

**A new subspecies of *Neurellipes helpsi* (Larsen, 1994)  
from Guinea, West Africa  
(Lepidoptera: Lycaenidae: Polyommatainae: Lycaenesthini)**

SZABOLCS SÁFIÁN<sup>1</sup> & CLAUDIO BELCASTRO<sup>2</sup>

<sup>1</sup>*Hungarian Natural History Museum, Department of Zoology,  
H-1088 Budapest, Baross utca 13, Hungary. E-mail: szsafian@gmail.com*

<sup>2</sup>*Museo della Biodiversita, Parco Nazionale della Sila, Loc Cupone,  
I-87058 Spezzano della Sila, Italy. E-mail: belcastroclaudio@yahoo.com*

**Abstract** – The only known western population of *Neurellipes helpsi* (Larsen, 1994), found by the authors in the Zياما Massif, Guinea is clearly distinct from the nominal typical population, which was recorded in the Atewa Range in Ghana and a couple of stray specimens from Tano Ofin (Ghana) and Banco Forest (Ivory Coast). A male specimen of the Guinean population was illustrated in the revision of *Anthene* s.l. in 2010 but the taxon was not described due to insufficient material available. Beside the material collected by the second author, a new series of males was collected during a biodiversity assessment by the first author and his team in 2019. Examination of male genitalia revealed insignificant differences and for that reason, despite clear biogeographic distinction, the taxon is here recognized as a new subspecies of *N. helpsi zياما* n. ssp., what is known only from upland forest habitats in the Zياما Massif, found near streams and upland swamps. With 19 figures.

**Key words** – endemism, Liberian subregion, UNESCO biosphere reserve, Zياما Massif.

## INTRODUCTION

In his comprehensive revision, LIBERT (2010) has illustrated a specimen of *Neurellipes helpsi* (Larsen, 1994), collected in the Zياما Forest, Guinea and sent to him as digital photographs by the second author. It had visibly broader dark brown outer edge on its forewings and also a much broader dark brown edge entirely around the central creamy patch on the hindwings compared to the taxon originally described as “*Anthene helpsi*” (LARSEN 1994, LARSEN 2005). Due to the lack of access to the original material, Libert could not describe the taxon. The senior author and his team successfully collected a small series of *N. helpsi* males in Zياما Forest in February 2019. Evidences from comparative

morphology and biogeographical considerations allow to describe the newly discovered population as representing a distinct, hitherto unknown subspecies of *Neurellipes helpsi*.

## MATERIALS AND METHODS

*Abbreviations for collections* – African Natural History Research Trust, Leominster, UK (ANHRT); CB = Claudio Belcastro Collection, Italy (CB); Hungarian Natural History Museum, Budapest, Hungary (HNHM), the Nature Education Centre of the Jagiellonian University, Krakow, Poland (NECJU) and Natural History Museum, London, UK (NHM).

*Specimens* – The type series was collected with hand-held butterfly nets, stored in glassine envelopes and dried using silica gel crystals; subsequently they were pinned, set and examined in laboratories.

*Genitalia dissection and photography* – Genitalia were dissected according to conventional methods: the abdomen was soaked in 10% KOH solution for 10–15 minutes and cleaned out of soft tissue in water in order to expose genital parts. They were further cleaned in ethanol, and then photographed in glycerol. Genitalia are kept in glycerol-filled microvials pinned under the corresponding specimens.

*Digital imaging and editing* – Photos *in vivo* were taken with a Canon 7D Mark II digital SLR camera and 100 mm Canon IS macro lens, Figures 1 and 4 were also taken with the same equipment. Nikon digital camera DS-Fi1 and Olympus SZX9 stereomicroscope were used for taking pictures of genitalia (Figs 11–14). Photos of specimens appearing as Figures 3, 6, 7–10 were photographed by Michel Libert (used for his original work LIBERT 2010), and provided as jpg-format digital files. The digital images, colour plates and locality maps were edited in various versions of Adobe Photoshop photo editor and Adobe InDesign layout and page-design software.

