

# A new species of *Lindra* Evans, 1955 from Ecuador (Lepidoptera: Hesperiiidae: Hesperiiinae)

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**Abstract:** A new species of *Lindra* Evans, 1955 is described from a single specimen from Napo Province, Ecuador. *Lindra olafmielkei* sp. nov. is the darkest species in the genus, with a nearly immaculate dark brown dorsal surface and comparatively rounded forewing apex, but stigma and genitalic morphology clearly place it within *Lindra*. This new species constitutes the first report of the genus *Lindra* from Ecuador.

**Key words:** Butterfly, distribution, genitalia, morphology, skipper.

**Resumen:** Se describe una especie nueva de *Lindra* Evans, 1955 de un solo ejemplar de la Provincia de Napo, Ecuador. *Lindra olafmielkei* sp. nov. es la especie más oscura del género, con un superficie dorsal pardo oscuro, casi immaculado, con el ápice del ala anterior relativamente redondeado, pero la morfología de su stigma y genitalia claramente la ubican dentro de *Lindra*. Esta especie nueva constituye el primer reporte del género *Lindra* para Ecuador.

**Palabras clave:** Distribución, genitalia, hespérido, mariposa, morfología.

## INTRODUCTION

The hesperiid genus *Lindra* Evans, 1955 was originally proposed to include two species, *Carystus simulius* H. Druce, 1876, and *Phlebodes gulala* Schaus, 1902 (Evans, 1955). The genus was subsequently revised by Mielke (1978), who transferred *P. gulala* to the genus *Mucia* Godman, 1900, moved *Phemiades procax* Draudt, 1923 and *Oeonus brasus* O. Mielke, 1968 into *Lindra*, and described *L. howarthi* O. Mielke, 1978, *L. vanewrighti* O. Mielke, 1978, *L. brasus ackeryi* O. Mielke, 1978 and *L. b. huxleyi* O. Mielke, 1978. Subsequently, after examining the types of *L. procax* and designating a lectotype, Mielke (1993) synonymized *L. howarthi* under *L. procax*, and named what he had considered to be *L. procax* in 1978 as *L. boliviana* O. Mielke, 1993. Thus, the genus is currently comprised of five species and an additional two subspecies (Mielke, 2005; Warren *et al.*, 2017).

Little is known about the biology of *Lindra* species. As noted by Mielke (1978), adults of *Lindra* are rarely encountered and *Lindra* specimens are rare in collections; Mielke's (1978) revision was based on just eighteen total specimens. Most *Lindra* are South American in distribution. *Lindra simulius* is known from Peru (Cuzco) and Bolivia; *L. procax* is known from Brazil (Mato Grosso) and Bolivia; *L. boliviana* is known only from Bolivia; *L. vanewrighti* is known from Peru (Cuzco); *L. brasus ackeryi* is known only from Brazil (Rio de Janeiro), and *L. b. huxleyi* is also known only from Brazil (Paraná and Santa

Catarina). Only *L. b. brasus*, originally described from Brazil (Distrito Federal), is known to occur in Central America, where it has been found in Panamá (Mielke, 1978), Belize (Warren *et al.*, 2017) and Costa Rica (Janzen & Hallwachs, 2009). The only information available on the life history of *Lindra* species is for *L. b. brasus* from Costa Rica, where larvae were found and reared on the bamboo *Elytostachys clavigera* McClure (Janzen & Hallwachs, 2009).

While studying specimens of Hesperiiidae collected in Ecuador by Nadia Venedictoff, a distinctive specimen was encountered, which, due to its dark overall appearance, was suspected to represent an undescribed species of *Lindra*. Subsequent dissection and study of its genitalia has confirmed its status as a new species, which is formally described below. We have included this new species in *Lindra* since it keys to that genus in Evans (1955), and shares many external and genitalic characters with *Lindra* species as revised and illustrated by Mielke (1978, 1993).

