THREE NEW SPECIES OF RIODININI FROM THE CLOUD FORESTS OF ECUADOR (LEPIDOPTERA: RIODINIDAE)

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ABSTRACT.—Three new species of the tribe Riodinini, in the genera Baectis Hübner, [1819] (Baectis attali n. sp.), Lasaia Bates, 1868 (Lasaia cutica n. sp.), and Chalodota Stichel, 1910 (Chalodota pescada n. sp.), are described from east Andean cloud forest habitats in Ecuador. Comparative taxa are also illustrated, including Baectis kadenii (C. & R. Felder, 1861) (n. comb.), which is transferred from Imelda Hewitson, 1870, Lasaia incoides Schaus, 1902 (n. comb.), which is transferred from Exopilia Godman & Salvin, 1866, and Lasaia servita Stichel, 1910, which is synonymized with Lasaia incoides (n. syn.).

KEY WORDS: Argentina, Baectis attali n. sp., bait trapping, behavior, Bolivia, Brazil, Chalodota pescada n. sp., Colombia, Exopilia, Imelda, Lasaia cutica n. sp., Neotropical, Paraguay, Peru, South America, taxonomy, Uruguay, Venezuela.

East Andean cloud forest habitats in Ecuador continue to yield interesting new riodinid discoveries (Hall & Willmott, 1995a,b, 1996, 1998). This paper describes three new species in the riodinid genera Baectis, Lasaia and Chalodota. All of these genera are comparatively well known and the species description in Lasaia represents the first since Clench (1972) revised the genus, that in Chalodota the first since Reibardt (1958) (see Callaghan, 1995) and that in Baectis only the second valid one in the latter half of the century (see Brémex, 1995). During the course of searching for sister taxa to the new species, the necessity for two new generic combinations was also uncovered.

The following museum acronyms are used throughout the text:
AMNH American Museum of Natural History, New York, NY, USA
BMNH Natural History Museum, London, England
MNCN Museo Nacional de Ciencias Naturales, Quito, Ecuador
USNM United States National Museum, Washington, DC, USA
ZMHI Zoologische Museum, Humboldt Universität, Berlin, Germany

Baectis attali Hall & Willmott, new sp.
Fig. 1a,b; 7a,b.

Description.—MALE: forewing length 18mm. Forewing distal margin slightly sinuate, hindwing rounded. Dorsal surface: forewing ground color dark brown; two slightly darker brown markings at base of cell 1A+2A; one dark brown line across cell end and one before cell end; orange-red square at base of cell M1; slightly larger, contiguous orange-red triangle at base of cell M1, small yellow patch joining this latter marking to costa; yellow circle in middle of wing extends in a narrower band to anal margin at a point two-thirds distance from base to tornus, rectangular yellow subapical patch, yellow spots towards tornus; undulating silver-blue line at margin, white fringe elements at margins of cells 1A+2A, Cu1 and M1, Hindwing ground color dark brown; one dark brown line across cell end and one before cell end; inwardly curving postdiscal yellow band extends from mid-point of costa to vein Cu1, much broader above vein M1; three tiny yellow spots in apex, one in each of cells M1–M3; even, silver-blue line at margin extends from apex to tornus, faint white fringe elements at margins of cells 1A+2A and M1, Ventral surface: forewing ground color dark brown; one dark brown line across cell end and one before cell end; discal cell proximal to this latter line yellow with a brown streak middle from wing base to line; yellow triangle at base of cell 1A+2A marked distally with a dark brown line, dark brown line through its middle; orange-red square at base of cell M1, slightly larger contiguous orange-red triangle at base of cell M1, with small yellow patch joining this latter marking to costa; unevenly edged yellow band through middle of wing extends from anal margin into cell Cu1; submarginal yellow band, which is broad in subapex, tapers towards costa, broken in cell Cu1, almost absent in Cu3, full in 1A+2A; three tiny yellow spots at distal margin of apex. Hindwing ground color dark brown; basal half of wing yellow with dark brown line at discal cell end and thin postdiscal dark brown line that traverses wing from costa to vein 1A+2A; broad, unevenly edged, yellow band at submargin, extends from apex to tornus, broader at middle; elongate yellow marginal streak in cells 1A+2A–M1, joined to the submarginal band in the former. Head: labial palpi black with white scaling. Eyes brown and bare. Fronts dark brown. Antennal segments black with basal white scaling laterally, reduced white scaling towards clubs; clubs black. Body: dorsal surface of thorax and abdomen dark brown, ventral surface greyish-white. Legs gray: Genitalia (Fig. 7a,b): uncus rounded, deeply divided posteriorly; vinculum extends over dorsum of tegumen, which has deeply indented anterior notch; saccus long, thin and pointed; posteriorly elongate pedicel of same length as saccus and tipped with coarse scobinate processus posterior (sensu Clench (1972)) of valves divided into upper, lobed saccus and lower, larger posteriorly projecting processus posterior attached to latter portion and very lightly sclerotized.