## RESULTS

Ordo LEPIDOPTERA Linnaeus, 1758  
Superfamily PAPILIONOIDEA Latreille, 1802  
Family LYCAENIDAE Leach, 1815  
Subfamily POLYOMMATINAE Swainson, 1827  
Tribe LYCAENESTHINI Toxopeus, 1929  
Genus *Neurellipes* Bethune-Baker, 1910

Type species: *Lycaenesthes lusones* Hewitson, 1874, by original designation.

***Neurellipes helpsi ziama* ssp. nov.**

(Figs 1–6; 11–14)

**Material** – Holotype, male, forewing costa length: 14 mm, in moderate condition (with slight damages in wing margins), set dorsally (Figs 2, 5); GUINEA, Forêt de Ziama, Guinée Forestière upland forest 800–1100 m. 24.II.–06.III.2019, Leg.: Sáfián, Sz., Koïvogui S., Florczyk, K., Simonics, G. Deposited in HNHM. Paratypes (n = 8) – with holotype data; deposited in ANHRT (paratype no. 1), NECJU (paratype nos 2–3), CB (paratypes no. 4: April, 2008; nos 5–7: October, 2010; no. 8: November, 2010; all collected in the same location as the holotype, but at 700 m, on the left side of the small river after the old bridge).

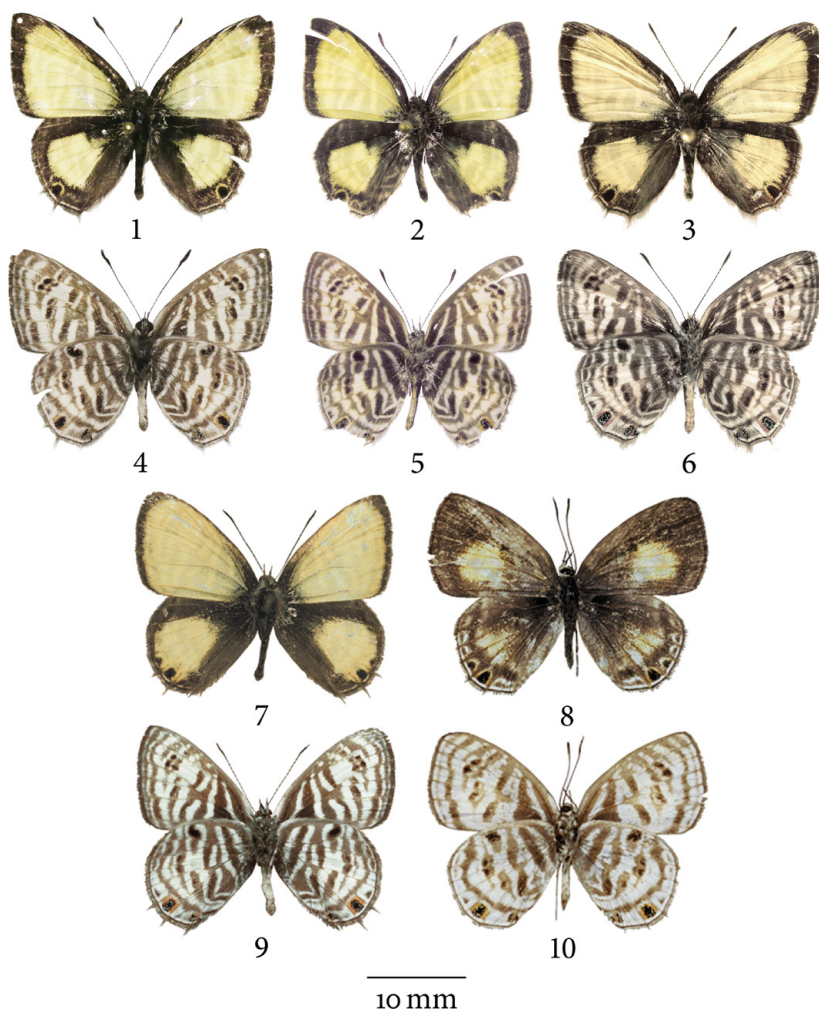
**Description and diagnosis** – In size and general appearance *N. helpsi ziama* ssp. n. is very similar to the nominate subspecies (Figs 7–10) with the main differences appearing in the width of brown forewing edge, which appears only as a fine line in the nominate subspecies (<1 mm); but it is broader than 1 mm in *N. h. ziama* ssp. n., and the brown line continues also along the costa, broadening also towards the margin. The creamy patch takes up slightly less than half of the hindwing upperside in *N. h. helpsi*, with the tornal black eyespot being fully embedded in the patch; while it is even smaller in *N. h. ziama* ssp. n., and the sub-tornal black eyespot (in space 2 of the hindwing) is either completely separate from the creamy patch, circled around by a very fine creamy line, or it is bordered basally by the patch, still visibly excluded from it. These features are permanent across the type specimens (Figs 1–6).

