


Description of the previously unknown sexes in four West African Lycaenidae (Lepidoptera) with new data on their distribution

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Abstract

Several new butterfly species in the family Lycaenidae were found during recent field surveys in Liberia. Amongst these, quite a few were collected as singletons or in small series, represented by only one of the sexes. This paper describes and illustrates the previously unknown sexes of four of those species which were subsequently found, adding new locality records to their known distribution.

Key words: *Parasiomera alfa*, *Geritola pacifica*, *Cephetola wingae*, *Pilodeudorix mano*, Liberian sub-region, Guinea Highlands, endemism

Introduction

Several new species of Lycaenidae have recently been recorded and described from Liberia, West Africa by the author and his colleagues in recent years (Sáfián 2015a, 2015b, Sáfián & Collins 2015, Sáfián *et al.* 2013, 2015a, 2015b). Several of them are known only from males: *Cephetola wingae* Sáfián, 2015, *Geritola pacifica* Sáfián & Libert, 2015, *Pilodeudorix mano* Sáfián, 2015, *Aphnaeus nimbaensis* Sáfián & Libert, 2013, while two species were described from female holotypes with no associated males known: *Parasiomera alfa* Sáfián, 2015, *Aphnaeus mirabilis* Sáfián & Collins, 2013. They are also generally known from a single locality due to their scarcity, and remoteness or inaccessibility of suitable habitats. Between 2017 and 2019 the author participated in various field studies in Liberia, where specimens of one or more newly described species were collected, including the yet undescribed sex. In this paper, the previously unknown male of *P. alfa* and females of *C. wingae*, *G. pacifica* and *P. mano* are described, and further records of each species are presented.

Material and methods

All specimens listed in this paper are deposited in the Lepidoptera collection and museum of the African Natural History Research Trust, Leominster, UK (ANHRT), comparative material was examined in the African Butterfly Research Institute, Nairobi, Kenya (ABRI). Genitalia of *P. alfa* and *P. paradoxa* (Schultze, 1917) were dissected in the Nature Education Centre of the Jagiellonian University, Kraków, Poland using the following method: male genitalia were removed from abdomens and soaked in boiling 10% KOH solution for 5–10 minutes. Subsequently, abdomens were preliminarily cleaned of soft tissue in water in order to expose the genitalia. Dissected genitalia were cleaned using 90–95% ethanol solution. A Nikon digital camera DS-Fi1 and an Olympus SZX9 stereomicroscope were used for imaging the dissections, processed in Combine ZP and Corel PHOTO-PAINT X3 programs to enhance focus and improve quality. Genitalia were retained in glycerol-filled vials pinned under the corresponding specimens (see reference numbers below). The digital images, colour plates and occurrence maps were edited in various versions of Adobe Photoshop photo editor and Adobe InDesign layout and page design software. References for venation and internervular spaces follow the simplified “English” or numerical system (Miller 1970), which is also used in modern works on African butterflies (Larsen 1991, 2005).

Results

Parasiomera alfa Sáfián, 2015

(FIGS. 1A,B; 2; 3B,D)

Sáfián & Collins (2015): 133–134.

urn:lsid:zoobank.org:pub:16A1C3C4-D996-4576-A882-E9EE37BE137D

Illustrated specimen data. ♂ LIBERIA, Lofa County, Wologizi Mountains, Ridge Camp 2 8°7'20.79" N, 9°56'50.75"W, 883 m, General collecting, 22-31.XI.2018, Sáfián, Sz., Simonics, G. Leg. Gen. prep.: SAFI00392. ANHRT: 28: 43.

