



Two new *Epitolina* from Liberia in the genera *Stempfferia* Jackson, 1962 and *Cephetola* Libert, 1999 (Lepidoptera: Lycaenidae: Poritiinae)

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Szabolcs Sáfian^{1,2}

¹ Institute of Silviculture and Forest Protection, University of West Hungary, H-9400 Sopron, Ady E. út 5. Hungary.

² African Butterfly Research Institute, P.O. Box 14308, 0800 Nairobi, Kenya. E-mail: safian@bcghana.org

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Abstract: Two new butterfly species in the family Lycaenidae were discovered during recent studies in the Nimba Mountains, Liberia: *Stempfferia katikae* sp. nov., and *Cephetola wingae* sp. nov. Both are described in comparison with their respective closest relatives. Both belong in the subtribe Epitolina, which has kept increasing in size since it was revised in 1999 and which contains a number of closely related species-pairs with completely allopatric distributions within the Guineo-Congolian forest zone. Two additional such pairs are discussed in this paper.

Key words: Epitolina, *Stempfferia katikae* sp.nov., *Cephetola wingae* sp.nov., allopatry, Liberian sub-region

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INTRODUCTION

In recent years butterfly studies have discovered a number of new species in Liberia, quite a few belonging to the family Lycaenidae (e.g. *Iridana kollariki* Sáfian, 2014; *Aphnaeus mirabilis* Sáfian & Collins, 2013; *A. nimbaensis* Sáfian & Libert, 2013; *Neurellipes gola* Libert, 2010 and *N. georgiadisi* Larsen, 2009). They were all characterised by having a closely related species distributed in Central or East Africa, with clearly allopatric distribution patterns (Sáfian *et al.*, 2013; Sáfian & Collins, 2014, Sáfian, 2014). It was therefore not surprising when two further lycaenid butterfly species in the tribe Epitolini were found in Liberia's Nimba Mountains, both of which have sister species with allopatric distributions. The new *Stempfferia* is closely related to *S. insulana* (Aurivillius, 1923), which has a wide distribution in the Congolian forest zone from Cameroon to western Tanzania, while the new *Cephetola* is very close to *C. izidori* (Kielland & Congdon, 1998), which is known from Kenya (Kakamega), Western Tanzania, Bangui, Central African Republic and in Southern Cameroon). A distinct subspecies of *C. izidori* is found in the southern outlier forests of Northern Zambia (*C. izidori zambeziae* Libert & Collins, 1999).

MATERIALS AND METHODS

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The male holotype of *S. insulana* was examined on the high quality colour illustrations in Libert (1999). Extensive material of *S. insulana* was viewed in the collection of the African Butterfly Research Institute, Nairobi (ABRI), including 54 males from Cameroon (various localities), 4 males from the Central African Republic (Bangui), 8 males from Tanzania (Minziro), as well as 9 males of *S. subtumescens* collected in Nigeria (West and the Niger Delta). A further 5 males of *S. moyambina* collected in Ivory Coast (various localities) were viewed in the Zoological Museum of the Jagellonian University, Krakow (ZMJU); 2 males from Ghana (Bunso Arboretum) and 1 from Liberia (Nimba Mountains) in the author's research reference collection.

The male holotype of *C. izidori* was examined in the ABRI collection, as well as a further male from Cameroon (Maan), 33 males from Tanzania (Minziro), 63 males from Uganda (Mabira) and 57 males from Kenya (Kakamega). The holotype of *C. izidori zambeziae* Libert & Collins, 1999 was viewed in the high quality colour illustration in Libert (1999). One typical male of each *Stempfferia* species, the holotype of *C. izidori* and another male from Mabira Forest Uganda are illustrated below.

Photograph methods were as described by Sáfian & Collins (2014).

RESULTS

GENUS *STEMPFFERIA* JACKSON, 1962

This is amongst the larger genera in the subtribe Epitolina; Libert's revision (1999) lists 45 species and a further 6 subspecies. The number of recognised species has not changed since its publication, according

to the African Butterfly DataBase (www.abdb-africa.org). They are distributed exclusively in the Guineo-Congolian forest zone. Probably most species (if not all) are associated with arboreal *Crematogaster* ants, since imagines are usually found near ant-infested trees. Although almost nothing is known about their development, a pupa and an empty case of *S. mercedes* [referred to as *S. carcina* before the revision by Libert (1999)] was found near a *Crematogaster* ant-tree in Nigeria (Lamborn, 1914), and the same species was bred in Sierra Leone, where the caterpillar was observed entering the carton nest of *Crematogaster* indicating strong myrmecophilous relationship (Sáfián unpublished). Many species are poorly known, due to their restriction to ant-trees; however, males of several species can also be observed displaying on hilltops with well-defined time-slots for each species (Libert, 1993; Congdon & Collins, 1998, Sáfián, unpublished). Females were mostly observed resting on dry twigs or tendrils near ant-trees, but recently egg-laying on branches and twigs of ant-trees by a few species has also been observed (Sáfián, unpublished).

