

# A NEW SPECIES OF *DYNAMINE* HÜBNER, [1819] FROM NORTHWESTERN ECUADOR (LEPIDOPTERA: NYMPHALIDAE: BIBLIDINAE)

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**Abstract-** A new nymphalid species in the subfamily Biblidinae, *Dynamine chiquita* Willmott & Hall n. sp., is described from northwestern Ecuador. *Dynamine chiquita* is known to date from only three female specimens collected along a 30 m section of dirt road in the dwindling lowland rainforests of Esmeraldas province. The new species is unique in the genus in having an entirely brown dorsal hindwing in the female, and it is perhaps most closely related to several Amazonian species.

**Resumen-** Se describe una nueva especie, *Dynamine chiquita* Willmott & Hall, n. sp., de la subfamilia Biblidinae, familia Nymphalidae del noroccidente del Ecuador. Únicamente se conocen tres especímenes de *Dynamine chiquita*, todos son hembras y fueron colectados a lo largo de una sección de 30 m de carretera en los remanentes de bosque húmedo tropical en la provincia de Esmeraldas. Esta especie nueva es la única en el género que tiene una ala posterior dorsal totalmente marrón en la hembra, y ciertas especies amazónicas parecen ser las más cercanamente relacionadas en terminos filogeneticos.

**Key words:** *Dynamine agatha*, *D. pebana*, neotropical region, taxonomy

## INTRODUCTION

The nymphalid genus *Dynamine* Hübner, [1819] currently contains 42 recognized species, including one undescribed species from Peru (Lamas, 2004; Brévignon, 2008). This genus of small colorful butterflies is distributed throughout the neotropical region, with the greatest species richness in lowland forests of the middle and upper Amazon, as with most other genera in the Biblidinae. Although some species are common (e.g., *D. postverta* (Cramer, 1779)), a number of Amazonian species are scarce to rare, with few specimens in world collections. Somewhat surprisingly, however, no new species were described after 1932, until Brévignon (2008) described *D. davinae* from French Guiana, although *Dynamine pebana elisa* Brévignon, 1995, likely also represents a distinct species. Despite the lack of a modern revision, D'Abbrera (1987) illustrates the genus well, and there seem to be few problems in identification, with most species defined by clear wing pattern differences.

A total of 22 species of *Dynamine* are known from Ecuador (Willmott & Hall, unpublished data). Although this number represents a relatively small proportion of the genus, it continues to grow slowly with the addition of scarce Amazonian species. Western Ecuador has only seven recorded species, but, despite this low number, one of these is highly distinctive and represents a hitherto unknown taxon, which we here describe and name.

## METHODS

*Dynamine* specimens were examined in major public and private collections in Europe and in North and South America to record distributional data, study morphological variation and assess taxonomic diversity. These include, among others, the McGuire Center for Lepidoptera at the Florida Museum of Natural History, Gainesville, FL, USA (FLMNH), American Museum of Natural History, New York, USA (AMNH), National Museum of Natural History, Smithsonian Institution,

Washington, DC, USA (USNM), Natural History Museum, London, UK (BMNH), Oxford University Museum, Oxford, UK (OUM), Zoologisches Museum, Humboldt Universität, Berlin, Germany (ZMHU), Museo Ecuatoriano de Ciencias Naturales, Quito, Ecuador (MECN), and Museo de Historia Natural, Universidad Nacional Mayor de San Marcos, Lima, Peru (MUSM). The Lamas collection of neotropical butterfly type specimen photographs at the MUSM, representing all currently recognized *Dynamine* species (Lamas, 2004) except *D. arene* Hübner, [1823], *D. dyonis* Geyer, 1837 and *D. meridionalis* Röber, 1915, was examined. The last three species were all clearly figured in their respective original descriptions and there is no doubt as to the identity of these names.

Morphology was studied using standard techniques, with adult abdomens being soaked in hot 10% KOH for 10-15 minutes, dissected and subsequently stored in glycerine. Body morphology and dissections were studied using a binocular microscope at 32x magnification. The terminology for genital and abdominal structures largely follows Klots (1956), and nomenclature for venation follows Comstock & Needham (1918).

Distributional data and field observations for *Dynamine* were also gathered by the authors during more than 600 days of field work in Ecuador between 1991 and 2009, representing 385 sites in 20 provinces, ranging from sea level to 4000 m on both Andean slopes.

