

**Taxonomical notes on the *Liptena augusta* and *L. batesana* species complexes with description of four new species (Lepidoptera, Lycaenidae, Poritiinae)**

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**Abstract** – The *Liptena augusta* Suffert, 1904 and *L. batesana* Bethune-Baker, 1926 species complexes are revisited following the capture of a specimen in Liberia, far outside the known range of any members of these groups. Four new species in the genus *Liptena* Westwood, [1851] are described: *L. neiltennanti* sp. n., *L. chrislowei* sp. n., *L. introspectionem* sp. n. and *L. minimis* sp. n., in comparison with *L. augusta* and *L. batesana*. An identification guide is provided based mainly on male and female genitalia for easier identification of the groups and species. The biogeography of the *L. augusta* and *L. batesana* species complexes is also discussed. With seven figures.

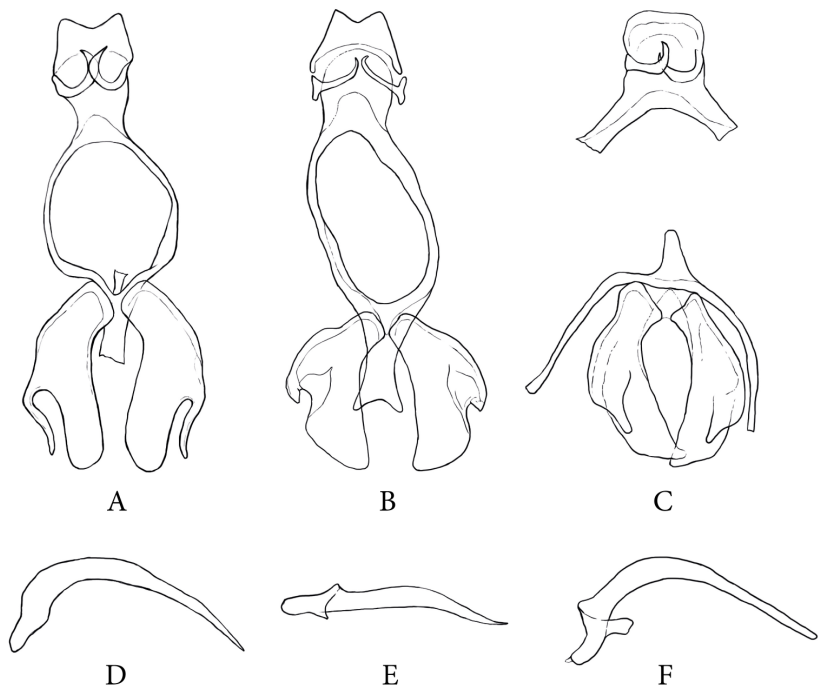
**Key words** – Afrotropical Region, biogeography, Congolian forest zone, Upper Guinean forest zone, Lake Victoria outlier forest, taxonomical problems, white *Liptena*, genitalia morphology

## INTRODUCTION

The purely white species in the genus *Liptena* Westwood, 1851 with black forewing apex, or “white *Liptena*” as referred to in STEMPFFER *et al.* (1974), always caused confusion among various authors, which is not actually surprising. Their almost identical appearance without key characters has led to the application of multiple names to various species, which later often turned out to pertain to another taxon as reflected on the hand-written labels of several specimens in the Natural History Museum, London. This was the case during the description of *L. augusta* Suffert, 1904, where the original series of syntypes represented two different species. As pointed out very recently by LIBERT (2021), only the male syntype belongs to *L. augusta*, while the three females are clearly members of *L. subundularis* (Staudinger, 1892). Further confusion was caused by the note

in STEMPFFER *et al.* (1974), who designated a neotype as the original type series was believed to be lost. This was finally solved with the discovery of the original type material in Berlin and designation of the male syntype as the lectotype of *L. augusta*, stabilizing its name (LIBERT 2021).

This happened also to LARSEN *et al.* (1980), who first identified their white *Liptena* collected in western Nigeria as *L. augusta* (*L. august* Suff. (sic)), but Larsen himself (LARSEN 2005b) later stated that those specimens probably belong to *L. ilaro* Stempffer, Bennett & May, 1974. Even before the first revision of the “white *Liptena*” by STEMPFFER *et al.* (1974), some of Stempffer’s own identifications remained uncertain; the records of *L. augusta* from Ivory Coast in STEMPFFER (1966) almost certainly refer to the later described *L. tiassale* Stempffer, 1969, as pointed out by LARSEN (2005a), or to a new species collected recently in Liberia and described below. Identification based on male genitalia helped solving the confusion to some extent, as males of all currently recognised species seem to carry specific characters. These were well described and accurately illustrated in STEMPFFER *et al.* (1974) (see Fig. 1).



**Figure 1.** Male genitalia and separated *Liptena* aedeagi re-drawn from the illustrations of STEMPFFER *et al.* (1974). A, D = *L. augusta* Suffert, 1904; B, E = *L. batesana* Bethune-Baker, 1926; C, F = *L. ilaro* Stempffer, Bennett & May, 1974

However, further taxa still remained undescribed in the group, which are described in this paper. Three species were only recently discovered; one from Cameroon, where it occurs sympatrically with *L. augusta* and *L. batesana* Bethune-Baker, 1926, one from Liberia, in the Liberian subregion of the Upper Guinean forest zone of West Africa, and one from the eastern Democratic Republic of Congo (North Kivu) and Uganda. A fourth species found in Eastern Nigeria and in the Gulf of Guinea Highlands in Cameroon, was already identified by Stempffer as new (and placed in the collection of the Natural History Museum, London as such, examined also by the author). Genitalia morphology of all species is discussed in detail and an identification guide is also given for easier navigation between the species complexes and the species within. Identification of the majority of species in the complexes is impossible or difficult on the basis of wing characters.

Beyond solving a taxonomical problem and providing an identification guide for all taxa discussed, this paper also aims to present further information on the biogeography of the group, as accurate distribution records would be able to help delineation of biogeographical boundaries, and when sufficient information will become available, in certain cases locality records alone may provide identity to specimens recorded. This might be the case in Western Nigeria, Liberia or in the high endemism areas of the Albertine Rift or the Lake Victoria outlier forests east in East Africa.

## MATERIALS AND METHODS

The acronyms and abbreviations of museum collections consulted, also those of countries, for other institutions and projects, plus decipherations for further abbreviations are given below in alphabetical order.

