

Annotated checklist of bats (Mammalia: Chiroptera) of Mount Cameroon, southwestern Cameroon

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Epomops franqueti (Tomes, 1860) (photo: Aaron Manga Mongombe).

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ABSTRACT

Mount Cameroon is a priority area for global biodiversity conservation, considering its high species richness and endemism across many taxa. As of yet, its Chiroptera fauna is still poorly known. Thus this paper aims to provide an updated checklist of the Chiroptera fauna of Mount Cameroon based on our own field data, previously published data and data from museum collections. Details on published references and conservation statuses are also provided for each species. During our field surveys (2016-2018), 613 individuals and 21 species were recorded. Among them three species are new to the area: *Mops (Xiphonycteris) nanulus* J. A. Allen, 1917, *Mops (Xiphonycteris) thersites* (Thomas, 1903) and *Glauconycteris egeria* Thomas, 1913. These new records bring the number of known bat species in the Mount Cameroon area to 38, belonging to seven families. This includes Pteropodidae Gray, 1821 (eleven species), Hipposideridae Gray, 1821 (six species), Rhinolophidae Gray, 1825 (three species), Miniopteridae Dobson, 1875 (three species), Vespertilionidae Gray, 1821 (seven species), Nycteridae Van der Hoeven, 1855 (five species) and Molossidae Gervais, 1856 (three species). We also observe that 23.7% of bats in the area are frugivorous (nine species), 71.1% are insectivorous (27 species) and 5.3% are nectarivorous (two species). Moreover, because of the increasing rate of deforestation in the area caused by slash-and-burn shifting cultivation and expansion of agro-industrial plantations, knowledge of the regional chiropteran fauna is imperative, especially as this information can provide a base for the development of future management and conservation strategies.

KEY WORDS

West Africa,
mammals,
biodiversity,
conservation,
ecology,
species richness.

RÉSUMÉ

Liste annotée des chauves-souris (Mammalia : Chiroptera) du mont Cameroun, sud-ouest du Cameroun. Le mont Cameroun est une zone prioritaire pour la conservation de la biodiversité, compte tenu de sa grande richesse spécifique et de son endémisme pour de nombreux taxons. À ce jour, sa chiroptérofaune est encore mal connue. Le but de cet article est de fournir une liste actualisée de la faune de chiroptères du mont Cameroun sur la base de nos propres données de terrain, des données précédemment publiées et des données de collections muséales. Des précisions sur les publications et les statuts de conservation sont également fournies pour chaque espèce. Au cours de nos études de terrain (2016-2018), 613 individus appartenant à 21 espèces ont été recensés. Parmi elles, trois espèces sont nouvelles pour la région : *Mops (Xiphonycteris) nanulus* J. A. Allen, 1917, *Mops (Xiphonycteris) thersites* (Thomas, 1903) et *Glauconycteris egeria* Thomas, 1913. Ces nouvelles signalisations portent à 38 le nombre d'espèces de chauves-souris connues dans la région du Mont Cameroun, appartenant à sept familles. Il s'agit des Pteropodidae Gray, 1821 (onze espèces), Hipposideridae Gray, 1821 (six espèces), Rhinolophidae Gray, 1825 (trois espèces), Miniopteridae Dobson, 1875 (trois espèces), Vespertilionidae Gray, 1821 (sept espèces), Nycteridae Van der Hoeven, 1855 (cinq espèces) et Molossidae Gervais, 1856 (trois espèces). Nous avons également observé que 23,7 % des chauves-souris de la région sont frugivores (neuf espèces), 71,1 % sont insectivores (27 espèces) et 5,3 % sont nectarivores (deux espèces). De plus, en raison du taux croissant de déforestation dans la région, causé par la culture itinérante sur brûlis et l'expansion des plantations agro-industrielles, la connaissance de la faune chiroptérologique régionale est impérative, car ces informations peuvent servir de base à l'élaboration de futures stratégies de gestion et de conservation.

MOTS CLÉS
Afrique de l'Ouest,
mammifères,
biodiversité,
conservation,
écologie,
richesse spécifique.

INTRODUCTION

Cameroon is one of the richest biodiversity countries in Africa, with high levels of endemism among various taxa (Alpert 1993). This rich biodiversity can be attributed to the country's diverse ecosystems suited for a wide range of biota. The number of plant species is estimated at over 9,000, of which 160 are endemic (Sunderland *et al.* 2003). At least 409 mammal species occur, of which 10 are endemic (Tchigio 2007); of these mammals, bat account for approximately 120 species according to ACR (2018). Moreover, most of the country's endemic taxa are concentrated on Mount Cameroon and other Cameroonian Highlands situated in the southwestern part of the country.

Mount Cameroon belongs to an ecoregion located on a volcanic chain called the Cameroon Volcanic Line (CVL). This volcanic chain extends northeast along the border between Cameroon and Nigeria, and southwest towards the islands of Bioko, São Tomé, Príncipe and Annobon. The ecoregion also encompasses the Cameroonian Highlands: a mountain chain that runs north east from Mount Cameroon along the coast through the Bakossi, Bamboutos and Bamenda Highlands, and finally ending further north at Tchabal Mbabo Mountains on the Adamaoua plateau. The Cameroonian Highlands are recognized as an area of high species diversity and endemism across many taxa (Stuart 1986). Moreover, the Mount Cameroon area is considered as a richness and endemism hotspot for bats in Africa (Herkt *et al.* 2016). This exceptional species richness is attributed to the heterogeneity of the habitats found within the area, which ranges from coastal ecosystems through submontane and montane forests to subalpine grasslands. The significance of Mount Cameroon and other Cameroonian Highlands as important

hotspots with biodiversity with many endemic taxa has long being recognized (Bergl *et al.* 2007). A possible reason for this unique diversity of Mount Cameroon is probably because it was one of the Pleistocene refuges (Maley 1991), together with the relative spatial isolation of the montane environment that resulted in increased speciation rates.

Mount Cameroon is listed among World Biodiversity Hotspots (Myers *et al.* 2000), and its rich biodiversity is threatened by anthropogenic activities. There are at least 42 plant species including three genera that are strictly endemic and another 50 species are near-endemic (Cable & Cheek 1998). The avifauna is estimated at over 370 species recorded, a number of which are endemic (Fotso *et al.* 2001). Two of these bird species are strictly endemic to Mount Cameroon notably the Mount Cameroon francolin (*Francolinus camerunensis* Alexander, 1909) and the Mount Cameroon speirops (*Speirops melanocephalus* Gray, 1862), which are listed as Endangered and Vulnerable respectively (Fotso *et al.* 2001).

The mammalian fauna include flagship species such as forest Elephant (*Loxodonta cyclotis* (Matschie, 1900)), the Nigerian-Cameroon Chimpanzee (*Pan troglodytes ellioti* (Matschie, 1914)), and Drill (*Mandrillus leucophaeus leucophaeus* (F. Cuvier, 1807)). Other mammals include the red river hog (*Potamochoerus porcus* (Linnaeus, 1758)), bushbuck (*Tragelaphus scriptus* Pallas, 1776), bay duiker (*Cephalophus dorsalis* (Gray, 1846)), blue duiker (*Cephalophus monticola* (Thunberg 1789)), yellow-backed duiker (*Cephalophus sylvicultor* Afzelius, 1815), and a host of small mammals such as rodents, shrews and bats (Dowsett-Lemaire & Dowsett 2001). Small mammals endemic to the mountain include Eisentraut's shrew (*Crociodura eisentrauti* Heim de Balsac, 1957), Mount Cameroon forest shrew (*Sylvisorex morio* (Gray, 1862)) and the Mount Cameroon brush-furred rat (*Lophuromys roseveari*,



Fig. 1. — Map of Cameroon, showing localities listed in the text (See Appendix 1 for names of localities).

W. Verheyen, Hulselmans, Colyn & Hutterer, 1997); another near-endemic is the Cameroon *Praomys* (*Praomys morio* (Trouessart, 1881), (Fotso *et al.* 2001). Most of these species are listed by the IUCN Red List as vulnerable or critically endangered: a concerted effort to protect them is thus highly necessary.

Despite Mount Cameroon's importance for conservation, its bat fauna still remains under-sampled. Pioneer surveys in the area were conducted in the 1950's and 1960's by Eisentraut (1956, 1963, 1964, 1968) and Hill (1968), with very few surveys carried out since then. There have been a growing number of studies on bat species richness and diversity in the past two decades in Cameroon, greatly adding to our knowledge on this order of mammals (Hutterer *et al.* 1992; Sedláček *et al.* 2006; Bakwo Fils 2009, 2010; Bakwo Fils *et al.* 2012, 2014; Hassanin 2014). These studies focused on other ecoregions of the country and none involved the Cameroonian Highlands in general and Mount Cameroon in particular. Furthermore, Mount Cameroon is characterized by fertile

volcanic soils, which has favored the clearing of the lowland forest to make way for large-scale plantation agriculture (Forbosh *et al.* 2011). This is likely to have a considerable impact on biodiversity of the area. Other threats to biodiversity in the area include burning of vegetation, slash-and-burn agricultural practices, uphill shifting cultivation and poaching. Given these threats, it is important to publish an updated checklist of bats of the area in order to document the species that are most in need of conservation measures. Furthermore, knowledge about the bat ecology of the area is important in the development of future conservation plans for these species, which is currently lacking.