***Stempfferia katikae* sp. nov.**

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The holotype and paratypes of *S. katikae* were collected by the author and a colleague during display flight on a hilltop in the Nimba Mountains (Mt. Beeton, Western Range). They kept a display-ground in a small gap in the forest canopy c. 6–10 m from the ground, where they flew between 10.30 and 11.00 am. They were often involved in fights with other displaying *Stempfferia* [e.g. *S. ciconia* (Grose-Smith & Kirby, 1892) and *S. cercene* (Hewitson, 1873)], which were active at the same time. They often took a rest on dry twigs, mostly out of reach (above 6 m). The specimens of the type series were captured when they chose to sit on a branch lower down. From the size and appearance of the specimens, it was immediately recognisable that they did not belong to any species known to occur in the Upper Guinean forest and based on comparison in the field with Larsen (2005), they looked closest to *S. subtumescens*. The similar-looking *S. insulana* was found to be the morphologically closest species in Libert's (1999) *Epitola* revision, but the unusually wide distribution gap between *S. insulana* and the new population led the author to investigate further the specific status of the latter.

Holotype: ♂ Mount Beeton, Nimba Mountains, Western Range, Nimba County, Liberia. Leg.: Sáfián, Sz. & Horváth, Á. 10–16.xii.2013. Coordinates: 07°31'52"N 08°39'22"W. Gen. prep: SAFI00017. Deposited in the ABRI collection.

Paratypes: 2♂♂ Mount Beeton, Nimba Mountains, Western Range, Nimba County, Liberia. Leg.: Sáfián, Sz. & Horváth, Á. 10–16.xii.2013. Deposited in the ABRI and Sáfián's research reference collection.

Description of the holotype: (Fig. 1 – A, C) Forewing length: 20 mm. Wingspan: 36.5 mm. Forewing upperside iridescent cobalt blue with narrow black costa. Black margin narrowing from tip (7 mm) to

tornus (1 mm). Blue area penetrated by black marginal triangles from the margin. Hindwing black on the costa above the cell and vein 6, black margin narrow, of equal width, and not penetrating the blue area covering the wing, except abdominal fold light greyish-brown. Underside: greyish-brown with silvery grey mottles on both wings (usual pattern for larger *Stempfferia*). Prominent rectangular spot at tornus of forewing, also narrow, silvery triangular (arrow-like) spots in spaces 2–5. Small crescent-shaped grey spots for a sub-marginal, grey chevrons form a marginal line. Hindwing mottles more irregular with grey streaks in the base and median, crescents and chevrons in the sub-marginal, marginal area. Eyes large, dark brown, antennae blackish on dorsal side, same brown as wings on underside. Body black on dorsal side, greyish-brown below.

Genitalia: (Fig. 2 – A, C) Large, 2.5 mm along dorsoventral axis. Slender and rather simple, similar to most species in the group. Coremata large (d = 1 mm), covered by thick black hairs. Uncus crescentic, thickly covered with short hairs, subunci long, slender. Tegumen narrow, almost straight, valva rectangular with rounded lobe-like projection at the anterior. Broadest at the median. Dorsal edge obtusely angled, ventral edge slightly concave. Saccus short, broad at base, narrowing down acutely. Aedeagus bent, broad in the middle, edge of dorsal protuberance angled. Narrows down acutely to anterior tip. Small, trapezoid apophysis present ventrally, edge sinuous towards base.

Differential diagnosis: *S. katikae* is morphologically closest to the Central-Eastern African *S. insulana*, but the latter differs from the new species in the following features: the ground colour of *S. insulana* is brighter cobalt blue, conspicuous only when series of the two are viewed next to each other. The blue scaling reaches beyond vein 7 on the forewing of *S. katikae* forming a very narrow, but quite well visible streak, while only scattered blue scaling appears in *S. insulana* (best seen in magnification). On the hindwing, *S. katikae* has an even, 1 mm broad black margin, while the majority of the examined males of *S. insulana* has only a very fine black marginal line, and only a couple of specimens have a defined black margin at all. The male genitalia of the two are also similar, although *S. katikae* has shorter and more slender sub-unci, and significantly broader valvae, which end in a lobe-like projection with a smooth transition on the dorsal edge. The valvae have a break on the dorsal edge at the base of the lobe in *S. insulana*. The ventral edge of the aedeagus of *S. katikae* is also bent more strongly downwards between the projection and the anterior end. The similar *S. subtumescens* is also dull blue on the upperside and on the forewing upperside, the blue scaling does not reach beyond vein 7, and also has a fine black streak at the end of the discoidal cell, which does not appear on *S. insulana* and *S. katikae*. This black tooth-like streak is even more conspicuous on the males of *S. moyambina* with which *S. katikae* flies sympatrically in the Nimba Mountains.