ABRI – African Butterfly Research Institute, Nairobi, Kenya

ANHRT – African Natural History Research Trust, Leominster, United Kingdom

BMN – Berlin Museum für Naturkunde (formerly Humboldt Museum für Naturkunde), Berlin, Germany

CAR – Central African Republic

CEP-MZUJ – Nature Education Centre, Jagiellonian University, Kraków, Poland

DRC – Democratic Republic of Congo

gen. prep. – genitalia preparation

HNHM – Hungarian Natural History Museum, Budapest, Hungary

ICZN – International Commission on Zoological Nomenclature

NHM – Natural History Museum, London, United Kingdom

reg. – registration code (for genitalia dissection)

SAFI – Szabolcs Sáfián (code for ABRI dissections)

SZS – Szabolcs Sáfián's research collection (now in ANHRT)

Large number of specimens ( $\Sigma = 88$ ; 6 specimens in NHM in drawer G.74.4.8; 82 specimens in ABRI from Cameroon) in the *L. augusta* and *L. batesana* complexes were examined (including the holotype of *L. batesana* Bethune Baker, 1926 (type locality: Cameroon: Bitje, Ja River) in NHM drawer G.74.4.8). This led to the conclusion that in the Central and Eastern African populations, only determination confirmed by genitalia dissection could be trusted in both sexes, in many cases even proper separation of sexes is difficult using magnifying glass. Further 35 specimens of *L. augusta* were examined in NHM (drawer G.74.4.9) from Cameroon and Uganda, two specimens from the Oban Hills in Eastern Nigeria, and 50 specimens from Cameroon in the ABRI collection (including 2 males and 1 female confirmed by genitalia determination: ABRI-2016-02759, SAFI00117; ABRI-2016-02760, SAFI00116). The following specimens of *L. batesana* were identified by examining genitalia: 1 male from Lolodorf, S. Cameroon I.2013. In coll.: ABRI. Gen. prep.: SAFI00115; 1 male from Bakassi, CM/NG border, W. Cameroon, March 2011. In coll.: ABRI. Gen. prep.: SAFI00338.

All species, except *L. augusta* and the newly described *L. minimis* sp. n. and *L. neiltennanti* sp. n. have extremely similar external characters and therefore only specimens determined by examining male genitalia are listed here by species (no descriptions or illustrations of female genitalia of any species in the group are available for comparison). In West Africa, *L. ilaro* was pre-determined in the ABRI collection by its well-defined distribution in Western Nigeria. The identification was later confirmed by examination of male genitalia (1 male specimen, ABRI reg.: ABRI-2016-02763, Gen. prep.: SAFI00118). The holotype and the only paratype of *L. ilaro* were also examined in NHM, drawer G.74.4.9, the holotype is also documented and illustrated in D'ABRERA (1981, 2009). The newly designated male lectotype of *L. augusta* was fully documented in LIBERT (2021), including detailed illustration of genitalia. These specimens are also referred to in the diagnosis. The author also consulted the relevant literature, especially original descriptions and revisional notes in STEMPFFER *et al.* (1974) and LARSEN (2005a) with special focus on the genitalic structure of males of “white *Liptena*”.

The dissected and examined genitalia are numbered and stored in vials attached to the corresponding specimens (see reference numbers throughout this paper). Reference for venation and individual veins follows the simplified “English” or numerical system (MILLER 1970), which is also used in modern works on African butterflies (LARSEN 1991, 2005a). The process of digital images of photographed specimens and genitalia dissections follows those described in SÁFIÁN (2020). The distribution map was edited in Adobe Photoshop CS5 photo editor program with the aid of Google Earth Pro GIS freeware program.

## RESULTS

Superfamily PAPILIONOIDEA Latreille, 1802  
family LYCAENIDAE Leach, 1815  
subfamily PORITIINAE Doherty, 1886  
tribe Liptenini Röber, 1892  
genus *Liptena* Westwood, [1851]

Type species: *Liptena undularis* Hewitson, by subsequent designation (ICZN Opinion 566, 1959)

***Liptena neiltennanti* sp. n.**  
(Figs 2A, D; 6D)

*Type material* – Holotype: ♀ LIBERIA, Mount Jideh Ridge, Putu Range, Grand Gedeh County. Leg.: Sáfián, Sz. & Strausz, M. 8–21. IV. 2011. Gen. prep.: SAFI00003. Coordinates: 5°38'30.26"N, 8°11'5.94"W. Elevation: 700 m asl. Deposited in ABRI.

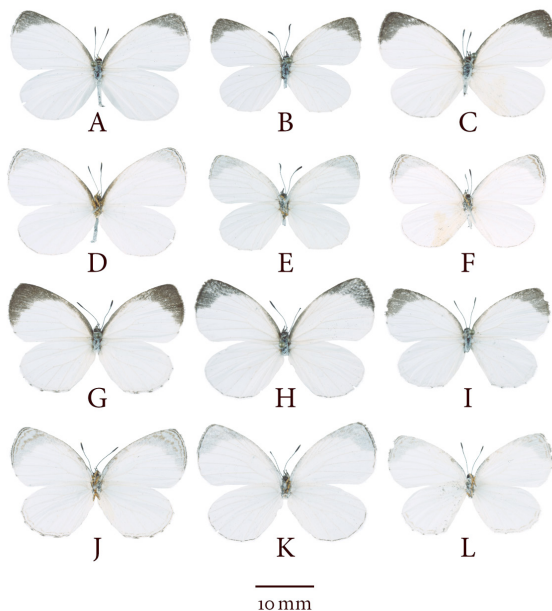
*Diagnosis* – In wing characters *L. neiltennanti* sp. n. does not differ significantly from *L. batesana*, *L. ilaro*, *L. introspectionem* sp. n. and *L. chrislowei* sp. n. The species *L. neiltennanti* sp. n. differs from *L. augusta* with the black costa tapering down to a fine line, while the black costal band in *L. augusta* is broad along the entire costa. Female genitalia differ from all other species, except *L. minimis* sp. n. in the long and oval bursa copulatrix, however, papillae analis are rectangular in *L. neiltennanti* sp. n., while they are rounded in *L. minimis* sp. n., *L. neiltennanti* sp. n. and *L. minimis* sp. n. differ from all other females by the much longer apophyses posteriores and larger and significantly more oval bursa copulatrix.

*Description* – Forewing length: 16 mm, wingspan: 31.5 mm. Upperside ground colour pure chalk white, with black apical spot on forewing. Apical spot tapers into black costal line in the centre of wing, slightly broadening towards base, where black line is overlaid with tinge of brown. Hindwing entirely white. Underside white, with fine black marginal line on forewing between apex and vein 3, also with diffuse tan sub-marginal line between costa and vein 4 and black costal line, overlaid by orange, fading into faint black scaling from median. Hindwing with one very fine, diffuse black marginal line between veins 1 and 6. Body densely covered by fine white hairs, except on underside. Legs orange. Eyes bald, black and brown, palpi orange. Antennae black, ringed with white; clubs rather narrow and long, black with orange tip. Female genitalia: papillae anales rather squat with rounded dorsal and ventral edges, almost flat posteriorly; apophyses longer than the dorsoventral width of papillae, almost straight; ductus bursae very short, with a rather sclerotized lamella antevaginalis and an even more sclerotized, funnel-

like ostium; bursa copulatrix oval (torn in the holotype), its length longer than the length of abdominal tergite and papilla in lateral view. Male unknown.

*Etyymology* – Dedicated to Neil Tennant (see Appendix).

*Remarks* – The mentioned antennal characters apply to all newly described species in the *L. augusta* and *L. batesana* species complexes and the description is therefore not repeated in detail below. However, the difference in the extension and shape of the forewing apical patch is likely diagnostic in *L. neiltennanti* sp. n. and *L. minimis* sp. n., although the available comparative material is not sufficient to establish these differences with certainty. For this reason, the most reliable diagnosis and identification guide are based largely on male and female genitalia characters (except in *L. augusta* and *L. ilaro*, where the more conspicuous black costal line on the forewing seems to be diagnostic).