The purpose of this study is therefore to compile an updated checklist of the Chiropteran fauna of Mount Cameroon from field surveys, published literature and museum collections, for the purpose of conservation. Data from previous studies by Eisentraut (1956; 1963; 1964; 1968; 1973) and Fedden & MacLeod (1986) were compared to our recent survey in order

to determine whether the populations of the species have increased or decreased during the past few decades.

MATERIAL AND METHODS

DESCRIPTION OF STUDY SITE

Mount Cameroon is an active volcano located in the Gulf of Guinea between latitudes 3°57' to 4°27'N and longitudes 8°58' to 9°24'E (Suh *et al.* 2003) (Fig. 1). The main axis of this roughly elliptical shaped mountain is 45 km long and 30 km wide (Tame 1999), and the mountain occupies an area of about 1500 km² (Tchouto 1995).

The mountain's original vegetation was described by Thomas & Cheek (1992) as consisting of a gradual gradient that starts with evergreen lowland rainforest at lower altitudes (0-800 m a.s.l.), through submontane forest (801-1600 m a.s.l.), montane forest (1601-1800 m a.s.l.), montane scrub (1801-2400 m a.s.l.), montane grassland (2000-3000 m a.s.l.) and finally sub-alpine grassland (3001-4100 m a.s.l.) near a bare summit. Unfortunately, most of the lowland forest has already been cleared and transformed into human settlements and large agro-industrial companies that grow mainly export crops such as rubber (*Hevea brasiliensis*), oil palm (*Elaeis guineensis*), tea (*Camellia sinensis*) and banana (*Musa* spp.) (Forboseh *et al.* 2011). Small-holder farmers in the region also extensively cultivate crops for subsistence and sale around the villages on the slopes of the mountain.

The climate of Mount Cameroon is described as predominantly humid tropical with heavy precipitation and high temperatures along the coastal belt. There are two distinct seasons: a rainy season that occurs between the months of June and October, and a dry season that extends from November to May. The annual rainfall on the mountain varies between 2085 and 10000 mm and the average annual humidity is high at about 75-80% (Payton 1993). The mean annual temperature is about 25°C, and temperature decreases by 0.6°C per 100 m ascent (Fraser *et al.* 1998). The hydrological network is poor with few water bodies mainly found at the lower slopes of the mountain.

DATA COLLECTION

Data were gathered by searching internet bases, examining museum collections and by carrying out field surveys. At the onset, we collected data by searching the internet for publications made on bats of Mount Cameroon through Google Scholar (<https://scholar.google.com>): by typing key words such as "Chiroptera of Mount Cameroon", "montane bat of Cameroon", "Mount Cameroon bats". We also consulted the ACR (2018) for information on type locality of African bat species. Additionally, we examined voucher specimens of bats collected from Mount Cameroon in the following museum collections in Germany: Zoological Research Museum Alexander Koenig (ZFMK), the State Museum of Natural History Stuttgart (SMNS) and the Berlin Zoological Museum (ZMB). These museums house some of the earliest bat specimens collected by Prof. Martin Eisentraut in the Mount Cameroon area.

Field surveys were also conducted over a 24 months period from November 2016 to November 2018 in the four forest types of Mount Cameroon. In each forest type, we established mist net sampling stations, four in lowland forest, six in sub-montane forest, two in montane forest and three in montane scrub (Table 1). At each sampling station, we deployed six nylon mist nets (Ecotone©, Poland), 12m long, 2.5m high, five shelves, mesh: 16, denier 70/2. We opened mist nets at dusk and operated them for at least six hours during capture nights depending on weather conditions, but we often had to close mist nets early on rainy, very windy nights. We also avoided sampling during full moons. In order to prevent the capture of familiar individuals and to maximize capture success, the location of each mist net was changed on subsequent capture nights within each capture station (Bergallo *et al.* 2003). The coordinates of sampled sites were recorded using a hand-held GPS (Garmin eTrex). The mist nets were deployed in different habitat types within each sampling station in order to maximize the chances of capturing different species (Table 1; Fig. 2A-I). The mist nets were attended to regularly and each captured bat was carefully extracted to avoid injury. We recorded parameters such as the sex, weight, age (juvenile or adult), and the reproductive status (testicles abdominal or scrotal for males; pregnant, lactating or post-lactating for females) (Racey 1988). Weight was recorded using a Ohaus YA501 electronic pocket scale, 500x0.1g, and standard museum measurements were recorded using a dial caliper (Ecotone©, Poland 150/0.1mm). The following external measurements were used for the identification of each bat to species level: forearm length (FA), tibia length (TiL), tail length (TaL), head and body length (HBL), ear length (EL), hind foot length (HFL), tragus length, shape (TrL) and greatest length of skull (GLS). In addition, the arrangement of palatal ridges was also examined to aid identification of fruit bats (Monadjem *et al.* 2010; Happold & Happold 2013). Identification was based on information and illustrations published in the keys of Rosevear (1965), Hayman & Hill (1971), and Happold & Happold (2013). After identification, bats were released near the location where they were captured. Species which were difficult to identify were preserved in 70% alcohol for later identification based on close examination of craniodental features, and deposited at the zoological laboratory of the University of Maroua. Craniodental measurements were also recorded from preserved bats for the three species recorded for the first time: *Mops* (*Xiphonycteris*) *nanulus* J. A. Allen, 1917, *Mops* (*Xiphonycteris*) *thersites* (Thomas, 1903) and *Glauconycteris egeria* Thomas, 1913. The greatest length of skull (GLS), condylo-basal length (CBL), condylo-canine length (GCL), zygomatic breadth (ZB), breadth of brain case (BB), maxillary toothrow length (C-M³), mandibular toothrow length (C-M³), and the mandible length (M) were measured following Bates *et al.* (2005).

ABBREVIATIONS

Institutions

SMNS	State Museum of Natural History Stuttgart;
ZFMK	Zoological Research Museum Alexander Koenig;
ZMB	Berlin Zoological Museum.

TABLE 1. — Sampling stations, habitat sampled and species captured during our field surveys (2016-2018). Abbreviations: **A**, above slow-flowing stream, **B**, cultivated farm; **C**, fallow farmland; **D**, beside fruiting tree; **E**, cleared farmland; **F**, understory of Primary forest; **G**, ecotone forest/alpine grassland, **H**, cave; **I**, gap between trees; **J**, forest fragment; **K**, waterhole.

Stations	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Total
Altitudes (m a.s.l.)	20	470	630	790	1070	1140	1290	1310	1400	1590	1680	1790	1810	2130	2280	
Habitats sampled	A, B, D	A, B, D	F, K	B, D	F	C, B	C, E	C, B	H, J, B	F	F	I, F	F	G, F	F	
Pteropodidae																
<i>Eidolon helvum</i>	3	3	0	3	0	2	0	0	0	0	0	0	0	0	0	11
<i>Epomops franqueti</i>	47	3	0	12	0	10	3	3	1	0	0	0	0	0	0	79
<i>Megaloglossus woermanni</i>	1	10	11	14	0	11	7	7	0	0	0	0	0	1	0	62
<i>Micropteropus pusillus</i>	28	8	0	19	0	2	0	0	0	0	0	0	0	0	0	57
<i>Myonycteris angolensis</i>	0	0	2	6	2	38	39	24	17	5	21	4	3	13	0	174
<i>Myonycteris torquata</i>	1	0	0	2	0	4	3	0	0	0	0	0	0	0	0	10
<i>Nanonycteris veldkampii</i>	1	5	0	0	0	0	0	0	0	0	0	0	0	0	0	6
<i>Rousettus aegyptiacus</i>	0	19	0	0	0	0	2	0	0	6	1	0	0	109	0	137
<i>Scotonycteris zenkeri</i>	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	4
Rhinolophidae																
<i>Rhinolophus landeri</i>	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	3
Hipposideridae																
<i>Doryrhina cyclops</i>	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
<i>Hipposideros cf. ruber</i>	0	0	26	1	1	0	0	0	2	1	3	0	6	1	0	41
<i>Macronycteris gigas</i>	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	3
Molossidae																
<i>Chaerephon major</i>	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
<i>Mops nanulus</i>	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	5
<i>Mops thersites</i>	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Miniopteridae																
<i>Miniopterus cf. minor</i>	0	0	0	0	0	0	0	0	11	0	0	0	0	0	0	11
Vespertilionidae																
<i>Glauconycteris egeria</i>	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
<i>Neoromicia nana</i>	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
<i>Neoromicia tenuipinnis</i>	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	4
<i>Parahypsugo eisentrauti</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1

Measurements

BB	breath of brain case;
CBL	condylo-basal length;
C-M ³	maxillary tooththrow length;
C-M ³	mandibular tooththrow length;
EL	ear length;
FA	forearm length;
GCL	condylo-canine length;
GLS	greatest length of skull;
HBL	head and body length;
HFL	hind foot length
M	mandible length;
TaL	tail length;
TiL	tibia length;
TrL	tragus length, shape;
ZB	zygomatic breadth.