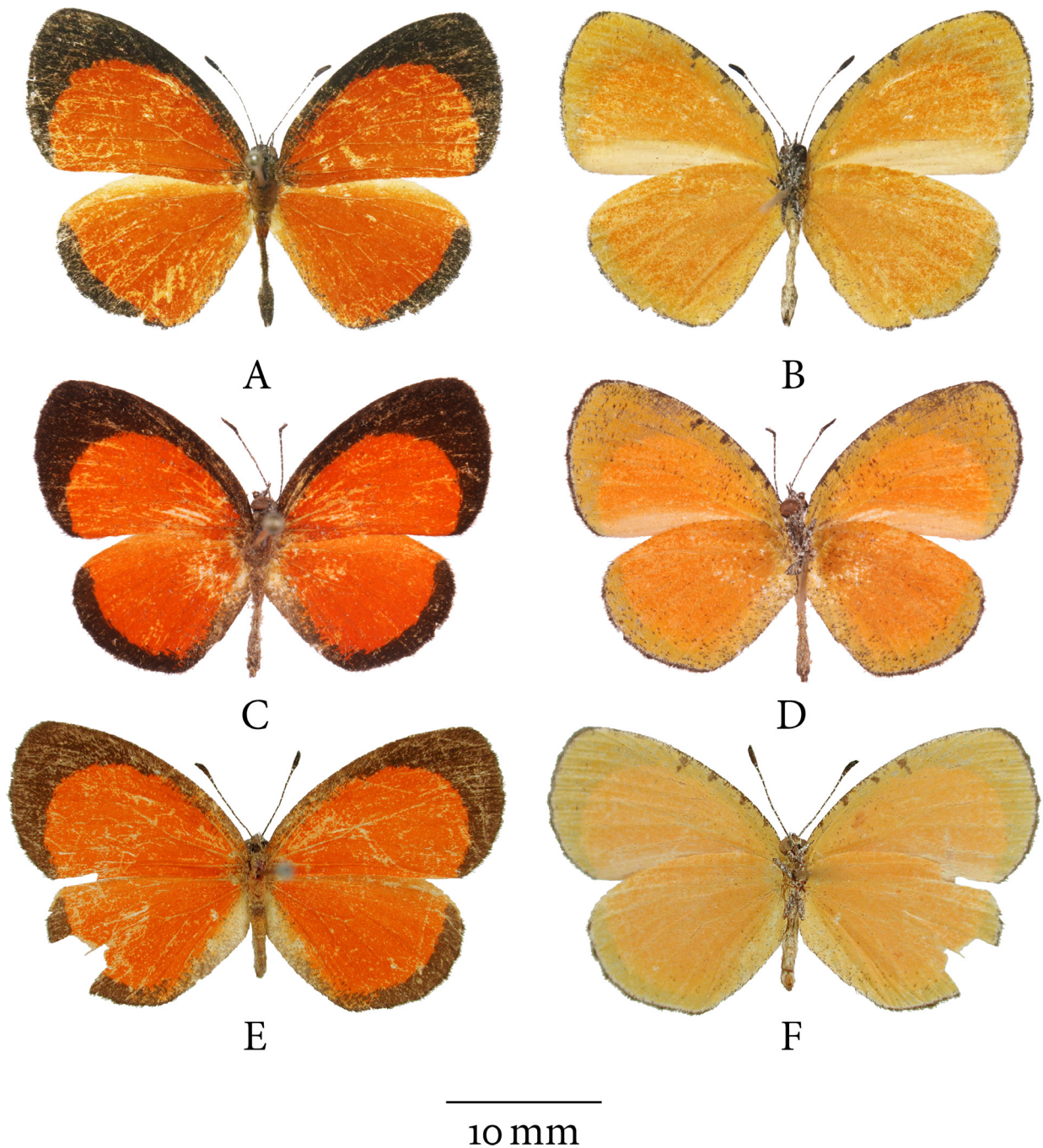


FIGURE 1. *Parasiomera* imagos: *P. alfa* male (Liberia, Wologizi Mountains) upperside—A, underside—B; *P. paradoxa* male (Cameroon, Ebogo) upperside—C, underside—D; *P. paradoxa* (lectotype female (Cameroon, Yendi, Southwest Region) upperside—E, underside—F.

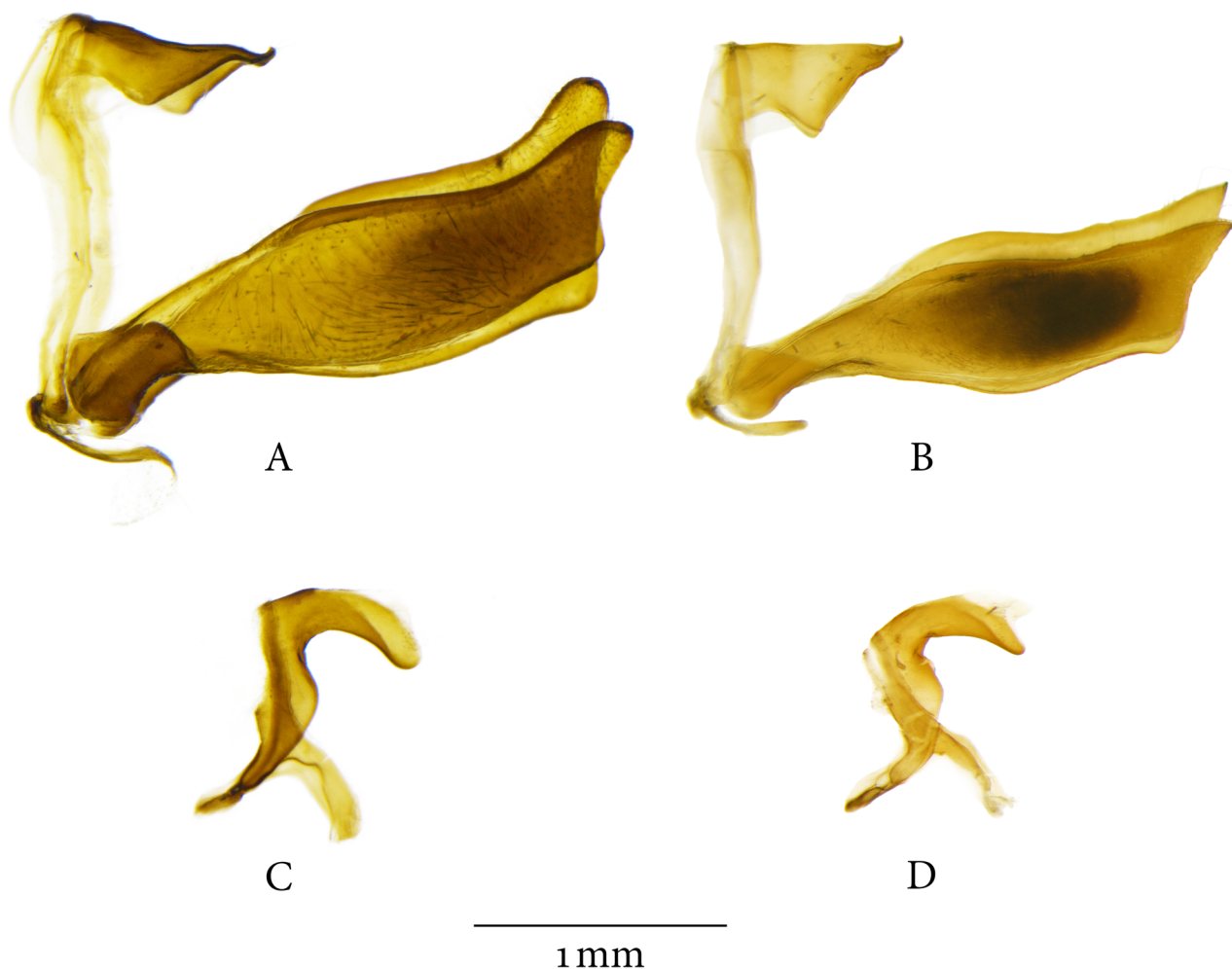


FIGURE 2. Male genitalia (lateral view and separated aedeagi): *P. alfa* (Liberia, Wologizi Mountains, Gen. prep.: SAFI00392)—A, C; *P. paradoxa* (Cameroon, Ebogo, Gen. prep.: SAFI00026)—B, D.

ANHRT unique number: ANHRTUK00058072

Description and identification. Forewing length: 16.4 mm. Wingspan: 30.7 mm. General appearance similar to that of female with bright red-orange upperside with black border on both wings and paler yellow underside. Forewing black border, hindwing marginal band slightly broader than in female, hindwing band tapers down to narrow black marginal line, terminates at tornus. Both sexes of *P. paradoxa* have broader black border on the wings, and *P. orientalis* (Stempffer, 1962) and *P. kivuensis* Sáfián & Collins, 2015 have a tiny black dot at the end of the cell on the forewing underside (Sáfián & Collins 2015). The genitalia of the specimen illustrated in Fig. 3 are similar to those of all other species in the genus, showing slight differences from those of *P. paradoxa*: the uncus in *P. alfa* is more slender and its pointed tip is longer, similarly their sacci (this should be viewed in proportion, as the examined male of *P. alfa* is larger than the comparative specimen of *P. paradoxa*).

New records. The species was described from the unique female holotype. It was collected on a hilltop, circling rather low with a male which escaped. Very similar bright-orange specimens have since been observed in the Putu Range, the Foya Proposed Protected Area and in the Wologizi Mountains, displaying high up under the canopy of tall ant-trees usually on hilltops. These displaying males did not descend to ground level, and could not be caught, and therefore the true identity of them could not be confirmed. However, a single male was captured under similar circumstance with a long-handle net on a hilltop in the Wologizi Mountains, which supports the possibility of a species more widely distributed in lowland forests in the Liberian sub-region. Only the confirmed new record is listed here and the specimen is illustrated on Fig. 1.