Although *L. neiltennanti* sp. n. is so far known only by the unique holotype, it is quite likely that the species is restricted to the Liberian subregion with upland affinities. The holotype was captured on the Mount Jideh ridge of the Putu Range, where other restricted-range species have recently been recorded (e.g. *Iolaus jadwigae* Sáfián, 2017, *Pilodeudorix putu* Sáfián, 2015, *P. intermedia* Sáfián, 2015) (SÁFIÁN *et al.* 2015, SÁFIÁN 2017).

**Figure 2.** Adults in the *Liptena augusta* and *L. batesana* species complexes (I.). A = *L. neiltennanti* sp. n. (holotype) upperside, D = *idem*, underside (gen. prep.: SAFI00003); B = *L. introspectionem* sp. n. (holotype) upperside, E = *idem*, underside (gen. prep.: SAFI00001); C = *L. chrislowei* sp. n. (holotype) upperside, F = *idem*, underside (gen. prep.: SAFI00002); G = *L. augusta* Suffert, 1904, female (Ebogo, Cameroon) upperside, J = *idem*, underside (gen. prep.: SAFI00022); H = *L. chrislowei* sp. n. (paratype) (Mekas Djar, Cameroon) upperside, K = *idem*, underside (gen. prep.: SAFI00023); I = *L. introspectionem* sp. n. paratype (North Kivu, DRC) upperside, L = *idem*, underside (gen. prep.: SAFI00024)

***Liptena chrislowei* sp. n.**  
(Figs 2C, F, H, K, 3B, E)

*Type material* – Holotype: ♂ CAMEROON, Ebogo on Nyong River, Central Region, II. 1996. Leg.: S.C. Collins. Gen. prep.: SAFI00002. Coordinates: 3°23'39.78"N, 11°28'7.05"E. Elevation: 670 m asl. Deposited in ABRI. Paratypes (3♂♂): CAMEROON, Mekas Djar Southern Cameroon VII-VIII.2012. Gen. prep.: SAFI00023, SAFI00139, SAFI00140. ABRI reg.: ABRI-17-2129, ABRI-17-2130. Deposited in ABRI.

*Diagnosis* – The species is indistinguishable by wing characters and other external features from *L. batesana*, *L. ilaro* and from the newly described *L. neiltennanti* sp. n., *L. introspectionem* sp. n. and *L. minimis* sp. n. with certainty. *L. augusta* has a prominent, evenly broad black costal line between the base and the black apical patch; the black costa narrows down to a very fine black line in *L. chrislowei* sp. n. (also in *L. batesana*, *L. neiltennanti* sp. n. and *L. introspectionem* sp. n.).

*Description* – Forewing length: 15 mm, wingspan: 32 mm. Wing characters and other external features are as described above in *L. neiltennanti* sp. n. with only minor variation. Male genitalia: gnathos straight, slender; uncus strongly curved laterally, bisected into two curved lobes distally; tegumen oval, vinculum narrow, saccus rather long; valvae large with curving concave ventral edge, blunt tip and small, irregular, finger-like (vermiform) process on dorsal edge; aedeagus very long, slender, strongly arched, tapering into fine, acute tip. Female unknown.

*Etymology* – Dedicated to Chris Lowe (see Appendix).

*Remarks* – Male genitalia differ significantly in the following, strongly diagnostic features: uncus lobed, its edges are evenly curved (more angled in *L. augusta* and *L. ilaro*). Sub-unci broad, angled sharply upwards, curved in *L. augusta* and *L. ilaro*. Tip of valva blunt, completely rounded in *L. augusta*, while it tapers down into a finger-like prolonged tip in *L. ilaro*. On the valva the latter also two have a thumb-like process, appearing as a slender, irregular vermiform projection on the dorsal edge in *L. chrislowei* sp. n. Aedeagus is very strongly arched in *L. chrislowei* sp. n., also extremely long, significantly longer than those of *L. augusta* or *L. ilaro*. Safe assignment of females could not be established on the basis of genitalia morphology in the distribution area where *L. chrislowei* sp. n., *L. batesana* and *L. augusta* overlap, therefore female genitalia for these species are not described.

The discovery of yet another white species in Central Africa in full sympatry with *L. batesana* was unexpected. However, the genitalia morphology positions the species immediately next to *L. augusta* and *L. ilaro* and the species is readily separable from its relatives by male genitalia. As male specimens should be dissected for exact identification, mapping of the actual distribution of the species will certainly take a long time, given the scarcity of specimens in collections.



**Figure 3.** *Liptena* male genitalia and separated aedeagi (lateral view). A, D = *L. augusta* Suffert, 1904 (Mekas Djar, Cameroon) (gen. prep.: SAFI00117, ABRI reg.: ABRI-2016-02759); B, E = *L. chrislowei* sp. n. (paratype) (gen. prep.: SAFI00023), C, F = E and *L. ilaro* Stempffer, Bennett & May, 1974 (Agbara Estate, Ogun, Nigeria) (gen. prep.: SAFI00118, ABRI reg.: ABRI-2016-02763)

### ***Liptena introspectionem* sp. n.**

(Figs 2B, E; 5A)

*Type material* – Holotype: ♂ UGANDA, Mabira Forest, 02-15.IV.2010. Leg.: Sáfián, Sz., Gen. prep.: SAFI00001. Deposited in ABRI. Paratypes (3♂♂): DRC, Mamove, Kivu 5.2012, 2.2013. Leg.: ABRI gen. prep.: SAFI00042, SAFI00138. Deposited in ABRI: 2♂♂); DRC, Mabungu, Kivu 1.2013. Leg., ABRI gen. prep.: SAFI00137 (ABRI: 1♂).

*Diagnosis* – The species is indistinguishable by wing characters and other external features from *L. batesana*, *L. ilaro* and the newly described *L. neiltennanti* sp. n. and *L. chrislowei* sp. n. with certainty. *L. augusta* has a more prominent, evenly broad black costal line between the base and the black apical patch; the black costa narrows down to a very fine black line in *L. introspectionem* sp. n. (also in *L. batesana*, *L. ilaro*, *L. neiltennanti* sp. n., *L. chrislowei* sp. n. and *L. minimis* sp. n.). Female genitalia characters are also not sufficiently robust to allow identification (and therefore even the most probable female specimens collected within the known distribution area of *L. introspectionem* sp. n. are marked with a question mark on Figs 2G,J and 6A).

*Description* – Forewing length: 13.5 mm, wingspan: 27 mm. Wing characters and other external features are as described above in *L. neiltennanti*



sp. n. with only minor variation. Male genitalia: gnathos slightly curving, rather broad; uncus hook-shaped, strongly curved laterally into acute tip, bisected into two lobes distally; sub-unci slender, curving slightly upwards, ends in acute tip; tegumen oval, vinculum narrow, long, saccus fish-tail shaped; valvae long, rather oval, narrow down to completely rounded tip with a right-angle break, ventral edge curving, slightly concave; aedeagus slender, nearly straight, spear-shaped with acute tip. Female unknown.

*Etymology* – the specific epithet “*introspectionem*” formed from the English “introspective”. It is used as a noun in apposition with the intentional meaning of signifying the necessity of an in-depth analysis for recognition (for more details see Appendix).

