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Hewitsonia rogerioi sp. nov., a new green species of the subtribe Epitolina from Angola (Lepidoptera: Lycaenidae: Poritiinae)

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Abstract – A new green epitoline butterfly species (Lepidoptera: Lycaenidae: Poritiinae: Liptenini: Epitolina) representing the genus *Hewitsonia* Kirby, [1871] is recognised and described from Angola's Northern Escarpment forests, in comparison with the similar congeners *H. bitjeana* Bethune-Baker, 1915, *H. beryllina* Schultze, 1916, and *H. magdalenae* Stempffer, 1951. The female genitalia of *Hewitsonia* are documented for the first time. Notes on adult behaviour and the myrmecophilous caterpillar are given. The biogeographical relevance of the new species is discussed. With 21 figures.

Key words – *Crematogaster*, endemism, Liptenini, myrmecophyly, Northern Escarpment forests

INTRODUCTION

Hewitsonia Kirby, [1871] (Lepidoptera: Lycaenidae: Poritiinae: Liptenini: Epitolina) is a moderately small Afrotropical genus encompassing 15 recognised species (Williams 2023, Sáfián & Siklósi 2025). The adult *Hewitsonia* have rather large wingspan, compared to the majority of Lycaenidae in Africa, and are quite well-known due to the amazing, iridescent blue or green upperside of wings of males, and also because they tend to fly lower, compared to their relatives in the subtribe Epitolina. Males with metallic green physical colour are present in only three known species of the genus: *H. bitjeana* Bethune-Baker, 1915, *H. beryllina* Schultze, 1916, and *H. magdalenae* Stempffer, 1951. A series of both sexes of a fourth species was recently collected in the Northern Escarpment (sensu Mendelsohn & Huntley 2023) forests in Angola from where only *H. kirbyi* Dewitz, 1879 (a blue species) and *H. bitjeana* (a green species) had been previously recorded. Based on their physical appearance, conspecificity of the

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newly described species with these two species could be ruled out immediately and was considered here as new. This new green species is described below, in detailed comparison with *H. magdalenae*, the most similar taxon in appearance, with notes on adult behaviour and last instar larva, and with brief discussion on the biogeographical relevance of the species.

MATERIAL AND METHODS

Abbreviations – ABRI = African Butterfly Research Institute (Nairobi, Kenya); CEPUJ = Nature Education Centre of the Jagiellonian University (Kraków, Poland); HNHM = Hungarian National Museum Public Collection Centre – Hungarian Natural History Museum (Budapest, Hungary).

Field methods – Adult butterflies were collected using conventional hand-held butterfly nets, stored in glassine envelopes and dried using silica gel crystals. Caterpillars were searched on the bark of trees inhabited by *Crematogaster* Lund, 1831 (Hymenoptera: Formicidae) in the night with strong light head-torches.

Wing venation – Numbering of wing veins follows the simplified English or numerical system (Miller 1970).

Genitalia dissection and photography – Genitalia were dissected in CEPUJ using KOH solution to dissolve soft abdominal tissue. For examination and photography, Nikon SMZ25 stereomicroscope was used with Nikon DS-Fi1 digital camera adapter and NIS Elements imaging software. Digital images of adult butterflies *in vivo* and *in vitro* were taken using Canon 7D Mark II DSLR camera and Canon EF 100 IS macro photo lens. Colour plates and the distribution map were edited in various versions of Adobe Photoshop and Adobe InDesign.

RESULTS

Ordo LEPIDOPTERA Linnaeus, 1758
Superfamily PAPILIONOIDEA Latreille, 1802
Family LYCAENIDAE Leach, 1815
Subfamily PORITIINAE Doherty, 1886
Tribe Liptenini Röber, 1892

Genus *Hewitsonia* Kirby, [1871]
(type species: *Corydon boisduvalii* Hewitson, 1869)

***Hewitsonia rogerioi* sp. nov.**
(Figs 1–6, 13–20)

Type material – Holotype: male, set dorsally, in good condition, forewing costa length: 25 mm; label data: ANGOLA, Cuanza Norte, Floresta de Cambondo, 9°6'1.57"S, 14°39'58.26"E, 420 m, 16–17.12.2023, leg. Sz. Sáfián; deposited in the ABRI. Paratypes: nine males, four females, Angola, Kwanza Norte, Floresta de Cambondo/Cambondo Forest, 9°6'1.57"S, 14°39'58.26"E, 420 m, 28.11–1.12.2024, leg. Sz. Sáfián, C. Correira, A. Oláh, H. Takács-Vágó (depositions: ABRI: seven males, three females; CEPUJ: one male; HNHM: one male, one female); one male, Angola, Uige Province, Serra do Pingano/Pingano Mountain Range, trail from Ambuila village, 7°50'21.18"S, 14°58'55.68"E, 750–1050 m asl., 7–10.12.2024, leg. Sz. Sáfián, C. Correira, A. Oláh, H. Takács-Vágó (deposited in the HNHM).

