

# FOUR NEW SPECIES OF RIODINIDS FROM WESTERN ECUADOR (LEPIDOPTERA: RIODINIDAE)

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**ABSTRACT.**— Four new species of Riodinidae in the genera *Theope* Doubleday, 1847, *Mesosemia* Hübner, [1819], and *Symmachia* Hübner, [1819], are named and described from western Ecuador, with additional observations on behavior.

**KEY WORDS:** behavior, *Calospila*, Central America, Colombia, Mesoamerica, *Mesosemia hazelae* n. sp., Neotropical, Panama, perching behavior, *Symmachia wiltoni* n. sp., Symmachiini, taxonomy, *Theope iani* n. sp., *Theope pepo* n. sp.



Fig. 1-2. La Punta, W. Ecuador: 1. View out over the canopy from the ridgetop site; 2. *Symmachia wiltoni* Willmott & Hall: male perching under a leaf.

The fauna of western Ecuador has clear affinities with southern Central America, but also has a number of endemic species, and others found only as far north as western Colombia. The first lepidopterists (de Mathan, Haensch, Flemming and Rosenberg) to collect in this area brought numerous new discoveries back to Europe around the turn of the century. This still constitutes a large percent of our knowledge. In more recent times collecting has been restricted mainly to the area just west of Quito, particularly the site of Tinalandia.

We have been working on the taxonomy and biogeography of the Ecuadorian fauna for the last two years, during which time we have discovered several new species, especially in the Riodinidae. The combination of comparatively little collecting and high degree of endemism in western Ecuador has made this an area of outstanding interest. A similar situation exists in the Choco region of western Colombia, where several new discoveries have also

recently been made in this remarkable family (Salazar, 1993; Salazar and Constantino, 1993). After consultation of relevant type material and original descriptions, we herein describe four new species of riodinid from western Ecuador. All these species may be easily identified by their distinctive external morphology, but drawings of genitalia are included for the sake of completeness.

### *Theope pepo* Willmott & Hall, new sp.

Fig. 3a-c, 7a-b

**Description.**— MALE: forewing length 17mm. Forewing costa strongly bowed near base, hindwing elongated apically and rounded at the tornus. Recto: forewing ground color black; basal area purple extending from base midway to tornus, up to midpoint of  $M_3$ , then back to the intersection of the costa and upper discocellular; purple fades to lustrous blue basally; thin purple stripe along distal margin from apex narrowing to-



Fig. 3-6. 3. *Theope pepo* Willmott & Hall: a) holotype ♂, recto surface; b) holotype ♂, verso surface; c) allotype ♀, recto surface. 4. *Theope iani* Willmott & Hall: a) holotype ♂, recto surface; b) holotype ♂, verso surface; c) allotype ♀, recto surface. 5. *Symmachia wiltoni* Willmott & Hall: a) holotype ♂, recto surface; b) holotype ♂, verso surface; c) allotype ♀, recto surface. 6. *Mesosemia hazelae* Willmott & Hall: a) holotype ♂, recto surface; b) holotype ♂, verso surface.

towards tornus, interrupted by black vein endings. Hindwing purple, fading to lustrous blue basally, costal margin black. Verso: both wings dark "pumpkin" orange, distal margins slightly darker, dorsal margin of forewing light brown. Labial palpi recto black, verso yellow. Eyes brown and bare. Antennae dark brown with white flecks, tip of club light brown. Thorax and abdomen recto dark grey, verso pale yellow. Genitalia (Fig. 7a-b): uncus short and setose; falces compact and rounded, valvae triangular, tips blunt; aedeagus long, pointed and flattened posteriorly.

**FEMALE:** forewing length 15mm. Similar to male except in the following respect. Recto: forewing basal area blue, not purple, meeting the dorsal margin more basally; distal margin lacks purple stripe. Hindwing blue, not purple, with a thin black distal border and black fringe of scales, orange at the apex.

**Types.**— *Holotype* ♂: ECUADOR.— Carchi Province, tributary of Río Mira, just west of Lita, 650m, 7 Jul 1994 (K. R. Willmott). *Allotype* ♀: same locality data as above (J. P. W. Hall). To be deposited in the Natural History Museum, London, England (BMNH).