RESULTS

Our field surveys resulted in the capture of 613 bats belonging to 21 species, 18 genera and six families (Table 1), of which seven species were frugivorous, 12 were insectivorous and two were nectarivorous. The complete list of bats from the Mount Cameroon area includes seven families, 22 genera and 38 species when our recent surveys are combined with previous data (Table 2). When our recent surveys are compared to previously published data and museum records, three species were new to the area: *Glauconycteris egeria*, *Mops* (Xiphonycteris) *nanulus* and *Mops* (Xiphonycteris) *thersites*. Some species recorded in the past were not recorded in the present surveys, including

Casinycteris ophiodon (Pohle, 1943), *Hypsognathus monstrosus* H. Allen, 1862, *Rhinolophus alcyone* Temminck, 1853, *Rhinolophus simulador alticolus* K. Andersen, 1904, *Doryrhina camerunensis* Eisentraut, 1956, *Hipposideros beatus* (K. Andersen, 1906), *Hipposideros caffer* (Sundevall, 1846), *Nycteris arge* Thomas, 1903, *Nycteris grandis* Peters, 1865, *Nycteris hispida* (Schreber, 1774), *Nycteris intermedia* Aellen, 1959, *Nycteris major* (K. Andersen, 1912), *Miniopterus inflatus* Thomas, 1903, *Miniopterus schreibersii schreibersii* (Kuhl, 1817), *Glauconycteris argentata* (Dobson, 1875) and *Myotis bocagii* (Peters, 1870). Our surveys increase the number of bats recorded in the Mount Cameroon region to 38 species, including nine frugivorous, 27 insectivorous and two nectarivorous. A gazetteer of known collecting localities including geographical coordinates are presented (Appendix 1; Fig. 1). During our field surveys, the most commonly captured species was *Myonycteris angolensis* (Bocage, 1898) with 174 individuals (28.4% of captures), followed by *Rousettus aegyptiacus* (E. Geoffroy St.-Hilaire, 1810) with 137 individuals (22.4%), and *Epomops franqueti* (Tomes, 1860) with 79 individuals (12.9%). Several species were represented by just a single individual: *Doryrhina cyclops* (Temminck, 1853), *Chaerephon major* (Trouessart, 1897), *Mops thersites*, *Glauconycteris egeria*, *Neoromicia nana* (Peters, 1852) and *Parahypsugo eisentrauti* (Hill, 1968) (Table 1). Generally, more species were captured in disturbed habitats under greater anthropogenic influence than in undisturbed high altitude habitats. Also, species such as *Epomops franqueti*, *Micropteropus pusillus* (Peters, 1868) and



FIG. 2. — Habitat sampled for bats on Mount Cameroon: **A**, slow flowing streams; **B**, cultivated farmland; **C**, fallow farmland; **D**, beside fruiting trees; **E**, cleared farmland; **F**, understory of primary forest; **G**, ecotone forest/ alpine grassland; **H**, cave; **I**, waterhole. Photos: © Aaron Manga Mongombe

Nanonycteris veldkampii (Jentink, 1888) were only captured in disturbed low altitude habitats. Meanwhile *Rousettus aegyptiacus* was the only species that was recorded primarily in undisturbed high altitude primary forest (Table 1).

CHECKLIST OF BATS RECORDED FROM MOUNT CAMEROON

Family PTEROPODIDAE Gray, 1821
Genus *Casinycteris* Thomas, 1910

Casinycteris ophiodon (Pohle, 1943)

Scotonycteris ophiodon Pohle, 1943: 78.

COMMON NAMES. — English: Campo-Ma'an Fruit Bat. French: Casinyctère de Campo-Ma'an.

MATERIAL EXAMINED. — 4 specimens.

Mount Cameroon area • 1♀, 1♂; Malende swamp area; 4°21'00"N, 9°26'00"E; 50 m; 13.XII.1957; Martin Eisentraut leg.; SMNS 6626, ZFMK 1961.0636 • 1♂; Mueli; 4°23'00"N, 9°07'00"E; 600 m;

6.II.1958; Martin Eisentraut leg.; SMNS 6627.

Other localities of Cameroon • 1♂; Bipindi; 3°05'00"N, 10°25'00"E; 184 m; Zenker Georg August leg.; ZMB 50001.

ORIGINAL DATA. — We did not record this species during our field surveys.

HABITATS AND DISTRIBUTION. — Bergmans (1990) cited this species to occur in the lowland forest of Mount Cameroon. This species has recently been transferred from the genus *Scotonycteris* to *Casinycteris* based on molecular analyses conducted by Hassanin (2014). *Casinycteris ophiodon* is primarily a forest obligate that has been recorded from both tropical lowland and montane forest of West and Central Africa, where it roosts singly in dense vegetation. Being a primary forest specialist it is threatened by the fragmentation and degradation of its forest habitats, and their conversion to agriculture use (Fahr 2013a; as *Scotonycteris ophiodon*).

Genus *Eidolon* Rafinesque, 1815

Eidolon helvum (Kerr, 1792)
(Fig. 3, Table 3)

Vespertilio vampyrus helvus Kerr, 1792: 11.

TABLE 2. — Checklist of bat fauna of Mount Cameroon based on different authors. Abbreviations: **X**, presence; **LC**, least concern; **NT**, near threatened; **DD**, data deficient.

Taxa	Eisenraut (1956-1973)	Fedden & MacLeod (1984 - 1986)	This study (2016 -2018)	IUCN Statuses	Population Trends
Pteropodidae					
<i>Casinonycteris ophiodon</i>	X			NT	decreasing
<i>Eidolon helvum</i>	X	X	X	NT	decreasing
<i>Epomops franqueti</i>	X	X	X	LC	stable
<i>Hypsignathus monstrosus</i>	X	X		LC	unknown
<i>Megaloglossus woermanni</i>	X	X	X	LC	stable
<i>Micropteropus pusillus</i>	X	X	X	LC	Stable
<i>Myonycteris angolensis</i>	X	X	X	LC	decreasing
<i>Myonycteris torquata</i>	X		X	LC	stable
<i>Nanonycteris veldkampii</i>	X		X	LC	unknown
<i>Rousettus aegyptiacus</i>	X	X	X	LC	stable
<i>Scotonycteris zenkeri</i>	X	X	X	LC	decreasing
Rhinolophidae					
<i>Rhinolophus alcyone</i>	X			LC	unknown
<i>Rhinolophus landeri</i>		X	X	LC	unknown
<i>Rhinolophus simulator alticolus</i>	X			LC	decreasing
Hipposideridae					
<i>Doryrhina camerunensis</i>	X			DD	unknown
<i>Doryrhina cyclops</i>	X	X	X	LC	decreasing
<i>Hipposideros beatus</i>	X			LC	decreasing
<i>Hipposideros caffer</i>	X			LC	decreasing
<i>Hipposideros cf. ruber</i>	X	X	X	LC	unknown
<i>Macronycteris gigas</i>	X		X	LC	unknown
Nycteridae					
<i>Nycteris arge</i>	X			LC	stable
<i>Nycteris grandis</i>	X			LC	decreasing
<i>Nycteris hispida</i>	X			LC	stable
<i>Nycteris intermedia</i>	X			LC	decreasing
<i>Nycteris major</i>	X			DD	unknown
Molossidae					
<i>Chaerephon major</i>			X	LC	stable
<i>Mops (Xiphonycteris) nanulus</i>		X	X	LC	unknown
<i>Mops (Xiphonycteris) thersites</i>			X	LC	stable
Miniopteridae					
<i>Miniopterus cf. minor</i>			X	DD	unknown
<i>Miniopterus schreibersii schreibersii</i>	X	X		LC	unknown
<i>Miniopterus inflatus</i>	X			LC	unknown
Vespertilionidae					
<i>Glauconycteris argentata</i>		X		LC	unknown
<i>Glauconycteris egeria</i>			X	DD	unknown
<i>Myotis bocagii</i>		X			
<i>Neoromicia nana</i>	X	X	X	LC	unknown
<i>Neoromicia tenuipinnis</i>	X	X	X	LC	unknown
<i>Parahypsugo eisenrauti</i>	X	X	X	DD	unknown
<i>Pipistrellus nanulus</i>		X		LC	unknown
Total	30	19	21		

COMMON NAMES. — English: African Straw-colored Fruit Bat.
French: Chauves-souris paillée.

MATERIAL EXAMINED. — 63 specimens (including original data).

Mount Cameroon area • 12 specimens; Nicolls-island Bimbria; 3°57'16"N, 9°14'42"E; 98 m; 7.II-10.II.1938; Martin Eisenraut leg.; ZMB 54674, 67046, 67144, 67145, 93798, 93799, 93780, 93801, SMNS 3461, 3462, 5584, 33024 • 2 ♂; Buea; 4°09'00"N, 9°12'00"E; 1050 m; 7.II-10.II.1938; Martin Eisenraut & Preuss P. leg.; ZMB 10203, 10204, SMNS 5073, 5074 • 14 specimens; Victoria; 4°00'46"N, 9°13'13"E; 136 m; Martin Eisenraut, Preuss P. & Bottcher. leg.; ZMB 54523, 54524, 54657, 54597, 54692, 670046, 67136, 67140, 67141, 67144, 67839, 67141, 67143, 93839.