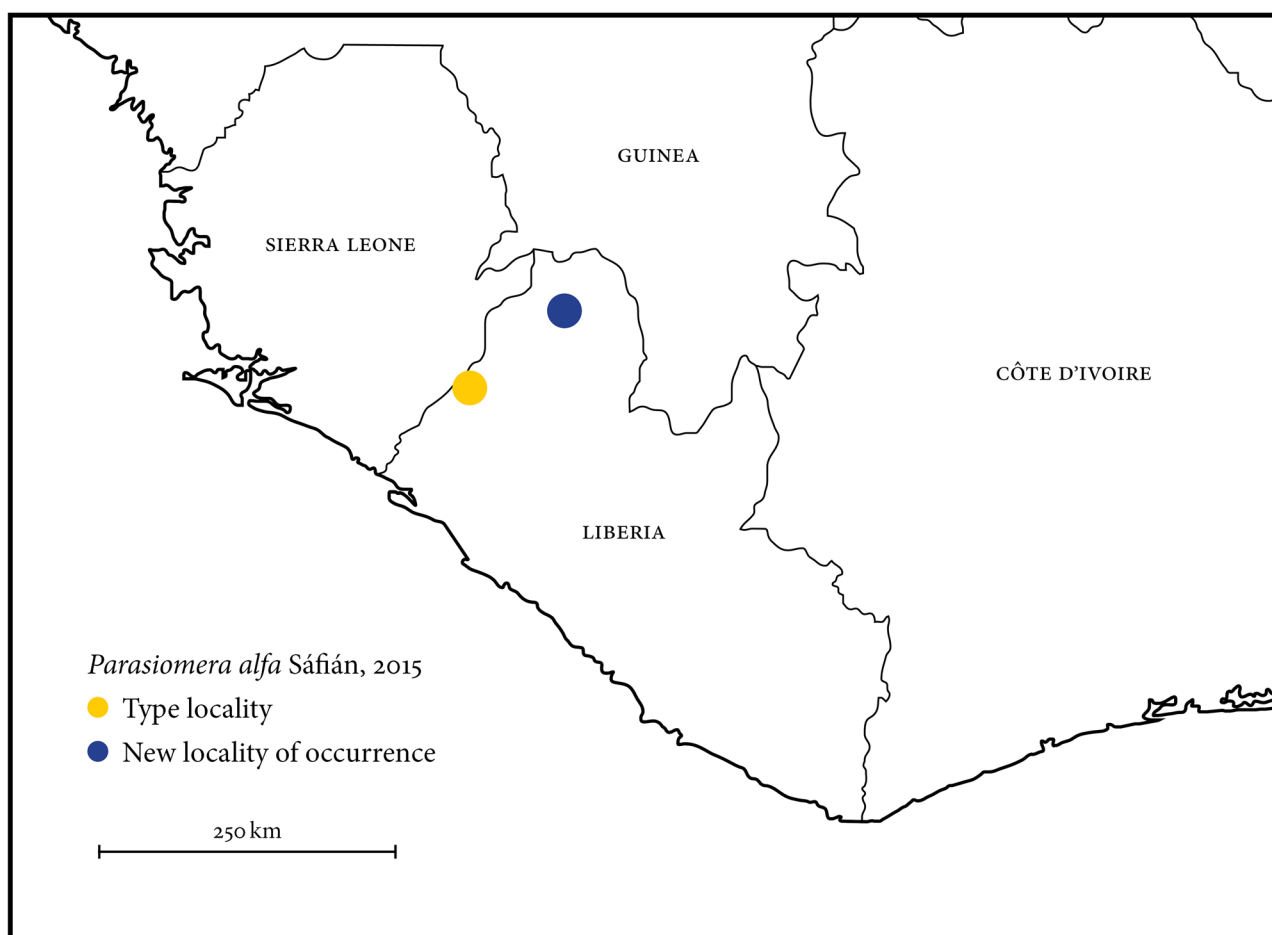


FIGURE 3. Known localities of *Parasiomera alfa*.

Geritola pacifica Sáfián & Libert, 2015

(FIGS 4A,B; 5)

Sáfián, Sz., Collins, S.C. & Libert, M. (2015): 287–288.

lsid:zoobank.org:pub:63593D6A-D6D2-425A-8607-B3AB08CD9471

Illustrated specimen data. ♀ LIBERIA, Lofa County, Foya Proposed Protected Area, Kailahun camp 7°56'35.80"N, 10°16'36.22"W, 530m, General collecting, 10-19.XI.2017, Aristophanous, M., Sáfián, Sz., Simonics, G., Smith, L. Leg. Gen. prep.: SAFI00392). ANHRT: 2017: 33

ANHRT unique number: ANHRTUK00037703.

Description and identification. Forewing length: 21.1 mm. Wingspan: 37.3 mm. The general appearance of the female is like *G. nitidica* Libert & Collins, 1999 and *G. wardi* Sáfián & Collins, 2015 with a black upperside with the forewing basal half overlaid by peachy blue scaling, which is restricted to the area between veins 1 and 6 on the hindwing. The underside is also very similar with virtually no markings except a fine, greyish marginal line and a submarginal row of grey chevrons. Similarly to the male, the basal two-thirds of vein 1 is thickened on the forewing, also in *G. nitidica*, whereas in *G. wardi* the thickened part of vein 1 is shorter than half the total length. The blue area extends to the margin in spaces 2 and 3 on the hindwing of *G. pacifica* female, whereas it is broader in *G. wardi*, reaching the margin between veins 1 and 4. The blue on the hindwing of *G. nitidica* is restricted to the basal and median area, leaving a broad black margin around it.

New records. *G. pacifica* was originally known only from lowland localities. The locus typicus is hyper-wet forest in the Gola National Forest (now Gola Forest National Park) on the Sierra Leonean border, where the type was collected with *Parasiomera alfa* at Camp Alpha. A second male specimen was collected by Robert Tropek in simi-

lar habitat in the Sapo National Park (Sáfián *et al.* 2015a). During an ANHRT-organized expedition, several males were collected displaying on a hilltop in the Foya Forest (Foya Proposed Protected Area) just north of the Gola Forest. These two lowland forest areas form a single large forest block of hyper-wet forest in Western Liberia. A small series of females was also collected at the same locality. Further male specimens were collected approximately 40 km north-east of the Foya locality in the Wologizi Mountains. A few were observed displaying on tree-trunks on hilltops at 830–860 m. At this altitude, Liberian forests usually harbour a few upland elements, and two presumably upland specialists, *P. mano* Sáfián, 2015 and the only known female of *C. wingae* Sáfián, 2015 were also collected on the hilltops, sympatrically with *G. pacifica*.

