

Taxonomic notes on *Liptena eketi* Bethune-Baker, 1926 and related species (Papilionoidea: Lycaenidae: Poritiinae)

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Abstract: Examination of male genitalia confirms that *L. seyboui* Warren-Gash & Larsen, 2003 is specifically distinct from *L. eketi* Bethune-Baker, 1926 and shows that *L. kiellandi* Congdon & Collins, 1998, whilst close to *L. eketi*, is also distinct. The subspecies *kakamegae* Congdon & Collins, 1998 of *L. kiellandi* is synonymised with the nominate subspecies, and the distribution of the different taxa is clarified.

Key words: African butterflies, Poritiinae, Liptenini, male genitalia.

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INTRODUCTION

Liptena eketi Bethune-Baker, 1926 is a rare species, and this is probably the reason why male genitalia of this species were never yet described, including even by Stempffer (1967: 54). *Liptena seyboui* Warren-Gash & Larsen, 2003 was downgraded to *L. eketi seyboui* by D'Abbrera (2009: 649) However, from facies differences between the two taxa, Collins *et al.* (2013: 51) reinstated *seyboui* as a full species.

L. kiellandi Congdon & Collins, 1998, whose nominate subspecies flies in north-western Tanzania and subspecies *kakamegae* Congdon & Collins, 1998 from western Kenya, also resemble *L. eketi* and *L. seyboui*. Another population of *L. kiellandi* occurs in north-eastern DRC.

Recently a series of *L. eketi* males were captured at canopy level in a rainforest in eastern Nigeria by J. Brophy (Libert, in press), and abdomens from these specimens were obtained from ABRI and RWC. It was then possible to extract and examine the genitalia of *L. eketi*, and compare them with those of *L. seyboui*, which were described by Sáfián & Lorenc-Brudecka (2020: 6). The male genitalia of *L. kiellandi* were also studied, and confirmed a close proximity of this species to *L. eketi*.

METHODS AND MATERIALS

Genitalia processing and examination

The abdomens were kept in an approximately molar solution of ammonia and heated in a water bath for several hours. The abdomen was cleaned and examined at regular

intervals, and the abdominal membrane was gradually cut. When the cleaning was finished, the genitalia were immobilised with the help of minute pins in positions, enabling useful characters to be seen. When necessary, several preparations were viewed side by side under the microscope, allowing interesting comparisons. Several drawings were then made with a camera lucida, transferred to a computer using a drawing tablet, and finally processed with Photoshop. The method was time consuming, but very effective.

The genitalia are preserved in glycerine in small vials with the number of the preparation. These vials are placed in larger ones, with a label giving the number of the preparation and particulars about the specimen (sex, genus and species names and locality). A similar label is pinned to the cabinet specimen.

Abbreviations

ABRI: African Butterfly Research Institute, Nairobi
DRC: Democratic Republic of the Congo
MLC: Michel Libert Collection, Rouen, France
RDC: Robert Ducarme Collection, Brussels, Belgium
RWC: Robert Warren Collection, London, UK
WGC: Haydon Warren-Gash collection, Pessac, France

Specimens examined

Except for specimens studied from the author's own collection, those of *L. eketi*, *L. seyboui* and *L. kiellandi* listed below were only studied from poor quality images.

L. eketi

3♂ Rhoko, Iko Esai Community Forest, Cross River State, Nigeria, 28.xi. to 20.xii.2010, leg. J. Brophy, ABRI; 5♂ as above, RWC; 2♀ near Umuhaia, Eastern Nigeria, leg. Davey, ABRI.

L. seyboui

1♂ 17.xii.2020, 1♀, 3.xii.2020, Alépé, south-east Ivory Coast, WGC; 1♂ Tano Ofin, western Ghana, ABRI.