## MATERIALS AND METHODS

In an effort to locate *Lindra* specimens relevant to this study, we reviewed collections of Lepidoptera containing Ecuadorian Hesperiiidae, as follows: Coleção Entomológica Padre Jesus Santiago Moure, Departamento de Zoologia, Universidade Federal do Paraná, Curitiba, Brazil (DZUP); McGuire Center for Lepidoptera and Biodiversity, Florida Museum of Natural



**Figure 1.** A) Dorsal and B) ventral views of holotype male of *Lindra olafmielkei* sp. nov., from Río Pununo, 400 m, Napo Province, Ecuador, 3/4-X-1979, collected by Nadia Venedictoff. Scale bar = 1.0 cm.

History, University of Florida, Gainesville, USA (MGCL); Museo de Zoología, Departamento de Biología Evolutiva, Facultad de Ciencias, Universidad Nacional Autónoma de México, Mexico City, Mexico (MZFC); Research material of Andrew D. Warren, USA (ADW).

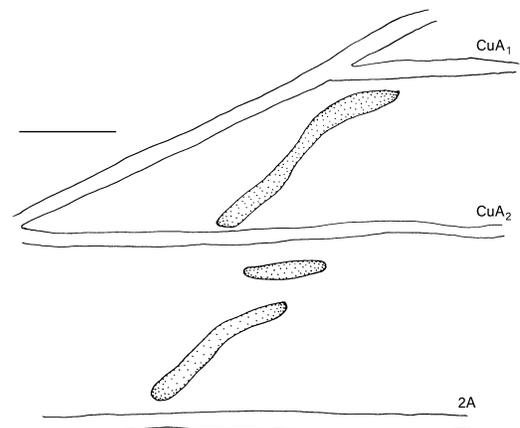
Male genitalia were prepared for examination by boiling the abdomen in 10% potassium hydroxide solution for 10 minutes before dissection under a Leica MZ 16 stereomicroscope with camera lucida attached. After dissection, genitalia were soaked in a weak acetic acid solution for 10 minutes to neutralize any remaining potassium hydroxide. After illustration, genitalia were placed in a small plastic vial containing glycerin for permanent storage. Photos of the specimen were taken with a Canon EOS 70D camera with a 100 mm macro lens. Images and plates were modified using Adobe Photoshop 2021 and Adobe Illustrator 2021. Terminology for genitalia follows Klots (1970) and Mielke (1978, 1993).

## RESULTS AND DISCUSSION

### *Lindra olafmielkei* A. Warren, Gott & Dolibaina sp. nov. (Figs. 1A-B, 2, 3)

**Description.** MALE (Figs. 1A-B): forewing length = 15.9 mm; forewing apex rounded, termen slightly convex; hindwing termen convex to  $CuA_1$ , slightly concave from  $CuA_1$  to 2A, then straight from 2A to 3A, inner margin slightly convex; black forewing stigma tripartite (Fig. 2); section in  $CuA_1$ - $CuA_2$  spanning entire cell, narrow, beginning just distad of origin of  $CuA_1$  immediately under vein, then slightly curved posteriorly under origin of  $CuA_1$ , continuing straight to  $CuA_2$  at about 1/5 distance from base to vein end; anterior portion in  $CuA_2$ -2A linear, below distal fourth of basal third of vein; posterior portion in  $CuA_2$ -2A originating immediately below anterior portion, slightly curved posteriorly near midpoint, continued to midpoint of vein 2A; dorsum nearly uniform dark brown; forewing with sparse dark ochreous scales along basal half of costa, at wing base, widely scattered in basal half of  $CuA_2$ -2A, and along inner margin; few dark ochreous scales just distad of stigma in  $CuA_1$ - $CuA_2$ ; indistinct, small, poorly-defined patch of dark ochreous scales just distad of posterior portion of stigma in  $CuA_2$ -2A; fringe dark brown with scattered grayish scales concentrated around tornus; dorsal hindwing with scattered dark ochreous scales on basal 2/3 of wing; indistinct, small, rounded, postmedial patches of ochreous scales in anterior half of  $M_1$ - $M_3$ ,  $M_3$ - $CuA_1$ , and  $CuA_1$ - $CuA_2$ ; fringe dark brown at apex, becoming mostly grayish-brown, palest at tornus.