FEMALE: unknown.

Types.—Holotype male: ECUADOR.—Zamora-Chinchipe Prov.: Loja-Zamora rd., nr. Sabanilla, Quebrada San Ramon, 1700m., 29 Oct 1997 (K. R. Willmott); to be deposited in the BMNH.

Paratype: ECUADOR.—Zamora-Chinchipe Prov.: same data as above, 5 ♂, 1 ♀ (MNCN), 1 ♂ to be deposited in USNM, 3 ♀ in coll. of the authors: Loja-Zamora rd., Río San Francisco, 1900m., 28 Nov 1993, 2 ♀ (B. Mery & S. Attal); in coll. of S. Attal, Paris, France.

Etymology.—This species is named for our friend Stéphane Attal, who, to our knowledge, collected the first specimens and generously loaned them to us for description.

Diagnosis.—Baectis attali n. sp., although somewhat divergent in wing pattern compared to typical Baectis species, shares the same basic wing pattern elements and male genitalia to members of that genus. Although the divided submarginal band in the tornus of the ventral hindwing in B. attali is reminiscent of that in members of the "B. melanis Hübner, [1831], group", and its forewing costal orange-red markings are similar to those of Baectis nesaea Godman & Salvin, 1889 (though these are probably not homologous, occurring in R1, R2 and M1 in B. nesaea), B. attali does not closely resemble any of the species hitherto regarded as belonging to Baectis. The sister species to B. attali appears to be Baectis kadenii (C. & R. Felder, 1861) (n. comb.), (Fig. 2a,b), which occurs in similar habitats in the Andes of Venezuela and north Colombia. B. kadenii has hitherto been placed as a member of the genus Imelda Hewitson, 1870, in the incertae sedis section (four forewing radial
veins) of Harvey (1987) (Stichel, 1930; Bridges, 1994), but since it possesses a deep anterior notch in the tegument of the male genitalia it properly belongs in the tribe Riodinini. Given the following similarities to B. attali and its otherwise Baeotis-like male genitalia (Fig. 8a,b), we transfer kadenini from Imelida to Baeotis. Although B. kadenini has white instead of yellow pattern elements and its discal band is very broad, it shares with B. attali a homologous postdiscal orange-red pair of markings on the forewing that are joined to the costa by a small pale patch, a subapical pale patch and marginal markings, and a similarly broad wing shape. Together, B. attali and B. kadenini appear to form a distinct species group within the genus. As the sexes of B. kadenini are not dimorphic, those of B. attali are also assumed to be very similar.

Discussion.— Two groups of males of B. attali were found along the Quebrada San Ramon, a small river in a steep forested valley, perching very high on and flying about overhanging bushes around 10-15m above the stream, where they were active from midday to 1600h. Males typically flew almost constantly at a fixed height and in certain flight paths in natural open areas above the river with a slow fluttering flight typical of perching Baeotis species, except when engaged in faster, spiralling male-male interactions. Very occasionally they would land, but only fleetingly, beneath leaves with their wings outspread. Although only two or three males were visibly present at any one time, captured individuals were quickly replaced by others.

B. attali is currently known only from the Río Zamora valley in southeast Ecuador between altitudes of 1700-1900m. The forest here is less moist and the canopy lower than at similar altitudes elsewhere in the eastern Ecuadorian Andes and the general region exhibits a high level of endemism at the subspecies and species level (Hall and Willmott, unpubl. data). The possibly restricted range of this species, and the height at which individuals usually fly, perhaps account for the lack of specimens in major collections.

Lasia cutisca Hall & Willmott, new sp.