**Genitalia** – The uncus consists of two rather blunt-edged and posteriorly slightly haired, laterally paralleloid plates, narrowly bridged together. Subunci is a bit longer than the uncus laterally, rather broad and straight with slightly bent and acute tip. Gnathos broad dorsally, tapers down towards saccus. Laterally short, and with the bent valva, the genitalia armature gives the impression of a cube. The valva is boomerang-shaped laterally, but with the basal half being slightly broader. It is characterised by a massive spine-like projection on its inner plate, which with the inward-curving lower spiny tip of the valva forms a U-shape curve. The terminal edge between the spiny lower and the blunter upper tip of the valva is rather unevenly serrated with several smaller and four-five more prominent teeth (Figs 6, 11).

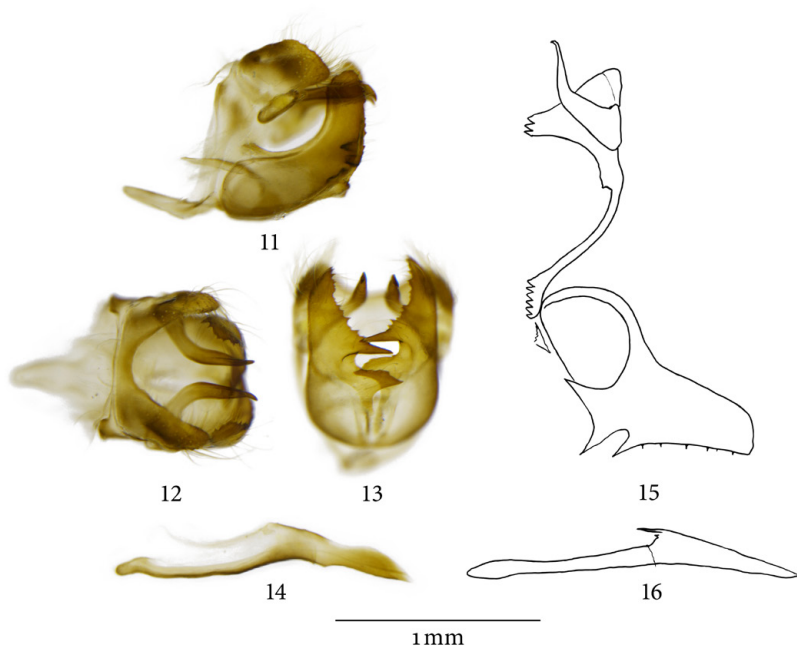
**Variation** – Among the type series (n = 9) there is only very slight variation in wingspan (cc 3.5 mm between the smallest and the largest specimens: 11.5–14 mm) and in the extent of the creamy patch on the upperside of either wing.

**Habitat and behaviour** – All male adults were observed in dry season, when they descend from the higher strata of forest in the morning hours between 9.00 and 11.00 in semi-shaded upland swamps and near small creeks inside forest, where they imbibe dissolved minerals from wet soil or bask in sun-lit spots on the ground or on the lower vegetation (Figs 17–18). All individual specimens were

observed in a very small area of a few hundred square metres in the strict vicinity of these unique wetlands, similarly to *N. h. helpsi*, which was collected only at a single spot in the Atewa Range, Ghana near a small stream (LARSEN 2005).