## *Dynamine chiquita* Willmott & Hall, new species Figs. 1A,B, 2, 3

**Description:** MALE: unknown. FEMALE (Fig. 1A,B): Forewing length 20 mm. *Wing shape:* Forewing with rounded apex and convex distal margin; hindwing rounded with very slightly scalloped margin. *Dorsal surface:* Forewing ground color blackish brown, paler in basal half; faint, dirty grayish postdiscal spot at base cell M3-M2; one broad (5 mm wide), white quadrate postdiscal spot in cells M2-R2, one broad

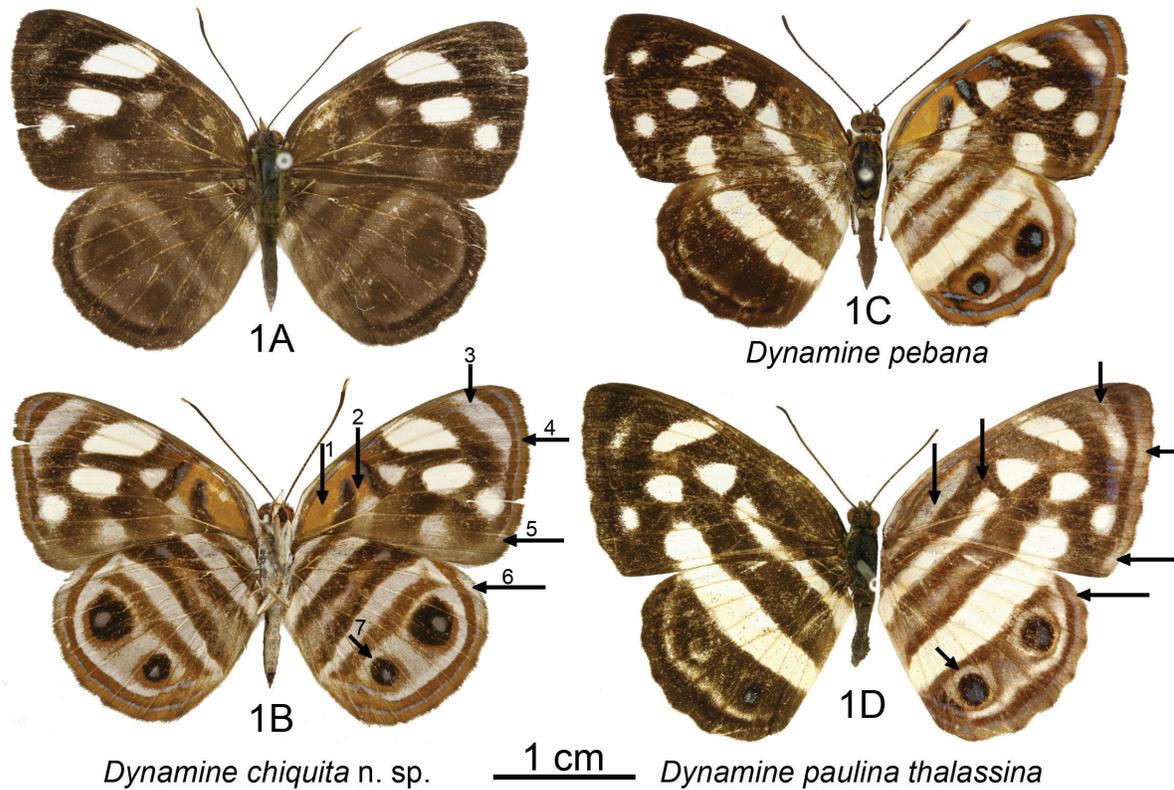


Fig. 1. A. *Dynamine chiquita* n. sp., female, HT, dorsal surface. B. *Dynamine chiquita* n. sp., female, HT, ventral surface, numbered arrows indicate characters discussed in the text. C. *Dynamine pebana*, female, Peru, Pebas, left dorsal surface, right ventral surface. D. *Dynamine paulina thalassina*, Nicaragua, Chontales, female, left dorsal surface, right ventral surface.

