

TWO NEW SPECIES OF *EUSELASIA* (RIODINIDAE: EUSELASIINAE) FROM WESTERN ECUADOR

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ABSTRACT.—Two new species in the genus *Euselasia* Hübner, [1819] are described from western Ecuador. *Euselasia nytua* Hall & Willmott **n. sp.** is currently known only from northwestern Ecuador. It seems to be the sister species to the widespread Amazonian species *E. mirania* (Bates, 1868). *Euselasia jocotoco* Hall & Willmott **n. sp.** is known to range from central Panama to northwestern Ecuador. Its phylogenetic affinities are less certain, although we suggest that *E. gyda* (Hewitson, 1860) is a close relative.

KEY WORDS: Central America, Chocó, Colombia, Ecuador, endemism, *Euselasia*, Panama, South America, taxonomy

Ecuador is one of the most biodiverse countries on the planet (e.g., Mittermeier *et al.*, 1999), and for nearly twenty years we have been conducting a comprehensive survey of its butterfly fauna (see www.butterfliesofecuador.com). Within the Riodinidae, a considerable, although rapidly dwindling, number of Ecuadorian taxa still remain to be described. The largest genus in the family is *Euselasia* Hübner, [1819], which contains over 150 described species (Hall & Willmott, 1998), including many that were described since the genus was last reviewed by Stichel in 1928. In this paper, we describe two new *Euselasia* species from the wet lowlands of northwestern Ecuador that appear to be endemic to the Chocó and southern Central America.

The terminology for male genital and abdominal 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 throughout the text: 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.

Euselasia jocotoco Hall & Willmott, **new sp.** (Figs. 1A,B; 4)

Description: MALE: Forewing length HT 17.5 mm, PTs 17-19 mm. *Wing shape:* Base of forewing costa convex, anal margin very slightly convex basally, and distal margin slightly apically convex; hindwing elongate, with a very slightly more elongate tornal half distal to vein M_3 , a convex anal margin, a rounded tornus, a very weakly undulating distal margin, and a rounded apex. *Dorsal surface:* Forewing dark brown, with a large dark rufous-brown patch in basal half of wing occupying all but upper distal quarter of discal cell, basal half of cell M_3 , basal two thirds of cell Cu_1 , basal three quarters of cell Cu_2 , and all but very distal tip of cell 2A, patch has a concave distal margin across cell Cu_2 ; fringe pale rufous brown; hindwing entirely dark rufous brown except for a pale rufous-brown costal margin that becomes plainer brown along wing margin, a pale rufous-brown anal margin that becomes plainer brown towards wing base, and a narrow area of dark brown scaling along distal margin between vein Cu_2 and apex that broadens slightly towards apex and extends a short distance proximally along veins; fringe orange brown. *Ventral surface:* Forewing ground color dirty white overlaid with a variably dark pearly violet cast, with a narrow area of gray-brown scaling along anal margin; a narrow, slightly uneven, violet-gray postdiscal band extends in an outwardly diagonal direction from a point on costal margin about two-thirds distance from wing base to a point on anal margin about two-thirds distance from wing base, becoming slightly diagonally steeper below vein M_3 ; a somewhat narrow, faint, pale violet band curves around entire submargin, becoming barely visible in apex; a thin line of orange-brown scales extends along entire costal margin, joining in apex with similarly colored