Notes on the distribution: The distributions of *S. katikae* and *S. insulana* show typical examples of the

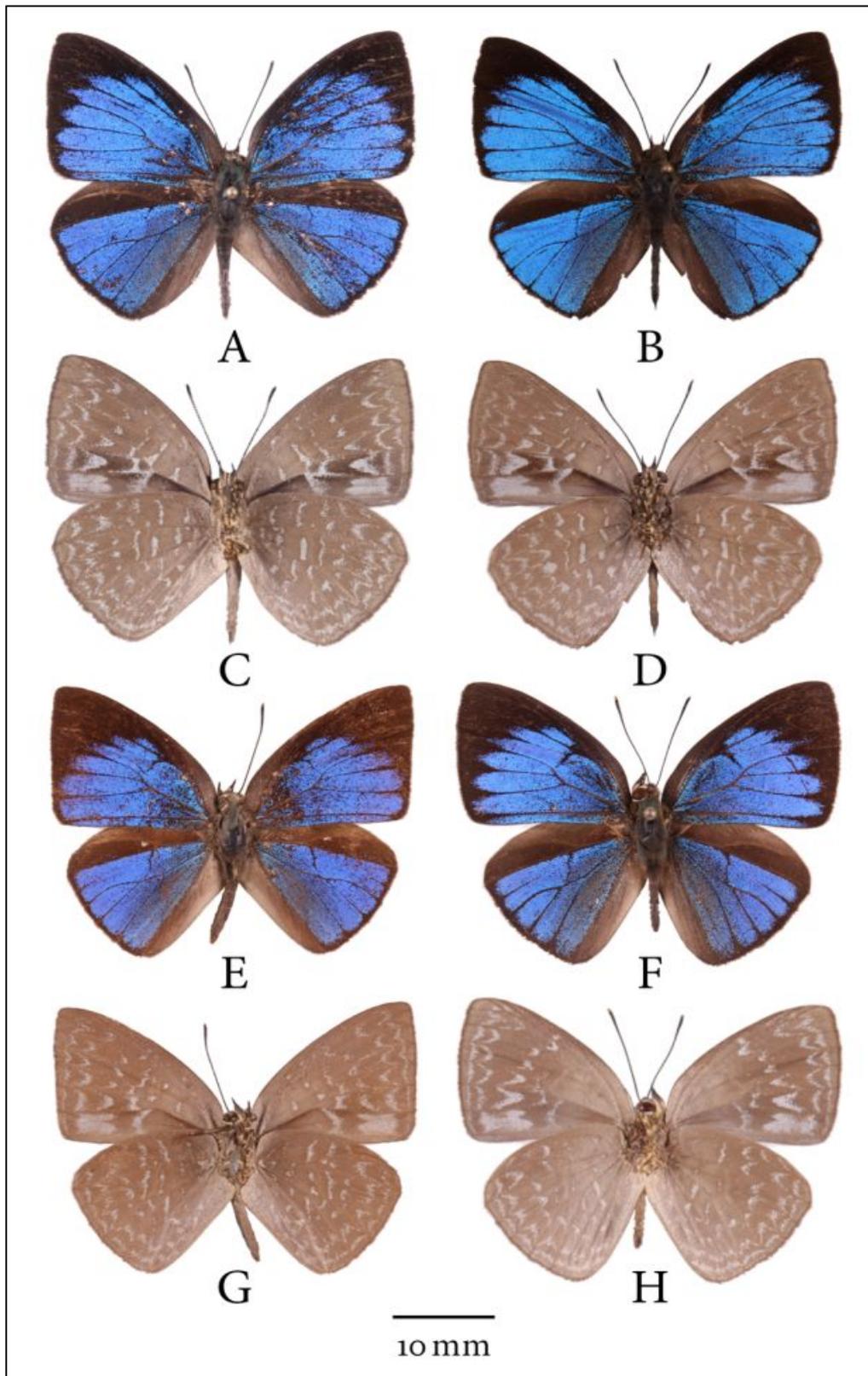


Figure 1 – *Stempfferia katikae* (holotype) A recto, C verso; *S. insulana* male (Meke, Cameroon) B recto, D verso; *S. subtumescens* male (Nigeria) E recto, G verso; *S. moyambina* male (Banco, Ivory Coast) F recto, H verso.

allopatry observed between closely related species in Central Africa's lowland rainforests and the Liberian sub-region (see also below for examples) (Fig. 3). The geographic distance between the ranges of the two species is about 1700 km, even if it is assumed that *S. katikae* is more widespread in the Liberian sub-region and not restricted to the Nimba Mountains, and

that *S. insulana* might reach Eastern Nigeria in the Cross River Loop [which was thought unlikely by Libert (1999)].