Ventral forewing dark ochreous brown, grading to black at base; poorly

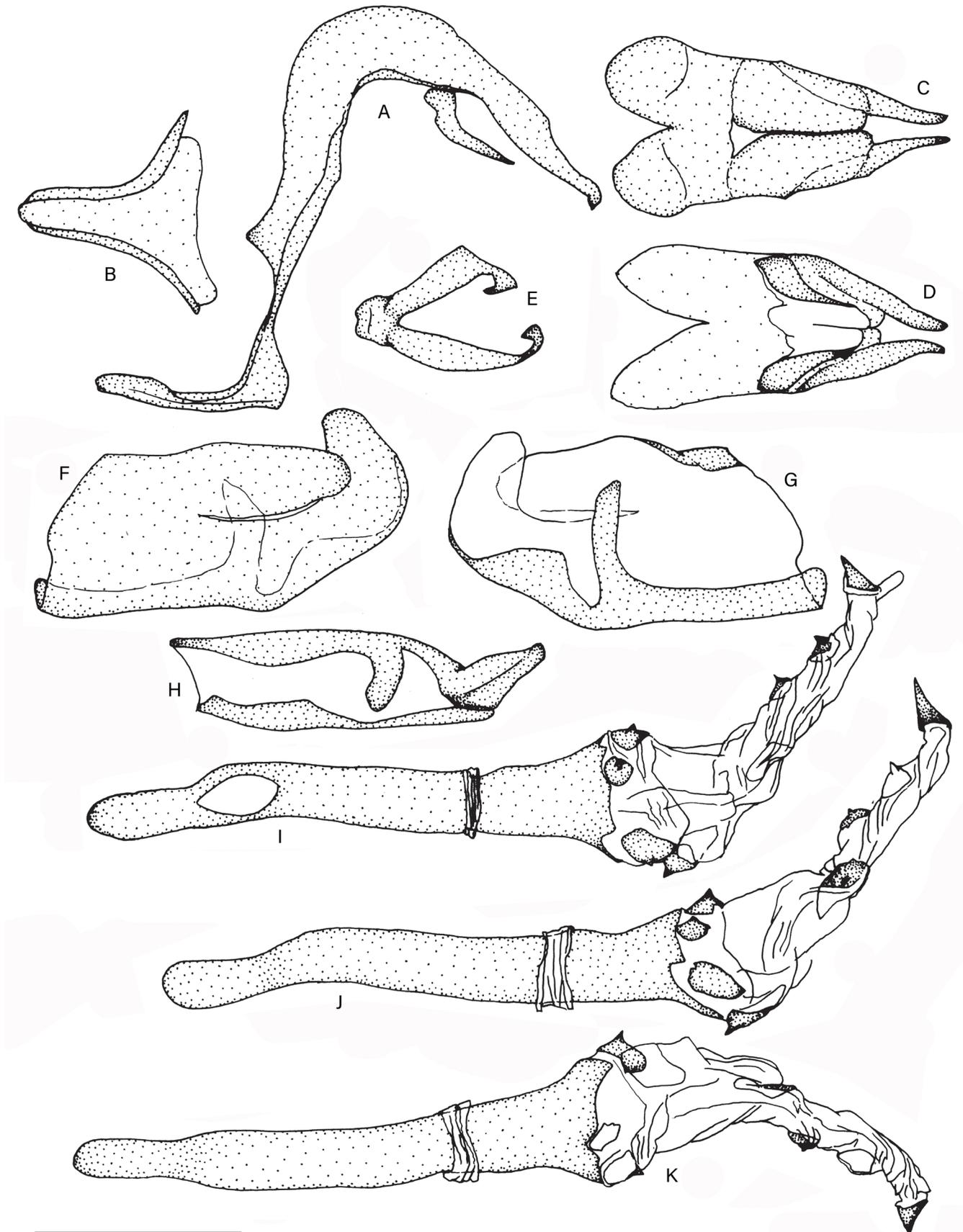


**Figure 2.** Tripartite right forewing stigma of *Lindra olafmielkei* sp. nov., holotype male. Scale bar = 1.0 mm.

defined dark ochreous macules as follows: subapical, minute, very indistinct, near base of  $R_2$ - $M_1$ ; small, indistinct, at mid- $M_2$ - $M_3$ ; larger rounded, spanning  $M_3$ - $CuA_1$  just basad of mid-cell; larger, semi-rectangular, spanning  $CuA_1$ - $CuA_2$  at end of basal third of cell; paler with indistinct distal boundaries in distal third of  $CuA_2$ -2A; circular, in posterior half of discal cell, near cell end; fringe as on dorsal surface; ventral hindwing uniform dark brown, slightly paler in posterior 1/5 of basal half of  $CuA_2$ -2A; indistinct, rounded, dark ochreous postmedial macules repeated from dorsal surface but slightly better-developed; additional larger, rounded, dark ochreous macule in posterior half of  $CuA_2$ -2A 2/3 distance from base to termen; fringe as on dorsal surface.

Dorsal head dark brown with scattered dark ochreous setiform scales, venter with dark ochreous, dark brown, and grayish setiform scales; left palpus missing; right palpus with dark ochreous and dark brown setiform scales dorsad, mostly dark ochreous with scattered dark brown scales on venter, third segment entirely dark brown, porrect; antennae black on dorsum, dark brown on venter, becoming mostly dark ochreous towards club; apiculus long and lanceolate; nudum dark ochreous, 16 segments; thorax dark brown-black, most scales missing; tegulae dark brown with scattered dark ochreous scales; ventral thorax with dense dark ochreous and whitish-gray setiform scales continued onto ventral surface of femora; dorsal and lateral surfaces of legs brown, ventral surfaces whitish gray; prothoracic tibia outer lateral surface with brown setiform scales; epiphysis brown; mesothoracic legs missing; metathoracic tibia dorsal surface with brown setiform scales, two pairs of whitish cream-colored spurs, outer spurs two-thirds length of inner spurs; abdomen dark brown on dorsum, pale grayish on venter with medial longitudinal dark brown stripe.