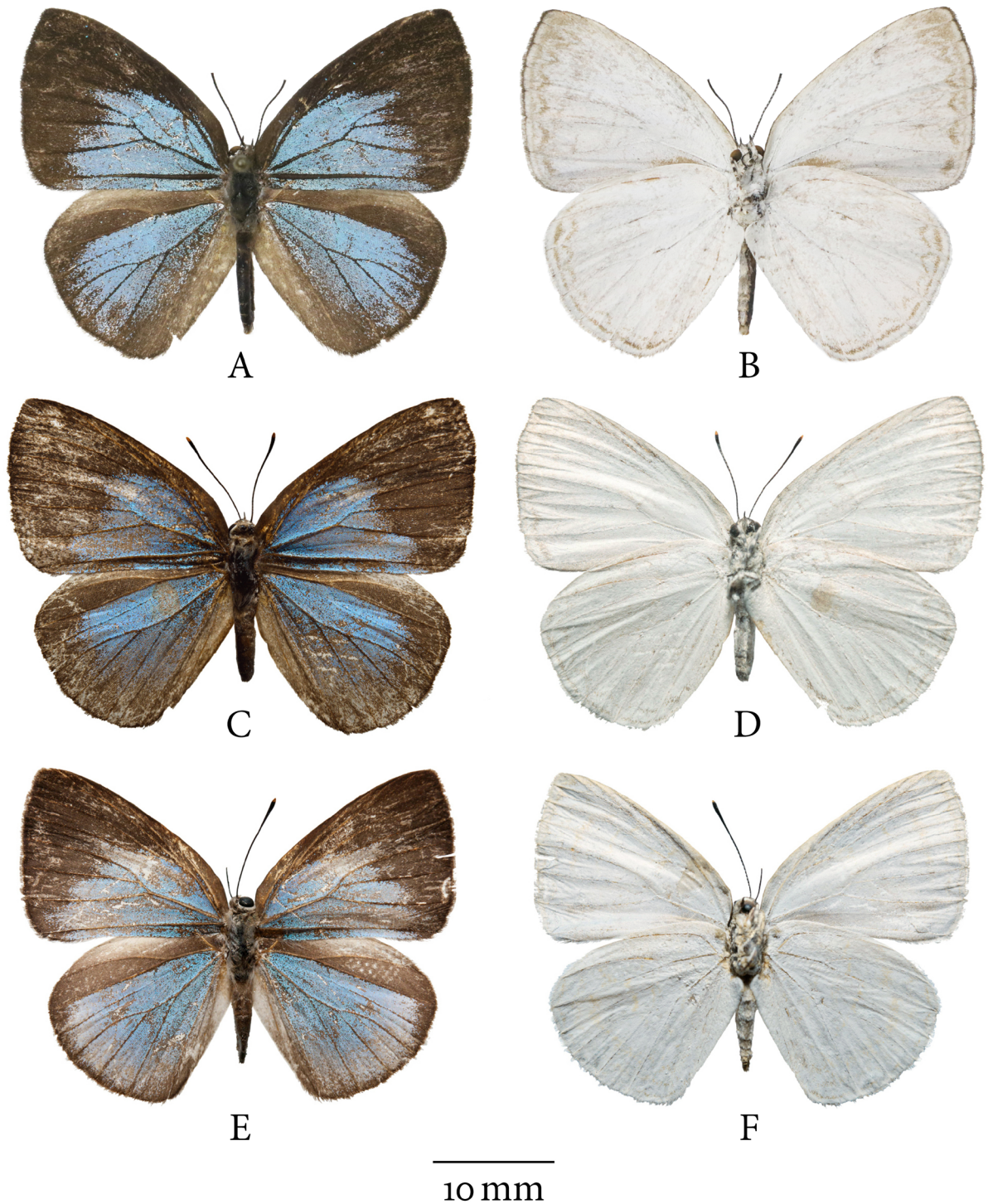


FIGURE 4. *Geritola* females: *G. pacifica* (Liberia, Kailahun camp, Foya Proposed Protected Area) upperside—A, underside—B; *G. nitidica* (Cameroon, Ebogo) upperside—C, underside—D; *G. wardi* paratype (Uganda, Mabira Forest) upperside—E, underside—F.

Additional material examined

LIBERIA 9♂♂, 5♀♀ LIBERIA, Lofa County, Foya Proposed Protected Area, Kailahun camp 7°56'35.80"N, 10°16'36.22"W, 530 m, General collecting, 10-19.XI.2017, Aristophanous, M., Sáfián, Sz., Simonics, G., Smith, L. Leg. ANHRT: 2017: 33

ANHRT unique numbers: ANHRTUK00037692, ANHRTUK00037694, ANHRTUK00037695, ANHRTUK00037697, ANHRTUK00037699, ANHRTUK00037700, ANHRTUK00037701, ANHRTUK00037702, ANHRTUK00037703, ANHRTUK00038168, ANHRTUK00038169, ANHRTUK00038170, ANHRTUK00038171, ANHRTUK00038172;

♀ LIBERIA, Lofa County, Wologizi Mountains, Ridge Camp 8°7'10.26"N, 9°57'10.14"W, 865 m, 24-29.XI.2017, General collecting, Aristophanous, M., Sáfián, Sz., Simonics, G., Smith, L. Leg. ANHRT: 2017: 33