Derivatio nominis: This beautiful species is named after Kati Torda (Katika), a Hungarian-Ghanaian

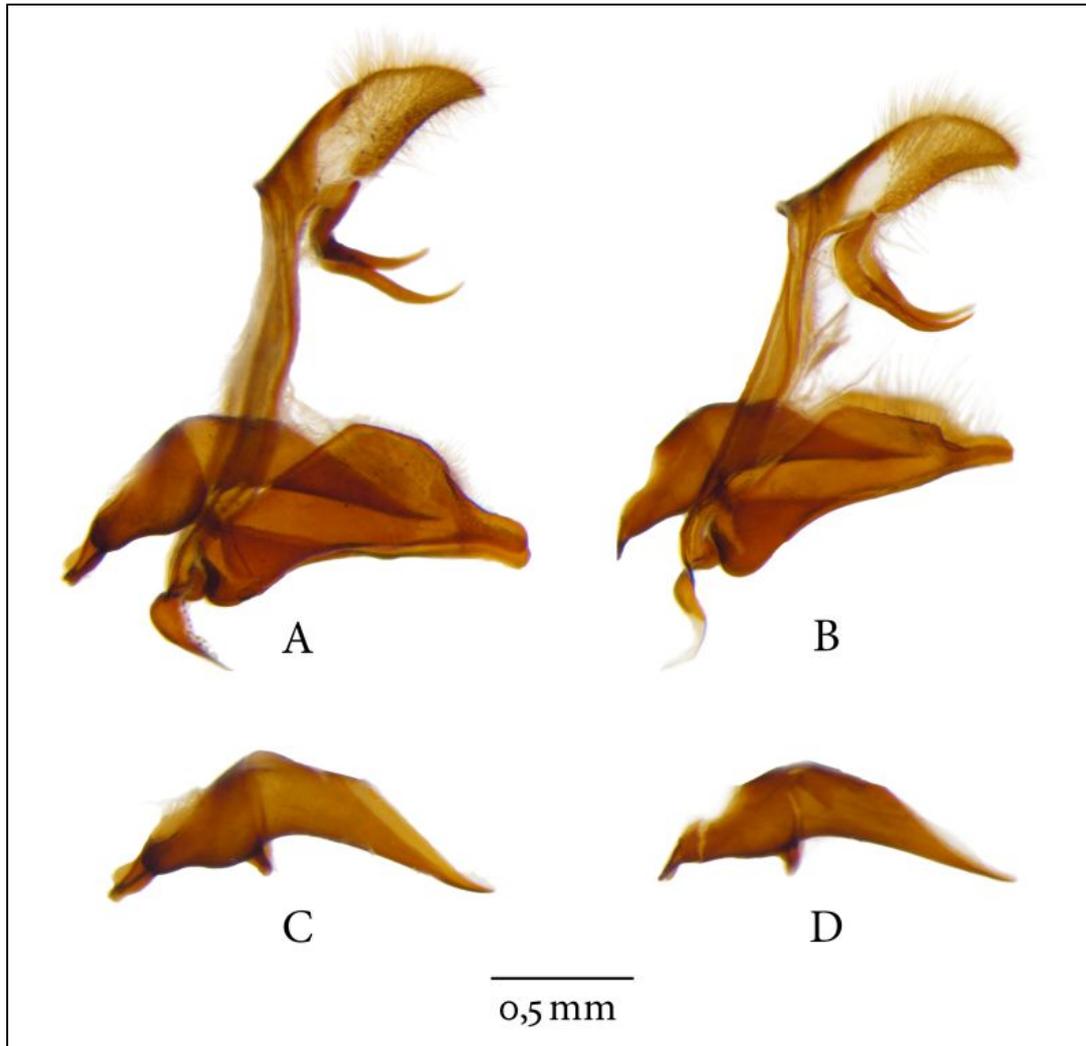


Figure 2 – Male genitalia of *S. katikae* (holotype) A lateral view, C aedeagus (Gen prep: SAFI00017) and *S. insulana* (Mekes, Cameroon) B lateral view, D aedeagus (Gen prep: SAFI00016). Coremata were removed.

