Their Natural History. Volume II: Riordinidae*. Princeton, NJ, Princeton University Press. 288 pp.
- DeVries, P. J., and C. M. Penz
2000. Entomophagy, behavior, and elongated thoracic legs in the myrmecophilous Neotropical butterfly *Alesa amesis* (Riordinidae). *Biotropica* 32(4a): 712-721.
- Eliot, J. N.
1973. The higher classification of the Lycaenidae (Lepidoptera): a tentative arrangement. *Bulletin of the British Museum of Natural History (Entomology)* 28: 373-506.
- Hall, J. P. W.
1999. *A Revision of the Genus Theope: Its Systematics and Biology (Lepidoptera: Riordinidae: Nymphidiini)*. Gainesville, FL, Scientific Publishers. 127 pp.
2003. Phylogenetic reassessment of the five forewing radial-veined tribes of the Riordininae (Lepidoptera: Riordinidae). *Systematic Entomology* 28(1): 23-37.
2005. *A Phylogenetic Revision of the Napaeina (Lepidoptera: Riordinidae: Mesosemiini)*. Washington, DC, The Entomological Society of Washington. 235 pp.
- Hanner, R. H.
1998. *Taxonomic Problems with Phylogenetic Solutions Derived from the Integration of Biochemical, Morphological, and Molecular Data*. Ph.D. Thesis. Eugene, OR, University of Oregon.
- Harvey, D. J.
1987. *The Higher Classification of the Riordinidae (Lepidoptera)*. Ph.D. Thesis. Austin, TX, University of Texas.
- Klots, A. B.
1956. Lepidoptera, pp. 97-110. In: Tuxen, S. L. (ed.), *Taxonomists' Glossary of Genitalia in Insects*. Copenhagen, Denmark, Munksgaard.
- Reuter, E. F.
1896. Über die palpen der Rhopalocera. Ein Beitrag zur Erkenntnis der verwandtschaftlichen Beziehungen unter den Tagfaltern. *Acta Societatis Scientiarum Fennicae* 22: 1-577.
- Salazar, J. A., and L. M. Constantino
2007. Descripción de nuevas especies de ropaloceros para Colombia (Lepidoptera: Pieridae, Nymphalidae, Satyrinae, Ithomiinae, Riordinidae). *Boletín Científico, Museo de Historia Natural, Universidad de Caldas* 11: 167-183.
- Stichel, H. F. E. J.
1930-31. Riordinidae, pp. 1-795. In: Strand, E. (ed.), *Lepidopterorum Catalogus*. Volumes 38-41. W. Junk, Berlin, Germany.