(4 mm), white quadrate postdiscal spot in cell Cu1-M3, one smaller (2 mm), rounded, white submarginal spot in cell Cu2-Cu1; very indistinct, slightly paler subapical band. Hindwing entirely brown, same color as basal half forewing, except for slightly paler where white ventral surface bands show through, and with a narrow (1 mm) darker brown submarginal band from tornus to apex. *Ventral surface*: Forewing ground color dark brown; costal margin white from base to two-thirds distance to discal cell end; thin, metallic blue line along anterior edge discal cell, extending as narrow dashes into base cells R3-R2 and R2-R1; discal cell orange except for slightly basally curving dark line intruding from posterior edge basal of base vein Cu2 and extending approximately three-quarters distance across cell, its anterior edge separated from orange by a thin metallic blue line, a roughly semi-circular white spot at posterior margin at base vein Cu2, a thin metallic blue dash near cell end in anterior half discal cell perpendicular to costa, and black line marking cell end; white, semi-circular postdiscal spot base cell M3-M2; rounded, indistinct white postdiscal spot middle cell 2A-Cu2; three white postdiscal spots as on dorsal surface; indistinct metallic blue line along posterior side vein R4-5 between white postdiscal spot and subapical band; slightly curving white subapical band (2 mm wide) from vein M3 to vein R3, tapering posteriorly to an indistinct, very thin line that continues parallel to wing margin to vein Cu1; even, rufous submarginal line from apex to vein Cu2, lined distally by thin metallic blue line which thickens slightly in apex extending from apex to mid

cell 2A-Cu2, margin dark orange from apex to mid cell 2A-Cu2. Hindwing ground color white; costal edge at base lined narrowly with dark brown; rufous-brown basal band from costa to anal margin through base discal cell; two approximately parallel dark rufous-brown bands from costa to anal margin, one extending through base veins Rs and Cu2, other extending through base cell M2-M1 and vein Cu1, area between in cell Rs-Sc+R1 with metallic blue spot in anterior half and orange spot in posterior half; rufous postdiscal band from vein Rs to vein 2A, approximately even in width, extending as scattered rufous scales into cell Rs-Sc+R1; two postdiscal ocelli, both with metallic blue pupil in distal half of larger black spot, latter lined distally with orange, larger spot centered in cell M2-M1 extending anteriorly into posterior half cell M1-Rs, posteriorly to vein M3, smaller spot centered in cell Cu2-Cu1, orange distal lining extending slightly into neighboring cells; even, rufous submarginal line from apex (touching distal discal dark brown band) to tornus, lined distally by thin metallic blue line which merges into white apical area in mid cell M1-Rs, margin dark orange except becoming white from mid cell M1-Rs to apex.

*Head*: Eyes reddish brown with short, sparse setae; labial palpi clothed with short, flat scales, grayish brown dorsally, white ventrally; antennae dark brown, basal half with sparse white scales at base each segment ventrally, terminal 6-7 segments yellow-brown.

*Body*: Thorax and abdomen grayish brown dorsally, white ventrally, except grayish brown on ventral thorax where legs

rest against body; legs grayish brown dorsally, white ventrally. *Genitalia and abdomen* (Fig. 2): Papillae anales with slight lateral ridge; anteroventral corner of eighth tergite elongated into a long, thin projection which extends ventrally but does not meet ostium bursae; seventh sternite folded dorsally at posterior edge and heavily sclerotized; ostium bursae a simple, flared round plate leading to a long, slender, sclerotized tube; ductus bursae slightly sclerotized at base ductus seminalis; corpus bursae large, oval in dorsal view, together with ductus bursae and ostium bursae extending almost entire length of abdomen.

**Types:** HOLOTYPE female: ECUADOR: *Esmeraldas*, km 10 San Lorenzo-Lita road, Estación Experimental 'La Chiquita', 50 m, [1°13.49'N, 78°45.57'W], 28 August 1999, K. Willmott leg., [genitalia vial KW-09-31], to be deposited in MECN.

PARATYPES: 2 females, same data as HT, [DNA voucher # LEP-01766] in FLMNH and [DNA voucher # LEP-01795] in Keith Willmott & Jason Hall collection, Gainesville, Florida, USA.

**Etymology:** This species is named for the type locality, which is also Spanish for 'little girl', alluding to the species being known to date only from females.