*Remarks* – Male genitalia of *L. introspectionem* sp. n. positions the species near *L. batesana*, as they share main characteristics, however, they differ in the shape of the tip of valva (completely rounded in *L. introspectionem* sp. n., blunt in *L. batesana*) and aedeagus (slenderer and tapers down more sharply in *L. introspectionem* sp. n.).

Although STEMPFFER *et al.* (1974) examined Ugandan material from Jackson’s collection (5 specimens from Bwamba, depository unknown), he probably did not dissect these specimens, since genitalic differences between the Central African *L. batesana* and the eastern *L. introspectionem* sp. n. are quite obvious and would not have been overlooked by Stempffer and his colleagues. It is still possible that *L. batesana* occurs also in Uganda, but based on current evidence, *L. introspectionem* sp. n. is best treated as the eastern vicariant of *L. batesana* with unknown overlap between them (see more information in the discussion of biogeography of the group).

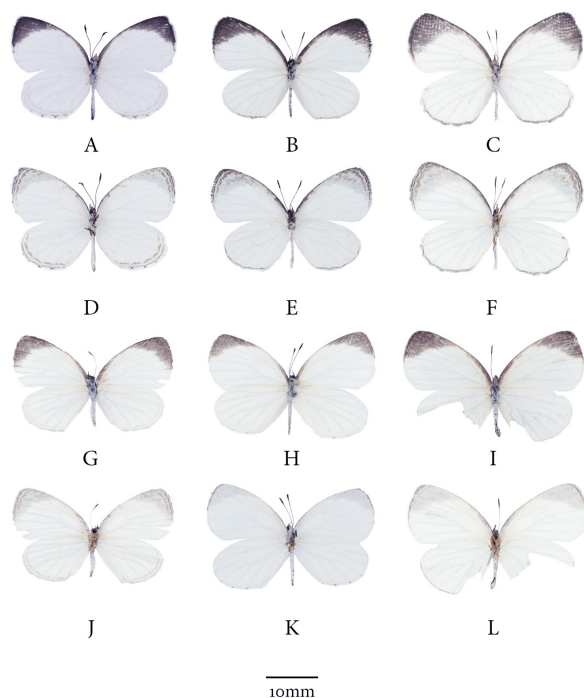
### *Liptena minimis* sp. n.

(Figs 4H, K; 6C)

*Type material* – Holotype: ♀ CAMEROON, Mount Manengouba, Manjo XI.2012. Leg ABRI; Gen. prep.: SAFI00114, ABRI reg.: ABRI-2016-02758. Deposited in ABRI. Paratype: ♀ CAMEROON, Mount Kupe, II.2010. Leg.: Mo *et al.*; Gen. prep.: SAFI00131, ABRI reg.: ABRI-17-2121. Deposited in ABRI.

*Further material examined* – NIGERIA, Oban Hills, Southern Nigeria May 1920 (NHM: 1♂ (presumably), 4♀♀).

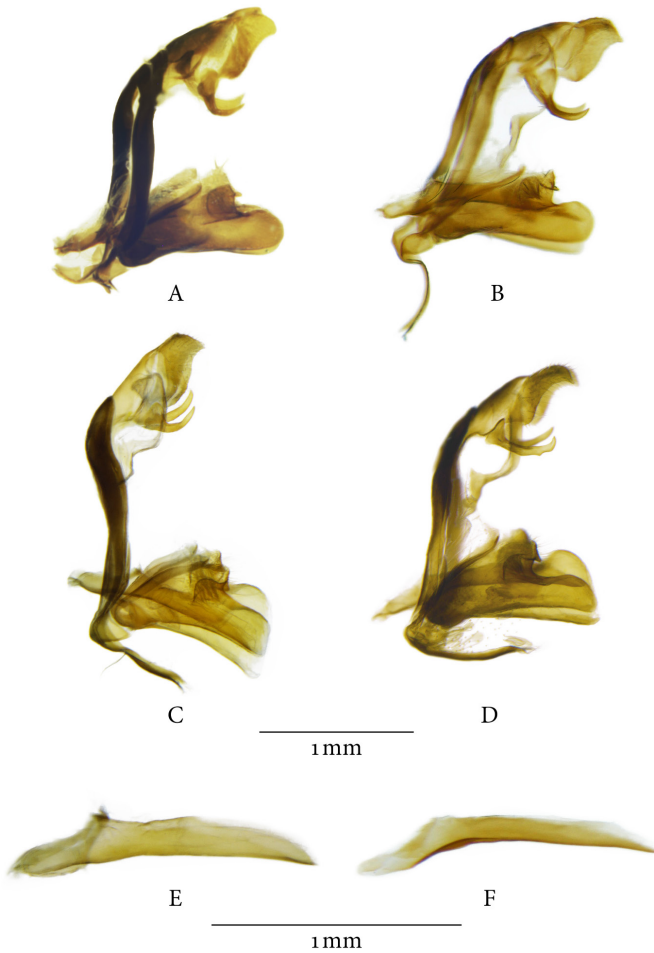
*Diagnosis* – With careful examination, *L. minimis* sp. n. could be distinguished from all other species except *L. neiltennanti* sp. n. in the complex with its very narrow black apical spot, which is constant across the specimens examined. Female genitalia differ from all other species, except *L. neiltennanti* sp. n. in the long and oval bursa copulatrix, however, papillae anales are rounded in *L. minimis* sp. n., while they are more rectangular, and flat posteriorly in *L. neiltennanti* sp. n.



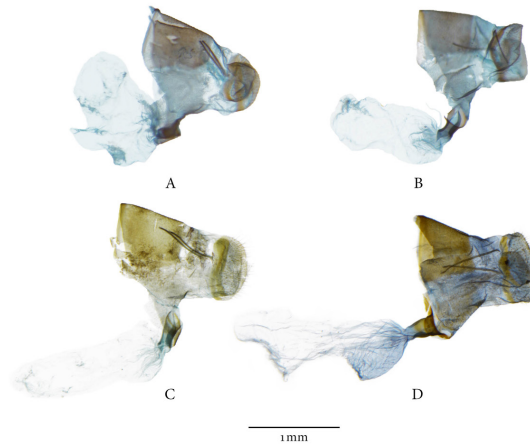
**Figure 4.** Adults in the *Liptena augusta* and *L. batesana* species complexes (II.). A = *L. batesana* Suffert, 1904, male (Lolodorf, Cameroon), upperside, D = *idem* underside (gen. prep.: SAFI00115, ABRI reg.: ABRI-2016-02761); B = *L. augusta* Suffert, 1904 male (Mekas Djar, Cameroon) upperside, E = *idem*, underside (gen. prep.: SAFI00116, ABRI reg.: ABRI-2016-02760); C = *L. augusta* male (Mekas Djar, Cameroon) upperside, F = *idem*, underside (gen. prep.: SAFI00117, ABRI reg.: ABRI-2016-02759); G = *L. introspectionem* sp. n., female (Mamove, Kivu, DRC) upperside, J = *idem*, underside (ABRI reg.: ABRI-2016-02757); H = *L. minimis* sp. n. (holotype) upperside, K = *idem*, underside (gen. prep.: SAFI00114, ABRI reg.: ABRI-2016-02758); I = *L. ilaro* Stempffer, Bennett & May, 1974 male (Agbara Estate, Ogun, Nigeria) upperside, L = *idem*, underside (gen. prep.: SAFI00118, ABRI reg.: ABRI-2016-02763)

*Description* – Forewing length: 15.5 mm, wingspan: 32 mm. Wing characters and other external features are as described above in *L. neiltennanti* sp. n. Female genitalia: papillae anales evenly rounded dorso-ventrally, gently curved posteriorly; apophyses longer than the dorsoventral width of papillae, slightly bent upwards in lateral view; ductus bursae very short, with a moderately sclerotized lamella antevaginalis and a slightly more sclerotized, ring-like ostium; bursa copulatrix oval (torn in the holotype), its length equal with the length of abdominal tergite and papilla in lateral view. Male unknown.