Other localities of Cameroon • 4 specimens; Mount Oku; 6°15'00"N, 10°26'00"E; 18.I.1967; Martin Eisenraut leg.; ZFMK 1969.0413, 0414, 0415, 0416 • 1 ♂; Mora; 11°2'47"N, 14°8'26"E; 31.I.1973; Martin Eisenraut leg.; ZFMK 1973.0368 • 3 specimens; Bipindi; 3°05'00"N, 10°25'00"E; 184 m; Zenker Georg August leg.; ZMB

10202, 67142, 67143 • 1 ♂; Yaounde; 3°52'00"N, 11°31'00"E; 726 m; Zenker Georg August leg.; ZMB 10210 • 1 ♀; Sangmelima; 2°56'00"N, 11°59'00"E; 543 m; Rolle H leg.; ZMB 18369 • 2 ♀, 1 specimen; Bafia area; 4°45'00"N, 11°14'00"E; 467 m; Buchholz, Tessmann & Zenker Georg August leg.; ZMB 31487, 5022, 54318 • 8 specimens; Mamfe; 5°46'00"N, 9°17'00"E; 459 m; Mansfeld, Strunk, Mack & Preuss P. leg.; ZMB 54588, 54598, 54601a, 54602, 54693, 54702, 54935, 54939 • 1 specimen; Bamenda; 5°56'00"N, 10°10'00"E; 1614 m; Glauning. leg.; ZMB 66524 • 2 specimens; Basha; 6°08'00"N, 9°26'00"E; 267 m; Von Örtzen leg.; ZMB 67031, 67032.

ORIGINAL DATA. — 11 individuals (6 males and 5 females) were captured during our field surveys (Table 1). Three individuals were captured at the beginning of the dry season in November in ground-level mist nets placed over a slow flowing stream while the remaining eight were captured in July and August in the rainy season by fruit-bearing Mango trees (*Mangifera indica*) and fig tree (*Ficus* spp).



FIG. 3. — *Eidolon helvum* (Kerr, 1792). Photo: © Aaron Manga Mongombe.

All individuals were captured at altitudes below 1140 m a.s.l. in disturbed and cultivated lowland rainforest and montane forest habitats (Table 1). This species was also collected by Eisentraut (1964) and Fedden & MacLeod (1986), in disturbed and cultivated habitats on Mount Cameroon. This species has also been recorded in the Sahelian zone of northern Cameroon (Bakwo Fils *et al.* 2014), and the tropical humid forest of Southern Cameroon (Bakwo Fils 2009).

HABITATS AND DISTRIBUTION. — This bat is widely distributed across the lowland rainforest and savannah zones of sub-Saharan Africa from Senegal in the west, to Ethiopia in the east, to southern South Africa (Mickleburgh *et al.* 2008a), and it has also been recorded on the Arabian Peninsula (Mickleburgh *et al.* 2008a). It is a species that often roosts amidst human habitations (Webala *et al.* 2014). This species is gregarious and colonies may number in tens of thousands (Monadjem *et al.* 2010). According to Happold (1987) they prefer tall dead trees with bare branches of particular species for roosting.

They are threatened across West and Central Africa by harvesting for bushmeat and medicinal use (Mickleburgh *et al.* 2008a).

Genus *Epomops* Gray, 1866

Epomops franqueti (Tomes, 1860)
(Fig. 4, Table 3)

Epomophorus franqueti Tomes, 1860: 54.

COMMON NAMES. — English: Franquet's Epauletted Fruit Bat.
French: Epomophore de Franquet.

MATERIAL EXAMINED. — 171 specimens (including original data).
Mount Cameroon area • 18 specimens; Victoria; 4°00'46"N,



Fig. 4. — *Epomops franqueti* (Tomes, 1860). Photo: © Aaron Manga Mongombe.

9°13'13"E; 136 m; 13.XII-16.XII.1966 & 11.XI.1973; Martin Eisentraut & Preuss P. leg.; ZFMK 1969.0579 to 0586; 1973.0371 to 0373, 0382, 0383, ZMB 53871, 53872, 53916, 67052, 9040 • 16 specimens; Mueli; 4°23'00"N, 9°07'00"E; 600 m; 20.I-9.II.1958; Martin Eisentraut leg.; ZFMK 1961.0604, 0605, 0609, 0611 to 0615, 0619, SMNS 6635 to 6641 • 5 specimens; Koto-Barombi; 4°27'57"N, 9°16'01"E; 457 m; 16.I-21.I.1958; Martin Eisentraut leg.; ZFMK 1961.0616, 0617, 0620, SMNS 6633, 6634 • 14 specimens; Isobi; 4°07'15"N, 8°59'33"E; 56 m; 17.I.1958; Martin Eisentraut leg.; ZFMK 1961.0606, 0608, 0610, 0618; 1969.0420, SMNS 6642 to 6650 • 1 ♂; Buea; 4°09'00"N, 9°12'00"E; 1050 m; 17.I.1958;

Martin Eisentraut leg.; ZFMK 1969.0421 • 1 specimen; Lake Barombi; 4°39'00"N, 9°25'00"E; 457 m; Conradt leg.; ZMB 54425.

Other localities of Cameroon • 3 specimens; Nyasoso; 4°49'42"N, 9°40'55"E; 1078 m; 10.XII-12.XII.1966; Martin Eisentraut leg.; ZFMK 1969.0422, 0425, 0431 • 8 specimens; Dikume Balue; 4°14'42"N, 9°29'36"E; 1100 m; 17.II-28.II.1967; Martin Eisentraut leg.; ZFMK 1969.0423, 0429, 0430, 0453 to 0457 • 3 specimens; Mount Kupe; 4°48'05"N, 9°42'29"E; 1078 m; 16.XI-26.II.1966; Martin Eisentraut leg.; ZFMK 1969.0424, 0427, 0428 • 1 specimen; Bamenda (Bambui); 6°03'00"N, 10°14'00"E; 1354 m; 5.II.1967; Martin Eisentraut leg.; ZFMK 1969.0426 • 1 specimen; Mora;



FIG. 5. — *Megaloglossus woermanni* Pagenstecher, 1885. Photo: © Aaron Manga Mongombe.

11°2'47"N, 14°8'26"E; Martin Eisentraut leg.; ZFMK 1973.0370 • 11 specimens; Bipindi; 3°05'00"N, 10°25'00"E; 184 m; Zenker Georg August leg.; ZMB 1128, 11280, 40160, 40161, 4785, 54934, 67098, 67101 to 67103, 67105 • 3 specimens; Yaoundé; 3°52'00"N, 11°31'00"E; 726 m; Carnap-querheimb & Heberer leg.; ZMB 10026, 10029, 54520 • 2 specimens; Moungo River; 4°02'50"N, 9°33'41"E; Buchholz leg.; ZMB 5001, 5002 • 1 ♂; Longji; 3°04'31"N, 9°58'40"E; 15 m; Paschen leg.; ZMB 54933 • 1 ♀; Batonga; 4°01'49"N, 9°06'04"E; 79 m; Kaiser leg.; ZMB 67103 • 3 ♂; Kribi; 2°57'00"N, 9°55'00"E; 13 m; Zenker Georg August leg.; ZMB 9041, 9972, 9973.

ORIGINAL DATA. — 79 individuals (22 males and 57 females) of this species were captured during our field surveys in disturbed habitats at altitudes below 1300 m a.s.l. (Table 1). Both Eisentraut (1963) and Fedden & MacLeod (1986) also recorded this species in lowland, disturbed forest in Mount Cameroon.

HABITATS AND DISTRIBUTION. — This species is mostly distributed in Central Africa, but can also be encountered in parts of West and East Africa (Kityo & Nalikka 2016). This species inhabits low to mid-elevation rainforest and some relic forest in savannah regions (Happold 1987). Happold (2013a) pointed out that this species prefers secondary to primary forest and is often caught in gardens, and in clearings close to dense undergrowth where it roosts in dense foliage of large trees.

Genus *Hypsignathus* H. Allen, 1862

Hypsignathus monstrosus H. Allen, 1862

Hypsignathus monstrosus H. Allen, 1862: 158.

COMMON NAMES. — English: Hammer-headed Bats. French: Hypsignathe monstrueux.

MATERIAL EXAMINED. — 39 specimens.

Mount Cameroon area • 1 specimen; Mueli; 4°23'00"N, 9°07'00"E; 600 m; 14.II.1958; Martin Eisentraut leg.; ZFMK 1961.0603 • 1 ♂; Koto-Barombi; 4°27'57"N, 9°16'01"E; 457 m; 20.I.1958; Martin Eisentraut leg.; SMNS 6632 • 18 specimens; Victoria (Currently Limbe); 4°00'46"N, 9°13'13"E; 136 m; Preuss P & Strunck leg.; ZMB 54204 to 54207, 54600, 54601, 54601b, 54604, 54696, 54698, 67120, 67121, 67123, 67128, 67132, 67133, 67135, 67150.

Other localities of Cameroon • 10 specimens; Bipindi; 3°05'00"N, 10°25'00"E; 184 m; Zenker Georg August & Sjöstedt Yngve Bror leg.; ZMB 40163, 54410, 67122, 67128 to 67131, 67134, 67157, 6942 • 1 ♂; Bonge; 4°28'00"N, 12°22'00"E; Sjöstedt Yngve Bror leg.; ZMB 7043 • 1 specimen; Bamundjinda; 5°36'46"N, 10°17'46"E; Adametz leg.; ZMB 67062 • 5 specimens; Dikume-Balue; 4°14'42"N, 9°29'36"E; 1100 m; Konietzko leg.; ZMB 57061, 67059, 67059 to 67061 • 2 specimens; Yaoundé; 3°52'00"N, 11°31'00"E; 726 m; Zenker Georg August & Heberer leg.; ZMB 9010, 54697.

ORIGINAL DATA. — The hammer-headed fruit bat was not captured during our field surveys, but had previously been recorded in the lowland and montane forest of Mount Cameroon by Eisentraut (1963), and by Fedden & MacLeod (1986) who capture one individual in coastal vegetation at Bimbia.