Diagnosis – Unlike in two other green species of *Hewitsonia*, *H. beryllina* and *H. bitjeana*, there is no lighter, creamy-whitish area in the outer half of the hindwing upperside in either sex of *H. rogerioi* sp. nov. Males of *H. magdalenae* are externally very similar to those of *H. rogerioi* sp. nov., but on the forewing underside, in space 2, an irregular patch with metallic green scales appears in *H. rogerioi* sp. nov. It is more prominent in the illustrated paratype (Fig. 4), present as green scaling also in space 3, but it is also present as a short green streak in space 2, parallel to veins in the holotype (Fig. 2). In males of *H. magdalenae* this area is black without a green patch or scaling (Fig.8). The *H. magdalenae* females lack the long and prominent whitish bar in space 1b characteristic for *H. rogerioi* sp. nov. as well as the prominent whitish dusting in space 1a along the inner edge of forewing upperside. Whitish colour is absent, or only obsolete white dusting appears in females of *H. magdalenae*. Male genitalia of *Hewitsonia* species, including the morphologically close *H. magdalenae*, were compared by Stempffer (1967), who stated that "four species are all very similar to *boisduvalii*". It is indeed the case also in *H. rogerioi* sp. nov., which has a slightly narrower tip of valvae compared to its congeners. Previously no female genitalia of *Hewitsonia* have been illustrated and their diagnostic value is yet to be examined.

Description – Male. Wings. Wingspan: 38.0–46.5 mm (n = 10). Forewing costa length 23–25 mm. Forewing upperside ground colour black, overlaid by metallic-green coloured scales along inner margin in spaces 1a, 1b and 2, also with diffuse metallic green scaling in discal area, with prominent metallic green spot in discalis apex and three smaller, more linear metallic green spots along vein 11 near costa; subapical area with four separate whitish spots, not forming a band, two middle ones larger (ca. 2.5 mm in length), trapezoid, one near costa shorter and linear, one nearer to outer edge in space 5 oval shaped, with diffuse edge and displaced distally (Figs 1, 3). Hindwing upperside completely overlaid by metallic green scaling between veins 1 and 6, two black triangles along hindwing margin space between vein 6 whitish, costa blackish brown;

abdominal fold grey in space 1b, an oval grey area with longer hairs present, probable an androconial patch. Forewing underside colouration and pattern typical for the genus with blackish-brown central area and whitish apex, costa and inner margin, the apical area also striped with fine black lines. Hindwing underside ground colour creamy white, with eleven black basal spots arranged in three poorly defined rows and fine black lines in postmedian area. Orange colouration in space veins 6 and 7 rather pale but continuous from base and an inconspicuous crescent-shaped black streak present across space 7.

Body. Antenna black, with length shorter than half of forewing length measured along the costa, head black with creamy hairs around eyes and on palpi, thorax and abdomen also black, legs deep orange-brown to chestnut brown.

Genitalia (Figs 13–15). Male structures typical as in subtribe Epitolina (*sensu* Stempffer 1967), uncus rounded, with sparse hairs dorsally and posteriorly, subunci rather broad and strong, bent in right angle, with very short upper arm, lower arm as long as uncus, slightly upcurving, with very acute apex; tegumen almost squat, subscaphium slender and short, appearing to be strongly sclerotised; saccus long and slender, somewhat undulate; valvae with narrow base, abruptly broadening in the middle, gradually tapering down to narrow and short finger-like apex, terminal upper edge sparsely haired, lower edge gently undulate; aedeagus arc-shaped, evenly tapering anteriorly and reaching terminus abruptly, its length equal with height of genitalia capsule from saccus base to tegumen tip, 1.4 mm long.