**Male genitalia** (Fig. 3): Tegumen anterior edge invaginated to nearly half its length, forming left and right sides; fenestra triangular, vinculum wide in lateral view, abruptly narrows to one-quarter its width just past midpoint, gradually widens to saccus; saccus narrows anteriorly to blunt, rounded tip,



**Figure 3.** Male genitalia of *Lindra olafmielkei* sp. nov., holotype male. Genitalia dissection DRD-23-2016. A) Left lateral view of tegumen, saccus, uncus, and gnathos; B) ventral view of anterior projection of saccus; C) dorsal view of tegumen, fenestra, and uncus; D) ventral view of tegumen and gnathos; E) dorsal view of left valve; F) external view of left valve; G) internal view of left valve; H) dorsal view of juxta; I) ventral, J) dorsal, and K) left-lateral views of aedeagus and everted vesica with cornuti. Scale bar = 1.0 mm.

slightly angled dorsally, as long as tegumen, caudal edge slightly concave; uncus bifurcate, thicker anteriorly, gradually narrowing in dorsal and lateral views to caudal tip, tip angled ventrally; gnathos bifurcate, as wide as tegumen at anterior edge, abruptly narrowing at midpoint to one half its width at anterior edge, half length of uncus, sclerotized laterally, becoming membranous medially; valvae symmetrical, twice as long as saccus; sacculus narrow, curving caudally to blunt, narrow, dorsally projected arm; harpe one half width of valve, curving dorsally near midpoint, gradually narrowing to wide, blunt, rounded tip directed dorsally; juxta v-shaped with arms wrapping around aedeagus; aedeagus as long as length of anterior projection of saccus and valvae combined, base rounded, gradually narrowing before widening at ductus ejaculatoris, remains continuous width until widening at two thirds length to broad, irregular tip, two points on ventral surface near caudal edge; vesica with eight cornuti, four at caudal extension, four near tip of penis.