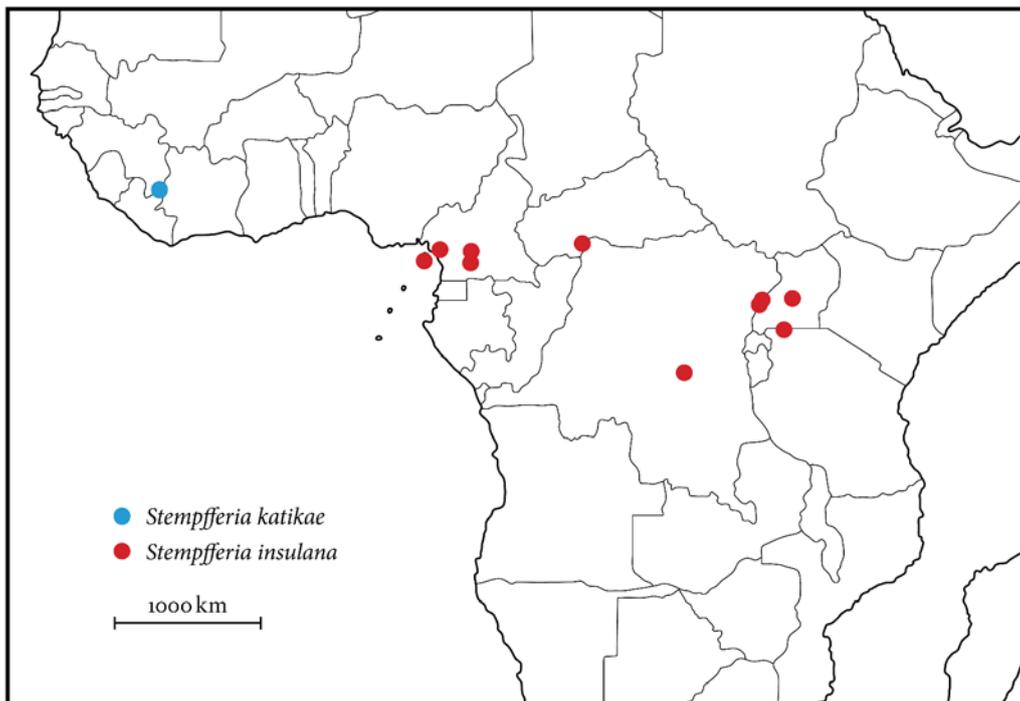


Figure 3 – Known distribution of *S. katikae* (Liberia) (Uganda, Tanzania, DRC, CAR, Cameroon and Equatorial Guinea) and *S. insulana* (Uganda, Tanzania, DRC, CAR, Cameroon and Equatorial Guinea).

artist who assisted the author on many occasions during his research in Ghana (as a student, usually on very low budget). Kati Torda, just like the butterfly named on her honour, really is a jewel on her own. The name is also a slight play with words, as in Hungarian Katikae (Katikáé) means Katika's/belongs to Katika.

GENUS *CEPHETOLA* LIBERT, 1999

This is the largest genus in the tribe Epitolini with 45 species and 9 further subspecies in Libert's revision (1999). The number of recognised species did not change since its publication according to the African Butterfly DataBase (www.abdb-africa.org). All species are distributed in the Guineo-Congolian forest zone. (the type locality of *C. australis* in Mozambique seems to be a *patria falsa*). Many, if not all, species are associated with arboreal *Crematogaster* ants, as imagines are usually found near ant-infested trees. Very little is known about their development; apart from a few oviposition records in the environment of ants (van Someren 1974), nothing has been published. Recently, larvae of a few species were found in proximity of *Crematogaster* ants and a larva of *C. collinsi* was even recorded entering the carton nest of the ants, indicating strong myrmecophilous relationship (Sáfián, unpublished). Many species are poorly known, due to their restriction to ant-trees; males of several species may also be observed displaying on hilltops at fixed times of the day (Libert, 1993, Congdon & Collins, 1998, Sáfián, unpublished). Females were mostly observed flying around ant-trees or larger bushes, which were also visited by ants. Egg-laying on branches and twigs of ant-trees by a few species was also observed (Sáfián, unpublished).

Cephetola wingae sp. nov.

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The holotype and the paratypes of *C. wingae* were collected by the author on hilltops in the Nimba Mountains [Mt. Beeton, Western Range and Mt Bele (Blei), Blei Community Forest]. They were among the first active displaying Epitolini seen on the hilltops, flying between 8.30 and 9.00 am. The only other species in the group present was *Iridana hypocala* Eltringham, 1929, which was displaying at the same time. The males of *C. wingae* (one or two at a time) flew around their territory quite low (5–6 metres from the ground) down in a small gap in the canopy at high speed, but were not seen settling. The captured specimens were immediately recognised to be unique, as no *Cephetola* species with large blue area on the hindwing were known from the Upper Guinean forests, apart from *C. subcoerulea* (Roche, 1954), which has concave outer margins of the forewing (Larsen, 2005). It mostly resembled *C. izidori* from illustrations in Libert (1999), but the unusually wide distribution gap led the author to further investigate the specific status of the Liberian population.