HABITATS AND DISTRIBUTION. — This species is mainly distributed in West and Central Africa, extending marginally to East Africa. This species is an inhabitant of lowland tropical rainforest, particularly gallery forest, swamp forest, mangroves, palm forest, and it has also been recorded in forest patches in savannah areas (Happold 1987). At Mount Nimba, this species was captured in forested habitats from 500 m up to 1350 m a.s.l. (Monadjem *et al.* 2016). It roosts singly or in small groups on exposed branches beneath dense vegetation, at heights of up to 30 m in the forest canopy (Happold 2013b). This species may be threatened by the bushmeat trade.

Genus *Megaloglossus* Pagenstecher, 1885

Megaloglossus woermanni Pagenstecher, 1885

(Fig. 5, Table 3)

Megaloglossus woermanni Pagenstecher, 1885: 128.

COMMON NAMES. — English: African Long-tongued Fruit Bats. French: Mégaloglosse de Woermann

MATERIAL EXAMINED. — 118 specimens (including original data). **Mount Cameroon area** • 23 specimens; Isobi; 4°07'15"N, 8°59'33"E; 56 m; Martin Eisentraut leg.; SMNS 8166, 8167, 47615, 6614 to 6623, ZFMK 1961.0626, 0628 to 0635, 1969.0454 • 6 specimens; Buea; 4°09'00"N, 9°12'00"E; 1050 m; 9.I.1958; Martin Eisentraut leg.; SMNS 6608, ZFMK 1969.0482a to 0482e • 9 specimens; Mueli; 4°23'00"N, 9°07'00"E; 600 m; 31.I-10.II.1958; Martin Eisentraut leg.; SMNS 6610 to 6613, ZFMK 1961.0636, 0637, 0191, 0627, 1963.0191 • 12 specimens; Victoria; 4°00'46"N, 9°13'13"E; 136 m, 14.XII.1968; Martin Eisentraut leg.; ZFMK 1969.0608, 0777a, 0777b, 0787a to 0787f, 1973.0378 to 0380.

Other localities of Cameroon • 1 ♀; Nyasoso; 4°49'42"N, 9°40'55"E; 1078 m; 10.I.1954; Martin Eisentraut leg.; SMNS 5119 • 2 specimens; Bitey; 3°01'00"N, 12°22'00"E; 616 m; Rosenberg leg.; ZMB 33340, 033341 • 2 specimens; Bipindi; 3°05'00"N, 10°25'00"E; 184 m; Kathke & Zenker Georg August leg.; ZMB 38959, 40162. **Equatorial Guinea** • 1 ♂; San Carlos; ZFMK 1964.0349.

ORIGINAL DATA. — 62 individuals (41 males and 21 females) of the long-tongued fruit bat were netted during our field surveys (Table 1).

TABLE 3. — External measurements of adult bats captured on Mount Cameroon. Measurements are given as mean ± standard deviation and range.

species	Sample size	Forearm	Tibia length	Head body length	Tail length	Tragus length	Ear length	Hind foot length	Greatest length of skull	Weight
<i>Eidolon helvum</i>	10	113.2±6.4 103.6-124.1	48.6±4.2 42.5-55.9	169.1±12.4 141.5-187.5	10.3±2.8 6.3-15.6	0	27.7±1.2 25.5-29.2	29.5±1.9 25.2-31.4	52.9±3.1 47.1-56.0	183.9±31.1 140.1-235.2
<i>Epomops franqueti</i>	78	85.9±5.4 70.9-96.0	33.3±2.5 28.2-41.2	128.7±0.8 102.2-153.2	0	0	21.7±1.9 17.6-26.6	18.3±0.75 13.3-24.5	43.2±3.4 35.3-51.1	89.0±19.0 51.1-142.0
<i>Megaloglossus woermanni</i>	61	42.2±1.75 39.1-45.0	18.4±1.01 16.3-19.9	69.9±3.19 64.9-76.6	0	0	13.7±1.29 12.2-16.9	9.8±0.97 8.5-12.1	26.5±1.23 24.5-28.2	14.3±2.75 11.2-17.8
<i>Micropteropus usillus</i>	57	50.7±3.2 40.1-55.1	21.4±2.0 16.6-24.8	79.4±7.3 63.0-88.9	0.31±0.9 0-3.8	0	13.9±1.6 10.2-16.5	13.3±1.5 10.1-20.3	28.5±3.5 20.1-46.4	29.7±6.9 20.1-35.5
<i>Myonycteris angolensis</i>	170	75.9±3.3 69.8-79.2	32.1±1.2 30.3-33.5	115.8±4.1 110.4-122.6	7.5±1.3 6.0-9.8	0	19.2±1.8 17.1-21.0	19.3±0.7 18.0-20.3	40.1±1.7 36.7-42.5	68.1±5.3 57.4-71.5
<i>Myonycteris torquata</i>	10	60.8±1.6 58.4-63.5	24.1±1.4 22.5-25.6	94.1±3.6 88.5-99.2	6.1±1.4 3.4-7.5	0	16.6±0.8 16.0-18.5	13.9±1.0 12.5-15.6	31.1±32.8 31.9-0.6	25.0±37.1 31.8-3.5
<i>Nanonycteris veldkampii</i>	6	46.2±1.6 44.5-49.2	18.9±1.7 16.9-20.5	68.7±9.4 64.0-73.3	0	0	13.9±2.5 10.5-18.0	11.3±1.2 10.1-13.0	24.8±1.4 22.9-26.4	18.1±4.0 11.1-23.0
<i>Rousettus aegyptiacus</i>	103	91.7±6.6 79.9-112.6	41.3±3.7 34.8-49.2	129.2±10.1 108.0-152.1	12.0±2.0 7.9-18.0	0	20.8±1.7 15.1-24.8	20.8±1.3 17.0-24.5	43.1±2.3 37.1-49.9	108.8±19.14 73.0-167.1
<i>Scotoonycteris zenkeri</i>	4	47.7±0.8 47.1-48.8	19.3±0.7 18.1-24.3	71.4±2.7 68.1-74.3	0	0	13.2±1.1 11.8-14.2	11.1±0.9 9.8-12.1	24.8±1.6 23.0-26.2	15.7±2.8 12.6-18.3
<i>Rhinolophus landeri</i>	2	44.7±2.96 42.6-46.8	18.6±0.92 18.0-19.3	47.2±1.62 46.1-48.4	23.8±2.62 21.6-25.6	0	18.2±2.90 16.1-20.2	8.6±0.35 8.3-8.8	18.3±0.92 18.1-18.6	8.2±0.92 7.9-8.5
<i>Doryrhina cyclops</i>	1	66.5	33.1	76.7	18.5	0	32.1	15.0	28.8	29.0
<i>Hipposideros cf. ruber</i>	41	51.5±1.1 49.1-53.4	20.2±1.06 17.7-22.5	52.2±3.4 45.5-56.0	31.3±2.2 28.3-35.8	0	15.2±0.8 13.7-16.5	7.6±0.6 6.3-9.1	18.1±0.9 16.3-19.9	9.6±1.3 7.9-12.9
<i>Macronycteris gigas</i>	1	107.6	43.9	114.9	38.1	0	28.9	16.6	36.6	98.5
<i>Chaerephon major</i>	1	42.4	14.5	63.0	32.8	0	10.0	6.0	18.3	15.3
<i>Mops (X.) nanulus</i>	5	29.5±0.7 28.7-30.2	11.6±0.4 11.1-11.9	54.5±1.2 53.1-55.6	22.9±1.5 21.7-25.5	4.2±0.9 3.2-5.4	13.0±0.7 12.0-14.0	6.5±0.8 49.1-53.4	17.9±1.0 16.6-19.2	8.0±2.2 5.1-10.2
<i>Mops (X.) thersites</i>	1	38.5	14.8	57.1	35.6	4.4	16.3	8.8	20.6	7.8
<i>Miniopterus cf. minor</i>	11	43.2±1.2 41.0-44.9	17.5±0.5 16.5-19.9	47.3±2.3 42.8-50.2	45.4±3.9 37.2-50.0	4.4±0.4 3.9-4.0	9.6±1.2 8.0-12.1	8.1±0.9 6.3-9.1	14.9±0.9 13.9-16.5	7.3±1.9 5.7-10.2
<i>Glauconycteris egeria</i>	1	38.5	18.1	43.8	45.1	4.8	11.3	6.3	13.5	4.1
<i>Neoromicia nana</i>	1	32.5	13.8	36.1	41.2	3.9	11.1	5.5	11.8	3.4
<i>Neoromicia tenuipinnis</i>	4	29.2±1.0 28.2-30.7	10.9±0.5 10.4-11.4	38.9±1.6 36.2-40.2	27.1±1.0 25.5-28.3	4.5±0.5 4.0-5.1	10.7±0.9 9.9-12.0	5.0±0.4 4.3-5.2	13.0±0.6 12.0-13.7	2.2±0.7 1.1-3.9
<i>Parahypsugo eisentrauti</i>	1	35.4	13.3	44.3	36.5	5.3	11.7	7.2	13.9	3.9

This specialist nectar and pollen eater was mostly captured in low altitude disturbed and cultivated habitats, though 11 individuals were also netted in undisturbed lowland forest and one in montane scrub (Table 1). The species had previously been documented on Mount Cameroon (Eisentraut 1963, 1973; Hayman & Hill 1971; Fedden & MacLeod 1986).