ANHRT unique number: ANHRTUK00039165

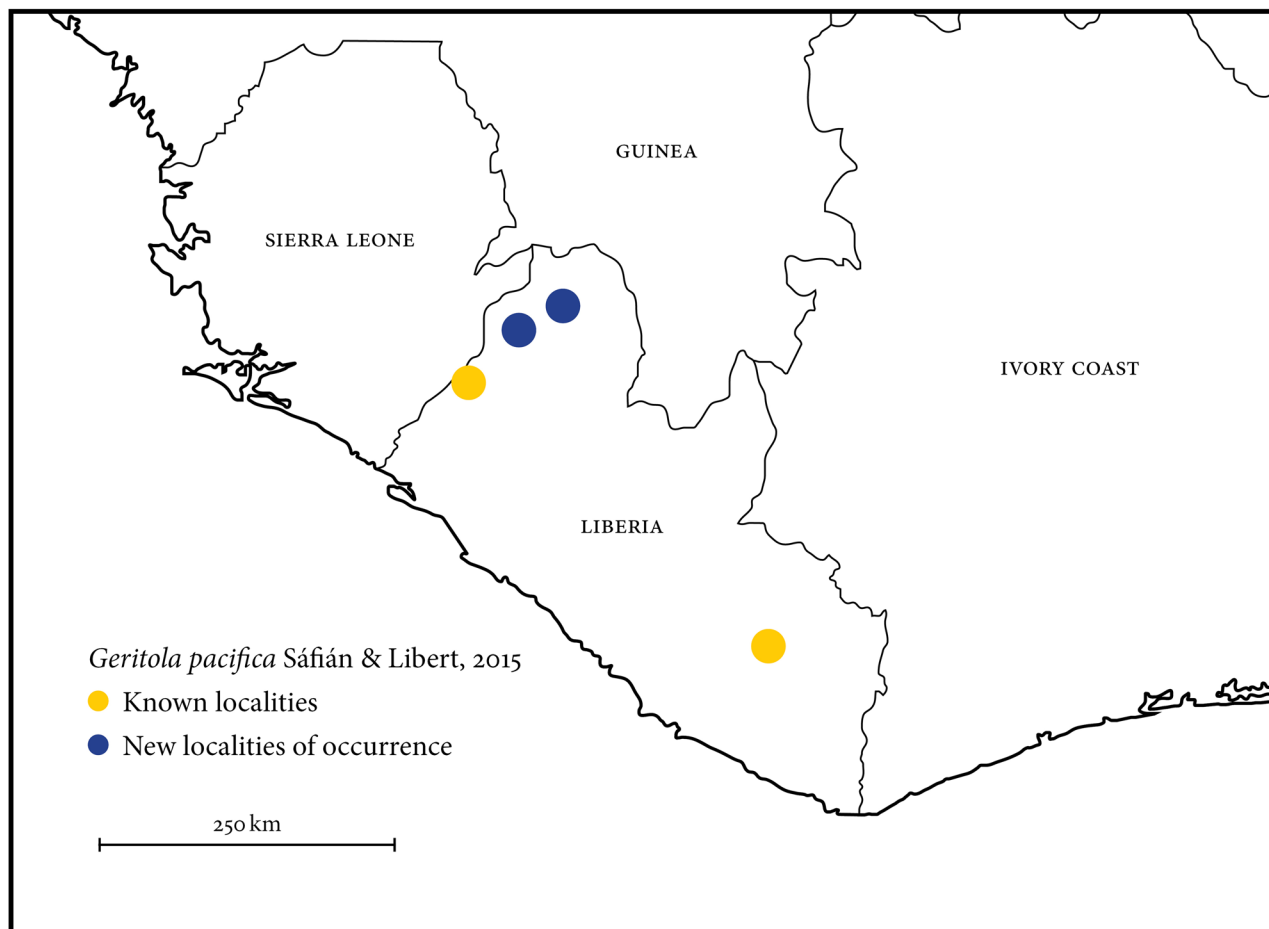


FIGURE 5. Known localities of *G. pacifica*.

Cephetola wingae Sáfián, 2015

(FIGS. 6A,B; 7)

Sáfián, Sz. (2015): 16–18.

urn:lsid:zoobank.org:act: 03AD959B-1B2C-42C3-97F9-42A74FB095B8

Illustrated specimen data. ♀ LIBERIA, Lofa County, Wologizi Mountains, Ridge Camp 8°7'10.26"N, 9°57'10.14"W, 865 m, 24-29.XI.2017, General collecting, Aristophanous, M., Sáfián, Sz., Simonics, G., Smith, L. Leg. ANHRT: 2017: 33

ANHRT unique number: ANHRTUK00039163

Note. Identification of females in some groups of *Cephetola* is often extremely difficult due to the similarity of several species combined with intraspecific variability. The female of *C. wingae* was expected to be similar to that of *C. izidori* (Kielland & Congdon, 1998), illustrated in Libert (1999) and also examined in the ABRI collection, as they are closely related (Sáfián 2015b). In West Africa there are only a couple species with similar females, both appear to be in the *C. cephenae* sub-group, previously listed under the name *C. cephenae* (Hewitson, 1873). The newly described *C. daveyi occidentalis* Libert, 2020 is known from Ghana, while the resurrected *C. doleta* (Kirby, 1890) from Ivory Coast, Liberia, Sierra Leone and Guinea (Libert 2020). The similar but much darker *C. mercedes ivoiriensis* (Jackson, 1967) is known from Ivory Coast and Liberia, and only *C. doleta* is relatively common. *C. mercedes ivoiriensis* has a reduced blue area on the hindwing and a more mottled pattern on the underside, as seen on the female allotype illustrated by both Libert (1999) and d'Abrera (2009).