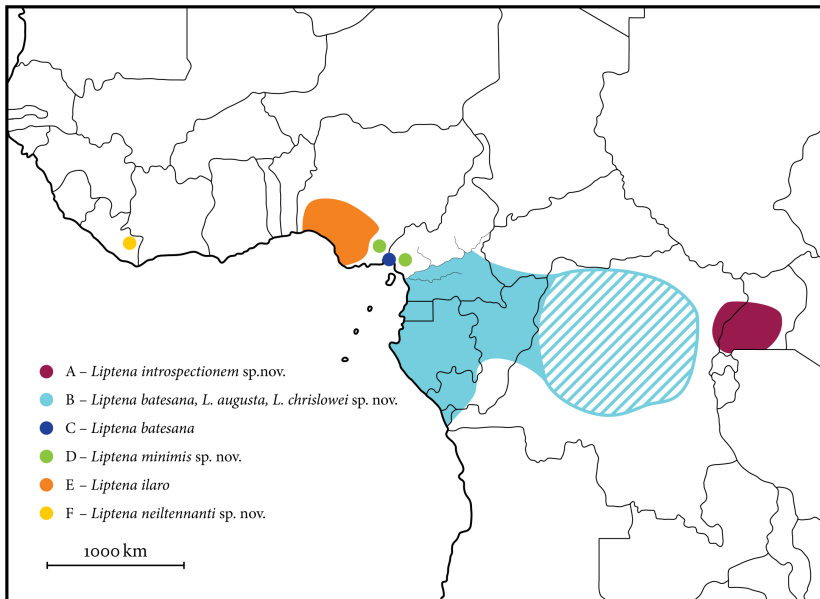
*Etymology* – the specific epithet “minimis” formed from the English “minimal”. It is used as a noun in apposition with meaning simplified, minimalistic, intended to emphasize the minimal pattern of the hindwing surface marginal area (for more details see Appendix).



**Figure 5.** *Liptena* male genitalia and separated aedeagi (lateral view). A = *L. introspectionem* sp. n. (holotype) (gen. prep.: SAFI0001); B = *L. introspectionem* sp. n. paratype (Kivu, DRC) (gen. prep.: SAFI00042), E = *idem*, aedeagus; C = *L. batesana* Bethune-Baker, 1926 (Lolodorf, Cameroon) (gen. prep.: SAFI00115), F = *idem*, aedeagus; D = *L. batesana* (Bakassi, Cameroon) (gen. prep.: SAFI00338)



**Figure 6.** Female genitalia (lateral view) in the “white *Liptena*” group: A = *L. augusta* Suffert, 1904 (Ebogo, Cameron) (gen. prep.: SAFI00022); B = *L. introspectionem* sp. n. ? (Mapimbi, North-Kivu, DRC) (= gen. prep.: SAFI00024); C = *L. minimis* sp. n. (holotype) (gen. prep.: SAFI000114); D = *L. neiltennanti* sp. n. (holotype) (gen. prep.: SAFI00003)



**Figure 7.** Tentative distribution of species in the *Liptena augusta* and *L. batesana* species complexes. A = *L. introspectionem* sp. n.; B = combined map for *L. augusta* Suffert, 1904, *L. batesana* Bethune-Baker, 1926, *L. chrislowei* sp. n. (the striped area is largely uncertain and no overlap with *C. introspectionem* sp. n. was recorded); C = *L. minimis* sp. n. (Nigeria and Cameroon upland forest occurrences); D = *L. batesana* (Cameroon, lowland forest occurrence); E = *L. ilaro* Stempffer, Bennett & May, 1974; F = *L. neiltennanti* sp. n.

IDENTIFICATION GUIDE TO GROUP AND SPECIES  
IDENTIFICATION IN THE LIPTENA AUGUSTA AND L. BATESANA  
SPECIES COMPLEXES

As the group “white *Liptena*” (sensu STEMPFFER *et al.* 1974) appears to be one of the most difficult groups in the Liptenina subtribe, an identification guide is presented, highlighting the most characteristic features to enable accurate determination of males and females of each species. Presently, most females cannot be matched to males with certainty in Central Africa, as it would require a combination of molecular and morpho-taxonomic examination of a larger number of specimens. No males of the newly described *L. neiltennanti* sp. n. were found in collections. The “white group” is identified by STEMPFFER *et al.* (1974) as follows in their identification guide below: ground colour white.

*Identification guide for the species complexes*

- Aedeagus is long and strongly arched ..... ***L. augusta* species complex.** (Figs 1D,F; 3D,E,F). Confirmed members of the *L. augusta* complex: *L. augusta*, *L. chrislowei* sp. n., *L. ilaro*.
- Aedeagus is lanceolate, slightly thickened basally ..... ***L. batesana* species complex.** (Figs 1E; 5E, F). Members of the *L. batesana* complex: *L. batesana*, *L. introspectionem* sp. n.
- Incertae sedis: *L. minimis* sp. n., *L. neiltennanti* sp. n. (as males are unknown).

*Identification guide for the individual species*

- Forewing black (in paler specimens dark grey) costal band is broad and prominent between the broadening of the black/blackish apical spot, and the base of vein 9 and does not taper down to a very fine costal black/blackish line. The black apical spot is prominent and reaches beyond vein 4, tapers down into a black margin, which can extend beyond vein 3. In male genitalia aedeagus is arched, tip of valva rounded, sub-unci slender, curved. Widely distributed in Central Africa with records from DRC, RCA, Cameroon and Gabon. Earlier records from Eastern Nigeria by Larsen (2005a) are not confirmed .....  
..... ***L. augusta* Suffert, 1904** (Figs 1A, D; 2G, J?; 3A, D; 4B, E, C, F; 6A?).
- Forewing black costa tapers down to a fine black (in paler specimens dark grey) costal line between the base and the broadening of the black apical spot. In male genitalia aedeagus is arched, tip of valva blunt, sub-unci narrowly angled upwards. Known only from Central and Southern Cameroon ..... ***L. chrislowei* sp. n.** (Figs 2C, F, H, K; 3B, E).
- Forewing black costa tapers down to a fine, but rather prominent black costal line between the base and the broadening of the black apical spot. In male genitalia aedeagus is arched, valva ends in long, finger-like tip, sub-unci broader, angled upwards in obtuse angle. Known only from Western Nigeria ..... ***L. ilaro* Stempffer, Bennett & May, 1974** (Figs 3C, F; 4I, L).