**Diagnosis and relationships:** Females of this new species are readily distinguished from all known *Dynamine* females by the dorsal hindwing being entirely brown (Fig. 1A). The majority of *Dynamine* females have a white postdiscal dorsal hindwing band (e.g., Fig. 1C,D), with most remaining species having green scaling with a white postdiscal band variably present. *Dynamine tithia* (Hübner, [1823]) has a white postdiscal spot only in cell M1-Rs. All *Dynamine* females that we examined also have a white postdiscal spot in cell 2A-Cu2 on the dorsal forewing, often extending into cell Cu2-Cu1, which is absent in *D. chiquita*.

We have not examined females of *D. agatha* (Oberthür, 1916), *D. neoris* (Hewitson, 1859) (although the female is described by Neild (1996)), *D. perpetua* (Bates, 1865), *D. intermedia* Talbot, 1932, *D. persis* (Hewitson, 1859) and the undescribed Peruvian species, and male *D. chiquita* is unknown, so it is important to consider diagnostic ventral wing pattern characters, which typically do not differ between the sexes in *Dynamine*. The genus can be divided into four not necessarily monophyletic groups based on ventral wing pattern. *Dynamine chiquita* is a member of the largest group, characterized by having prominent postdiscal ocelli on the hindwing centered in cells Cu2-Cu1 and M2-M1. Within this group, a combination of

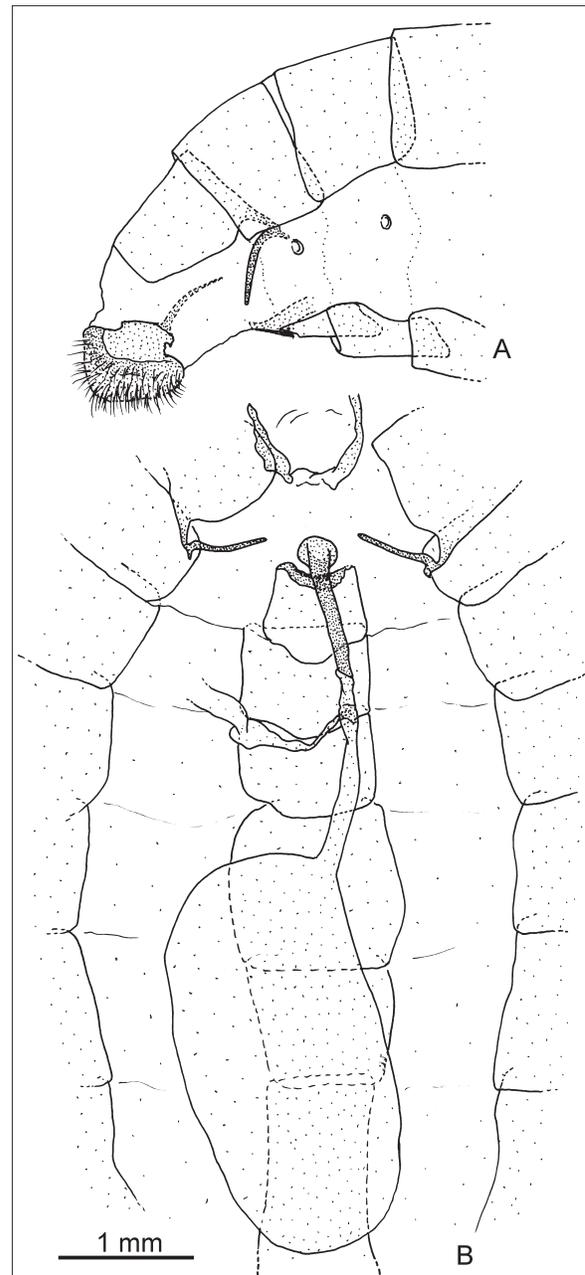


Fig. 2. *Dynamine chiquita* n. sp., female genitalia, HT. A. lateral view of abdomen. B. dorsal view of abdomen interior and genitalia.

Table 1. Characters distinguishing *D. chiquita* n. sp. from similar potentially sympatric (*D. paulina*, *D. postverta*) and allopatric (*D. pebana*, *D. agatha*) species. We assume no sexual dimorphism in these characters.