HABITATS AND DISTRIBUTION. — This species is widespread in Central Africa but marginal to Southern Africa. According to Bergmans (1997), it typically inhabits lowland tropical rainforest, although it has also been recorded from swamp forest, Mangrove forest and mosaic forest-grassland habitats where it commonly forages in cultivated area adjacent to forest.

REMARK. — Recent studies based on molecular analyses revealed that *Megaloglossus woermanni* from the Upper Guinea Forest are highly divergent from those of the Congo Basin Forest. Upper Guinean

forest specimens formerly included in *Megaloglossus woermanni* are now placed in a distinct species, *Megaloglossus azagnyi*, sp. nov. (Nesi *et al.* 2013).

Genus *Micropteropus* Matschie, 1899

Micropteropus pusillus (Peters, 1868)
(Fig. 6, Table 3)

Epomophorus pusillus Peters, 1868: 870.

COMMON NAMES. — English: Peters' Lesser Epauletted Fruit Bat.
French: Rousette naine de Peters

MATERIAL EXAMINED. — 79 specimens (including original data).



Fig. 6. — *Micropteropus pusillus* (Peters, 1868). Photo: © Aaron Manga Mongombe.

Mount Cameroon area • 1 specimen; Isobi; 4°07'15"N, 8°59'33"E; 56 m; 20.II.1958; Martin Eisentraut leg.; ZFMK 1961.0625 • 1 specimen; Buea; 4°09'00"N, 9°12'00"E; 1050 m; 16.II.1967; Martin Eisentraut leg.; ZFMK 1969.0599 • 11 specimens; Victoria; 4°00'46"N, 9°13'13"E; 136 m; 20.XII.1968-28.II.1973; Martin Eisentraut leg.; ZFMK 1969.0587 to 0589, 0788a, 0788b; ZFMK 1972.0056, 0058a, 0058b, 1973.0374, 0375, 0377.

Other localities of Cameroon • 9 specimens; Nyasoso; 4°49'42"N, 9°40'55"E; 1078 m; 9.IV.1954, 16.XI-12.XII.1966; Martin Eisentraut leg.; ZFMK 1969.0590, 0591, 0595 to 0598, 0600; SMNS 5117, 5118 • 1 specimen; Kribi; 2°57'00"N, 9°55'00"E; 13 m; 7.II. 1973; Martin Eisentraut leg.; ZFMK 1973.0376.

ORIGINAL DATA. — 57 individuals (26 males and 31 females) were captured during our field surveys in cultivated, cleared and fallow farmland (Table 1). The species was encountered from 20 m up to 1140 m a.s.l in disturbed habitats on Mount Cameroon, and had previously been recorded from Mount Cameroon in cultivated farmlands (Eisentraut 1963; Fedden & MacLeod 1986).

HABITATS AND DISTRIBUTION. — This species is distributed in West, Central and East Africa (Bakwo Fils & Kaleme 2016a). It is an inhabitant of savannah woodlands, but can also be encountered in tropical rainforest, swamp forest, bushland and mosaics of these habitats (Thomas & Henry 2013). At Mount Nimba of West



FIG. 7. — *Myonycteris angolensis* (Bocage, 1898). Photo: © Aaron Manga Mongombe.



FIG. 8. — *Myonycteris torquata* (Dobson, 1878). Photo: © Aaron Manga Mongombe.

Africa, it was captured both inside and outside forested habitats from 500 m to 1350 m a.s.l. (Monadjem *et al.* 2016). Thomas & Henry (2013) also noted that this species prefers secondary to primary forest and is often caught in gardens, and in clearings close to dense undergrowth. They roost singly or in pairs in lower part of trees among dense foliage within few meters of the ground (Happold 1987).

Genus *Myonycteris* Matschie, 1899

Myonycteris angolensis (Bocage, 1898)
(Fig. 7, Table 3)

Cynonycteris angolensis Bocage, 1898: 133.

COMMON NAMES. — English: Angolan Soft-furred Fruit Bat. French: Lissonyctère d'Angola.

MATERIAL EXAMINED. — 286 specimens (including original data). **Mount Cameroon area** • 10 ♀♀, 6 ♂♂, 5 specimens; Bimbia; 3°57'16"N, 9°14'42"E; 98 m; 4.II-5.II.1938; Martin Eisentraut leg.; SMNS 3460, 5585 to 5587; ZMB 93792 to 93796, 67157 to 67168 • 54 specimens; Buea; 4°09'00"N, 9°12'00"E; 1050 m; 14.II-22.II.1954, 2.I-4.I.1958, 13.XI.1957; Martin Eisentraut leg.; SMNS 5075 to 5090, 5093 to 5104, 6652 to 6656, 6818 to 6827, 8151, 8152, ZFMK 1963.0211b to 0211j • 2 specimens; Mueli; 4°23'00"N, 9°07'00"E; 600 m; 10.II-11.II.1958; Martin Eisentraut leg.; SMNS 6657; ZFMK 1961.0568 • 3 specimens; Lager I; 4°23'00"N, 9°07'00"E; 600 m; 18.XI-23.XI.1966; Martin Eisentraut leg.; ZFMK 1961.0569; 1969.0469, 0478; Lager III • 5 specimens; 4°09'00"N, 9°13'00"E; 1200 m; 2.I-21.I.1958; Martin Eisentraut leg.; ZFMK 1961.0570 to 0572, 1963.0210a, 0210b • 2 specimens; Kumba; 4° 38'38"N, 9°26'19"E; 257 m; 19.XII.1957; Martin Eisentraut leg.; ZFMK 1961.0573, 0574 • 3 specimens; Musake; 4°12'00"N, 9°12'00"E; 2000 m; 24.III.1967; Martin Eisentraut leg.; ZFMK 1969.0467, 0468, 0480c.

Other localities of Cameroon • 6 specimens; Mount Kupe; 4°48'05"N, 9°42'29"E; 1078 m; 3.XII-6.XII.1966; Martin Eisentraut leg.; ZFMK 1969.0464, 0465; 1969.0470, 0471, 0481a, 0481b • 12 specimens; Nyasoso; 4°49'42"N, 9°40'55"E; 1078 m; 5.IV.1954; Martin Eisentraut leg.; SMNS 5105 to 5116 • 4 specimens; Dikume - Balue; 4°14'42"N, 9°29'36"E; 1100 m; 22.II-27.II.1967; Martin Eisentraut leg.; ZFMK 1969.0473, 0475, 0477, 0479.

ORIGINAL DATA. — The species was the most abundant captured during field surveys, with 174 individuals (18 males and 156 females, Table 1). Individuals were recorded in different habitat types such as cultivated and fallow farmland, entrance of caves, around fruiting mango trees (*Mangifera indica*) at low to mid-altitudes, and in understory canopy of high altitude primary montane forest (Table 1). Eisentraut (1963; 1973) and Fedden & MacLeod (1986) captured this species in both primary and disturbed forest in a wide range of altitudes on Mount Cameroon.

HABITATS AND DISTRIBUTION. — This species is widely distributed in West, Central and East Africa, but marginal in southern Africa. The species is an inhabitant of lowland rainforest and montane forest from sea level to 4000 m a.s.l. It has also been recorded in relic forest in savannah. Small colonies roost in hollow trees and entrance of caves (Rosevear 1965; Happold 1987). Thomas (1983) noted that immature male cohorts of this species migrate between forest and savannah habitats in West Africa.

REMARK. — Formerly this species was known as *Lissonycteris angolensis*, but recent molecular analyses of the tribe Myonycterini Lawrence & Novick, 1963 placed *Lissonycteris* within the genus *Myonycteris* (Nesi *et al.* 2013).

Myonycteris torquata (Dobson 1878)
(Fig. 8, Table 3)

Cynonycteris torquata Dobson, 1878: 76.

COMMON NAMES. — English: Little Collared Fruit Bat. French: Petit Myonyctère.

MATERIAL EXAMINED. — 19 Specimens (including original data). **Mount Cameroon area** • 7 specimens; Mueli; 4°23'00"N, 9°07'00"E; 600 m; 7.II-16.II.1958; Martins Eisentraut leg.; ZFMK 1961.0621 to 0624, SMNS 6628, 6629; 6630 • 1 specimen; Victoria; 4°00'46"N, 9°13'13"E; 136 m; 15.XII.1968; Martin Eisentraut leg.; ZFMK 1969.0609 • 1 specimen; Isobi; 4°07'15"N, 8°59'33"E; 56 m; Martin Eisentraut leg.; SMNS 6631.

ORIGINAL DATA. — During our field surveys, 10 individuals (4 males and 6 females) were mistnetted (Table 1). Two females and two males were trapped by a fruiting fig tree at an altitude of 1140 m a.s.l, six other individuals were captured either by fruiting trees or in fallow farmlands. All individuals were captured in disturbed habitats at altitudes below 1290 m a.s.l. (Table 1). The little collared fruit bat had previously been recorded from Mount Cameroon by Eisentraut (1968).

HABITATS AND DISTRIBUTION. — This species has a wide distribution in Central Africa (Bakwo Fils & Kaleme 2016b). According to Bergmans (1997), this species is distributed in the low and medium altitude rainforest and the rain forest-savannah boundary where they roost singly or in small groups in trees.

REMARK. — Recent molecular analyses showed that *Myonycteris torquata* from the Upper Guinea Forest of West Africa are separate from those of the Congo Basin Forest. As such West Africa specimens formerly included in *Myonycteris torquata* are now placed in a distinct species, *Myonycteris leptodon* K. Andersen, 1908 (Nesi *et al.* 2013).