*Paratypes:* 2 ♂ and 2 ♀, same data as above (1♂ and 1♀ deposited in the Pontificia Universidad Católica, Quito, Ecuador; 1♂ and 1♀ to be deposited in the Florida State Collection of Arthropods, Gainesville, Florida, USA (FSCA)).

**Diagnosis.**— The male is distinguished from all other species in the *Theope pedias* group by the purple marginal border on the forewing recto and the dark "pumpkin" orange verso surface.

**Etymology.**— This species is named for its distinctive verso coloration, after the Latin for pumpkin.

**Discussion.**— The female recto blue coloration is quite variable, extending distally towards the margin between cell  $M_3$ - $Cu_1$  in

some specimens.

The first specimen collected by us was a female at Tinalandia, feeding on a flowering bush around midday. Subsequently a large population was discovered along the banks of a tributary of the Río Mira, near Lita. Both males and females were found feeding on a large flowering tree by the river. Several males could be found perching on another tree on the opposite bank, from which they would make sorties out over the river. Callaghan (1983) followed Scott ([1976]) in defining perching behavior as "males resting at characteristic sites and investigating passing objects by flying out at them in search of females". It is possible that this perching site was established here due to the proximity of the flowering tree, which provided an abundant nectar source for females. Indeed, a male and female were found in *copulo* on the underside of a leaf on the "perching bush". This clarifies the status of five *Theope* specimens figured by D'Abrera (1994, p. 995), curated in the BMNH. These represent two distinct species, one of which is described here as *T. pepo* n. sp. The two specimens figured as *Theope?* sp., male, recto and verso are actually *T. pepo* females. The two specimens figured as *Theope?* sp., female, recto and verso represent an unnamed taxon, from eastern Ecuador, to be described by the authors in the near future. The second *Theope* sp., male, recto is *T. pepo*, male. In total there are five females in the BMNH, which bear the locality data "La Chima" and "Paramba". The male is also from "La Chima". All of these are localities on the western slopes of the Andes between 300m and 900m. In addition, a single unidentified fe-



male was located in the Allyn Museum of Entomology, Sarasota, Florida, bearing the following locality data: "Panama, Colon, Pina 200m, 8 Feb 1973, H. L. King". This extends the known range from western Ecuador north to Panama. Further field work in this region may well show that this distribution is applicable to some of the other species described in this paper, and indeed to other supposed western Ecuadorian endemics.

*Theope iani* Willmott & Hall, new sp.

Fig. 4a-c, 8a-b

**Description.**— MALE: forewing length 16mm. Forewing costa strongly bowed near base and slightly concave towards apex; apex acute. Hindwing slightly elongated apically and slightly angular at the tornus. Recto: basal half of forewing violet blue, extending from base to near tornus and along the costa as far as the discocellulars; apical half black. Hindwing violet blue as forewing, with costal margin and apex black and a very thin border continuing to the tornus. Verso: basal half of forewing below costal vein medium grey, lightening towards base; apical half light orange brown. Hindwing medium grey lightening in the discal and post-discal areas, margin of termen orange brown as in forewing; two small, teardrop-shaped spots in the tornus, proximal half white, distal half black, spot nearest tornus smaller. Labial palpi recto black, verso white. Eyes dark brown and bare. Antennae dark brown, ringed with white, tip of club light brown. Thorax and abdomen recto dark brown with blue scaling, verso light brown. Genitalia (Fig. 8a-b): falces small and blunt; valvae small, blunt and setose; aedeagus short and hooked at the tip.

FEMALE: forewing length 17mm. Similar to male, except in the following respects. Forewing costa less concave. Recto: blue color paler, in forewing extending to tornus. Hindwing apex black area reduced. Antennae dark brown.

**Types.**— *Holotype* ♂: ECUADOR.— Esmeraldas Province, km 44 rd. Lita-San Lorenzo, La Punta, 300m, 21 Jun 1994 (J. P. W. Hall). *Allotype* ♀: ECUADOR.— Pichincha Province, Río Tanti, Tinalandia, 2 Aug 1993 (K. R. Willmott). To be deposited in the BMNH.