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L. kiellandi

1♀ Manki, NE of Fouban, west Cameroon (17.ii.1988)
MLC gen. prep. Libert 120–028; 5♂ Nord-Kivu, NE
DRC, leg. Ducarme, RDC; 4♂ Kasugho, 2000 m, v.2015,
viii.2014 (gen. prep. Libert 117-191, 117-192), xi.2016,
viii.2017; 1♂ Maliva, 1800 m, ii.2016, Bold MLIB–2530,

MLC; 5♂ Ebogo, S of Yaoundé, Cameroon, ABRI; 1♂
Ebolowa, south Cameroon, ABRI; 1♂ Bertoua, east
Cameroon, ABRI; 1♂ Batalimo, nr Bangui, Central
African Republic, ABRI; 2♂ Mabira Forest, Uganda,
ABRI.

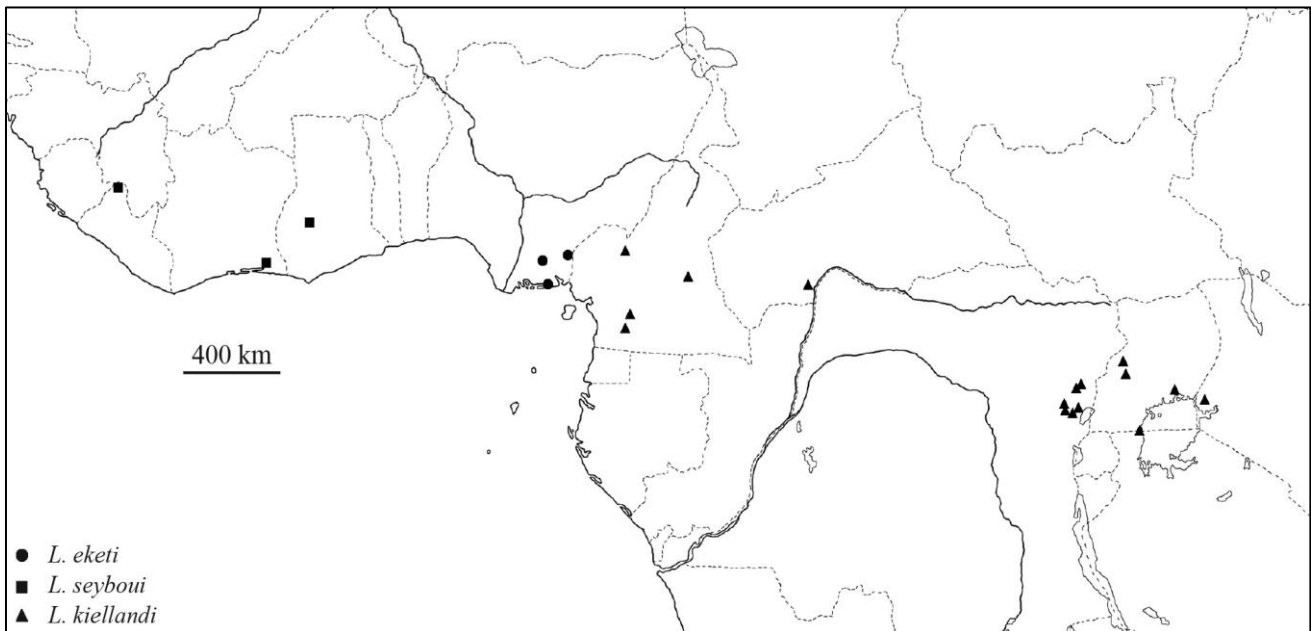
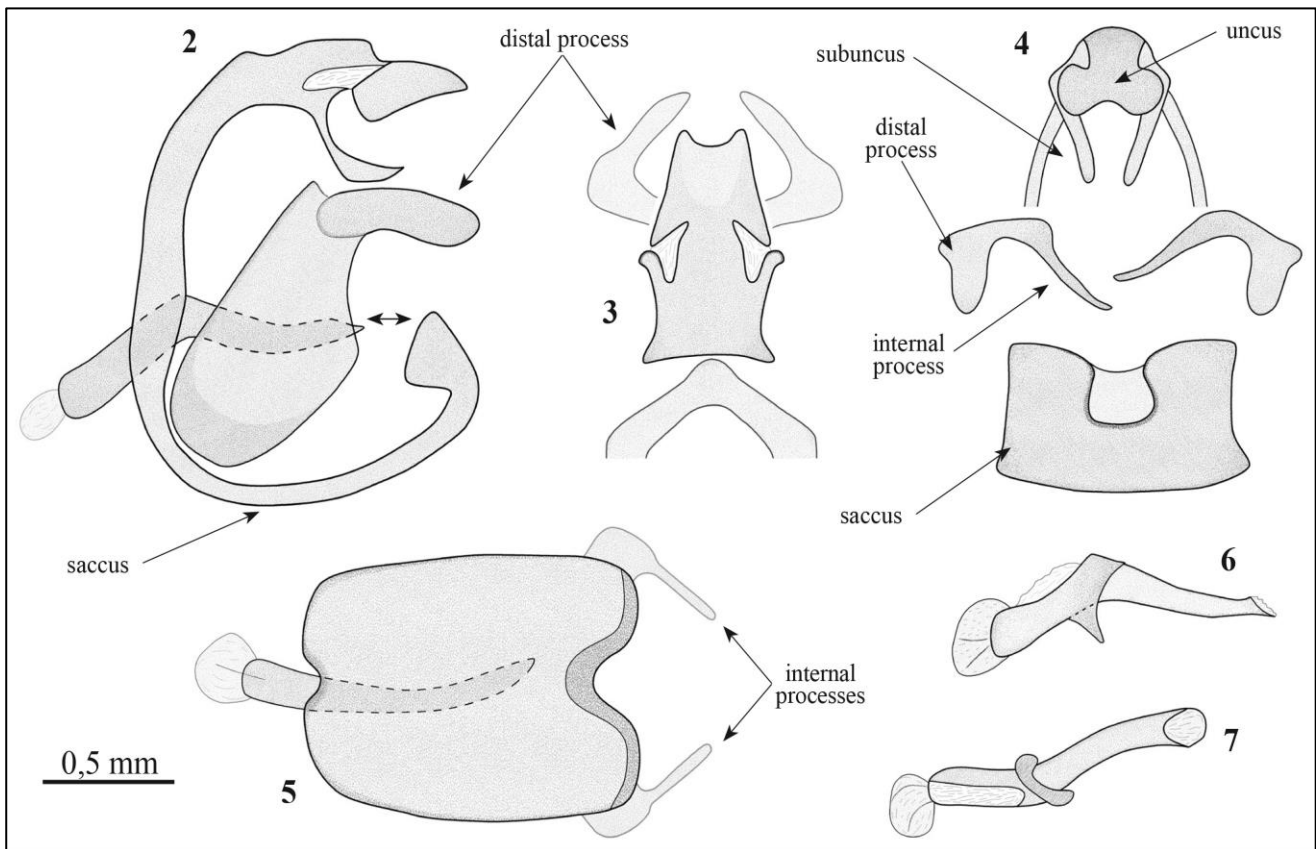