Species	Character (see Fig. 1B,D)						
	1. VFW discal cell base orange	2. VFW discal cell with orange connecting to white at base vein Cu2	3. VFW white subapical band split with brown line at costa	4. VFW margin with white scaling at vein M2	5. VFW margin with white scaling at cell 2A-Cu2	6. VHW apex white	7. VHW postdiscal ocelli isolated from dark postdiscal band by white scales
<i>D. chiquita</i>	Yes	Yes	No	No	No	Yes	Yes
<i>D. paulina</i>	No	No	Yes	Yes	Yes	No	No
<i>D. postverta</i>	No	No	Yes	Yes	Yes	No	No
<i>D. pebana</i>	Yes	Yes	No	No	No	Yes	Rarely
<i>D. agatha</i>	Yes	Yes	No	No	No	No	No

characters distinguishes *D. chiquita* from almost all other species (Fig. 1B, Table 1), of which the most notable are the orange ventral forewing discal cell base (1), which is fused with the white discal band at the base of vein Cu2 (2), the white ventral hindwing apex (6), and the white scaling separating the ventral hindwing ocelli from the dark postdiscal band (7). Although the male of *D. chiquita* is unknown, in western Ecuador it is likely to be confused only with *D. postverta* or *D. paulina thalassina* (Boisduval, 1870), which have similar ventral patterns. We therefore figure female *D. p. thalassina* (Fig. 1D) to indicate obvious wing pattern differences and aid in future identification of male *Dynamine* from western Ecuador.

In fact, *D. chiquita* appears to be most similar to several Amazonian and southeast Brazilian species (Table 1); *D. agatha*, *D. pebana* Staudinger, [1885], *D. perpetua* and *D. meridionalis* have character 2, and of these, only *D. pebana* (Fig. 1C) occasionally has the ventral hindwing ocelli isolated from the postdiscal band by white scaling (7), though never as clearly as in the new species. *Dynamine chiquita* further differs from *D. pebana* in the shape of the dark ventral hindwing postdiscal band, being straight and even in width in the former, but tapering at the ends, concave and indented at the posterior ocellus in *D. pebana*. In addition, in *D. chiquita* the dark discal and postdiscal ventral hindwing bands are closer together, and the rufous ventral hindwing submarginal band has a very even basal edge, rather than being scalloped as in *D. pebana*. Finally, the white forewing spots that are visible on the dorsal surface are much broader in *D. chiquita* than in *D. pebana*. One reviewer suggested that *D. chiquita* might represent the unknown female of *D. agatha*, partly because *D. agatha* has a rufous ventral hindwing submarginal band with an even basal edge, as in *D. chiquita* but not *D. pebana*. However, this character is also shared with several other *Dynamine* (e.g., *D. zenobia* (Bates, 1865), *D. gisella* (Hewitson, 1857), *D. aerata* (Butler, 1877), *D. neoris*), so it is unlikely to be a synapomorphy. All of the other characters that distinguish *D. chiquita* from *D. pebana* also apply to distinguish the former from *D. agatha*, in addition to character 6 & 7 (Fig. 1B), so we not believe that *D. chiquita* represents female *D. agatha*.

We were unable to dissect any female specimens of *D. pebana*, since the figured specimen (Fig. 1C) in the BMNH is the only female known to us. The female genitalia of *Dynamine paulina thalassina* differs slightly from *D. chiquita* in the antrum being unsclerotized, the ostium bursae being shorter and the fold in the seventh sternite being more pronounced. It is therefore possible that additional distinguishing features may be found in the female genitalia, when specimens of species that are likely closely related become available for study.

**Natural history and distribution:** This species is known to date only from the type locality in Esmeraldas province, northwestern Ecuador (Fig. 3). All three known specimens were captured along a 30 m stretch of dirt road leading east from the Estación Experimental ‘La Chiquita’ through humid tropical lowland forest, at a point where the road crossed a small, swampy stream. During a sunny spell from 13:30 hrs to 14:00 hrs, females were observed every 5-10 minutes appearing from the forest and flying either across or along the road from 2-6 m above the ground. Presumably the larval hostplant grew