Description.— MALE: Forewing length 12.5mm. Forewing distal margin convex, costal margin concave at middle and sharply convex at apex, hindwing tornus elongated to a point. Dorsal surface: Forewing ground color dark brown; three darker brown marks in discal cell, one marking cell end, two at base of vein 1A+2A; thin, darker brown postdiscal line, with fainter darker brown scaling proximally, extends diagonally from vein R3 at a point three-quarters distance from wing base to apex, to vein M2, then vertically to anal margin; a pair of small black submarginal spots in 1A+2A, a single similar spot in each of cells M1, M2, all individually surrounded by a square of paler brown, darker brown distally; distal tips of veins silver-blue at distal margin; white fringe elements at center of distal margins of cells 1A+2A, Cu1, M1, and M2, Hindwing ground color dark brown; three darker brown markings in discal cell, one marking cell end, remaining two positioned with one just distal and one just proximal of a square black spot in cell Rs2; two indistinct darker brown spots below discal cell; uneven, darker brown postdiscal line extends from costa, at a point two-thirds distance from wing base to apex, to vein 1A+2A; submarginal pattern same as forewing; faint white fringe element at distal margin of cell M1. Ventral surface: Forewing differs from dorsal surface in following ways: ground color paler brown, most distal marking at base of cell 1A+2A divided in two, postdiscal line slightly displaced at vein Cu1 and with no darker brown proximally, submarginal black spots fainter and not surrounded by paler brown, vein endings not silver-blue. Hindwing differs from dorsal surface in following ways: ground color paler brown, two basal dark brown spots visible in base of cells Rs and 1A+2A, one visible at base of Cu1, submarginal black spots not surrounded by paler brown, vein endings not silver-blue. Head: Labial palpi mixture of dark brown and pale brown scales. Eyes brown and setose. Frons dark brown. Antennal segments black with lateral streaks of white scales, clubs black. Body: dorsal surface of thorax and abdomen dark brown, ventral surface brown. Legs brown. Genitalia (Fig. 9a,b): uncus thickens significantly in lower half, distal edge mildly toothed, tegumen with deeply indented anterior notch; aedeagus long, thin and pointed with lightly sclerotised elongate cornutus towards tip; posteriorly elongate pedicel of same length as aedeagus and tipped with recurved scobinate patch that has numerous fine setae; processes superior of valvae upwardly, rounded point with small rounded projection from lower edge, lightly sclerotised processes inferior attached along length of latter except for pointed tip.

FEMALE: differs from male in following respects: forewing length 14mm. Medial portions of distal margins more bulbous on both wings, forewing apex more falcate. Dorsal surface: ground color paler brown; forewing postdiscal line more uneven and slightly more diagonally positioned in upper portion.

Types.— Holotype male: ECUADOR.— Sucusan Provs. nr. La Bonita, Río Sucio, 1800m, 21 Nov 1996 (K. R. Willmott); to be deposited in BMNH. Allotype female: ECUADOR.— Napo Provs.: Zacca, 0°27'S 77°53'W, 2000m, 5 Nov 1988 (R. Robbins) (USNM).

Paratypes: ECUADOR.— Sucusan Provs.: same data as holotype, 8 ♀ and 1 ♂ deposited in the MNCN, 1 ♂ deposited in the USNM, 6 ♀ in the coll. of the authors. Napo Provs.: same data as allotype, 1 ♀ (USNM); same locality data as allotype, 27 Oct 1988, 1 ♀ (J. S. Miller) (AMNH), Tungurahua Provs., Río Blanco Valley, Santa Ana, Apr 1936, 1 ♀ (AMNH), Morona-Santo Domingo Provs. km 20 Macas-Nuevo de December rd., Río Abanico, 1800m, 27-29 Sept 1997, 1 ♀ (R. C. Busby); in coll. R. C. Busby, Boston, MA. Pichinchá Provs.: 70 km E of Santo Domingo, 2055m, 22 Oct 1980, 1 ♀ (G. W. Busby III); in coll. G. W. Busby III, Boston, MA.

Etymology.— The species name is taken from the Quechua word “cutisca”, meaning dull or discolored, in reference to the atypical brown dorsal surface of this species.

