

A new species of *Calospila* (Lepidoptera: Riodinidae: Nymphidiini)

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Abstract: A distinctive *Calospila* specimen (Riodinidae: Nymphidiini) with no locality data is described, in the context of a recent generic revision, as *C. ignotaterra* Hall n. sp. An updated phylogenetic analysis for the genus suggests that the new species is sister to the *parthaon* + *furvolinea* clade. *Calospila metaensis* Salazar & Nielsen, [2018], is synonymized with *Argyraspila alma* Hall, 2018 (n. syn.).

Key words: *Argyraspila*, Neotropics, species description, taxonomy

INTRODUCTION

The Neotropical riodinid genus *Calospila* Geyer, 1832 (Nymphidiini) was recently revised by Hall (2018), who recognized three described species, *C. rhodope* (Hewitson, 1853), *C. parthaon* (Dalman, 1823), and *C. furvolinea* Hall, 2018. Historically, *Calospila* was a much larger genus (e.g., Callaghan & Lamas, 2004). However, the phylogenetic analyses conducted by Hall (2018) showed that *Calospila* as traditionally conceived was polyphyletic, resulting in most species being transferred to other genera. A few misplaced species were moved to *Periplacis* Geyer, 1837, and *Joiceya* Talbot, 1928, but the great majority were transferred to the resurrected genus *Calliona* Bates, 1868, and the newly described genera *Parvospila* Hall, 2018, *Pseudolivendula* Hall, 2018, and *Argyraspila* Hall, 2018. *Calospila* males have orange dorsal patterns with blue subapical and submarginal scaling on the forewing, and predominantly blue-gray ventral patterns, thus closely resembling *Argyraspila* males, from which they externally differ by lacking prominent dark dorsal spotting, most notably in the discal cell of the forewing and around the distal margin of the hindwing. *Calospila* females differ from those of related genera by having two to three small white subapical spots on both surfaces of the forewing. The genus is widely distributed from southern Mexico to southeastern Brazil, with all three of the described species occurring sympatrically in western Amazonia. *Calospila* species are somewhat uncommon to rare inhabitants of predominantly wet lowland forest, where males perch on ridgetops and hilltops as well as along streams. The food plants and immature stages of *Calospila* species remain unknown.

The purpose of this paper is to describe a new species of *Calospila* that was examined and mentioned by Hall (2018), but whose discovery came too late for inclusion in that work. A

single male specimen lacking locality data was located among accessions material at the McGuire Center for Lepidoptera and Biodiversity (Florida Museum of Natural History, Gainesville, Florida, USA [FLMNH]). Although describing a new taxon from such a solitary specimen is clearly far from ideal, I do so here because it is in the context of my recent revision of the genus. Most of the world's major collections have already been searched for additional material, and the specimen in question clearly represents a distinctive undescribed species. Also, by publishing this description, the chances are greatly increased of additional material coming to light, particularly from collections in Latin America, which would reveal the taxon's geographic area of origin.

MATERIALS AND METHODS

Morphology was studied using standard techniques, with the dissection methods used following those outlined in Hall (2018). The terminology for male genital structures follows Klots (1956), Eliot (1973), and Harvey (1987), and the nomenclature for venation follows Comstock & Needham (1898), with cells named for the vein above. *Calospila* material was studied in 42 institutional and private collections worldwide (as listed in Hall, 2018). A phylogenetic analysis for the genus *Calospila* was conducted using the morphological data set presented in Hall (2018) updated to include the new species, with *Hypophylla lasthenes* (Hewitson, 1870) again used as the outgroup taxon. The character matrix was edited using MacClade Version 3.05 (Maddison & Maddison, 1995), and the maximum parsimony analysis was performed using PAUP Version 4.0b10 (Swofford, 2002). An exhaustive search was performed with tree bisection-reconnection (TBR) branch swapping and 500 random-addition-sequence replicates, with all characters equally weighted and unordered.

SPECIES DESCRIPTION

Calospila ignotaterra Hall, new species

(Figs. 1-3)