Genus *Nanonycteris* Matschie, 1899

Nanonycteris veldkampii (Jentink, 1888)
(Fig. 9, Table 3)

Epomophorus veldkampii Jentink, 1888: 52.

COMMON NAMES. — English: Veldkamp's Dwarf Fruit Bat. French: Roussette naine de Veldkamp.

MATERIAL EXAMINED. — 14 specimens (including original data). **Mount Cameroon area** • 3 ♂♂, 3 ♀♀; Victoria; 4°00'46"N, 9°13'13"E; 136 m; 12.XII-21.XII.1968; Martin Eisentraut leg.; ZFMK 1969.0603 to 0607; 0786. **Other localities of Cameroon** • 2 specimens; Nyasoso; 4°49'42"N, 9°40'55"E; 1078 m, 10.XII.1966; Martin Eisentraut leg.; ZFMK 1969.0601, 0602.

ORIGINAL DATA. — The mainly nectar-feeding Veldkamp's dwarf epauletted fruit bat was represented by six individuals (Table 1): one female was netted in a farmland at an altitude of 20 m a.s.l. and five other individuals (3 males and 2 females) were captured at another cultivated site at an altitude of 470 m a.s.l. (Table 1). The species was previously recorded from Mount Cameroon by Eisentraut (1973).

HABITATS AND DISTRIBUTION. — This species is widely distributed in West Africa and western parts of Central Africa. It principally inhabits disturbed lowland rainforest, but has also been recorded in savannah habitats, gallery forest and isolated forest patches where it roosts singly or in pairs in the lower parts of shrub and trees among

dense foliage (Happold 1987). Thomas (1983) noted that this species shows migratory patterns with both sexes moving between forest and savannah habitats in West Africa.

Genus *Rousettus* Gray, 1821

Rousettus aegyptiacus (E. Geoffroy St.-Hilaire, 1810)
(Fig. 10, Table 3)

Pteropus aegyptiacus E. Geoffroy Saint-Hilaire, 1810: 96.

COMMON NAMES. — English: Egyptian Fruit Bat. French: Roussette d'Égypte.

MATERIAL EXAMINED. — 230 specimens (including original data). **Mount Cameroon area** • 29 specimens; Isobi; 4°07'15"N, 8°59'33"E; 56 m; Martin Eisentraut leg.; SMNS 6687 to 6694, ZFMK 1961.0577, 0580, 0581, 0583, 0587 to 0591, 0594, 0598, 0599; ZFMK 1963.0208a to 0208e, 0218c; ZFMK 1969.0417, 0419, 0489a • 27 specimens; Mueli; 4°23'00"N, 9°07'00"E; 600 m; 8.II-23.II.1958; Martin Eisentraut leg.; SMNS 6672 to 6686; ZFMK 1959.0450; ZFMK 1961.0576, 0578, 0582, 0584 to 0586, 0595 to 0597, 0600, 0602 • 8 specimens; Koto-Barombi; 4°27'57"N, 9°16'01"E; 457 m; 17.I-26.I.1958; Martin Eisentraut leg.; SMNS 6667 to 6671; ZFMK 1961.0575, 0579, 0601 • 24 specimens; Above Buea; 4°09'34"N, 9°14'12"E; 1850 m; 23.XI-26.XI.1957, 04.I.1958; Martin Eisentraut leg.; SMNS 6658 to 6666, 6828 to 6832, 8155, 8156; ZFMK 1961.0592, 0593; ZFMK 1963.0209a to 0209f • 1 ♀; Victoria; 4°00'46"N, 9°13'13"E; 136 m; Strunk leg.; ZMB 54700 • 2 specimens; Musake; 4°12'00"N, 9°12'00"E; 2000 m; Martin Eisentraut leg.; ZFMK 1969.0418, 0489b.

Other localities of Cameroon. Yaoundé, ZMB 10239 • 2 specimens; Bipindi; 3°05'00"N, 10°25'00"E; 184 m; Zenker Georg August leg.; ZMB 54691, 54699.

ORIGINAL DATA. — With 137 individuals (131 males and 6 females) the echolocating and cave-dependent Egyptian Roussette was the second most abundant bat species captured during our field surveys (Table 1). The species was trapped in both primary montane forest and lowland secondary and cultivated forest at a wide range of altitudes from 470 m up to 2280 m a.s.l. (Table 1). The species has previously been sampled in large caves on the lower slopes and in montane grassland of Mount Cameroon (Eisentraut 1963; Fedden & MacLeod 1986).

HABITATS AND DISTRIBUTION. — *Rousettus aegyptiacus* is widespread in sub-Saharan Africa, North Africa, Middle East, the Arabian Peninsula right across to Iran and Pakistan (Korine 2016). This species has broad habitat preference and has been recorded in arid to moist tropical and subtropical habitats where large colonies roost in caves and artificial structures such as mosques, tombs and mines (Happold 2013c). Happold (1987) noted that the local distribution of this species is influenced more by the availability of suitable roost sites than by vegetation type. The species is threatened in parts of its range by bushmeat trade, cave disturbance and persecution (Korine 2016).

Genus *Scotonycteris* Matschie, 1894

Scotonycteris zenkeri Matschie, 1894
(Fig. 11, Table 3)

Scotonycteris zenkeri Matschie, 1894: 202.

COMMON NAMES. — English: Zenker's Tear-drop Fruit Bat. French: Scontonyctère de Zenker.



FIG. 9. — *Nanonycteris veldkampii* (Jentink, 1888). Photo: © Aaron Manga Mongombe.

MATERIAL EXAMINED. — 14 specimens (including original data).
Mount Cameroon area • 2 specimens; Mueli; 4°23'00"N, 9°07'00"E; 600 m; 16.II.1958; Eisentraut m leg.; ZFMK 1961.0646, 0647 • 2 specimens; Malende Swamp Area; 4°21'00"N, 9°26'00"E; 50 m; 19.XII.1957; Martin Eisentraut leg.; SMNS 6624, 6625.

Other localities of Cameroon • 3 specimens; Mount Kupe; 4°48'05"N, 9°42'29"E; 1078 m; 1.XII.1966; Martin Eisentraut leg.; ZFMK 1969.0458, 0459, 0461 • 1 ♀; Dikume - Balue; 4°14'42"N, 9°29'36"E; 1100 m; 21.II.1967; Martin Eisentraut leg.; ZFMK 1969.0460 • 1 ♀; Bipindi; 3°05'00"N, 10°25'00"E; 184 m; Zenker Georg



FIG. 10. — *Roussettus aegyptiacus* (E. Geoffroy St.-Hilaire, 1810). Photo: © Aaron Manga Mongombe.



FIG. 11. — *Scotonycteris zenkeri* Matschie, 1894. Photo: © Aaron Manga Mongombe.

August leg.; ZMB 54390 • 1 ♀; Yaoundé; 3°52'00"N, 11°31'00"E; 726 m; Zenker Georg August leg.; ZMB 66533.

ORIGINAL DATA. — Four individuals of *Scotonycteris zenkeri* were netted in an undisturbed lowland forest of mount Cameroon at an altitude of 630 m a.s.l (Table 1). This species had previously been recorded in the lowland forest of Mount Cameroon by Eisentraut

(1963), Hayman & Hill (1971), and by Fedden & MacLeod (1986), who mist-netted three individuals in a primary undisturbed forest. At Mount Nimba it was recorded at altitudes between 500 m to 600 m a.s.l. by Coe (1975) and at altitude below 800 m a.s.l. by Wolton *et al.* (1982).

DIAGNOSIS. — The four specimens display the characteristic brown head with prominent white spots on the forehead between nostrils and the eyes, small white spots at the posterior corner of each eye, and lips fringed with white (Fig. 3). The external measurements (Table 3), and description generally agree with those of Fahr (2013b), and Nigerian specimens described by Happold (1987).

HABITATS AND DISTRIBUTION. — This species has a limited distribution in Central Africa, centered on Cameroon (see Hassanin *et al.* 2015). According to Bergmans (1990), this species inhabits tropical lowland and montane forest where it lives in the lower strata of the forest about 3 m above the ground (Happold 1987); it roosts singly in trees or bushes (Happold 1987; Fahr 2013b). It is threatened by habitat loss through deforestation and the conversion of primary forest to agricultural use.

REMARK. — Based on molecular analyses, Hassanin *et al.* (2015) split *Scotonycteris zenkeri* into three species: *Scotonycteris occidentalis* in the Upper Guinea Region of West Africa, *S. zenkeri* in Cameroon and *S. bergmansi* in Central Africa.

Family RHINOLOPHIDAE Gray, 1825
Genus *Rhinolophus* Lacépède, 1799

Rhinolophus alcyone Temminck, 1853

Rhinolophus alcyone Temminck, 1853: 80.

COMMON NAME. — English: Halcyon Horseshoe Bat. French: Rhinolophe d'Halcyon.

MATERIAL EXAMINED. — 59 specimens.

Mount Cameroon area • 10 ♀♀, 18 ♂♂, 30 specimens; Buea; 4°09'00"N, 9°12'00"E; 1050 m; 14.I.1954-2.I.1958; Martin Eisentraut leg.; SMNS 5134 to 5138, 6763, 6765 to 6817; ZFMK 1961.0545 • 1 specimen; Malende; 4°21'00"N; 9°26'00"E; 150 m; 21.XII.1957; Martin Eisentraut leg.; ZFMK 1961.0644.