Diagnosis.— Lasia cutisca n. sp. is very similar to Lasia incoides (Schaus, 1902) (n. comb.) (= Lasia scotina Stichel, 1910 n. syn.). However, since in his revision of Lasia, Chen (1972) illustrated L. incoides (as L. scotina) only in black and white and neglected to figure the male genitalia, the systematic position of this species has always been less than certain. To rectify this situation, we illustrate the type of L. incoides (in the USNM) in color (Fig. 4a,b) and figure the male genitalia (Fig. 10a,b) (based on the holotype of L. scotina in the ZMHH). L. incoides was formerly placed in Exoplista Godman & Salvin, 1886 (Bridges, 1994, see also Hemmings, 1967), a genus that is polyphyletic even with the exclusion of L. incoides (Hall & Willmott, unpubl. data). Since the male genitalia of L. incoides lack the additional lateral flanges on the processes superior that are characteristic of Exoplista and are instead very similar to those of Lasia species, we place it in combination with the latter genus. Both L. cutisca and L. incoides resemble certain species in the genus Chalodota Stichel, 1910, but they both possess a posteriorly pointing pedicel tipped with a scobinate patch in the male genitalia, a character typical of many riodinines but not found in any Chalodota species that we have dissected, including the type, C. theodora (C. & R. Felder, 1862).

Both sexes of L. cutisca differ from those of L. incoides by their larger size (e.g., forewing length 12.5mm instead of 10.5mm in males), by having a more concave-convex forewing costal margin and convex distal margin, slightly darker dorsal and ventral ground colors which have less well contrasted pattern elements, a straighter forewing postdiscal line and two prominent white fringe elements in the subapex of the forewing instead of one. In the male genitalia of L. cutisca the posteriorly projecting pedicel is much longer than that of L. incoides, being of similar length to the aedeagus, the scobinate patch is broader and the setae are shorter and more numerous, the elements of the processes superior of the valvae are less pointed and the processes inferior is slightly longer and more pointed at its tip.

Perhaps even more similar to L. cutisca is what appears to be an undescribed species from southeast Brazil (there is a small series of males in the USNM). It has an almost identical wing pattern to L. incoides but is more similar in size to L. cutisca as it is in the male
Fig. 1-6. 1. *Baeotis attali* Hall & Willmott n. sp., holotype male: a) dorsal surface; b) ventral surface. 2. *Baeotis kadenii* (C. & R. Felder, 1861), Colombian male, ZMHL: a) dorsal surface; b) ventral surface. 3. *Lasia cutica* Hall & Willmott n. sp., holotype male: a) dorsal surface; b) ventral surface. Allotype female: c) dorsal surface; d) ventral surface. 4. *Lasia incoidea* (Schaus, 1902), holotype male, USNM: a) dorsal surface; b) ventral surface. Allotype female, USNM: c) dorsal surface; d) ventral surface. 5. *Chalodeta pescada* Hall & Willmott n. sp., holotype male: a) dorsal surface; b) ventral surface. 6. *Chalodeta panurga* Stichel, 1910, Ecuadorian male: a) dorsal surface; b) ventral surface.
genitalia. However, although the pedicels of the undescribed species and *L. cutisca* are of a similar length, the scobinate patches are different shapes and there are also differences in the shapes of the uncus and the superior and inferior portions of the valvae. There thus appear to be three species in this group of *Lasaia* with the following geographic distributions: *L. cutisca* E. Andes, probably Colombia-Peru or Bolivia; *L. incoides* Argentina, Paraguay, S.E. Brazil (Paraná, Santa Catarina, Rio Grande do Sul [TL of *scotina*]), probably Uruguay (Biezanko *et al.*, 1957) (the TL of Peru for *incoides* is in error; D. Harvey, pers. comm.); *L. sp.* n. S.E. Brazil (mountains of Rio de Janeiro).

**Discussion.**— *L. cutisca* is currently known only from Ecuador, from several east Andean provinces and the west Andean province of Pichincha between 1800-2050m, but given its occurrence near the Ecuador/Colombia border, it will certainly be found in the latter country. A small group of males was encountered at the type locality at a slight rise along a riverside path where they were perchng on the tops of bushes about 2m high, resting on the tops of leaves with their wings shut between 1000h and 1215h. Males maintained particular leaves as perches and their flight was very rapid, especially when engaged in male-male interactions, not unlike that of thecine lycaenids. Solitary males were also encountered perchng elsewhere along the path, which appeared to have been cut relatively recently through the forest and was lined with low secondary growth bushes.