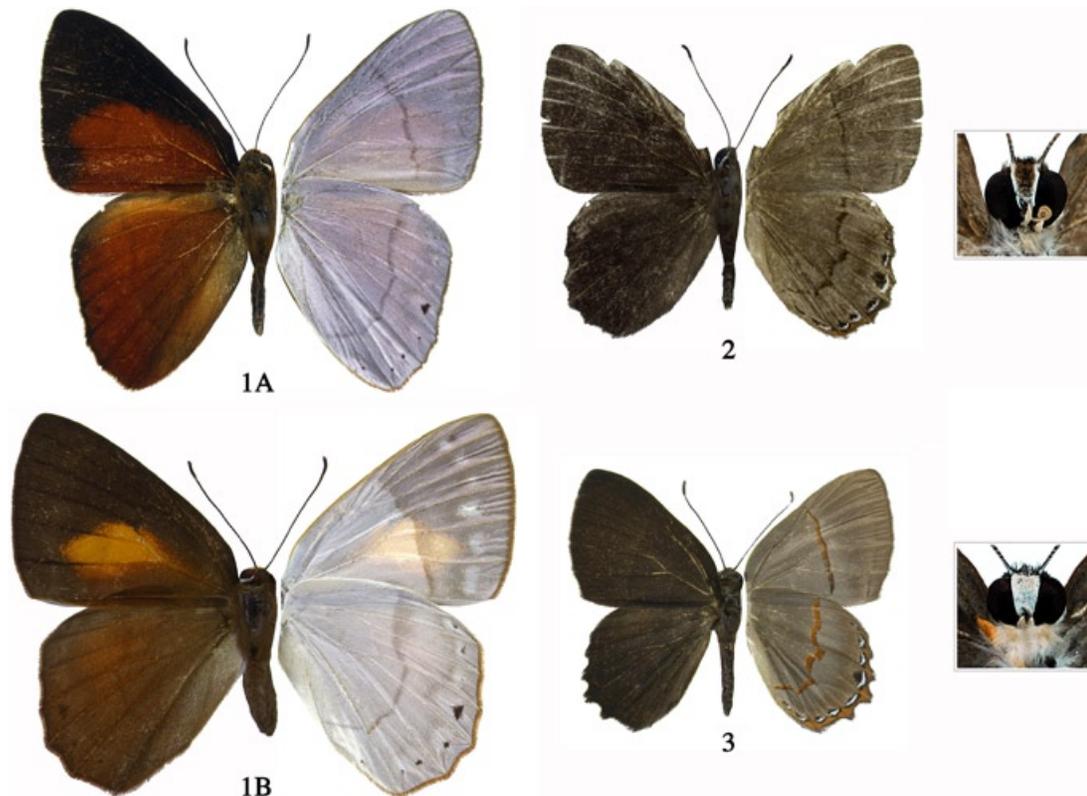
distal fringe; hindwing ground color dirty white overlaid with a variably dark pearly violet cast; a narrow violet-gray postdiscal band extends from near apex to a point on anal margin about two-thirds distance from wing base, between costal margin and vein Cu_1 , band parallels distal margin, is slightly uneven, and is slightly proximally disjunct across cells M_2 and M_1 , in cell Cu_2 band is inwardly diagonal and slightly concave, and in cell 2A band is straight and nearly horizontal; a somewhat narrow and discontinuous submarginal band consisting of faint, round to semicircular, pale violet markings with a small black medial spot distally and a narrow indistinct band of faint dark violet scaling proximally extends around entire submargin from cell 2A to cell R_s , and includes a more proximally elongate pale violet marking with a much larger triangular black spot in cell M_3 , and two black spots in cell Cu_2 ; fringe a contrasting orange brown.

Head: Eyes brown and bare, with white marginal scaling; frons white, with pale orange scaling dorsally; labial palpi dirty white; antennal length approximately 60% of forewing length, segments black with a small section of whitish scaling at base, nudum along inner ventral margin very narrow and discontinuous, clubs black with orange-brown tips.

Body: Dorsal surface of thorax and abdomen dark rufous brown, ventral surface dirty white; forelegs dirty white, midlegs and hindlegs with a dirty white femur and a pale orange tibia and tarsal segments.

Genitalia (Fig. 4): Uncus approximately square in lateral view, with a short and downwardly curved posterior projection from middle of dorsal posterior margin, a rounded and prominently serrated posterior margin, a weakly serrated posterior ventral margin, and a prominently concave anterior ventral margin; tegumen with a very elongate and inwardly curved ventral lobe that is triangular in dorsal half and narrowly rectangular in ventral half; falces of medium size, with a prominent rounded "elbow" and an upturned tip; vinculum a medially divided, evenly broad, and sinuous ribbon that is fused to anterior margin of tegumen, saccus a long and straight anteroventral continuation of vinculum; outer portion of valve in lateral view narrow and elongate, inwardly curved distally, and positioned at approximately a 45° angle, with a short and narrowly rectangular basal section, a gradually broadening medial section that has an approximately straight dorsal margin and a convex ventral margin, and a gradually tapered and slightly downwardly curved posterior section that has a convex dorsal margin and a concave ventral margin, inner portion of valve extends anteriorly from outer portion of valve along edge of aedeagus to just beyond vinculum and has a medially indented anterior margin that is fused dorsally to opposing valve, with a somewhat elongate, medially bifurcate, slightly dorsally directed, and dorsoventrally flattened flange extending posteriorly from dorsum of aedeagus and dorsal junction of valvae, valvae in ventral view somewhat narrow, elongate, and slightly divergent, with an inwardly elongate base, a large and semicircular inward projection from medial section that nearly touches projection from opposing valve, and a gradually tapered and prominently inwardly curved posterior section that has broadly rounded tips; aedeagus of medium length and width, and slightly convex, with a narrowly tapered and slightly downwardly curved ventral posterior tip, ventrally curved anterior portion opens anterodorsally and posterior tip opens posteriorly, unverted vesica has a large square sclerotized pad at its dorsal base that is partially fused to aedeagus; eighth tergite and sternite approximately square.