Female. Wings. Wingspan 43–45 mm. Forewing costa length: 23–25 mm. Forewing: upperside ground colour dark, almost blackish-brown, four prominent, rather squat creamy-white bars present in subapical area, with an ill-defined whitish line continuing along discalis costa, supplemented by another long and oval creamy-white bar in space 2, plus shorter and longer whitish area (thick whitish scaling) in space 1b; hindwing upperside somewhat lighter, entirely brown, except creamy white dusting along costa, underside pattern identical to that of male.

Body: as in male.

Genitalia (Figs 16–17): Papillae anales small, finely haired, rather rounded posteriorly, embedded in thick, short hairs dorsally and laterally on edge of last tergite. Apophyses posteriores very strong and sclerotised, curved down, hook-like with acute tip. Posterior ductus bursae unusually narrow, sclerotised, rest of ductus membranous, much broader. Bursa copulatrix thin and membranous, broadening gradually into an oval sphere, three times longer than that of ductus. Lamella antevaginalis moderately sclerotised, laterally bi-partite, plate-like, irregular-shaped with anterior half almost twice as broad as the posterior one.

Figures 1–12. *Hewitsonia* adults: 1 = *H. rogerioi* sp. nov. (holotype) upperside, 2 = underside; 3 = *H. rogerioi* sp. nov. (male paratype, Angola, Serra do Pingano) upperside, 4 = underside; 5 = *H. rogerioi* sp. nov. (female paratype, Angola, Floresta de Cambondo) upperside, 6 = underside; 7 = *H. magdalenae* (male, DRC, Kivu) upperside, 8 = underside; 9 = *H. beryllina* (male, Nigeria) upperside, 10 = underside; 11 = *H. magdalenae* (female, DRC, Kivu) upperside, 12 = underside. Scale bar = 10 mm.

Etymology – The species is dedicated to the late Rogério Ferreira, Angolan nature enthusiast, who expressed serious commitments to learn about natural values. He established the popular-scientific Facebook group 'Biodiversidade Angola', which is the greatest hub of information about the biodiversity of the country. Rogério was a great nature photographer, and we had long discussions about Angola and had plans to study the diverse butterfly fauna of the country. The specific epithet is a proper noun in the genitive case.

Figures 13–17. Genitalia documentation of *H. rogerioi* sp. nov.: 13 = male (paratype, Angola, Cambondo Forest, CEP-GEN-11462), lateral view with coremata; 14 = male (paratype, Angola, Cambondo Forest, CEP-GEN-11462), lateral view, coremata removed; 15 = aedeagus (paratype, Angola, Cambondo Forest, CEP-GEN-11462); 14 = female (paratype, Angola, Cambondo Forest, CEP-GEN-11463), lateral view showing papillae anales, apophyses posterior, ductus and bursa copulatrix; 17 = female (paratype, Angola, Cambondo Forest, CEP-GEN-11463), posterior view with lamella antevaginalis. Scale bars = 1 mm.

DISCUSSION

Identification – Mendes *et al.* (2019) list *Hewitsonia bitjeana* from Angola but they do not provide further information on the source or locality. Vande weghe (2010) also lists the species from Gabon. It is possible that *H. bitjeana* occurs in Cabinda (Angola), maybe also in the Northern Escarpment forests. Potential misidentification of previously collected *H. rogerioi* sp. nov. specimens as *H. bitjeana* could not be ruled out, however, despite the similar metallic green colour on the males the differences between the two species, particularly on the hindwing upperside colouration, are far too large to be overlooked.

Adult behaviour – Males display around *Crematogaster*-infested trees roughly between 12.00 and 13.30. They prefer semi-open canopy with large trees or clearings and usually fly below the canopy with their fast and rather erratic flight, often engaged with intraspecific fight with other displaying males. When not disturbed they often settle on dry twigs or climbers with wings wide open (Fig. 18), showing their iridescent green colour to the passing females. Freshly emerged females approach the males, swooping down from the canopy of the trees and they quickly engage in copulation without much of courting. A few mating pairs were seen resting on dry twigs within the display area (Fig. 19). In December 2023 a single male was caught displaying, and a couple of other males and females were observed flying high. In March 2024 no males were observed and only a very tattered female was spotted high up near an ant-tree but could not be captured. At the end of November 2024 both sexes were common in Cambondo, one male was also caught in the beginning of December displaying on a hilltop on Mount Pingano (Serra do Pingano) and an egg-laying female was also spotted.