- Forewing black costa narrows down to a fine black costal line between the base and the broadening of the black apical spot. In male genitalia aedeagus is straight, lanceolate, tip of valva rhomboid. Distributed in Central Africa penetrating West Africa with confirmed records from Southern and Western Cameroon.....  
.....*L. batesana* Bethune-Baker, 1926 (Figs 1B, E; 4A, D; 5B, D).
- Forewing black costa narrows down to a fine black costal line between the base and the broadening of the black apical spot. In male genitalia aedeagus is straight, lanceolate, tip of valva evenly rounded. Known only from Uganda and Eastern DRC .....  
.....*L. introspectionem* sp. n. (Figs 2B, E; 5A, C, E).
- Forewing black costa narrows down to a very fine, inconspicuous black line between the base and the broadening of the black apical spot. The triangular apical spot is very narrow, tapering down to a very fine marginal line, which stops at vein 4. In all other species, except *L. neiltennanti* sp. n. the black apical patch does not taper down to a fine marginal line stopping at vein 4, as the patch stops at the vein abruptly or extends into space 3. The main characters in the female genitalia are the large, elongate bursa copulatrix, long, sclerotised lamella antevaginalis, long and gently bent apophyses posterior and large and rounded papillae analis. Known only from Eastern Nigeria and North-western Cameroon .....  
.....*L. minimis* sp. n. (Figs 4H, K; 6C).
- Forewing black costa narrows down to a very fine, inconspicuous black line between the base and the broadening of the black apical spot. The triangular apical spot is very narrow, tapering down to a very fine marginal line, which stops at vein 4. In all other species, except *L. minimis* sp. n., the black apical patch does not taper down to a fine marginal line stopping at vein 4, as the patch stops at the vein abruptly or extends into space 3. The main characters in the female genitalia are large elongate bursa copulatrix, long, sclerotised lamella antevaginalis, long and straight apophyses posterior and large, rectangular papillae analis. Known only from Liberia.....*L. neiltennanti* sp. n. (Figs 2A, D; 6D).

## DISCUSSION

### *Biogeography of the Liptena augusta and L. batesana species complexes*

The first two recognised species in the “white *Liptena*” group were described from Cameroon (*L. augusta*, *L. batesana*), and only *L. batesana* was previously recorded also from Uganda (Bwamba Valley). From here records of the latter remain doubtful, until genitalic examination confirms the presence of that species. These records almost certainly refer to the newly described *L. introspectionem* sp. n., which is currently known from the Kivu area of the DRC and from the Mabira Forest, Eastern Uganda. *L. introspectionem* sp. n. is an East African species, occurring in the mid-altitude rainforests of the Albertine Rift and the isolated Lake Victoria outlier forests (Fig. 7 – area A). It will probably be found in other forest areas in Uganda (e.g. Kalinzu Forest, Kibale National Park).

Although all records except those of *L. augusta* of the complexes in Central Africa should be treated with reservations without examination of genitalia of male specimens (currently only males in Central Africa could be reliably identified on the basis of genitalia morphology), it is proven that *L. augusta*, *L. batesana* and *L. chrislowei* sp. n. occur sympatrically (at least in Southern Cameroon) (Fig. 7 – area B), which is already in the main area of distribution of Congolian rainforest species with outstanding diversity. One or more of them probably also occur in the Cuvette Central in DRC, although no records from the area are available.

According to present knowledge, the remaining three species in the group are purely West African of narrower distribution. *L. minimis* sp. n. is found in the Cameroon Highlands, as well as in the Oban Hills in Eastern Nigeria in parapatry with *L. batesana*, which has confirmed records from the lowlands in the Cameroon-Nigeria border (Fig. 7 – area C). *L. ilaro*, a western vicariant of *L. augusta*, seems to be completely restricted to the Western Nigeria subregion with a large disjunction (Fig. 7 – area D). Western Nigeria is increasingly recognised as a discreet biogeographical subregion in West Africa, and several butterfly taxa are known to occur only in the area between the Niger Delta and the eastern boundary of the Dahomey Gap (LARSEN 2005a, 2005b, LIBERT 2014, PYRCZ *et al.* 2011, PYRCZ & SÁFIÁN 2018, SÁFIÁN *et al.* 2016).

The most surprising record of “white *Liptena*” is the newly described *L. neiltennanti* sp. n. from Liberia (Fig. 7 – area E), since no closely related species have been previously found in the Upper Guinean forest zone, west of the Dahomey Gap (LARSEN 2005a). *L. neiltennanti* sp. n. is known only from the unique holotype collected in the upland forest zone of the Putu Range and for this reason the species cannot be assigned to this habitat type with certainty, but multiple examples prove that West African lower mountain ranges that include the Atewa Range in Ghana and the Putu Range in Eastern Liberia host several endemic and restricted-range taxa (LARSEN 2005a, 2007). The latter one is type locality of three recently described species, which could prove restricted to upland forest habitats in the Liberian subregion (SÁFIÁN *et al.* 2015; SÁFIÁN 2017, 2021). Whether *L. neiltennanti* sp. n. is one of these upland forest species or is more widely distributed in the hyper-wet forests of Liberia is yet unknown.

\*

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the first genitalia dissections. The enormous difference between the morphology of the genitalia triggered the extensive work on the species groups. Jadwiga Lorenc-Brudecka and Klaudia Florczyk (CEP-MZUJ, Kraków, Poland) tirelessly dissected abdomens of “white *Liptena*”. Peter Ward (Johannesburg, South Africa) hosted the author in Jinja, Uganda, allowing the capture of the first “*L. batesana*” specimen. Renátó Molnár (Budapest, Hungary) helped editing the plates and the distribution map. Two anonymous reviewers should be acknowledged for their valuable comments and corrections, which significantly improved the quality of the manuscript.

## REFERENCES

- D'ABRERA B. 1980: *Butterflies of the Afrotropical Region*. – Lansdowne Editions, Melbourne, 593 pp.
- D'ABRERA B. 2009: *Butterflies of the Afrotropical Region Part III Lycaenidae, Riodinidae*. – Hill House Publishers, Melbourne & London, pp 531–880.
- INTERNATIONAL COMMISSION ON ZOOLOGICAL NOMENCLATURE 1959: Opinion 566. Suppression under the Plenary Powers of the generic name *Tingra* Boisduval, 1847, and designation under the same Powers for the genera *Liptena* Westwood, [1851] and *Pentila* Westwood, [1851], of type species in harmony with accustomed usage (Class Insecta, Order Lepidoptera). – *Opinions and Declarations Rendered by the International Commission on Zoological Nomenclature* 20: 377–389.
- LARSEN T. B. 1991: *The Butterflies of Kenya and their Natural History*. – Oxford University Press, Oxford, 490 pp + 22 colour pls.
- LARSEN T. B. 2005a: *Butterflies of West Africa*. – Apollo Books, Svendborg, Denmark, 595 pp + 135 colour pls.
- LARSEN T. B. 2005b: Fossil on a pin. – *Biodiversity* 6(2): 34.  
<https://doi.org/10.1080/14888386.2005.9712765>
- LARSEN T. B. 2007: Additional comments on butterflies of the Upland Evergreen Forest of the Atewa Range Forest Reserve, Ghana. In McCullough, J., L.E. Alonso, P. Naskrecki, H.E. Wright and Y. Osei-Owusu (eds.): *A Rapid Biological Assessment of the Atewa Range Forest Reserve, Eastern Ghana*. – RAP Bulletin of Biological Assessment 47. Conservation International, Arlington, VA pp 61–62.
- LARSEN T. B., RILEY J. & CORNES M. A. 1980: The butterfly fauna of a secondary bush locality in Nigeria. – *Journal of Research in Lepidoptera* 18: 4–23.
- LIBERT M. 2014: *Sur la taxonomie du genre Celaenorrhinus Hübner en Afrique (Lepidoptera, HesperIIDae)*. – African Butterfly Research Institute, Nairobi 272 pp + 26 colour pls.
- LIBERT, M. 2021: The types of *Liptena augusta* Suffert and *Liptena subundularis* (Staudinger) (Lepidoptera, Lycaenidae, Poritiinae). – *Metamorphosis* 32: 13–14.
- MILLER L. D. 1970: Nomenclature of wing veins and cells. – *Journal of Research on the Lepidoptera* 8: 37–48.
- PYRCZ T. W., LORENC J. & KNOOP D. P. 2011: New species of *Euphaedra* Hübner of the *ceres* group from southwestern Nigeria – with new evidence from female genital morphology (Lepidoptera: Nymphalidae: Limenitidinae). – *Genus* 22(4): 621–638.
- PYRCZ T. W. & SÁFIÁN SZ. 2018: A new subspecies of *Cymothoe fumana* (Westwood, 1850) from Western Nigeria (Lepidoptera: Nymphalidae: Limenitidinae). – *Metamorphosis* 29: 5–8.