Figure 1 – Distribution map for *L. eketi*, *L. seyboui*, *L. kiellandi*



Figures 2 to 7 – Male genitalia of *Liptena eketi* (♂ Rhoko Forest, Eastern Nigeria, gen. prep. M. Libert 118-143)

2 – left lateral view; 3 – dorsal view of uncus; 4 – posterior view; 5 – ventral view of saccus and penis; 6 – penis, left lateral view; 7 – penis, dorsal view of the distal part.

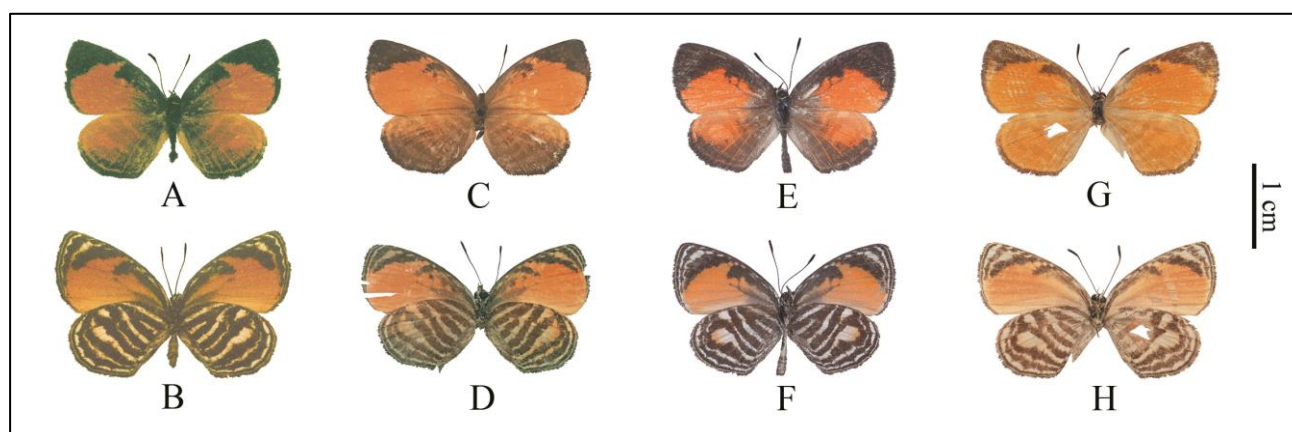


Plate 1 – A, B: *L. seyboui*, Alépé (Ivory Coast) A: ♂ Recto, B: ♀ Verso; C, D: ♂ *L. eketi*, Rhoko forest (Nigeria) C: Recto, D: Verso; E, F: ♂ *L. kiellandi*, Maliva (NE DRC) E: Recto, F: Verso; G, H: ♀ *L. kiellandi*, Manki (Cameroon) G: Recto, H: Verso.

RESULTS

Liptena eketi Bethune-Baker, 1926

Type material and distribution

L. eketi was described from a male collected at Eket, in south-eastern Nigeria. *L. eketi* was illustrated by d'Abbrera (2009: 649), with the upper side of the holotype and the underside of another male. A female captured in western Cameroon was attributed to *L. eketi* by Libert (1992: 28) but is now considered to be *L. kiellandi* (see below). From the available data, the range of *L. eketi* therefore appears to be restricted to south-eastern Nigeria (Fig. 1).

Facies (Plate 1 C, D)

See the description by Bethune-Baker (1926).

Male genitalia (Figs 2–7)

The saccus of *L. eketi* is so developed that it can be described as hypertrophied (even unique). The lateral view of the genitalia shows that its extremity curls up (Fig. 2) and the posterior view that the upraised part presents a significant notch (Fig. 4). In the 'natural' position, the distal end of the penis is very close to the saccus (Fig. 2, arrow), and it can be hypothesised that the notch constitutes a guide for the penis. While the saccus rarely offers any interesting character, that of *L. eketi* is genuinely exceptional, both for its size and the role it seems to play.

The dorsal edge of the valve is adorned with a structure composed of two processes, one distal and the other internal. There is no ventral process comparable to *L. seyboui*. The distal process, visible on the lateral view (Fig. 2), is massive and well sclerotized; an internal process, much thinner, is approximately perpendicular to the distal process and to the valve and therefore only visible in the dorsal and lateral views (Figs 4-5).

Other differences are less important, but the subunci are shorter in *L. eketi* (Fig. 2). The penis of *L. eketi* is distinctly twisted, its distal part turned to the right (Fig. 7 shows a dorsal view of this part, the basal part turned left).

It is possible that the penis of *L. seyboui* is also twisted, and that the unusual shape of its distal end is an artefact (Sáfián & Lorenc-Brudecka 2020, Fig. 4C).

Liptena seyboui Warren-Gash & Larsen, 2003.

Type material and distribution

The type-series of *L. seyboui* consisted of four specimens (3♂, 1♀) collected in Alépé, in the south-east of Ivory Coast. The only other two specimens known were 1♂ in western Ghana (Tano Ofin, ABRI), and 1♂ in the Wologizi mountains of north-western Liberia (Sáfián & Lorenc-Brudecka, 2020). The range of *L. seyboui* therefore extends over nearly 900 km, with about 1000 km and the Dahomey gap separating it from *L. eketi* (Fig. 1).