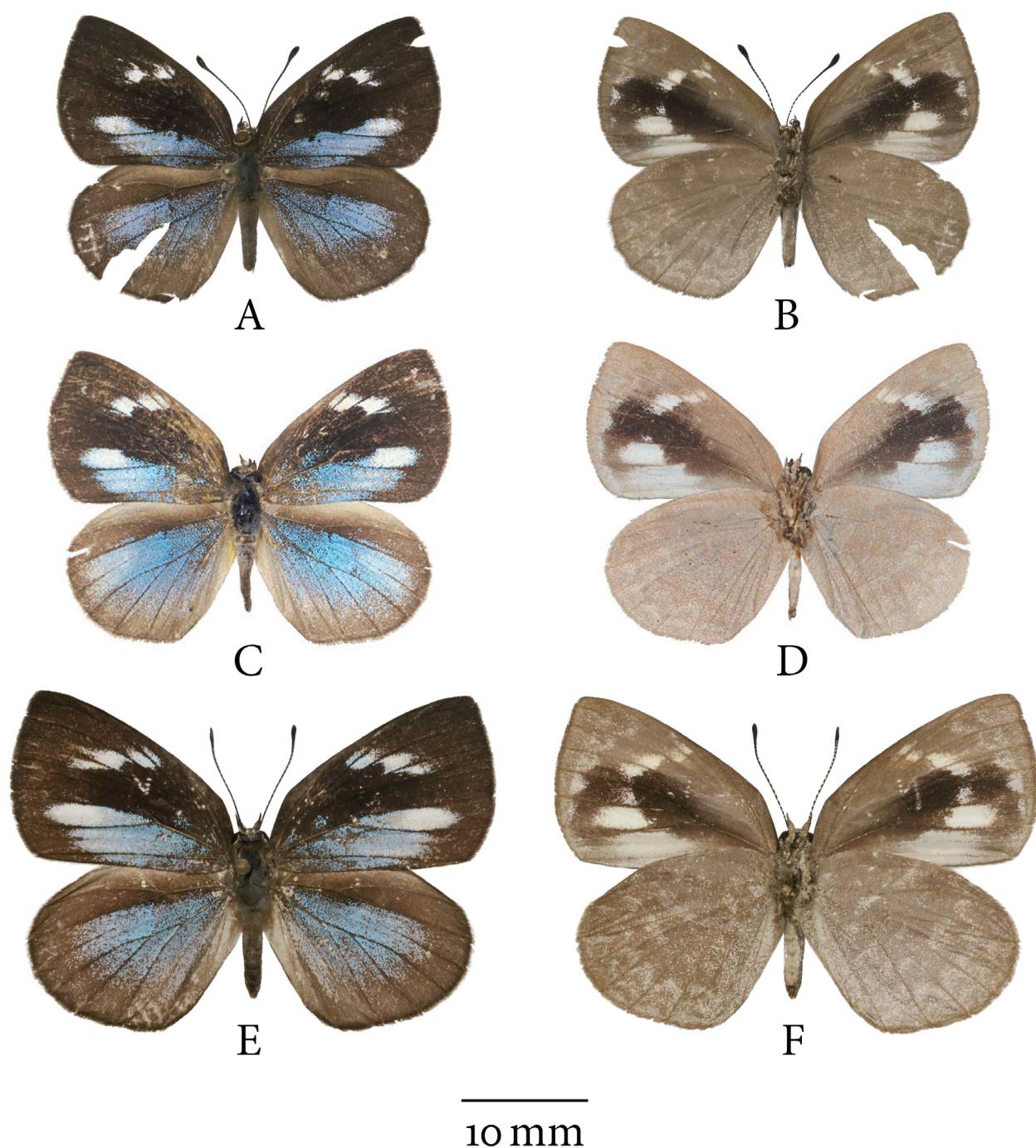


FIGURE 6. *Cephetola* females: *C. wingae* (Liberia, Wologizi Mountains) upperside—A, underside—B; *C. doleta* (Guinea, Labé) upperside—C, underside—D; *C. daveyi occidentalis* (Ghana, Volta Region) upperside—E, underside—F.

Description and identification. Forewing length: 16.9 mm. Wingspan 30.5 mm. The general appearance of the female is like that of several species in the genus including those in the *C. cephena* subgroup as described in Libert (2020). The upperside ground colour is blackish, with light a light blue patch on the forewing that covers roughly the median area of space 1a, the basal two-thirds of 1b and appears as a small oval spot turning whitish towards its tip in space 2. The usual white sup-apical row of spots is present with only two spots properly formed, the lowest one in the upper half of space 5 and the top one in space 9 are obsolete. The spots are also speckles with a few light blue scales. The hindwing has a large light blue patch in the centre between veins 1 and 6. The edge of the patch is largely diffuse, particularly in space 1b, in the discal cell and along its outer edge. The forewing underside has the usual black centre and the upperside blue patch and the sub-apical spots appear as dirty white spots. The rest of the forewing is greyish-brown with some grey chevrons along the outer edge. The hindwing is greyish-brown with diffuse grey chevrons along the out margin and grey specks in the outer half of the wing and along the inner margin.

New records. The species was described from the Liberian Nimba Mountains and was known from two upland localities on the summits of Mount Beeton (type locality) and Mount Bele (Blei) (Sáfián 2015b). The female (specimen data shown above) was collected on a hilltop in the Wologizi Mountains, also in upland forest.

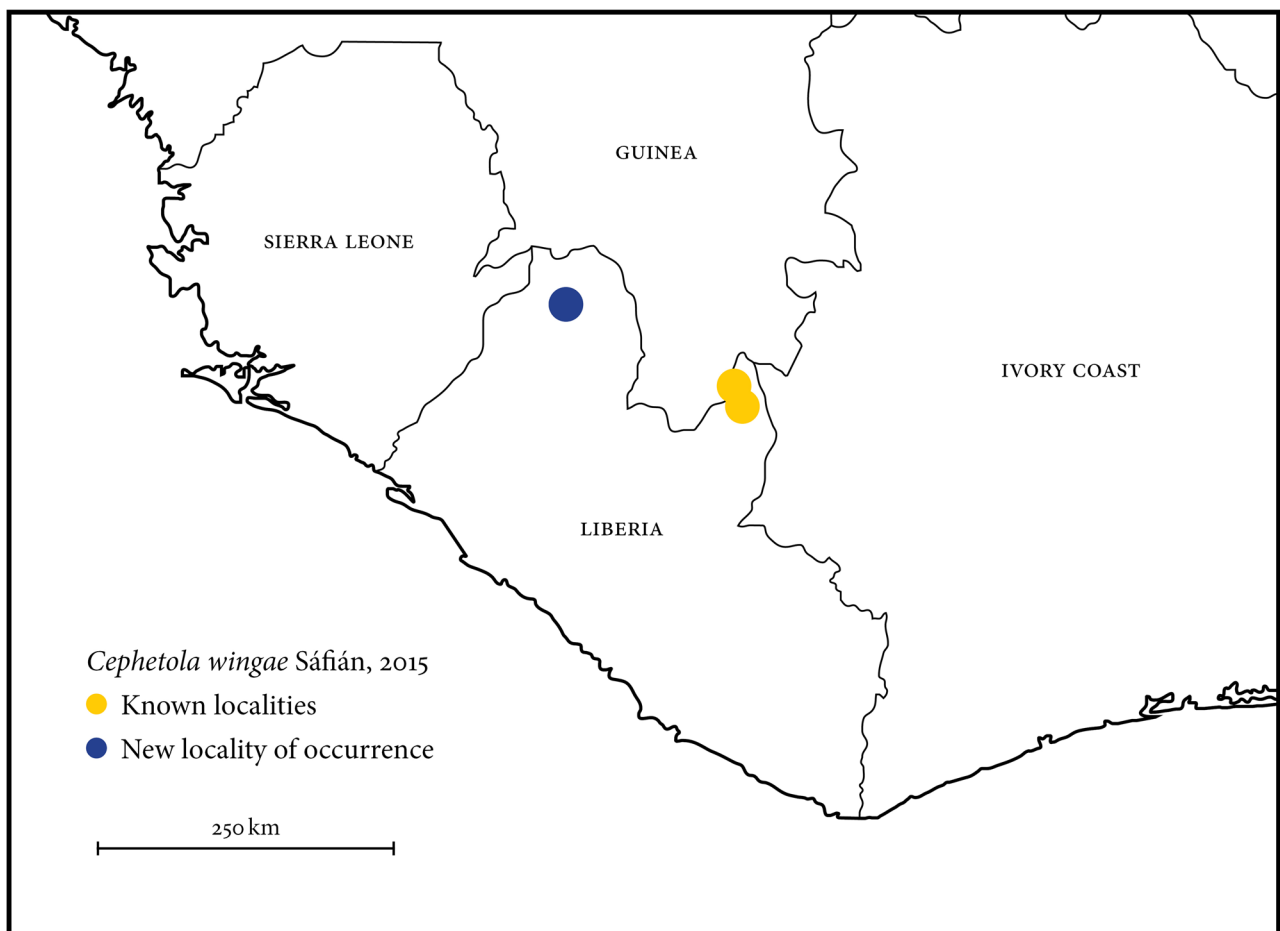


FIGURE 7. Known localities of *C. wingae*.