**Paratypes:** 2 ♂, same data as male above (1 ♂ deposited in Pontificia Universidad Católica, Quito, Ecuador; 1 ♂ to be deposited in the FSCA).

**Diagnosis.**— The male of this species has a recto pattern similar to several species (e.g., *T. theritas* Hewitson, [1860], *T. phaeo* Prittwitz, 1865). The verso pattern is unusual and similar only to *T. zosteria* Bates, [1868], from which it is easily distinguished by possessing two spots in the hindwing tornus. The female forewing recto surface differs from that of *T. zosteria* by not possessing a "tongue" of black intruding into the blue. The combination of such a two-tone verso surface and two spots in the hindwing tornus is not found in any other species.

**Etymology.**— This species is named for my father, Ian Willmott, who has supported in every way my lepidopterological excursions over the years with great enthusiasm, and accompanied me armed with a net along the most treacherous paths of the Cameron Highlands in Malaysia (K. R. Willmott).

**Discussion.**— After collecting the allotype at Tinalandia in 1993, we discovered a further two unidentified specimens in the collection of the BMNH. These specimens were labelled "Paramba, Ecuador" and "Paramba, 3500' III '97 dry season (Rosenberg)". Since then we have collected a further four males at La Punta (including the holotype). These localities all lie on the western slopes of the Andes, from 300-900m. The female was collected flying slowly down river in the late afternoon. The males were all found in a hilltop clearing perching on the

underside of leaves of the same bush, at 4-5m above the ground, in the early afternoon.

*Symmachia wiltoni* Willmott & Hall, new sp.

Fig. 2, 5a-c, 9a-b

**Description.**— MALE: forewing length 15mm. Forewing costa straight, hindwing tornus angular. Recto: forewing ground color bright orange, costal edge black, distal margin black, narrowing from apex to tornus, with fine white scaling at the apex; five small black dashes of variable size and shape intruding into the orange from the costal vein. Hindwing ground color orange, as forewing, with even black distal margin interrupted by a small orange stripe near the tornus. Verso: ground color grey brown, lighter along the dorsal margin; discal cell with four black dashes, the most distal marking the cell end; two black dashes in 2A-Cu<sub>2</sub> below cell, a line of disjointed black dots in the postdiscal area, two submarginal rows of diffuse black markings. Hindwing same pattern as forewing. Labial palpi pale brown with black tips. Eyes brown and bare. Antennae black, ringed with white, brown tipped club. Thorax recto orange, verso brown. Abdomen recto orange, verso brown with yellow bands. Genitalia (Fig. 9a-b): uncus broad and flattened, pointed medially; valvae bifurcate; aedeagus short with two sets of closely packed spines pointing posteriorly.

FEMALE: forewing length 14mm. Wings rounded. Recto: ground color yellow; discal cell with three black dashes intruding from costa, most distal marking cell end; two black dashes in 2A-Cu<sub>2</sub> below cell; marginal and submarginal black bands beginning at the apex and costa, narrowing and breaking into dots towards tornus; fine white scaling at the apex. Hindwing ground color yellow, with six lines of disjointed black dots, thin black margin. Verso: identical to recto surface. Labial palpi yellow with black tips. Eyes brown. Antennae black, ringed with white, brown tipped club. Thorax recto yellow, verso brown. Abdomen recto and verso brown with yellow bands.

**Types.**— *Holotype* ♂: ECUADOR.— Esmeraldas Province, km 44 rd. Lita-San Lorenzo, La Punta, 300m, 7 Jul 1994 (J. P. W. Hall). *Allotype* ♀: same locality data as above (K. R. Willmott). To be deposited in the BMNH.

**Paratypes:** 2 ♂, same data as above (1 ♂ deposited in Pontificia Universidad Católica, Quito, Ecuador; 1 ♂ to be deposited in the FSCA).

**Diagnosis.**— This species is closest to *S. xypete* (Hewitson, 1870), but the male differs in having much thicker black borders and a lighter orange coloration. In addition, the underside is quite different, being orange brown in *S. xypete*. The female of *S. wiltoni* n. sp. is of lighter coloration and has increased black markings compared to the female of *S. xypete*. The verso surface of the male more closely resembles that of *S. urichi* Kaye, [1925] in its grey coloration, but differs in the arrangement of black markings.