**Figures 1–10.** Adults of *Neurellipes helpsi*: 1 = *N. h. ziama* male (paratype) upperside; 4 = ditto, underside (ANHRT); 2 = *N. h. ziama* male (holotype) upperside; 5 = ditto, underside (HNHM); 3 = *N. h. ziama* (paratype) upperside; 6 = ditto, underside (CB); 7 = *N. h. helpsi* (presumably holotype) upperside; 9 = ditto, underside (NHM); 8 = *N. h. helpsi* female (Ghana, Mpasaso) upperside; 10 = ditto, underside (photos by Michel Libert).



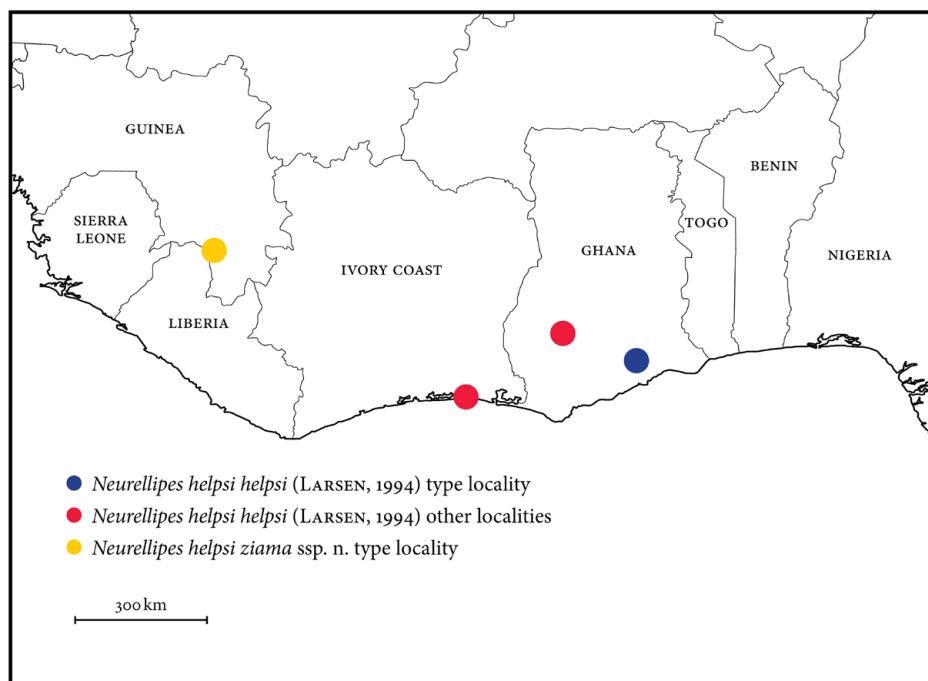
**Figures 11–16.** *Neurellipes helpsi* male genitalia: 11 = *N. h. ziama* (paratype) lateral view; 12 = ditto, dorsal view; 13 = ditto, posterior view; 14 = ditto, aedeagus lateral view; 15. = *N. h. helpsi* uncus, subuncus, tegumen and valva in position; 16 = *N. h. helpsi* aedeagus in lateral view (Figs 15–16 redrawn from the original of LARSEN 1994)



**Figures 17–18.** *Neurellipes helpsi ziama* ssp. n. adult *in vivo*: 17 = male imbibing dissolved minerals; 18 = male thermoregulating (photos by Sz. Sáfián)