Facies (Plate 1 A, B)

See the original description by Warren-Gash & Larsen (2003) and illustrations from Sáfián & Lorenc-Brudecka (2020: 5).

L. seyboui does not differ much from *L. eketi*, with the upper side redder and darker, and the red-coloured area of forewings reduced, not quite reaching the marginal edge of the wings in space 3 (in *L. eketi* it only deviates from the edge beyond vein 3), and with a broad black margin between the costa and the cell (the black margin is narrower in *L. eketi*). These differences are similar on the underside where the light transverse bands of the hind wings are also thinner than in *L. eketi*, especially the second one (next to the marginal line), which also tends to widen towards the edge of the wing in *L. eketi*. The differences remain limited and do not allow deciding on the status of *L. seyboui* (subspecies of *L. eketi* or distinct species).

Male genitalia

The male genitalia of *L. seyboui* were described and illustrated by Sáfián & Lorenc-Brudecka (2020: 6). The most significant difference from *L. eketi* lies in the saccus. Whilst the saccus of *L. seyboui* is of a similar size to most other species of *Liptena*, the saccus of *L. eketi* is unusually large (see Fig. 2).

The processes on the valves of *L. seyboui* differ significantly from *L. eketi*, with a long ventral process, and a very weakly sclerotized distal process (described by Sáfíán & Lorenc-Brudecka as a ‘soft and bursa-like discoid lump’).

Liptena kiellandi Congdon & Collins, 1998

Type material and distribution

The description of *L. kiellandi* was based on c. twenty specimens, all collected at the type-locality (Minziro forest, in north-western Tanzania). The authors also described the subspecies *kakamegae*, from c. thirty specimens, all from the type-locality (Kakamega Forest, western Kenya). All of these type-specimens are in ABRI.

A female captured in western Cameroon, originally identified as *L. eketi* by Libert (1992: 28) looks closer to *L. kiellandi* (which was only described in 1998).

More recently, several other populations of *L. kiellandi* have been discovered:

- Two specimens captured in the Mabira forest, in south-eastern Uganda (ABRI, referred to the nominate subspecies)
- A large population in north-eastern DRC (around twenty-five specimens – ABRI and RDC)
- Western Uganda (three specimens from Budongo and Bugoma in the Nairobi Museum, as *L. fulvicans*¹)

The range of *L. kiellandi* therefore extends from western Kenya to western Cameroon (Fig. 1). It is separated from *L. eketi* by the Cameroon highlands, although Manki and the Rhoko forest are only about 260 km apart.

Facies (Plate 1: E–H)

Male holotypes of both subspecies were shown in the original description (upper side, two-thirds the actual size) and in d’Abrera (2009: 653), and their comparison appears to confirm the validity of the Kenyan subspecies. However, there are now about fifty specimens of the Kakamega subspecies in ABRI, several of which are hardly different from the nominate subspecies.

The upper side of *L. kiellandi* is very variable and not very different, either from *L. seyboui*, or from *L. eketi*, but the wide black margin along the costal edge of forewings makes it more similar to *L. seyboui*.

On the underside of the hindwings, the widening of the second pale transversal band is more strongly marked in *L. kiellandi* than in the other two species, and forms a discoid spot around the middle of spaces 4 and 5; on the costal edge, the spot in space 7 is also larger.

It was probably the existence of the discoid spot that prompted Vande Weghe (2010: 349) to compare

L. kiellandi to *L. praestans* Grose-Smith, 1901 and, looking at the underside of the hindwings only, the two species could indeed be confused, especially in the Kivu area of the DRC, where *L. praestans* is not rare. However, both the upper side of *L. praestans* and male genitalia are very different from those of *L. kiellandi*.

Given the variability of specimens from different populations, especially for the extension of the orange part on the upper side of hindwings, the DRC population cannot be considered as a distinct subspecies. Furthermore, it is uncertain whether a female of the DRC population has ever been captured, because dissection has shown that three specimens in the Ducarme collection identified as females from a photo were actually males.