**Chalodeta pescada** Hall & Willmott, new sp.

*Fig. 5a,b; 11a-c.*

**Description.**— MALE: forewing length 16.5mm. Forewing costal margin concave at middle, convex at apex, distal margin convex, apex slightly falcate; hindwing rounded with pointed tornus. **Dorsal surface:** forewing ground color dark brown; three dark brown marks in discal cell, one marking cell end, two at base of 1A+2A; thin darker brown postdiscal line extends diagonally from costa, at a point three-quarters distance from wing base to apex, to vein M₁, then vertically and unevenly to vein 1A+2A at anal margin, with slightly paler brown distally; pair of small, elongate dark brown submarginal spots in cell 1A+2A, single similar spots in cells M₁-Cu₁, all lined proximally with a thin, continuous blue-green silvery line that extends from tornus to apex where it curves fractionally inwards; distal margin fringe entirely white except for black scaling at vein endings. Hindwing ground
color dark brown; two darker brown markings in discal cell, one marking cell end, a faint darker brown spot above and below cell; thin, uneven, darker brown postdisclinal line extends from near tornus to vein Rs before kinking inwards, with slightly paler brown distally; small, elongate dark brown spot in submarginal cells C_{1}-C_{4}, a pair of similar spots in cell 1A+2A, all lined proximally with a thin, continuous blue-green silvery line that extends from apex to tornus; distal fringe entirely white. Ventral surface: forewing differs from dorsal surface in following ways: ground color iridescent greenish-blue, submarginal black spots smaller and fainter, those in tornus surrounded by pale blue; submarginal silver line absent. Hindwing differs from dorsal surface in following ways: all submarginal black spots rounded and surrounded by contiguous rectangles of pale blue with dark blue-gray distally and proximally; submarginal silver line absent. Head: labial palpi brown. Eyes chestnut brown and setose. Frons brown. Antennal segments black with small amount of basal white scaling, clubs black. Body: dorsal surface of thorax and abdomen black, ventral surface blue-gray. Genitalia (Fig. 11a-c): uncus lobed in ventral portion, facia short and robust, aedeagus thin and pointed, pedicel posteriorly elongate and thickened but still strap-like, valvae form upper, lower and central points, latter sheaths aedeagus dorsally and ventrally.

FEMALE: unknown.

Types.– Holotype male: ECUADOR.– Napo Prov.: km 49 Tena-Loreto rd., 1300m, 7 Oct 1996 (K. R. Willmott); to be deposited in the BMNH. Paratypes: ECUADOR.– same locality data as above, 4♂; same data as above, 2♂, in coll. of the authors; 1♂, 23 Oct 1996 (A. E. Neild), in coll. of the authors; 1♂, 14 Mar 1995 (J. P. W. Hall), to be deposited in the USNM. Pasusa Prov.: nr. Shell, Rio Pindo Grande, 1050m, 7 Feb 95, 1♂ (J. P. W. Hall), to be deposited in the MNCN.

Diagnosis.– Chalodeta pescada n. sp. is most similar to the sympatric Chalodeta panurga Stickel, 1910 (Fig 6a,b), but differs by its larger size (forewing length 16.5mm instead of 14mm), plain brown dorsal surface that lacks the extensive blue-gray coloration on both wings of C. panurga, its greenish-blue instead of blue ventral ground color, more distinct and slightly distally displaced postdisclinal forewing line, much reduced submarginal forewing markings, more distally positioned postdisclinal hindwing line and by having pale blue rectangles instead of triangles at the hindwing margin with a black spot in each. Another somewhat similar sympatric Chalodeta is C. lypera (Bates, 1868), but this species has a more proximally positioned postdisclinal line on both wings, only a vague hint of dull blue-gray iridescence on the ventral surface and no submarginal pale blue on the ventral hindwing. The male genitalia of C. pescada are typical for the genus and differ little from that of the type, C. theodora (C. & R. Felder, 1862), which has quite different wing facles.

Discussion.– This species is only known from lower cloud forest habitats in the east Ecuadorian Andes from 1050-1300m, where it occurs in sympatry with congeners C. panurga, C. lypera and C. theodora. To date we have only found C. pescada in traps baited with rotting fish placed 5-10m above the ground in forest light gaps between 1100h and 1400h, and we have yet to find males perching. We have recorded all Ecuadorian Chalodeta species feeding on fish (Hall and Willmott, in prep.), and indeed C. lypera and C. panurga have only been collected by us in Ecuador from fish traps; we have recorded just two specimens of the latter species and seen only two more (including the type) in the ZMHU.

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