- SÁFIÁN SZ. 2015: *Aslauga larseni* (Lycaenidae: Miletinae: Liphyrini), a unique new species from the Nimba Mountains, Liberia. – *Metamorphosi*. **26**: 27–30.
- SÁFIÁN SZ. 2017: Three new species in the genus *Iolaus* Hübner, 1819 (Lepidoptera, Lycaenidae, Theclinae) from West Africa. – *Metamorphosis* **28**: 2–10.
- SÁFIÁN SZ. 2020: Description of the previously unknown sexes in four West African Lycaenidae (Lepidoptera) with new data on their distribution. – *Zootaxa*. **4834(2)**:219–230.  
<https://doi.org/10.11646/zootaxa.4834.2.4>
- SÁFIÁN SZ., COLLINS S. C. & LIBERT M. 2015: Descriptions of seven new *Pilodeudorix* Druce, 1891 from equatorial Africa (Lepidoptera: Lycaenidae: Theclinae). – *Metamorphosis* **26**: 62–78.
- SÁFIÁN SZ., COLLINS S. C., WARREN-GASH H., BELCASTRO C. 2021: Description of five new species of *Epitola* sensu lato (Lepidoptera: Lycaenidae: Poritiinae) from West and Central Africa. – *Zootaxa*. **4981(3)**: 554–576.  
<https://doi.org/10.11646/zootaxa.4981.3.7>
- SÁFIÁN SZ., PYRCZ T. & BRATTSTRÖM O. 2016: Two new species of *Bebearia* Hemming, 1960, as further evidence of centre of endemism of butterflies in Western Nigeria (Lepidoptera: Nymphalidae: Limenitinae). – *Zootaxa* **4175(5)**: 449–462.  
<https://doi.org/10.11646/zootaxa.4175.5.3>
- STEMPFER H. 1962: Contribution a l'étude des lepidoptères Lycaenidae d'Afrique tropicale et equatoriale. – *Bulletin de la l'Institut Francaise d'Afrique Noire* **24(A)**: 1135–1181.
- STEMPFER, H. 1966: Liste des Lepidoptères Lycaenidae de Cote d'Ivoire actuellement onnus. – *Bulletin de la l'Institut Fondamental d'Afrique Noire* **28(A)**: 1554–1586.
- STEMPFER H. 1967: The genera of the African Lycaenidae (Lepidoptera: Rhopalocera). – *Bulletin of the British Museum (Natural History) (Entomology), Supplement* **10**: 1–332.  
<https://doi.org/10.5962/p.145446>
- STEMPFER H. & BENNETT N. H. & MAY S. J. 1974: A revision of some groups of *Liptena* Westwood (Lepidoptera: Lycaenidae). – *Bulletin of the British Museum of Natural History (Entomology)*. **30(2)**: 107–181.  
<https://doi.org/10.5962/bhl.part.24940>

## APPENDIX: ETYMOLOGIES

All newly described species are dedicated to recognise the artistic work of one of the most influential British pop duos, Pet Shop Boys, who always played an important role in the author's life since 1986 and inspired him in various ways. Their intelligent, often ironic and yet emotional music supplemented by outstandingly sophisticated art design in both their appearances and hundreds of record sleeve designs have got the author completely obsessed for over three decades, and being a fan of their music had been among the top priorities in his life. As time had passed, science and nature conservation work became increasingly important, and the author has finally found a way to acknowledge Pet Shop Boys' existence and their lifetime commitment to electronic and electro-acoustic

pop and dance music, making millions of people happy or sad, disillusioned or disenchanted, while listening to their music since the first release of West End Girls in 1984 till its re-release as a New Lockdown Version on the 1<sup>st</sup> June 2020.

*Liptena chrislowei* sp. n. – The species carries the name of Christopher Sean Lowe, keyboardist, programmer and also occasional songwriter and singer of Pet Shop Boys. His unique musical skills, often extravagant and sometimes eccentric appearance cover a humble and deep personality, which had often influenced the image of Pet Shop Boys.

*Liptena introspectionem* sp. n. – A freely Latinised version of the word “Introspective”. Introspective is one of Pet Shop Boys’ most recognised album, released in 1988, and the first one the author could officially buy behind the “Iron Curtain” in the then communist Hungary. The opening song “Left To My Own Devices” is still among his most loved musical moments with its grandiose orchestral arrangements on house beats.

*Liptena minimis* sp. n. – A freely Latinised version of the word “Minimal”, the title of Pet Shop Boys’ song and their 37<sup>th</sup> top 20 single in Britain. The expression “minimal” reflects the lack of characteristics of the *L. batesana* complex with the absence of pattern on the upperside and minimalistic marginal lining on the underside. The opening line of the lyrics “White on white, light, sublime, subliminal” is also an accurate definition of the species in the complex, since the lack of any visible features characterise most accurately the entire species group.

*Liptena neiltennanti* sp. n. – The species carries the name of Neil Francis Tennant, songwriter and lead singer of Pet Shop Boys as a tribute to his talent and lifetime enthusiasm to music.