Description: MALE: Forewing length 16.5 mm. *Wings:* see Fig. 1 (note that a small piece of the forewing tornus is missing). *Head:* Eyes brown and bare, with grayish-blue marginal scaling; frons black, with grayish-blue lateral and ventral scaling; dorsal surface of labial palpi black, ventral surface grayish blue, second and third segments relatively elongate; antennal length approximately 60% of forewing length, segments black with dirty whitish scaling at ventral base, nudum along inner ventral margin discontinuous, clubs black, tips brown. *Body:* Dorsal surface of thorax dark brown with some orange scales, ventral surface grayish blue, dorsal surface of abdomen a mixture of dark brown and orange scales, ventral surface grayish; all legs grayish. *Genitalia:* see Fig. 2; posterior valve tips asymmetrical in length, with left tip significantly longer than right tip; ductus ejaculatorius enters anterior tip of aedeagus anteroventrally; everted vesica exits posterior tip of aedeagus posteriorly, cornuti positioned on right side of vesica behind a bulbous dorsal protuberance, cornutal complex consists of a broad, anteriorly directed, dorsally positioned, spine-like central cornutus with a slightly shorter, much narrower, and sinuous ancillary spine emanating from base of anterior tip, and a barely sclerotized and ridged, dorsolateral rectangular pad extending posteriorly; eighth tergite rectangular; eighth sternite broadly rectangular, gradually narrowing posteriorly, with a very slight medial indentation at posterior margin. FEMALE: Unknown.

Types: HOLOTYPE male: "Nov 1975", "Allyn Museum /Acc. 1990-15" (FLMNH).

Etymology: This species is named for the Latin phrase "ignota terra", meaning "unknown land", in reference to the current lack of knowledge regarding its country of origin.



Fig. 1. Holotype male of *Calospila ignotaterra* n. sp. (dorsal surface on left, ventral surface on right), no locality data (FLMNH).

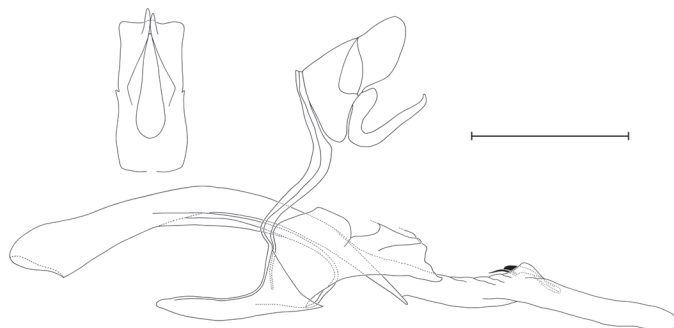


Fig. 2. Male genitalia of *Calospila ignotaterra* n. sp. in lateral view, with ventral view of valve complex (at top left). Scale bar = 1 mm.

Systematic placement and diagnosis: The new species described herein can unequivocally be placed in the genus *Calospila* due to its possession of orange patches on the dorsal wings that lack any dark spotting combined with blue submarginal and subapical scaling only on the dorsal forewing, including white scaling within the blue subapical patch that shows through onto the ventral surface, and an everted male genital vesica with a cornutal complex that is positioned at the middle of its right side beside a dorsolateral protuberance and consists of a rectangular sclerotized pad with two long anteriorly directed spines at the anterodorsal corner. Given the genital homogeneity among *Calospila* species, Hall's (2018) phylogenetic analysis for the genus was limited to four wing pattern characters. This analysis generated the following hypothesis of relationships: *rhodope* + (*parthaon* + *furvolinea*). To determine the phylogenetic placement of *C. ignotaterra*, an updated analysis was conducted that included one additional character. Character five was the absence (0) or presence (1) of an area of black scaling around the ventral margin of the discal cell on the dorsal hindwing in males. For this character, *C. rhodope* and *C. ignotaterra* were coded with state (0) and *C. parthaon* and *C. furvolinea* with state (1). *Calospila ignotaterra* was coded with states (0), (1), (?), and (?) for characters one to four, with characters three and four based on female characters. Character one (scattered or broken orangish scaling along the anal margin of the dorsal forewing of males) is shared by *C. parthaon* and *C. furvolinea* only, whereas character two (a prominent bluish subapical patch on the dorsal forewing of males) is shared by these two species plus *C. ignotaterra*. With no homoplasy in the small data set, the exhaustive search generated a single most parsimonious cladogram with a length of 5 steps, a consistency index of 1, and a retention index of 1. This cladogram (Fig. 3) places *C. ignotaterra* as sister to the *parthaon* + *furvolinea* clade, although such a hypothesis is clearly tentative given that it is based on only a few characters of the male wing pattern.