FEMALE: Forewing length PTs 18-20 mm. *Wing shape:* Base of forewing costa convex, anal margin approximately straight, and distal margin convex; hindwing rounded, with a very slightly more elongate tornal half beyond vein M_3 , a slightly angular anal margin, a rounded tornus, a weakly undulating distal



Figs. 1-3. *Euselasia* adults (dorsal surface on left, ventral surface on right). **1A.** *E. jocotoco* n. sp. PT♂, El Encanto, W. Ecuador (JHKW). **1B.** *E. jocotoco* n. sp. PT♀, Colón, C. Panama (USNM). **2.** *E. nytua* HT♂, San Francisco, W. Ecuador (USNM), with ventral view of head at right. **3.** *E. mirania* (Bates, 1868) ♂, Finca San Carlo, nr. Tena, E. Ecuador (JHKW), with ventral view of head at right.

margin, and a slightly angular apex. **Dorsal surface:** Forewing brown, with an oval pale rufous-brown patch in middle of wing occupying lower distal quarter of discal cell, basal quarter to third of cell M_3 , basal half to two thirds of cell Cu_1 , and adjoining upper half of cell Cu_2 , patch has a convex distal margin, and area between patch and wing base is very slightly rufous brown; fringe pale rufous brown; hindwing entirely very slightly rufous brown except for a rectangular area of slightly more prominent rufous-brown scaling across basal two thirds of cells M_2 and M_1 and sometimes basal half of cell M_3 , a plainer brown costal margin and apex, and a plainer brown anal margin that becomes grayish brown towards wing base; fringe orange brown. **Ventral surface:** Forewing ground color grayish white proximal to postdiscal band and medium gray distal to postdiscal band; a narrow, slightly uneven postdiscal band colored medium gray with a hint of pale rufous-brown scaling extends in an outwardly diagonal direction from just beyond middle of costal margin to a point on anal margin about two-thirds distance from wing base, becoming slightly diagonally steeper and sometimes slightly distally disjunct below vein M_3 ; a somewhat broad, faint, pale gray band curves from anal margin to costal margin just distal to postdiscal band, becoming more faint towards costal margin; a somewhat broad and discontinuous submarginal band consisting of rectangular to semicircular grayish-white markings surrounded by dark gray scaling extends around entire submargin, and includes a more proximally elongate grayish-white marking in cell M_3 , and a dark gray to pale black spot distally in cell R_{4+5} , and sometimes cell M_3 ; a thin line of pale orange-brown scales extends along entire costal margin, joining in apex with similarly colored distal fringe; hindwing ground color grayish white; a largely narrow postdiscal band colored pale gray sometimes with a hint of pale rufous-brown scaling in cell Cu_2 , extends from just beyond middle of costal margin to just beyond middle of anal margin, between costal margin and vein M_2 band is approximately vertical and three times typical width, in cell M_2 band is outwardly diagonal and gradually tapers to typical width, between vein M_3 and vein Cu_2 band is inwardly diagonal, in cell Cu_2 band is more steeply inwardly diagonal and slightly concave, and in cell 2A band is straight and nearly horizontal; a somewhat broad and discontinuous submarginal band consisting of faint, round to semicircular, whitish markings with a small black medial spot distally and a somewhat narrow indistinct band of pale gray scaling proximally extends around entire submargin from cell 2A to cell R_s , and includes a more proximally elongate whitish marking with a

much larger triangular black spot in cell M_3 , and two black spots in cell Cu_2 ; fringe a contrasting pale orange brown.

Head: Eyes brown and bare, with white marginal scaling; frons white, with dark yellow scaling dorsally; labial palpi white; antennal length approximately 50% of forewing length, segments black with a small section of whitish scaling at base, nudum along inner ventral margin narrow and discontinuous, clubs black with orange-brown tips.