**Etymology.**— This species is named for my father, John Wilton Hall, who introduced me to tropical butterflies in the field as a child and fostered my fascination in them. He always lived for the present (J. P. W. Hall).

**Discussion.**— We place this taxon in *Symmachia* due to its very close affinities with other species currently in the genus. However, we recognize that further taxonomic and behavioral studies (Callaghan, 1983) may show that *Symmachia* is composed of more than one genus. The taxonomic boundaries of *Symmachia* appear ill-defined at present, as illustrated by the recently described *Calospila splendida* Salazar & Constantino, 1993, which shows morphological characters typical of both *Symmachia* and *Calospila*. The presence in the male of two androconial patches on the anterior margin of abdominal segments 4 and 5 at

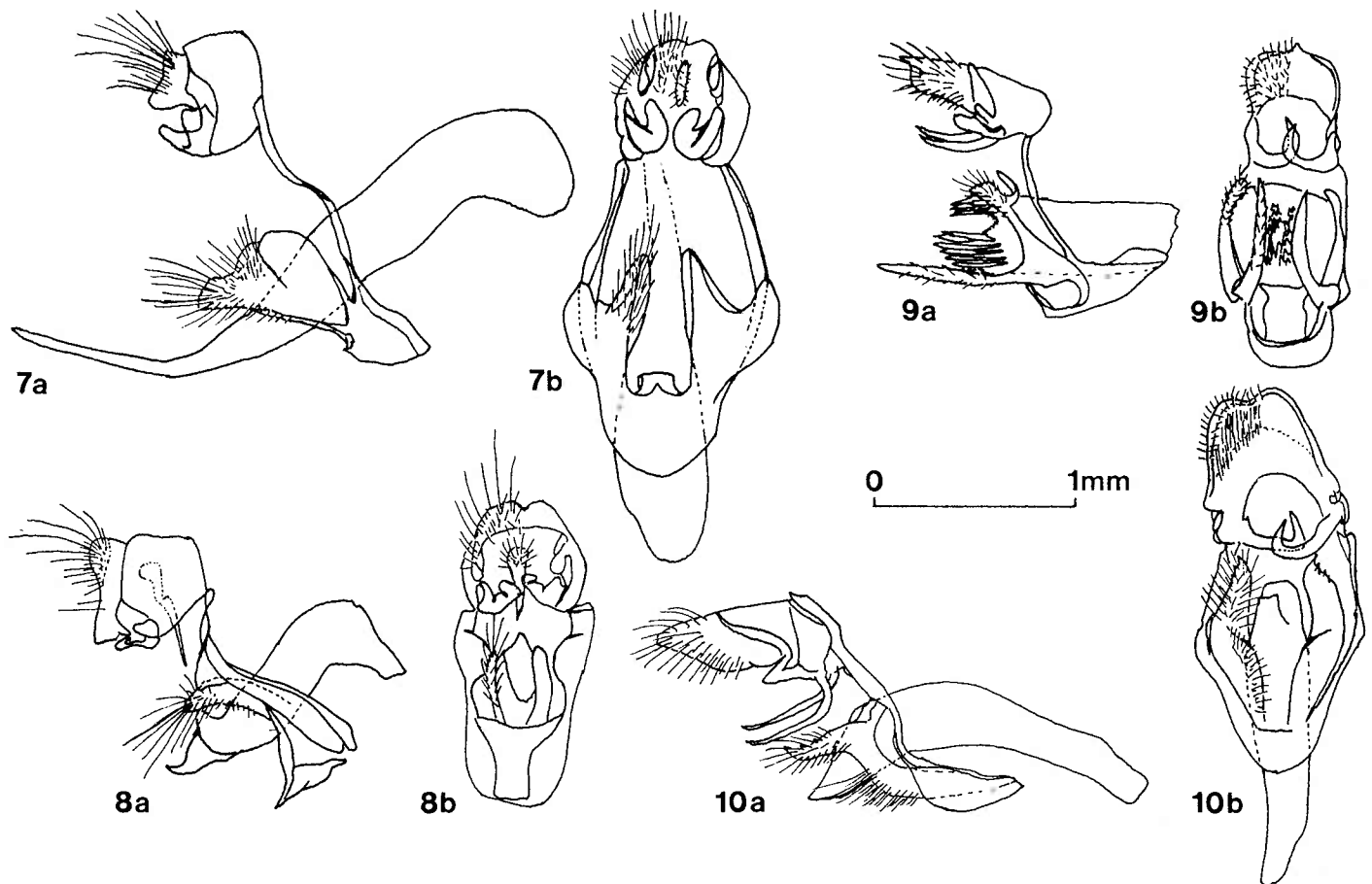


Fig. 7-10. Male genitalia (lateral (a) and ventral (b) view in each case): 7. *Theope pepo* n. sp.; 8. *Theope iani* n. sp.; 9. *Symmachia wiltoni* n. sp.; 10. *Mesosemia hazelae* n. sp. Setae omitted on right side of ventral views for clarity.

least places the species described here within the tribe Symmachini, as defined by Harvey (1987), which excludes the genus *Calospila*.

*Symmachia wiltoni* n. sp. was found with seven other species of *Symmachia* in ridgetop light gaps at La Punta (300m), and a single male was also found in a ridgetop clearing near Lita at 800m. Males of *S. wiltoni* were abundant at the type locality and could be found perching from 0900 to 1600h on the underside of leaves with wings outspread, at heights of 1-2m above the ground. The allotype female was found in the forest fluttering around a small sapling.

***Mesosemia hazelae* Willmott & Hall, new sp.**

Fig. 6a-b, 10a-b

**Description.**— MALE: forewing length 22mm. Forewing distal margin slightly convex, hindwing distal margin slightly angular. Recto: ground color black; basal to subdiscal area of forewing metallic blue, cut by a thin postbasal black line extending from the costa to 2A; indistinct black ocellus at the cell end with three small white dots; submarginal blue band running from costa and narrowing to near tornus. Hindwing ground color black; triangular area of metallic blue extending from base to postdiscal area, crossed