Holotype: ♂ Mount Beeton, Nimba Mountains, Western Range, Nimba County, Liberia. Leg.: Sáfián, Sz. & Horváth, Á. 10–16.xii.2013. Coordinates:

07°31'52"N 08°39'22"W. Gen. prep: SAFI00068. Deposited in the ABRI collection.

Paratypes: 4♂♂ Mount Beeton, Nimba Mountains, Western Range, Nimba County, Liberia. Leg.: Sáfián, Sz., Horváth, Á. 10–16.xii.2013.; Leg.: Sáfián, Sz., Kőrösi, Á. 02–06.x.2013.; Mount Bele (Blei), Blei Community Forest, Nimba Mountains, Nimba County, Liberia. Leg.: Sáfián, Sz. & Horváth, Á. 27–31.xii.2013. Deposited in the ABRI and Sáfián's research reference collections.

Description of the holotype: (Fig. 4 A, D) Forewing length: 15.5 mm. Wingspan: 28.5 mm. Upperside: Forewing black with two small brilliant blue spots in space 1b and one in space 2. Hindwing black with extensive brilliant blue between vein 2 and vein 6. Base black, also the margin leaving a 1 < mm black frame around the blue area. Two-thirds of discoidal cell blue, fine black streak present at the end of the cell. Underside: centre of forewing black in a band broadening from the base towards the margin with rather diffuse edge. Large silvery-grey spot is present in space 1a, 1b, a smaller one in space 2 in the border area of the black centre. Smaller silvery spots present also in space 3 and along vein 5. Silvery grey dusting is present on apex. Hindwing dark greyish-brown, scattered with silvery scaling, especially along the inner margin and the sub-marginal area on the hindwing. Ventral body colour is like underside, dorsal side black. Legs dark, chequered with white. Antennae black, chequered with white, with tiny orange tip on club.

Genitalia: (Fig. 5 A, C) Size: 1.5 mm along dorsoventral axis. Slender and rather simple with broad valvae, similarly to other species in the group. Uncus erect, conical, subunci reduced to a downwards directed (pendulous looking) apophysis on one side, vestigial on the other side. Tegumen rather broad, straight. Saccus long, slender, valve broad, oval-shaped with lobed extremity. Aedeagus trapezoid, with triangular protuberance on dorsal edge, ventral edge almost straight, only very slightly sinuous. Coremata missing.

Differential diagnosis: The male of *C. wingae* is very similar to that of *C. izidori* in general appearance, however, the latter has three well visible but rather diffuse blue spots in the forewing discoidal cell (Fig. 4) and the southern subspecies *C. izidori zambeziae* has even more extensive blue spotting, almost forming a blue band in the forewing cell. Only minute blue scaling is seen in the forewing cell of *C. wingae*, the blue spots are also much smaller in veins 1b and 2 compared to those in *C. izidori*. The genitalia are also similar but the valvae of *C. wingae* are bolder and the lobed projection at the tip of the valva of *C. izidori* is slightly longer compared to that of *C. wingae*. The aedeagus of *C. wingae* is also broader compared to that of *C. izidori* (Fig. 5).

Notes on the distribution: Similarly to *S. katikae* and *S. insulana*, *C. wingae* and *C. izidori* form a species-pair, where *C. izidori* has a wider distribution in East and Central Africa, whereas *C. wingae* was found only locally in the Nimba Mountains in northern Liberia.