***Pilodeudorix mano* Sáfián, 2015**

(FIGS 8A,B; 9)

Sáfián, Sz., Collins, S.C. & Libert, M. (2015): 68–69.

urn:lsid:zoobank.org:act: F18D3284-A9A7-492D-B7F5-391F7D0FCA43

Illustrated specimen data. ♀ LIBERIA, Nimba County, ENNR, Nimba Mountains camp, 7°31'45.00"N, 8°31'37.00"W, 1165 m, General collecting, Aristophanous, M., Sáfián, Sz., Simonics, G., Smith, L. leg. ANHRT: 2017: 33.

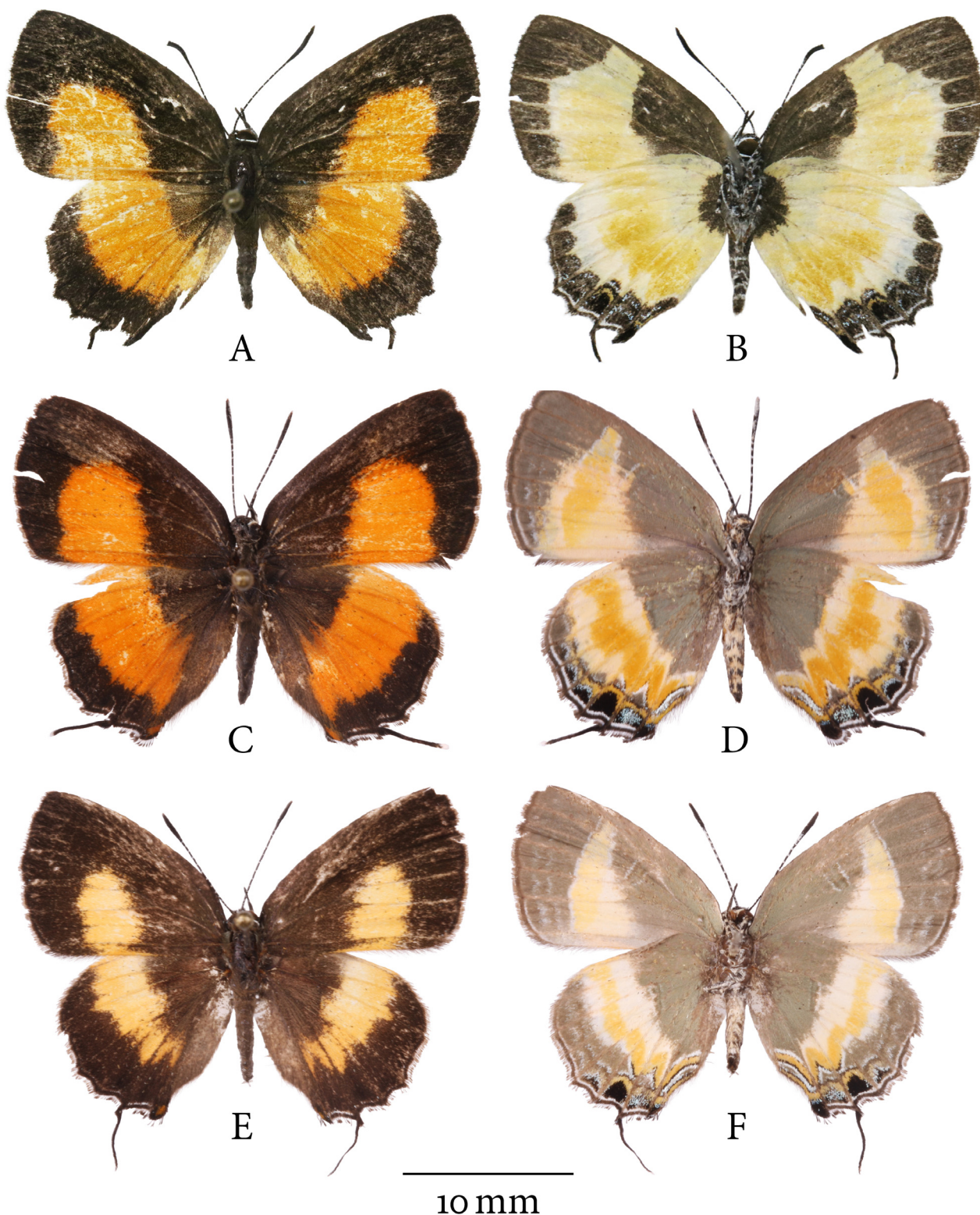


FIGURE 8. *Pilodeudorix* females: *P. mano* (Liberia, ENNR, Nimba Mountains) upperside—A, underside—B; *P. mimeta* (Cameroon, Ebogo) upperside—C, underside—D; *P. baginei* (Kenya, Kakamega Forest) upperside—E, underside—F.

ANHRT unique number: ANHRTUK00037764

Description and identification. Forewing length: 14.9 mm. Wingspan: 28.5 mm. The general appearance is as other females in the *P. mimeta* group with brown ground colour on the upper wing surface and orange patches on both fore- and hindwings. The hindwing orange patch has straighter and more irregularly serrated outer margin,

which are more even, and rather more rounded in *P. mimeta*. The underside ground colour is brown, with broad yellow area on the forewing, which is approximately half the width of the wing in the centre. Its width narrows by half near the costa. The veins are also yellow almost to the margin. The hindwing is almost covered entirely with yellow, leaving only the base and the margin brown, its middle is being slightly darker yellow. A black lunule, surrounded by a lighter edge is found at the tornus and the base of the hairtail.

New records. The species was described from a male holotype, collected in the Liberian Nimba Mountains (ENNR, Cellcom Road 1000-1100 m). It was predicted to occur in upland forests in the Nimbas or to be patchily distributed in mountainous areas in the Guinea Highlands (Sáfián *et al.* 2015). Recent field surveys revealed that *P. mano* occurs also in the Guinean side of Nimba Mountains in similar habitat, and a few males were also found in the Wologizi Mountains at about 800-850 m. There is a single male in the collection of Claudio Belcastro, collected in Ziama Forest in Guinea, at about 800 m (Belcastro pers. comm.). The first and still the only known female was found near its type locality, a forested hilltop at 1165 m in the Liberian Nimba Mountains, where a series of males were also collected (Fig. 7).