Since the abdomens of several specimens from ABRI had been lost during transport, it has not been possible to compare the genitalia of the males of the Cameroon population to those of the more easterly populations. Paradoxically, the only female formally identified as such is from the Cameroon population, i.e. the Manki specimen (Figs 13–14 show its genitalia). Vande Weghe (2010, pl. 106) illustrates two of these specimens, one as male (Figs 41–42), the other as a female (Figs 43–44), but the latter is identical to the male from Minziro which was dissected for this work, and it is not certain whether it is female.

Male genitalia (Figs 8–12)

The figures show the genitalia of a male nominate *kiellandi* from the type-locality. The genitalia of the population from Kasugho (NE DRC) and of subspecies *kakamegae* (W Kenya) are identical to those of nominate *kiellandi*. All genitalia dissected were significantly larger than those of *L. eketi* (about 25%).

The saccus, as massive as in *L. eketi*, confirms the proximity of the two species; at the distal end, the curled up part has two rounded lateral rounded processes (Figs 11–12), but there is no notch, and we cannot speak here of a guide for the penis (Fig. 12). At the distal end of the valves, the internal process is not very different from that of *L. eketi*, but the distal one is very reduced, almost vestigial (Fig. 8, 10 & 12); on the other hand, the dorsal edge of the valves shows a short, pointed process, which is absent in *L. eketi* (Fig. 8). The uncus is slightly more indented than in *L. eketi* (Fig. 9), and the distal part of the subunci is shorter (Fig. 8). The penis, appreciably longer, is hardly curved (Fig. 8); it is not really twisted, but its distal end is turned slightly to the left (Fig. 10).

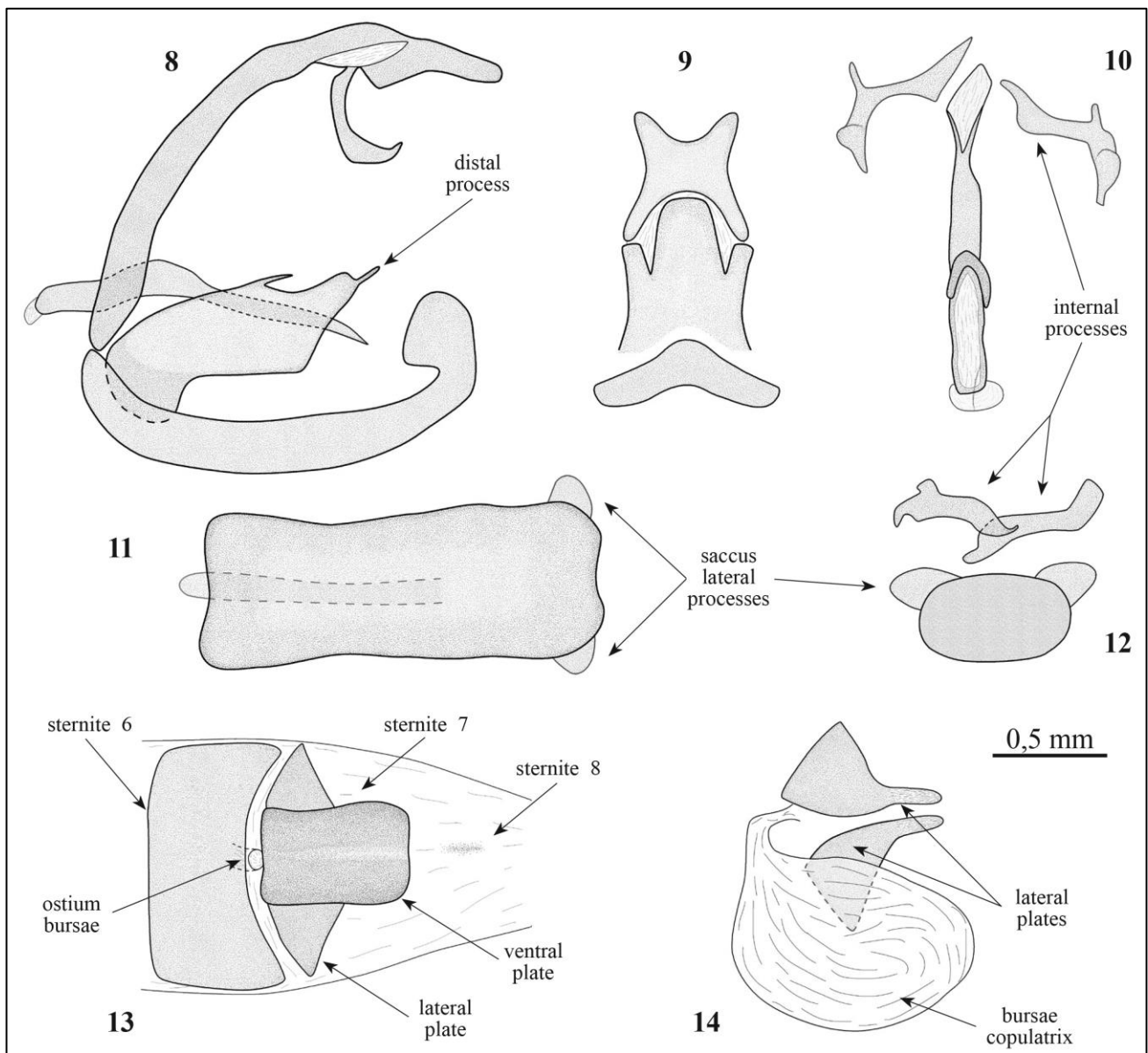
Female genitalia (Figs 13–14)