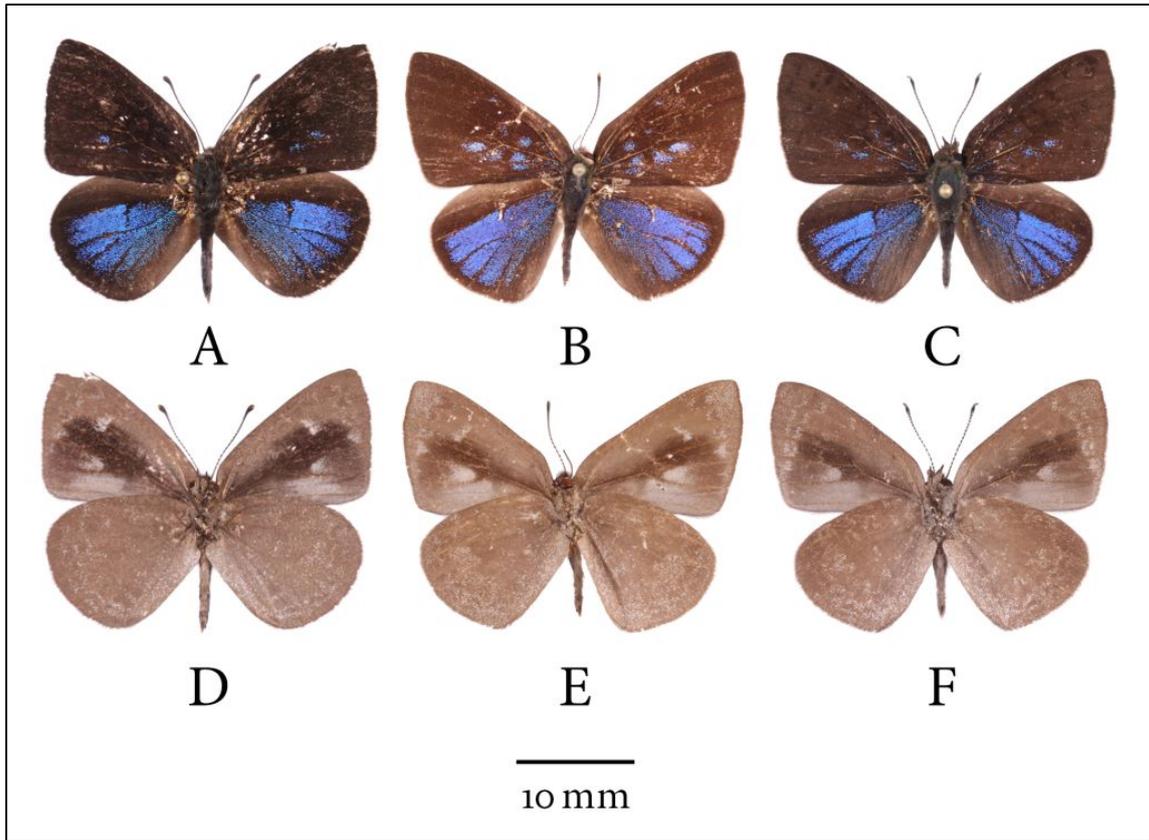


Figure 4 – *Cephetola wingae* (holotype) A recto, D verso; *C. izidori* (holotype) B recto, E verso; *C. izidori* male (Mabira Forest, Uganda) C recto, F verso.

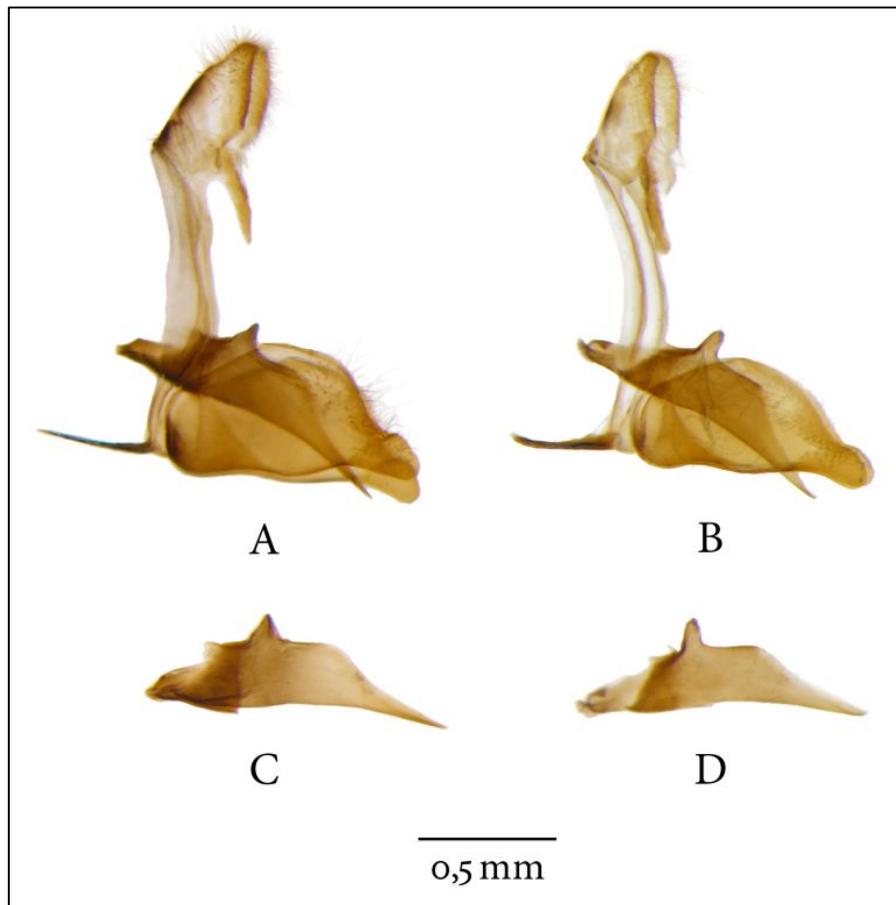


Figure 5 – Male genitalia of *C. wingae* (holotype) A lateral view, C aedeagus (Gen prep: SAFI00068) and *C. izidori* (Mabira Forest, Uganda) B lateral view, D aedeagus (Gen prep: SAFI00069).