Calospila ignotaterra is externally most similar to *C. parthaon* and *C. furvolinea* (see Fig. 3), but most obviously differs in its orange male dorsal patterning, on the forewing having a single large semicircular orange patch in the basal half of the anal margin instead of a variable number of smaller orange patches in the distal half of the anal margin (and sometimes extending into the discal cell in *C. parthaon*), and on the hindwing having a large orange patch extending across the entire basal two thirds of the wing, leaving a broad black distal margin, instead of an orange patch predominantly confined to the distal two thirds of the wing, with black scaling restricted to the vicinity of the discal cell, apex, and costal margin. Additionally, the blue subapical patch on the dorsal forewing of *C. furvolinea* is smaller than that of *C. ignotaterra*, and at least in nominotypical *C. parthaon* this patch lacks any whitish scaling within it. On the ventral surface, the holotype of *C. ignotaterra* differs from males of *C. parthaon* and *C. furvolinea* by being slightly darker and having a more prominently orange area of pale scaling at the anal margin of the forewing, a larger area of subapical whitish scaling on the forewing, and slightly more proximally positioned dark postdiscal spots in cells Cu_1 and M_3 on both wings. The forewing length of the *C. ignotaterra*

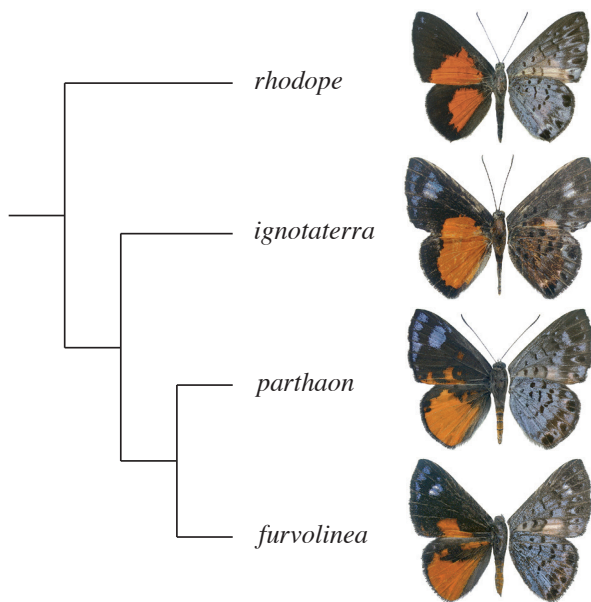


Fig. 3. Phylogeny of *Calospila* based on an updated analysis of the data matrix in Hall (2018) that included *C. ignotaterra* n. sp. and one additional character. Single most parsimonious cladogram (length 5 steps, consistency index 1, and retention index 1) resulting from the exhaustive analysis of five wing pattern characters, with *Hypophylla lasthenes* as the outgroup taxon.

holotype is 16.5 mm, which is at or fractionally above the upper forewing length range limit of the other *Calospila* species, meaning the new species may also prove to be slightly larger than its congeners. The male genitalia of all *Calospila* species are very similar. The anteriorly elongate and ventrally convex saccus of *C. ignotaterra* is most similar to those of *C. parthaon* and *C. furvolinea*, but otherwise the genitalia are probably most similar to those of *C. rhodope*, sharing a slightly shorter and broader posterior projection from the saccus, a more smoothly curving aedeagal pedicel, a slightly shorter and narrower posterior pad to the aedeagal cornutal complex (which in the holotype of *C. ignotaterra* is barely sclerotized), and a dorsally more gradually tapered posterior tip to the valvae.

Biology: Nothing is known about the biology of this species.

Distribution: As the unique holotype of *C. ignotaterra* lacks locality data, the distribution of this species remains unknown. The type specimen does bear date and accession labels, but Allyn Museum records indicate only that the apparently commercially collected lot was donated by Mark Simon (J. Miller, pers. comm.), who has no specific recollections about this thirty-year-old donation (M. Simon, pers. comm.). Given that the relatively well collected Amazon basin harbors all three of the previously described *Calospila* species, *C. ignotaterra* seems most likely to inhabit a more poorly known peripheral portion of the generic range. With very few members of the myrmecophilous Nymphidiini occupying montane habitats, the lowlands of the Chocó or southern to southeastern Brazil seem the most likely areas of origin for *C. ignotaterra*, with the former region having no *Calospila* records in the collections examined and the latter region having only a handful of records for *C. parthaon* and *C. rhodope* from the states of Bahia (both

species), Espírito Santo, and Rio de Janeiro (*C. parthaon* only) (Hall, 2018).

Additional note: A name worth mentioning here that was not included in Hall (2018) is *Calospila metaensis* Salazar & Nielsen, [2018]. It was proposed in a paper by Vargas ([2018]) in the Colombian journal *Boletín Científico, Museo de Historia Natural, Universidad de Caldas* that was initially published online in December 2017. However, because the electronic work was not registered with ZooBank, the new names in that paper were only made nomenclaturally available when a hard-copy version of the relevant journal issue was published in August 2018 (ICZN, 2012; G. Lamas, pers. comm.). The name *metaensis*, described from males from eastern Colombia, is here synonymized with *Argyraspila alma* Hall, 2018 (n. syn.), a name that was described in February 2018 on the basis of both sexes from eastern Ecuador and Peru.

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