Body: Dorsal surface of thorax and abdomen dark brown, ventral surface whitish; forelegs whitish, midlegs and hindlegs with a whitish femur and a dark yellow tibia and tarsal segments.

Types: *Holotype* ♂, PANAMA: *Darién*, Cana, 750 m, 30 Jul 1981 (G. B. Small) (USNM).

Paratypes: PANAMA: *Panamá*, 1♂, 1♀, Colón, Santa Rita, 1500 ft, 4 Feb 1970 (S. S. Nicolay) (USNM); 1♂, Colón, 1000 ft, 6 Jan 1973 (USNM); 1♀, Colón, 1500 ft, 15 Feb 1969 (USNM); 1♂, Cerro Jefe, 1600 ft, 22 Sept 1973 (G. B. Small) (USNM); 1♀, Cerro Campana, 3000 ft, 29 Aug 1963 (G. B. Small) (USNM). *Darién*, 1♂, 1♀, Cerro Pirre, 1000 m, Jan 1979 (G. B. Small) (USNM). ECUADOR: *Esmeraldas*, 1♂, El Encanto, km. 16 Lita-San Lorenzo rd., 0°53.59'N 78°32.22'W, 850 m, Jun 1998 (I. Aldas) (JHKW); 1♂, Río Chuchuví, km. 12.5 Lita-San Lorenzo rd., 0°53.01'N 78°30.90'W, 800 m, Jul 2002 (I. Aldas) (JHKW).

Etymology: This species is named after the Fundación de Conservación Jocotoco, an NGO that has created many important reserves throughout Ecuador, including the northwest, to protect the country's birdlife and other biodiversity (<http://www.fjocotoco.org>).

Systematic placement and diagnosis: Because *E. jocotoco* n. sp. does not closely resemble any other species in the genus, its systematic placement is not certain. Among its west Andean congeners, *E. jocotoco* is probably externally most similar to the more widespread and partially sympatric *E. gyda* (Hewitson, 1860). The male of *E. jocotoco* is readily distinguished from that of *E. gyda*, however, by its more pointed wing shape, darker rufous-brown instead of yellow-brown dorsal coloration, which is restricted to a smaller area in the basal portion of the forewing and does not extend to the costal margin and apex of the hindwing, violet instead of white ventral surface, and more prominent dark violet postdiscal band on both ventral wings, which is more prominently outwardly diagonal on the forewing and more jagged on the hindwing, without

a distally elongate loop in cell Cu_1 . The females of *E. jocotoco* and *E. gyda* are completely dissimilar, with that of *E. gyda* having a plain white ground color to the ventral surface and a predominantly white dorsal surface, with a small area of black scaling in the forewing apex. The significant differences in wing pattern between both sexes of *E. jocotoco* and *E. gyda* could give the impression that the two species were not particularly closely related. However, the male genitalia, which share an uncus with a serrate posterior margin and a short posterior projection dorsally, a similarly shaped tegumen, aedeagus, and valvae, and the same sclerotized pad at the dorsal base of the vesica, are sufficiently similar as to suggest otherwise. The male genitalia of *E. jocotoco* differ from those of *E. gyda* by having a more rounded posterior margin to the uncus, a straighter and more evenly broad ventral projection from the tegumen, a less deeply bilobed posterior projection from the dorsal junction of the valvae, valvae in lateral view that have a slightly more anteriorly positioned and uneven convex section near the middle of the ventral margin, and, most obviously, valvae in ventral view that have an inwardly elongate base, a large and semicircular projection from the middle of the inner margin, and more prominently inwardly curved posterior tips.

We have not been able to locate any closer relatives to *E. jocotoco* than *E. gyda*. Potential candidates included the Amazonian species *E. euphaes* (Hewitson, [1855]), *E. utica* (Hewitson, [1855]), *E. teleclus* (Stoll, 1787), and *E. catoleuce* (Hübner, 1823), whose females share with the female of *E. jocotoco* the same head and body coloration, a very similar dorsal surface, with a pale orange area in the middle of the forewing and a variably prominent orange to orange-brown area near the apex of the hindwing, and a similar two-tone ventral surface, with whitish scaling proximal to the postdiscal band and grayish scaling distally. However, the male genitalia of these species are very different to those of *E. jocotoco*, suggesting that there is not a particularly close phylogenetic relationship between them.