Larva – Despite extensive night search with strong torch lights, only one caterpillar, clearly belonging to *Hewitsonia*, was found (Fig. 20) as well as an empty pupal case. It is reasonable to assume that they represent *H. rogerioi* sp. nov. as the butterfly seems to be on the wing in the first half of the rainy season (see previous paragraph). The single rather well-developed caterpillar was found on the treebark of a *Crematogaster* ant-infested tree along an empty pupal case. The caterpillar of *H. rogerioi* sp. nov**.** appears to be similar to that of *H. intermedia* illustrated in Baron *et al.* (2017). The body is flattened, its colour dirty white with grey and brown reticulated lining dorsally. Lateral mamillae are with two brown spots also with some black irregular markings. Each of them has a tuft of long and fine glossy whitish hairs. Anal segment has two black patches and two tufts of longer whitish hairs. Head and legs are hidden under the flat body and were not checked. The life-cycle could not be documented as the caterpillar died in a couple of days.

Figures 18–19. *Hewitsonia* adult behaviour: 18 = *H. rogerioi* male displaying (Angola, Cambondo Forest), in shallow angle the green colour appears almost white because of the high reflectivity of the scales. 19 = *H. rogerioi* copulating (Angola, Cambondo Forest).

Figure 20. *Hewitsonia rogerioi* caterpillar in L4 or L5 stage (Angola, Cambondo Forest).

Biogegraphical notes – The presence of a distinct green species of *Hewitsonia* in Angola's Escarpment forests is not surprising. Several butterflies of restricted range have been already known from this area (e.g., *Appias sylvia ribeiroi* Mendes Bivar de Sousa, 2006, *Bebearia sophus angolensis* Mendes, Bivar de Sousa & Lopes, 2021, *Eagris multiplagata* Bivar de Sousa & Mendes, 2007); as Bivar de Sousa & Mendes (2007), Mendes & Bivar de Sousa (2006) and Mendes *et al.* (2021) highlighted that multiple taxa recorded from these forest outliers, are either taxonomically distinct from other congeners or within a species, distinct from any recognised subspecies, and are endemic to the forests in the Northern and/or Central Escarpment (Uige, Cuanza Norte and Cuanza Sul

Provinces). The endemic butterflies and their distribution are summarised by Gardiner & Williams (2023), who list six species and 15 subspecies known only from the Escarpment Forests of Angola. Recent studies show that the actual rate of endemism in these forests is significantly high, and the number of endemic taxa recognised in the Escarpment Forests will increase in the next few years, particularly in the family Lycaenidae (Sáfián, unpublished). Although *H. rogerioi* sp. nov. is currently known only from two localities in Angola, the position of these localities projects the species to be present across the Northern Escarpment landscape, representing yet another endemic species, highlighting the biogeographical relevance of the area (Fig. 21). However, based on scarcity of records and the limited volume of previous research activities in the region, the possibility of *H. rogerioi* sp. nov. occurring in the southern Democratic Republic of Congo could not be ruled out.