## DISCUSSION

The new subspecies has been recorded only from a single locality in Zياما Forest Reserve (Zياما Massif) in the Forest Region of Guinea and hitherto it is found only in upland forest above 800 m asl near streams and swamps (SÁFIÁN *et al.* 2020b) (Fig. 19). The Zياما Massif is a UNESCO Biosphere Reserve and is the largest protected rainforest area in Guinea, which is also continuous with the Wonegizi Mountains in northern Liberia. This transboundary area was found very important for the conservation of butterfly fauna by SÁFIÁN *et al.* (2020b) with stating its intactness and special biogeographical position. Multiple new taxa have been identified from the Guinea Highlands and many of them were also found, and even identified from the Zياما Massif (e.g. *Gorgyra zياما* Belcastro & Sáfián, 2020, *Telchinia pseudopaea zياما* Belcastro, Boireau & Sáfián, 2020) (SÁFIÁN *et al.* 2020a, 2020c). The Guinea Highlands covers a large landscape of mountain ranges that stretch from northwestern Ivory Coast across northern Liberia and Guinea to Sierra Leone. It harbours multiple recently discovered and described endemic butterfly taxa, and given its special microhabitat requirements, *N. h. zياما* ssp. n. could easily prove one of them.



**Figure 19.** Type localities and further occurrences of *Neurellipes helpsi helpsi* and *N. helpsi zياما* ssp. n.

Taxonomically, in the case of very similar species in a genus, such as *Neurellipes*, it is often difficult to decide whether the newly recognised taxon would deserve species rank or should be recognised as a subspecies. Both external morphology and the biogeographic position of the taxon indicate that it could be recognised as a distinct species. However, for the lack of significant genitalic characters the authors decided to give subspecies rank to the new taxon.

Further evidence would be provided by DNA comparison, but for this study it could not be performed for the lack of accessible material of *N. h. helpsi*. This decision is in line with the recognition of *Telchinia pseudopaea ziamae*, which is also known from the Atewa Range in Ghana and from a few upland localities in the Guinea Highlands with distinctive appearance but no recognisable differences in male genitalia (SÁFIÁN *et al.* 2020c).

\*

*Acknowledgements* – The authors are grateful to Gergely Katona (HNHM, Hungary), who photographed the holotype of *N. h. ziamae*; to Michel Libert (Rouen, France), who provided his original images of *N. h. helpsi* to this publication; and also to Klaudia Florczyk (CEPUJ, Kraków, Poland), who helped with the genitalia dissection and photography. Renátó Molnár (Biatorbágy, Hungary) kindly assisted with editing the plates and the map. The field work in Ziam Forest was carried out under the auspices of the Conserving and Connecting the Ziam-Wonegizi-Wologizi Transboundary Forest Landscape between Guinea and Liberia of Fauna & Flora International (FFI) and in partnership with USAID's West Africa Biodiversity and Climate Change Programme (WA BiCC) and Centre Forestier de N'Zérékoré (CFZ), Guinea with funding from the USAID West Africa Biodiversity and Climate Change Program (USAID WA BiCC). Staff of FFI Liberia and FFI Guinea and CFZ have been instrumental in the organisation of the field work and we are thankful to Wing-Yunn Crawley, Toupou Koighae, Alan Deverell, Madame Wata Kamara and Colonel Dumbouya for their assistance.

## REFERENCES

- LARSEN T.B. 1994: *Anthene helpsi* sp. nov. A remarkable new lycaenid from Ghana. (Lepidoptera, Lycaenidae). – *Lambillionea* 94(4): 550–552.
- LARSEN T.B. 2005: *Butterflies of West Africa*. – Apollo Books, Svendborg, 595 pp. + 135 pls.
- LIBERT M. 2010: *Révision des Anthene africains (Lepidoptera, Lycaenidae)*. – African Butterfly Research Institute & Lambillionea, Nairobi 420 pp + 32 pls.
- SÁFIÁN SZ., BELCASTRO C., BOIREAU P. & COLLINS S.C. 2020a: New taxa of skipper butterflies (Lepidoptera, HesperIIDae) from tropical Africa. – *Metamorphosis* 31: 56–71.
- SÁFIÁN SZ., KOÏVOGUI S., SIMONICS G. & FLORCZYK K. J. 2020b: Butterfly diversity (Lepidoptera: Papilionoidea) in the Ziam Massif in Guinea and the adjacent Wonegizi and Wologizi Mountains in Liberia (West Africa): A transboundary conservation approach. – *Metamorphosis* 31:104–128.
- SÁFIÁN SZ., PYRCZ T., BOIREAU P. & BELCASTRO C. 2020c: A new subspecies of *Telchinia* Hübner, [1819] (Lepidoptera: Nymphalidae: Heliconiinae) from West Africa. – *Metamorphosis* 31: 45–48.