The male of *E. jocotoco* does not exhibit any significant wing pattern variation, but the female does. The size of the orange patch in the middle of the dorsal forewing is the most variable character. The female specimen shown in Fig. 1B has a smaller than average forewing orange patch, which usually extends more distally in cells Cu_1 and M_3 . The Panamanian females from the Darién have a larger forewing orange patch than those from the Canal Zone. We have not seen any females from western Colombia and Ecuador. The exact shade of the rufous-brown scaling on the dorsal hindwing and the prominence of the paler area in the hindwing apex are also slightly variable.

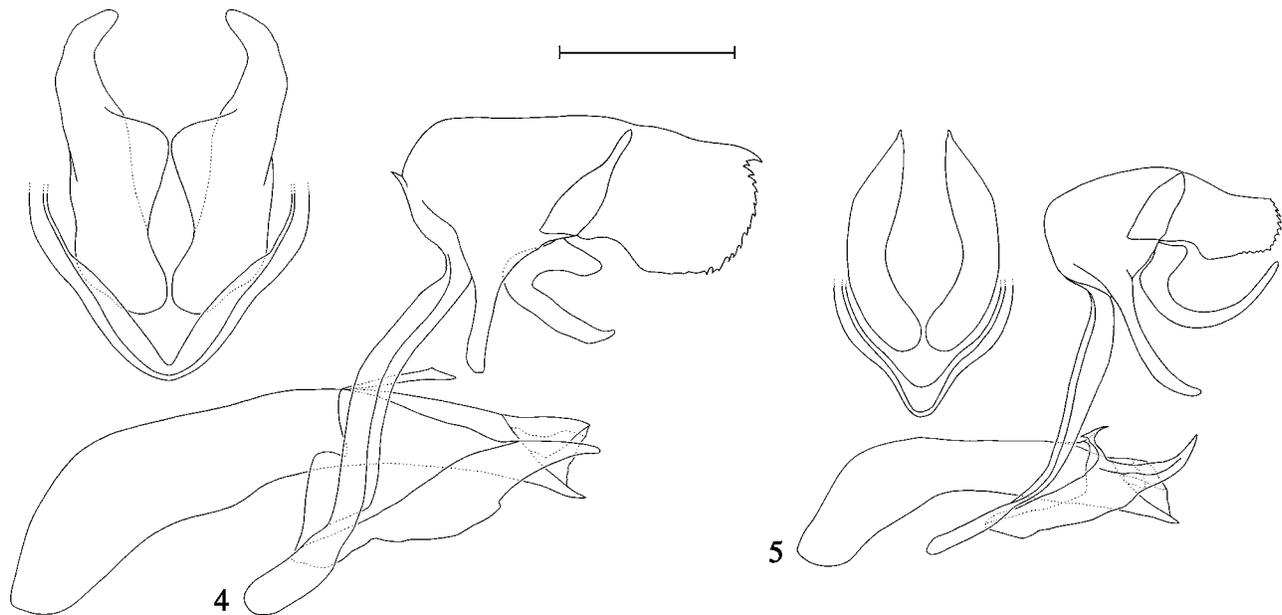
Biology: This species inhabits wet lowland rainforest, where it has been recorded between 350 and 1000 m. Judging from the very few specimens in collections from Ecuador and Colombia, this species appears to be generally uncommon to rare in nature, but the moderately large series of specimens in the USNM from Panama suggests that it can be locally more common in certain areas. In northwestern Ecuador, solitary males of *E. jocotoco* were encountered perching along streams in secondary growth areas bordering primary forest during the mid-morning (I. Aldas, pers. comm.).

Distribution: *Euselasia jocotoco* is currently known to range from central Panama to northwestern Ecuador. In addition to the type specimens listed above, we have examined additional material from central and eastern Panama in the USNM and one male from central western Colombia in the Colombian collection of J. Salazar.