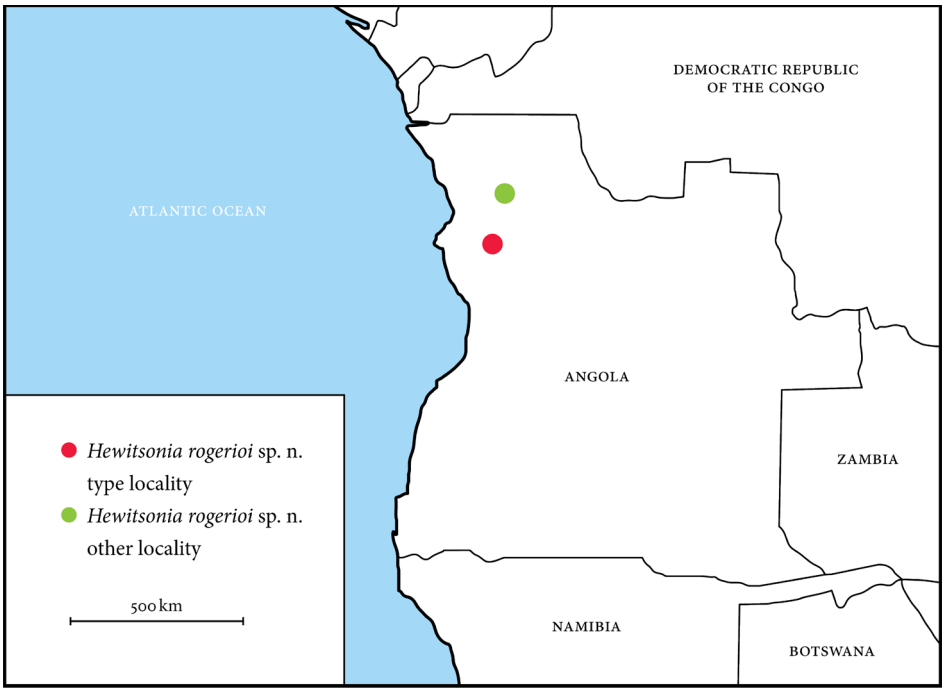

Figure 21. Known localities of *Hewitsonia rogerioi* sp. nov.

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Zöld színű, új algászkafaj Angolából: *Hewitsonia rogerioi* sp. nov. (Lepidoptera, Lycaenidae, Poritiinae)

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Összefoglaló – Az angolai Északi-hegyvidék erdeiben gyűjtött pillangószerű algászka (Epitolina, Liptenini: Poritiinae: Lycaenidae) *Hewitsonia* nemzetséget képviselő új zöld faj kerül leírásra, amelyet a szerző *H. bitjeana* Bethune-Baker, 1915, a *H. beryllina* Schultze, 1916 és a *H. magdalenae* Stempffer, 1951 közelrokon fajokkal vet össze. A *Hewitsonia* női ivarszerv először kerül dokumentálásra. A szerző jegyzetet fűz a lepkék viselkedéséhez, a hangyákkal együtt élő hernyóhoz, és tárgyalásra kerül az új faj állatföldrajzi helyzete. 21 ábrával.

Kulcsszavak. – *Crematogaster*, endemizmus, hangyagazdás fejlődés, Liptenini, Northern Escarpment hegyvidéki erdőség

ÁBRAALÁÍRÁSOK

1–12. ábra. *Hewitsonia* imágók: 1 = *H. rogerioi* sp. nov. (holotípus) felszín, 2 = fonák; 3 = *H. rogerioi* sp. nov. (hím paratípus, Angola, Serra do Pingano) felszín, 4 = fonák; 5 = *H. rogerioi* sp. nov. (nőstény paratípus, Angola, Floresta de Cambondo) felszín, 6 = fonák; 7 = *H. magdalenae* (hím, Kongói Demokratikus Köztársaság, Kivu) felszín, 8 = fonák; 9 = *H. beryllina* (hím, Nigeria) felszín, 10 = fonák; 11 = *H. magdalenae* (nőstény, Kongói Demokratikus Köztársaság, Kivu) felszín, 12 = fonák. Méretléc = 10 mm.

13–17. ábra. *H. rogerioi* sp. nov. ivarszerv: 13 = hím (paratípus, Angola, Cambondo-erdő, CEP-GEN-11462), oldalnézet, coremátával; 14 = hím (paratípus, Angola, Cambondo-erdő, CEP-GEN-11462), oldalnézet, coremáta nélkül; 15 = aedeagus (paratípus, Angola, Cambondo Forest, CEP-GEN-11462); 16 = nőstény (paratípus, Angola Cambondo-erdő, CEP-GEN-11463), oldalnézet, a papillae analis, az apophyses posterior, a ductus és a bursa copulatrix ábrázolása; 17 = nőstény (paratípus, Angola, Cambondo-erdő, CEP-GEN-11463), hátulsó nézet, a lamella antevaginalis ábrázolása. Méretléc = 1 mm.

18–19. ábrák. *Hewitsonia* imágók viselkedése. 18 = Őrhelyén mutatkozó hím *H. rogerioi* (Angola, Cambondo-erdő), lapos szögben a zöld szín szinte fehérnek látszik a pikkelyek nagy fényvisszaverő képessége miatt. 19 = Párzó *Hewitsonia rogerioi* egyedek (Angola, Cambondo-erdő).
20. ábra. A *Hewitsonia rogerioi* L4 vagy L5 stádiumú hernyója (Angola, Cambondo-erdő).
21. ábra. A *Hewitsonia rogerioi* sp. n. ismert előfordulásai Angolában.