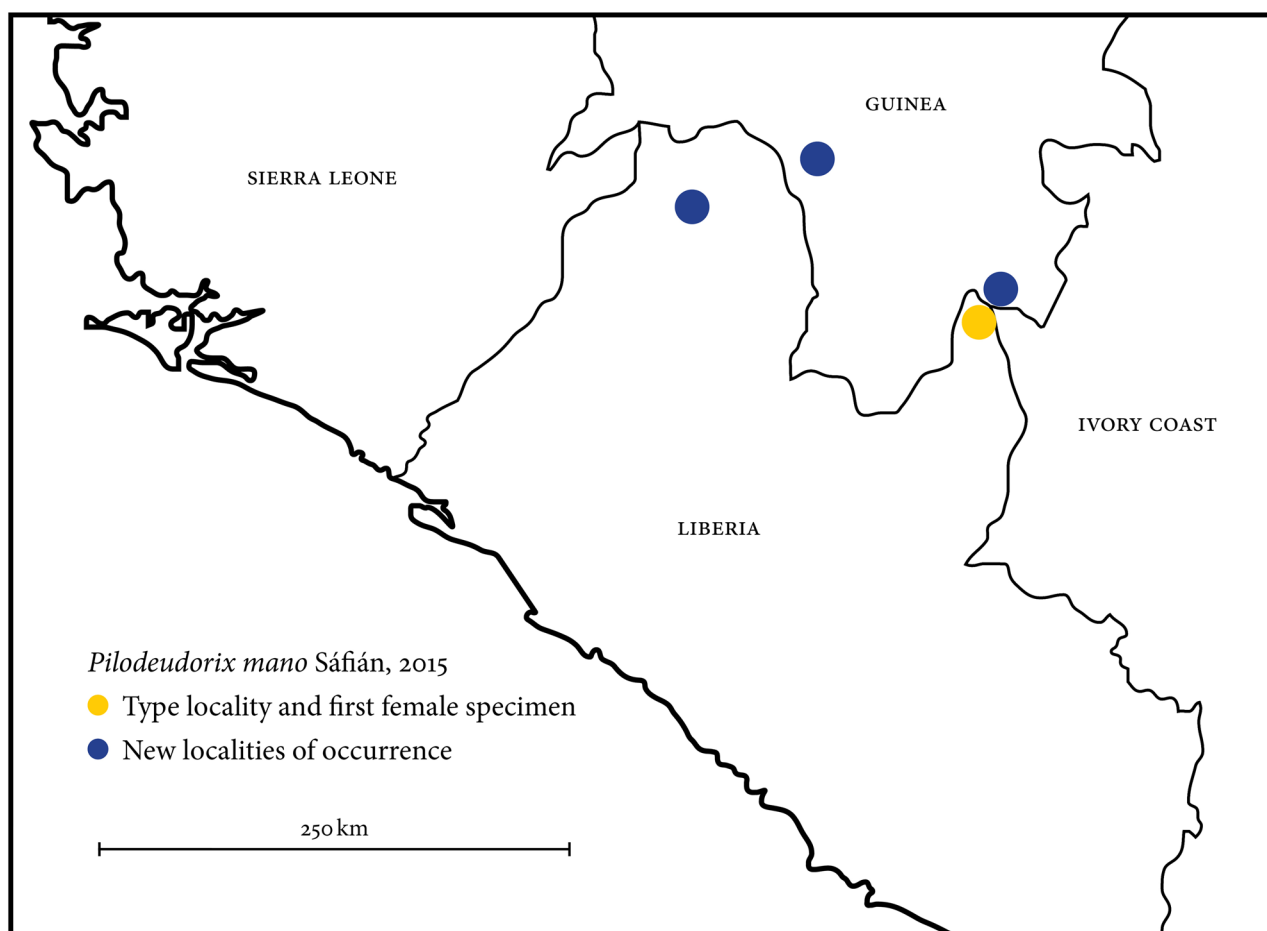


FIGURE 9. Known localities of *P. mano*.

Additional material examined

♂ GUINEA, Nimba Mountains, SMFG concession area (Société des Mines de Fer de Guinée) Cité 1, 7°42'2.83"N, 8°23'58.60"W, 700 m 21-31.V.2017, General collecting, Sáfián, Sz. Leg. ANHRT: 2016: 36

ANHRT unique numbers: ANHRTUK00038138

9♂♂ LIBERIA, Nimba County, ENNR, Nimba Mountains camp, 7°31'45.00"N, 8°31'37.00"W, 1165 m, General collecting, Aristophanous, M., Sáfián, Sz., Simonics, G., Smith, L. leg. ANHRT: 2017: 33.

ANHRT unique numbers: ANHRTUK00018345, ANHRTUK00018346, ANHRTUK00018347, ANHRTUK00018348, ANHRTUK00019958, ANHRTUK00019959, ANHRTUK00019960, ANHRTUK00037754, ANHRTUK00037763

3♂♂ LIBERIA, Lofa County, Wologizi Mountains, Ridge camp 2, 8°7'20.79"N, 9°56'50.75"W, 883 m, General collecting, Sáfián, Sz., Simonics, G. Leg. ANHRT: 2018: 43.

ANHRT unique numbers: ANHRTUK00058075, ANHRTUK00058076, ANHRTUK00058077 1♂ GUINEA, Sérédou, Zياما Forest, 600-800m 15. Feb. 2011. Leg.: C. Belcastro.

Discussion

It was expected that with further field research in Liberia and the Liberian sub-region more specimens of these generally rare and restricted-range lycaenids would gradually be collected, as has happened with other rare species, previously known to be restricted to a narrow area in the region (Larsen 2005, Sáfián & Takano 2019, Sáfián *et al.* 2019). It is also interesting to observe the distribution pattern of these species, as two of them were predicted to have upland affinities (Sáfián 2015a, Sáfián *et al.* 2015b) and the new locality records of *C. wingae* and *P. mano* clearly correspond with the predictions. Both might be patchily distributed in the upland zone of the Guinea Highlands and their occurrence is therefore predicted from other mountainous areas between Northwestern Ivory Coast and the mountains of northern Sierra Leone. In contrast, both *P. alfa* and *G. pacifica* were described from hyper-wet lowland forest (Sáfián & Collins 2015, Sáfián *et al.* 2015a) with some of the new records coming from upland forest in the Wologizi Mountains, but neither of them were recorded from the Nimba Mountains (Sáfián 2014) or the Zياما Massif in Guinea (Sáfián *et al.* in prep.) further north of Wologizi. Although their presence in these mountains cannot be ruled out, their distribution is certainly centred on the lowland forests of the Liberian sub-region and they might just reach their northern edge of distribution in Wologizi, with the Guinea Highlands as an ecological barrier further north.

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<https://doi.org/10.11646/zootaxa.3718.2.7>
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<https://doi.org/10.11646/zootaxa.4018.1.7>
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