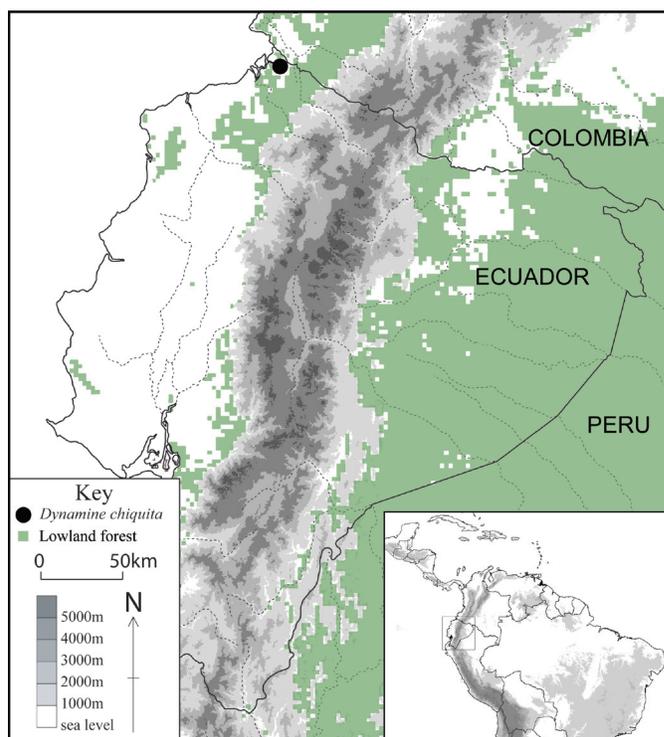


Fig. 3. Map of Ecuador (neotropical region inset) showing type locality of *Dynamine chiquita* n. sp. and undisturbed forest cover below 1000 m elevation. Land cover data are from the Global Land Cover 2000 database, European Commission, Joint Research Centre, 2003. <http://bioval.jrc.ec.europa.eu/products/glc2000/glc2000.php>

in the vicinity, though no oviposition behavior was observed. Larval hostplants of *Dynamine* are mostly vines in the genera *Dalechampia* and *Tragia* (Euphorbiaceae) (DeVries, 1987; Beccaloni *et al.*, 2008). Males of *Dynamine postverta* were observed perching 2 m above the ground along the edge of the road and stream, and a single *Dynamine* individual, appearing to have more brilliant dorsal green than typical *D. postverta*, was also observed. If not an unusually bright *D. postverta*, this might have represented the male of *D. chiquita*, or perhaps that of *D. paulina thalassina*, a species as yet unknown but likely to occur in western Ecuador.

The butterfly fauna of the type locality is mixed, with some species typical of the wetter Chocó forests further north (e.g., *Morpho cypris* Westwood, 1851), while others are west Ecuadorian-northwest Peruvian moist to dry forest endemics (e.g., *Dynamine haenschi* Hall, 1917). It is thus difficult to speculate as to the likely geographic range of the new species. The type series was collected at the end of August 1999, but despite subsequent visits in March 2001 and August 2002, the species was not observed again.

## DISCUSSION

We decided to describe this species based solely on the female after the deforestation of the type locality (see below) decreased the probability of capturing male specimens. The ventral pattern, which is very distinct from any known or likely sympatric species, should help to readily identify the male. The sister species of *D. chiquita* is not known with certainty; despite

many similarities between *D. chiquita* and the Amazonian *D. pebana* (see Diagnosis), there are no characters unique to these two species. Although we have not examined the female genitalia of *D. pebana*, we are confident in treating *D. chiquita* as a species based on the very distinct dorsal wing pattern, which differs from all other known *Dynamine*, the absence of strong geographic variation in *Dynamine* wing patterns, and the slight differences in ventral pattern discussed under Diagnosis.

We first visited the type locality in December 1996, shortly after completion of the Ibarra-San Lorenzo road. The Estación Experimental 'La Chiquita' of the Universidad Técnica Luis Vargas Torres, Esmeraldas, was created in part to develop sustainable means for harvesting timber. The reserve protected a small but valuable remnant of some 1400 ha of lowland west Ecuadorian moist forest, of which only a small fraction remains (Fig. 3) (Dodson & Gentry, 1991). However, even in 1998, biologists at the station were warning of the increase in illegal logging in the area since the construction of the Ibarra-San Lorenzo road (anonymous, 1998). In November 2002, the Ecuadorian newspaper *El Universo* reported that the reserve was under severe threat from illegal loggers who were cutting hundreds of trees within the reserve borders (Toro, 2002). By March 2004, the forest where the type specimens were collected had been entirely clear-felled up to at least 0.5 km from the dirt road (Hall, pers. obs.). Obviously, any additional observations of this species or locality records would be extremely valuable in assessing its conservation status.

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