As mentioned above, only the female from Manki (Cameroon) was dissected.

The ostium bursae is located between sternites 6 and 7 (Fig. 13); the strongly sclerotized sternite 7 is constituted

¹ – They are mentioned in Congdon & Collins, 1998, p. 68 as *L. sp.*, and p. 119 as *L. pseudofulvicans* (unpublished manuscript name); the

specimen from Bugoma, which was caught in December 1939, is probably the oldest specimen known.



Figs 8 to 14 – Genitalia of *Liptena kiellandi*

Male genitalia: 8 – left lateral view; 9 – dorsal view of uncus; 10 – dorsal view of the valves processes and the penis; 11 – saccus, ventral view; 12 – posterior view of the saccus and the valves processes. Female genitalia: 13 – ventral view of sternites 7 & 8; 14 – three-quartered dorsal view.

by the three plates that form the sinus aginalis, a ventral plate and two lateral ones (Fig. 13).

The three plates seem to be merged, but the lateral plates are slightly separated from the edges of the ventral one, with which they laterally form an angle of about 40°. The sclerotization of sternite 8 is extremely reduced (Fig. 13). The ductus bursae is very short, but the bursae copulatrix is a rather voluminous ball; folded above the lateral plates, it considerably hinders their observation [this is why it is illustrated on a three-quartered view (Fig. 14)].

DNA barcode analysis

Almost all of the material examined for this work is too old for barcode sequencing to have been attempted, and the only sequence obtained was extracted from a male of *L. kiellandi* from Kivu (Maliva, in the north of the Mitumba Mountains). Although a single sequence is of

little interest, Maximum Parsimony and Maximum Likelihood trees constructed with a hundred sequences belonging to numerous *Liptena* species show that this sequence constitutes the sister-group of [*L. fallax* Libert, 2018 (x2) + *L. eukrines*, Druce, 1905 + *L. lualaba diminuta* Libert, 2018 (x4)].

With a bootstrap index of only 49, this result is not robust, and it is only given as an indication (the massive saccus of *L. kiellandi* and *L. eteti* is found in *L. eukrines* males but not in those of the two other species).

CONCLUSIONS

The great variability of the facies of *L. kiellandi* and the homogeneity of male genitalia throughout the eastern part of its range show that there is no need to distinguish subspecies, and *L. kiellandi kakamegae* is synonymised with *L. kiellandi* (**syn. nov.**). On the other hand, the status

of the western population could be reviewed when the genitalia of a male can be examined.

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