Female: Unknown.

**Specimens examined.** Holotype male with the following labels: white, printed: / ECUADOR Napo 300m / Río Pununo / 3/4 X 1979 / Col N Venedictoff /; white, printed: / Venedictoff colln. / Allyn Mus. Acc. / # 1986-26 /; white, printed and handprinted: / DRD-23-2016 / *Lindra* sp. nov. / DOLIBAINA DET. 2016 /; red, printed: / HOLOTYPE / *Lindra olafmielkei* / A. Warren, Gott & Dolibaina /. The holotype is deposited at the McGuire Center for Lepidoptera and Biodiversity, Florida Museum of Natural History, University of Florida, Gainesville (MGCL).

**Type locality.** Río Pununo, Napo Province, Ecuador, is a small tributary of Río Misahuallí, located at 01°00'56"S 77°40'10"W, at about 400 m elevation. The area is dominated by typical lowland tropical forest.

**Etymology.** This species is named in honor of Olaf Hermann Hendrik Mielke, one of the top experts on Neotropical Hesperidae and author of most *Lindra* taxa. Olaf's enthusiasm for fieldwork, generosity, and warm hospitality are unmatched, and his studies of type specimens of Neotropical Hesperidae have built a foundation upon which all subsequent students have benefited.

**Distribution and phenology.** To date, *L. olafmielkei* sp. nov. is known only from the type locality, where the holotype specimen was collected in early October, which corresponds with the first half of the local dry season (but rains are still frequent).

**Diagnosis and discussion.** *Lindra olafmielkei* sp. nov. is immediately recognized by its almost immaculate dark brown dorsal coloration, the poorly-defined ochreous macules on the ventral forewing, and details of its tripartite forewing stigma (Fig. 2). It is not likely to be confused with any other *Lindra* species, due to its very dark coloration and comparatively rounded forewing apex. The forewing stigma of *L. olafmielkei* sp. nov. is most similar to that of *L. b. brasus*, but the anterior section in 1A-2A is much longer than in *L. b. brasus* or any other *Lindra* species. The pattern of ventral forewing macules is shared with other *Lindra* species, but the macules are not as well defined on *L. olafmielkei* sp. nov. as they are on other species.

The genitalia of *L. olafmielkei* sp. nov. and other *Lindra* spp. share multiple similarities that place *L. olafmielkei* sp. nov. in the genus *Lindra*. Overall, characters observed closely resemble *L. procax*, specifically in the shape of the valvae, with the sacculus forming a dorsally projected arm and the harpe forming a blunt, rounded dorsally projected arm. The uncus in both taxa is bifurcate with tips being deeply divided and angled ventrally, and the caudal edge of the tegumen is deeply divided

to near the midpoint, forming left and right sides (see Mielke 1993). Additionally, the gnathos in both taxa is bifurcate, reaching approximately half the length of the uncus, sclerotized laterally while membranous medially, and the aedeagus is shaped similarly with the ventral surface near the caudal tip containing two points and the vesica containing eight cornuti. *Lindra olafmielkei* sp. nov. genitalia differ from *L. procax* by the uncus being divided for a shorter length (last third widely separated while *L. procax* widely separated for approximately half the length of the uncus), the dorsal projection of the sacculus is longer, and the harpe is narrower and less rounded than that of *L. procax*.

*Lindra olafmielkei* sp. nov. becomes the sixth species of *Lindra*, and the only species in the genus known from Ecuador. Like other *Lindra* species, *L. olafmielkei* sp. nov. appears to be rare, given that multiple surveys for Hesperidae have been conducted in Ecuador's Napo province. We hope that future field surveys in eastern Ecuador will result in the collection of additional specimens of *L. olafmielkei* sp. nov., including the female, and clarify the extent of its geographic distribution.

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