•••••

**A *Neurellipes helpsi* (Larsen, 1994) lücenér boglárkarokonú lepke  
új alfaja a nyugat-afrikai Guineából  
(Lepidoptera: Lycaenidae: Polyommattinae: Lycaenesthini)**

SÁFIÁN SZABOLCS<sup>1</sup> & CLAUDIO BELCASTRO<sup>2</sup>

<sup>1</sup>Magyar Természettudományi Múzeum, Állattár, 1088 Budapest, Baross utca 13., Magyarország.

E-mail: szsafian@gmail.com

<sup>2</sup>Museo della Biodiversita, Parco Nazionale della Sila, Loc Cupone, I-87058 Spezzano della Sila,

Olaszország. E-mail: belcastroclaudio@yahoo.com

**Összefoglaló** – A *Neurellipes helpsi* (Larsen, 1994), a szerzők által Guineában, a Zيامa-hegységben felfedezett egyetlen ismert populációja egyértelműen különbözik a ghánai (Atewa-hegység) nominotipikus állománytól. A 2010-es évben megjelent *Anthene* és azzal rokon génuszok revíziójában LIBERT már illusztrált egy guineai példányt, de elegendő összehasonlító anyag hiányában a taxont nem írta le. 2019-ben azonban Sáfián és kollégái egy kisebb sorozatot gyűjtöttek a hímekből, amely lehetővé tette a két populáció szakszerű összehasonlítását. Mivel hímek ivarszervei nem mutatnak jelentős morfológiai különbségeket, ezért a guineai populációt alfaji szinten különböztetjük meg a típus *N. helpsi*-től. Az újonnan leírt alfaj, a *N. helpsi zيامa* ssp. n. kizárólag a Zيامa-hegység montán esőerdeiben, patakok mentén és hegyvidéki mocsarakban került elő. 19 ábrával.

**Kulcsszavak** – endemizmus, Libériai-szubrégió, UNESCO bioszféra rezervátum, Zيامa-hegység

## ÁBRAALÁÍRÁSOK

**1–10 ábra.** *Neurellipes helpsi* példányok fotói: 1 = *N. h. zيامa* hím (paratípus) felszín; 4 = u.a., fonák (ANHRT); 2 = *N. h. zيامa* male (holotípus) felszín; 5 = u.a., fonák (HNHM); 3 = *N. h. zيامa* (paratípus) felszín; 6 = u.a., (CB); 7 = *N. h. helpsi* (valószínűleg holotípus) felszín; 9 = u.a., fonák (NHM); 8 = *N. h. helpsi* nőstény (Ghana, Mpasaso) felszín; 10 = u.a., fonák (A *N. helpsi helpsi* fotóit Michel Libert készítette).

**11–16. ábrák.** *Neurellipes helpsi* hím ivarszerv: 11 = *N. h. zيامa* (paratípus no.3) oldalnézet; 12 = u.a., dorzális nézet; 13 = u.a., posterior nézet; 14 = u.a., oldalnézet; 15 = *N. h. helpsi* uncus, subuncus, tegumen és valva; 16 = u.a., aedeagus oldalnézet (14–15. ábrák LARSEN 1994 eredeti munkája után).

**17–18. ábrák.** *Neurellipes helpsi zيامa* ssp. n. imágó természetfotói: 17 = hím példány oldott ásványi sókat szívogat; 18 = hím példány nyitott szárnnal napozik (fotók: Sáfián Szabolcs).

**19. ábra.** A *N. helpsi helpsi* és *N. helpsi zيامa* ssp. n. típuslelőhelyei és további ismert lelőhelyek.