***Euselasia nytua* Hall & Willmott, new sp.**
(Figs. 2; 5)

Description: MALE: Forewing length HT 15 mm, PT 15.5 mm. *Wing shape:* Base of forewing costa convex, anal margin very slightly convex basally, and distal margin slightly convex; hindwing rounded, with a slightly more elongate tornal half beyond vein M_3 , a slightly angular anal margin, a rounded tornus, a prominently undulating distal margin, and a rounded apex. *Dorsal surface:* Both wings entirely blackish brown, becoming slightly paler along costal and anal margins of hindwing; forewing fringe entirely blackish brown, hindwing fringe blackish brown with medial white scaling in cells Cu_2 to M_1 . *Ventral surface:* Forewing ground color a very slightly grayish medium brown; a narrow postdiscal band colored dark brown with a hint of dark rufous-brown scaling extends in a shallowly outwardly diagonal direction from just beyond middle of costal margin to just beyond middle of anal margin, becoming slightly diagonally steeper below vein Cu_1 ; a broad and slightly darker brown band extends from costal margin to anal margin distal to postdiscal band, gradually becoming narrower towards anal margin; a very narrow and discontinuous darker brown band extends from vein 2A around entire submargin, becoming barely visible in apex; hindwing ground color a very slightly grayish medium brown, with a paler gray-brown anal margin; a narrow postdiscal band colored dark brown with a hint of dark rufous-brown scaling extends from near apex to a point on anal margin about two-thirds distance from wing base, band is approximately straight between costal margin and vein M_1 , slightly concave between veins M_1 and M_3 , becomes distally disjunct and inwardly diagonal at vein M_3 , is variably concave in each of cells M_3 , Cu_2 , and Cu_1 , and is approximately straight and horizontal as well as slightly thinner across cell 2A; an evenly broad and slightly darker brown band extends around entire distal margin from apex to tornus; a narrow and discontinuous submarginal band consisting of elongate and slightly convex white bars with a narrow semicircular area of black scaling proximally and a thin line of black scaling distally extends around entire submargin from cell 2A to cell Rs, and includes a much larger distal black area in cell M_3 , a much narrower distal black area in cell 2A, and two spots in each of cells Cu_2 and 2A; entire margin distal to submarginal band dark orange.

Head: Eyes brown and bare, with white marginal scaling; frons pale brown, with dirty white lateral bands; labial palpi pale brown; antennal length approximately 60% of forewing length, segments along shaft black with a small section of whitish scaling at base, segments preceding clubs dirty white, nudum along inner ventral margin very narrow and discontinuous, clubs black with



Figs. 4-5. Male genitalia of new *Euselasia* species in lateral view, with ventral view of valvae. 4. *E. jocotoco*. 5. *E. nytua*. Scale bar = 0.5 mm.

orange-brown tips.

Body: Dorsal surface of thorax and abdomen blackish brown, ventral surface grayish brown, dirty white scales around distal margin of eighth abdominal segment; forelegs grayish brown, midlegs and hindlegs with a grayish-brown femur and a dark yellow tibia and tarsal segments.

Genitalia (Fig. 5): Uncus elongate, angular, and approximately rectangular in lateral view, with a shallow U-shaped indentation at middle of dorsal posterior margin, a slightly convex and prominently serrated posterior margin, a weakly serrated posterior ventral margin, and a prominently convex medial ventral margin; tegumen with a very elongate and slightly posteriorly directed ventral lobe that is approximately evenly narrow, except for a broader base and a tapered tip, and slightly upwardly and inwardly curved in posterior half; falces large, elongate, and prominently upwardly curved, with a weak rounded "elbow"; vinculum a medially divided and somewhat sinuous ribbon that is slightly broader in dorsal half and fused to anterior margin of tegumen, saccus a long and straight anteroventral continuation of vinculum; valve in lateral view somewhat narrow and elongate, inwardly curved posteriorly, and positioned at approximately a 45° angle, with a rectangular basal half that broadens slightly posteriorly and a gradually tapered, prominently upwardly curved, and horn-like posterior half that is fused anterodorsally to opposing valve, with a short, rounded, slightly dorsally directed, and dorsoventrally flattened flange extending posteriorly from dorsum of aedeagus and raised dorsal junction of valvae, valvae in ventral view evenly somewhat narrow, elongate, and slightly medially convex, with a gradually tapered posterior section that has short and very slightly inwardly curved tips; aedeagus of medium length and width, and slightly convex, with a narrowly tapered and very slightly downwardly curved ventral posterior tip, ventrally curved anterior portion opens anterodorsally and posterior tip opens posteriorly, unevolved vesica has a weakly sclerotized "hood" at its dorsal base that is more elongate laterally; eighth tergite and sternite approximately square.

FEMALE: Unknown.

Types: *Holotype* ♂, ECUADOR: *Esmeraldas*, San Francisco ridge, km. 17 San Lorenzo-Lita rd., 1°60.43'N 78°41.92'W, 150 m, 2 Nov 2003 (K. R. Willmott) (USNM)

Paratypes: 1♂, ECUADOR: *Esmeraldas*, La Punta, nr. El Durango, km. 44 Lita-San Lorenzo rd., 1°30.91'N 78°39.00'W, 300 m, 21 Jun 1994 (J. P. W. Hall) (JHKW).