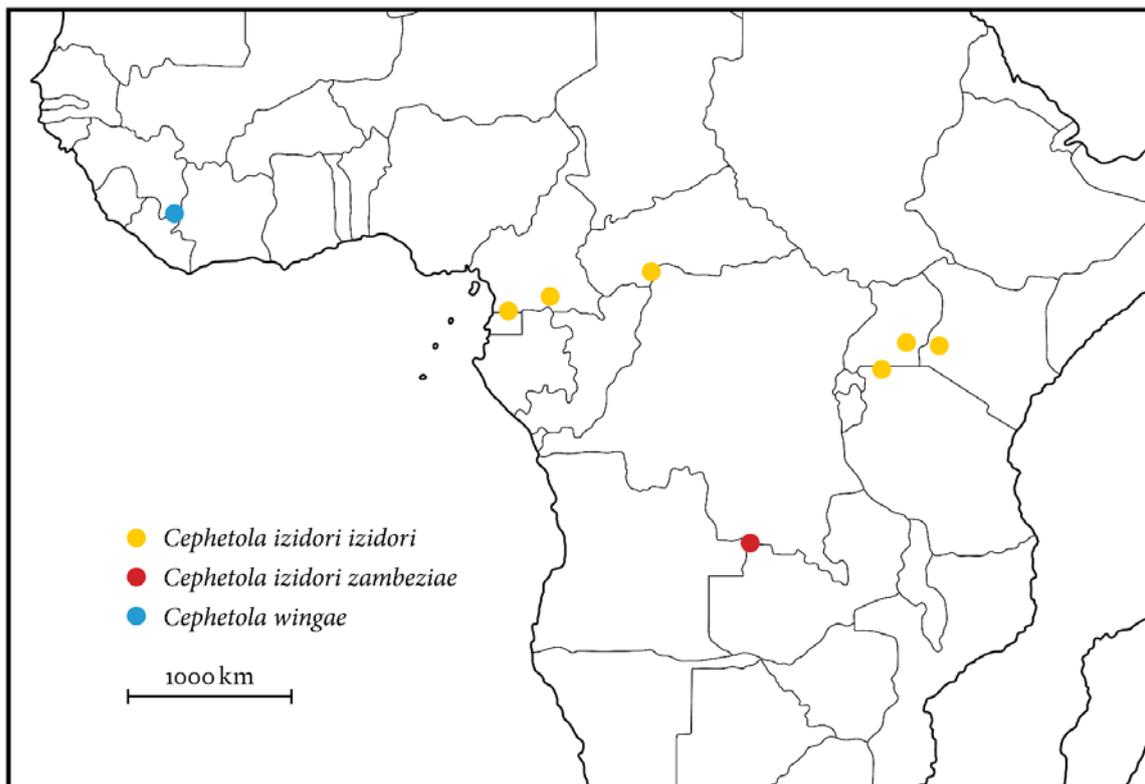


Figure 6 – Known distribution of *C. wingae* (Liberia), *C. izidori* (Kenya, Uganda, Tanzania, Cameroon and CAR) and *C. izidori zambeziae* (Zambia).

Recently, other species groups (or species-pairs) were found, showing similar distribution pattern in other genera of Lycaenidae. *Aphnaeus nimbaensis* Sáfián & Libert, 2013 was described recently from the upland forests of the Nimba Mountains, with its relatives occurring in the Congolian forests (Libert, 2013, Sáfián *et al.*, 2013) and a yet undescribed *Pilodeudorix* in the *P. mimeta*-group (*sensu* Libert) was found only in the Nimba (Sáfián unpublished), while *P. mimeta* (Karsch, 1895) is widespread in the forests of the Congo Basin (Libert, 2004).

Derivatio nominis: The species is named after Wing-Yunn Crawley, biodiversity program coordinator for ArcelorMittal, Liberia. Wing is among the most enthusiastic conservationists I ever worked with; without her commitments the East Nimba Nature Reserve and the Liberian Nimbas would not have received their well-deserved attention and care from conservation organisations and researchers.

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