## Taxonómiai jegyzetek a *Liptena augusta* és *L. batesana* fajcsoportokról, négy új faj leírásával (Lepidoptera, Lycaenidae, Poritiinae)

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**Összefoglalás** – A *Liptena augusta* Suffert, 1904 és *L. batesana* Bethune-Baker, 1926 fajcsoportok a kizárólag Afrotropikus Régióban előforduló *Liptena* Westwood, [1851] génusz legnehezebben határozható csoportjainak tekinthetők, mivel a taxonok megjelenése egymáshoz nagyon hasonló és az egyértelműen leírható mintázatbeli különbségek is hiányoznak. Emiatt a múzeumi és a korábbi publikációkban közölt határozások sem megbízhatóak, amelyre több szerző is felhívta a figyelmet, illetve egyes példányok alatt különbözõ, kézzel írt névcédulák szerepelnek. Egy nemrégiben Libériában gyűjtött példány vizsgálata újra ráirányította a csoportra a figyelmet, ugyanis a Felső-Guineai erdõzónából a csoport korábban nem volt ismert, míg az összehasonlításhoz felboncolt hím egyedek ivarszervei jelentõsen különböztek az eddig ábrázolt fajoktól. A csoportok teljes elterjedési területérõl megvizsgált példányok alapján kiderült, hogy a két fajcsoportban további három leíratlan faj is található, illetve megerõsítésre került, hogy a Stempffer és kollégái által a londoni Természettudományi Múzeumban leíratlan fajnak határozott példányok is új fajt képviselnek. Az új fajok leírása mellett a cikkben szerepel a határozást segitõ, fõképp ivarszerv-morfológiai bélyegekre alapuló határozó-segédlet is, valamint a fajok életföldrajzát taglaló kitekintés. A *L. neiltennanti* sp. n. és a *L. minimis* sp. n. nyugat-afrikaiak; az elsõnek említett faj kizárólag Kelet-Libériából került elõ, az utóbbi pedig a Nigéria és Kamerun határvidékén elterülõ hegyvidékek közepes magasságban fekvõ erdõzónájából ismert. A *L. chrislowei* sp. n. a *L. augusta* és *L. batesana* fajokkal szimpatrikusan fordul elõ Közép-Afrika síkvidéki esõerdeiben, míg a *L. introspectionem* sp. n. az Albertine-hasadék két oldalán lévõ hegyvidéki erdõkben és a Viktória-tó relikturnerdeiben található. Hét ábrával.

**Kulcsszavak** – Afrotropikus Régió, életföldrajz, kongói erdõzóna, felsõ-guineai erdõzóna, Viktória-tó relikturn esõerdõk, taxonómiai problémák, fehér *Liptena*-fajok, ivarszerv-morfológia

## ÁBRAMAGYARÁZATOK

**1. ábra.** *Liptena* hím ivarszervek és elkülönített aedeagus-ok STEMPFFER *et al.* (1974) eredeti ábráinak újrarajzolása alapján. A, D = *L. augusta* Suffert, 1904; B, E = *L. batesana* Bethune-Baker, 1926; C, F = *L. ilaro* Stempffer, Bennett & May, 1974

**2. ábra.** A *Liptena augusta* és *L. batesana* fajcsoportok imágói (I.). A = *L. neiltentanti* sp. n. (holotype) felülnézet, D = *idem*, alulnézet (gen. prep.: SAFI00003); B = *L. introspectionem* sp. n. (holotype) felülnézet, E = *idem*, alulnézet (gen. prep.: SAFI00001); C = *L. chrislowei* sp. n. (holotype) felülnézet, F = *idem*, alulnézet (gen. prep.: SAFI00002); G = *L. augusta* Suffert, 1904, nőtény (Ebogo, Cameroon) felülnézet, J = *idem*, alulnézet (gen. prep.: SAFI00022); H = *L. chrislowei* sp. n. (paratype) (Mekas Djar, Cameroon) felülnézet, K = *idem*, alulnézet (gen. prep.: SAFI00023); I = *L. introspectionem* sp. n. paratype (North Kivu, DRC) felülnézet, L = *idem*, alulnézet (gen. prep.: SAFI00024)

**3. ábra.** *Liptena* hím ivarszervek és elkülönített aedeagus-ok (oldalnézet). A, D = *L. augusta* Suffert, 1904 (Mekas Djar, Kamerun) (gen. prep.: SAFI00117, ABRI azonosító: ABRI-2016-02759); B, E = *L. chrislowei* sp. n. (paratípus) (gen. prep.: SAFI00023); C, F = *L. ilaro* Stempffer, Bennett & May, 1974 (Agbara Estate, Ogun, Nigéria) (gen. prep.: SAFI00118, ABRI azonosító: ABRI-2016-02763)

**4. ábra.** A *Liptena augusta* és *L. batesana* fajcsoportok imágói (II.). A = *L. batesana* Suffert, 1904 hím (Lolodorf, Kamerun) felszín, D = *idem*, fonák (gen. prep.: SAFI00115, ABRI azonosító: ABRI-2016-02761); B = *L. augusta* hím (Mekas Djar, Kamerun) felszín, E = *idem*, fonák (gen. prep.: SAFI00116, ABRI azonosító: ABRI-2016-02760); C = *L. augusta* hím (Mekas Djar, Kamerun) felszín, F = *idem*, fonák (gen. prep.: SAFI00117, ABRI azonosító: ABRI-2016-02759); G = *L. introspectionem* sp. n. ?, nőtény (Mamove, Kivu, Kongói Demokratikus Köztársaság), J = *idem*, fonák (J. ABRI azonosító: ABRI-2016-02757); H = *L. minimis* sp. n. (holotípus) felszín, K = *idem*, fonák (gen. prep.: SAFI00114, ABRI azonosító: ABRI-2016-02758); I = *L. ilaro* Stempffer, Bennett & May, 1974 hím (Agbara Estate, Ogun, Nigéria) felszín, L = *idem*, fonák (gen. prep.: SAFI00118, ABRI azonosító: ABRI-2016-02763)

**5. ábra.** Hím ivarszervek és elkülönített aedeagus-ok (oldalnézet). A = *L. introspectionem* sp. n. (holotype) (gen. prep.: SAFI0001); B = *L. introspectionem* sp. n. paratype (Kivu, DRC) (gen. prep.: SAFI00042), E = *idem*, aedeagus; C = *L. batesana* Bethune-Baker, 1926 (Lolodorf, Cameroon) (gen. prep.: SAFI00115), F = *idem*, aedeagus; D = *L. batesana* (Bakassi, Cameroon) (gen. prep.: SAFI00338)

**6. ábra.** A „fehér *Liptena*-fajok” nőtényeinek ivarszervei (oldalnézetben). A = *L. augusta* Suffert, 1904 (Ebogo, Kamerun) (gen. prep.: SAFI00022); B = *L. introspectionem* sp. n. ? (Mapimbi, Észak-Kivu, Kongói Demokratikus Köztársaság) (gen. prep.: SAFI00024); C = *L. minimis* sp. n. (holotípus) (gen. prep.: SAFI000114); D = *L. neiltentanti* sp. n. (holotípus) (gen. prep.: SAFI00003)

**7. ábra.** A *Liptena augusta* és *L. batesana* fajcsoport taxonjainak közelítő elterjedése. A = *L. introspectionem* sp. n.; B = a *L. augusta* Suffer, 1904, *L. batesana* Bethune-Baker, 1926 és *L. chrislowei* sp. n. együttes elterjedése (a sávozott terület csak becslést mutat, innen nem ismertek *L. introspectionem* sp. n. előfordulási adatok); C = *L. minimis* sp. n. (Nigéria és Kamerun hegyvidéki erdeiből ismert előfordulások); D = *L. batesana* (Kamerun, síkvidéki esőerdei előfordulás); E = *L. ilaro* Stempffer, Bennett & May, 1974; F = *L. neiltentanti* sp. n.