Etymology: This species is named after the Fundación NYTUA (Niño y Tierra Unidos por el Ambiente), an NGO that is specifically working to protect forests in northwestern Ecuador (<http://www.codeso.com/NYTUA.html>).

Systematic placement and diagnosis: Its relatively small size, compact wing shape, and rounded hindwing bearing a prominently undulating distal margin and a full complement of white fringe elements, combined with a ventral hindwing that possesses a single narrow, very jagged, and reddish postdiscal band, a prominently reddish distal margin, and a prominent series of approximately evenly sized white and black submarginal spots, clearly place *E. nytua* n. sp. in the small *pelor* species group of *Euselasia*, referred to by Stichel (1930-31) as the "Peloriformes". Within the *pelor* group, most species have reddish or bluish dorsal patterns, but *E. eumedia* (Hewitson, [1853]) and *E. mirania* (Bates, 1868) have brown dorsal wings.

Euselasia nytua is similar only to the uncommon but widespread Amazonian species *E. mirania* (see Fig. 3), and appears to be its west Andean sister species. Despite the overall similarity, there are many subtle differences in wing shape and pattern between the two species. The female of *E. nytua* is currently unknown, but, given that *E. mirania* is sexually monomorphic, the following external diagnosis should apply to both sexes. *Euselasia nytua* has a slightly elongate hindwing beyond vein M_3 instead of an evenly rounded hindwing, a slightly less convex distal forewing margin, a plain dark brown dorsal surface instead of a medium brown dorsal surface with a subtle bluish-gray cast, a very slightly grayish medium brown instead of pale grayish-brown ventral ground color, a postdiscal band on both ventral wings that is dark brown with a hint of dark rufous-brown scaling instead of bright orange red lined proximally with variably prominent dark yellow scaling, a darker orange distal margin to the ventral hindwing, and a slightly larger black submarginal spot in ventral hindwing cell M_3 . In addition, *E. nytua* appears to be slightly larger. The forewing length of the two known *E. nytua* males ranges from 15-15.5 mm, whereas the forewing length of the numerous *E. mirania* males that we have examined ranges from 13-14.5 mm. The final external difference lies in the coloration of the frons. In *E. nytua*, the frons is brown with narrow white lateral bands (see Fig. 2), whereas in *E. mirania* the frons is entirely white (see Fig. 3). The male genitalia of the two species are very similar, with only a few minor differences apparent between them. The male genitalia of *E. nytua* differ from

those of *E. mirania* by having a more elongate uncus with a more anteriorly positioned convex section to the ventral margin, a more abruptly upturned tip to the ventral projection from the tegumen, and a slightly narrower and more prominently upturned posterior section to the valvae in lateral view.

Biology: This rare species inhabits very wet lowland rainforest, where it has been recorded between 150 and 300 m. During survey work in northwestern Ecuador over a period of 15 years, *E. nytua* was encountered on only two occasions. Solitary males were found perching on a small hilltop at La Punta, near El Durango, and on a prominent ridge near San Francisco. They perched under leaves 2 to 3 m above the ground with their wings closed at the sun-dappled edges of lightgaps between 1000 and 1030 hrs. At La Punta, the solitary male of *E. nytua* was perching on the same low bush as a group of *E. amphidecta* (Godman & Salvin, 1878) males.

Distribution: *Euselasia nytua* is currently known only from northwestern Ecuador, but its geographic range presumably includes at least western Colombia. It is the only *pelor* group species known to be restricted to a region outside of the Amazon basin. The only other member of the group known to occur west of the Andes, *E. pelonia* Stichel, 1919, is widespread from at least Costa Rica to southeastern Brazil.

ACKNOWLEDGMENTS

We thank all those museum curators in Europe and the Americas who gave us access to the riodinid collections in their care (see list in Hall, 1999, 2005); the National Science Foundation (DEB #0103746 and #0639977) and the National Geographic Society (Research and Exploration Grant # 5751-96) for financial support of museum and field research; Ismael Aldas for field assistance; two anonymous reviewers for helpful comments on the manuscript; and the Ministerio del Ambiente and the Museo Ecuatoriano de Ciencias Naturales, in Quito, for arranging the necessary permits for research in Ecuador.

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