by a faint black discal stripe; thin metallic blue submarginal line bisects the black distal border. Verso: forewing ground color medium brown, darker brown discal and postdiscal bands; black

ocellus at cell end with three white dots, ringed by a thin yellow line; small black ocellus between 2A and  $Cu_2$ , also ringed by a thin yellow line. Hindwing ground color medium brown, with two straight, darker brown postdiscal and discal bands, lined proximally with yellow, running parallel to margin; small black ocellus at cell end, with three white spots, ringed with a thin yellow line; postbasal line of darker brown. Labial palpi dark brown. Eyes brown and hairy. Antennae black, ringed with fine white lines. Thorax and abdomen recto brown with metallic blue scaling, verso light brown. Genitalia (Fig. 10a-b): uncus broad and flattened; falces long, thin and pointed; valvae pointed and serrated dorsally at the tip.

FEMALE: unknown.

**Types.**— *Holotype* ♂: ECUADOR.— Esmeraldas Province, Río San Miguel, San Miguel, 100m, 6 Aug 1993 (K. R. Willmott). To be deposited in the BMNH.

**Diagnosis.**— This species is similar to *M. balza* D'Abrera, 1994, from which it is most easily distinguished by the less angular shape of the hindwing, the submarginal blue forewing band and the lack of a postdiscal white band on the forewing verso. The combination of the large basal area of blue on the hindwing recto and the blue submarginal band on the forewing verso distinguishes this species from all others.

**Etymology.**— This species is named for my mother, Hazel Willmott, who has always encouraged me to take every opportunity as it comes, and to live for the present (K. R. Willmott).

**Discussion.**— The holotype male was collected in lowland pluvial forest on the edge of a light gap around 1400h. Both *M. hazelae* n. sp. and *M. balza* are currently known only from western Ecuador and would seem to be closely related species occupying different altitudinal zones. The former is only known from the lowland type locality, while the latter species has been collected by the authors only in cloudforest habitats between 1800m and 1900m (the three males of *M. balza* in the BMNH all bear the locality data "Balzapamba", which is also a mid-altitude locality).

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