HABITATS AND DISTRIBUTION. — This sub-Saharan bat species ranges through much of West and Central Africa (Monadjem *et al.* 2017e). This species had previously been signalled in Mount Cameroon (Hill 1968), but was not recorded during our field surveys. The habitat of this species is tropical rainforest, but could extend into savannah zones. This species roosts in caves, hollow trees, the roofs of thatched houses and in old mine shafts (Happold 1987).

Rhinolophus landeri Martin, 1838
(Fig. 12, Table 3)

Rhinolophus landeri Martin, 1838: 101.

COMMON NAME. — Lander's Horseshoe Bat. French: Rhinolophe de Lander.

MATERIAL EXAMINED. — 24 specimens (including original data).

Mount Cameroon area • 12 ♀♀, 7 ♂♂; Buea; 4°09'00"N; 9°12'00"E; 1050 m; 14.III.1938; Martin Eisentraut leg.; SMNS 3455 to 3457, 5124, 5592 to 5595, 5123 to 5133, ZMB 78447, 78448, 93809 to 93812 • 1 ♀; Victoria; 4°00'46"N, 9°13'13"E; 136 m; 29.IV.1954; Martin Eisentraut leg.; SMNS 5122 • 1 ♀; Bimbia; 3°57'16"N,

9°14'42"E; 98 m; 4.II.1938; Martin Eisentraut leg.; SMNS 5592 to 5598.

ORIGINAL DATA. — Three individuals of this species were captured during our surveys (Table 1). One was mist-netted in a fallow farmland at an altitude of 1140 m a.s.l, while the other two were captured in primary forest at an altitude of 1070 m a.s.l.

HABITATS AND DISTRIBUTION. — At Mount Cameroon, this cave dependent species had previously been recorded at altitudes up to 1250 m a.s.l. (Fedden & MacLeod 1986), who also noted that this species inhabits both disturbed forest fringes and montane forest. Eisentraut (1963) also recorded this species in the lowland forest of Mount Cameroon at Bimbia and Limbe area, and in a cave at Buea. This species principally inhabits lowland rainforest, but has also been recorded in savannah and gallery forest (Happold 2013d), where they roost in small groups in caves, hollow trees and mine shafts (Monadjem *et al.* 2010). This species has a broad sub-Saharan African distribution from West Africa through Central Africa to East Africa (Taylor *et al.* 2018).

REMARK. — Recent molecular studies showed that the southern and eastern African savannah-dwelling *Rhinolophus landeri* is distinct from West African forest populations. As such the southern and eastern African populations have been assigned to a distinct species *Rhinolophus lobatus* Peters, 1852 (Taylor *et al.* 2018).

Rhinolophus simulator alticolus Sanborn 1936

Rhinolophus simulator alticolus Sanborn, 1936: 108.

COMMON NAME. — English: Bushveld Horseshoe Bat. French: Rhinophe de Bushveld.

MATERIAL EXAMINED. — 85 specimens.

Mount Cameroon area • 41 ♀♀, 21 ♂♂, 22 specimens; Buea; 4° 09'00"N, 9°12'00"E; 1050 m; 18.I.1954-2.I.1958; Martin Eisentraut leg.; SMNS 5137 to 5192, 6597 to 6607, 6760 to 6762, ZFMK 1961.0675 to 0685, ZFMK 1969.0450 to 0452 • 1 specimen; Musake; 4°12'00"N, 9°12'00"E; 2000 m; 29.I.1954; Martin Eisentraut leg.; SMNS 5193.

ORIGINAL DATA. — This species had previously been signalled in Mount Cameroon (Brosset 2003), but no specimen attributed to this species was recorded during our field surveys.

HABITATS AND DISTRIBUTION. — According to Cotterill & Happold (2013), this species has diverse habitat, ranging from montane forest and moist savannah to rainforest savannah mosaic. It roosts singly or in small groups in caves. This species has been recorded in Mount Nimba in West Africa (Guinea and Liberia), in central Nigeria (Denys *et al.* 2013), in the Cameroonian Highlands, in Eastern Africa and southern Africa (Cotterill & Happold 2013).

REMARK. — Though *Rhinolophus simulator alticolus* has been suggested as a separate species by Csorba *et al.* (2003), it is still retained as a subspecies of *Rhinolophus simulator* with the subspecies *R. s. simulator* Andersen, 1904 being restricted to eastern and southern Africa (Simmons 2005).

Family HIPPOSIDERIDAE Lydekker, 1891

REMARK. — Recent molecular evidence has led to the review of the family Hipposideridae, with species traditionally placed within the genus *Hipposideros* Gray, 1831 assigned to three different genera, namely *Doryrhina* Peters, 1871, *Hipposideros* Gray, 1831, and *Macronycteris* Gray, 1866 (Foley *et al.* 2017).

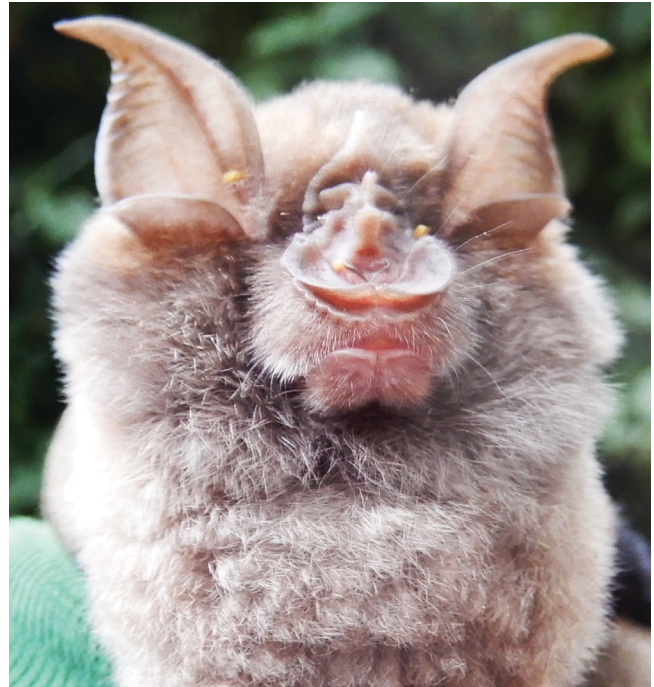


FIG. 12. — *Rhinolophus landeri* Martin, 1838. Photo: © Aaron Manga Mongombe.

Genus *Doryrhina* Peters, 1871

Doryrhina camerunensis (Eisentraut, 1956)

Hipposideros camerunensis Eisentraut, 1956: 526.

COMMON NAME. — English: Cameroon Leaf-nosed Bat. French: Phyllorine du Cameroun.

MATERIAL EXAMINED. — 14 specimens.

Mount Cameroon area • 4 ♀♀, 5 ♂♂, 5 specimens; Buea; 4°09'00"N, 9°12'00"E; 1050 m; 29.IV.1954-10.IV.1958; Martin Eisentraut leg.; SMNS 5194 to 5917, 6580, 6581, 1853, 1854a, 1854b; ZFMK 1961.0641 to 0643, ZFMK 1963.0200; ZFMK 1979.0138.

ORIGINAL DATA. — We did not capture any individual attributed to this species.

HABITATS AND DISTRIBUTION. — This species is considered a forest-dependent species that inhabits montane and lowland forest (Happold 2013e as *Hipposideros camerunensis*). Indeed, Eisentraut (1963) documented this species in the montane forest of Mount Cameroon at an altitude of 1400 m a.s.l. It has been recorded in two other localities in Africa: Shabunda in eastern Democratic Republic of the Congo and at the Kakamega Forest in western Kenya (Mickleburgh *et al.* 2019). Being a forest-dependent species, it is probably threatened by ongoing forest degradation in its geographical range (Mickleburgh *et al.* 2008b).

REMARK. — We use the generic name *Doryrhina* based on the revision by Foley *et al.* (2017).

Doryrhina cyclops (Temminck, 1853)
(Fig. 13, Table 3)

Phyllorhina cyclops Temminck, 1853: 75.

COMMON NAME. — Cyclops Leaf-nosed Bat. French: Phyllorine des Cyclopes.

MATERIAL EXAMINED. — 34 specimens (including original data). **Mount Cameroon area** • 12 specimens; Mubenge - Isongo; 4°05'00"N, 9°00'00"E; 0 m; 3.III.1938; Martin Eisentraut leg.; SMNS 3451, 3452, 5597 to 5599, ZMB 54912 to 54915, 93802 to 93804 • 3 ♀♀, 2 ♂♂; Malende Swamp area; 4°21'00"N, 9°26'00"E; 50 m; 9.III-10.III.1957; Martin Eisentraut leg.; SMNS 6582, 6583, 8163, 8164 • 1 specimen; Malende; 4°21'00"N, 9°26'00"E; 150 m; 10.II.1957; Martin Eisentraut leg.; ZFMK 1961.0639 • 1 ♂; Mueli; 4°23'00"N, 9°07'00"E; 600 m; 8.XII.1958; Martin Eisentraut leg.; ZFMK 1961.0640.

Other localities of Cameroon • 1 specimen; Mount Kupe; 4°48'05"N, 9°42'29"E. 1078 m; 2.XII.1966; Martin Eisentraut leg.; ZFMK 1969.0463 • 9 specimens; Bipindi; 3°05'00"N, 10°25'00"E; 184 m; Zenker Georg August leg.; ZMB 67752 to 67769, T10541.

ORIGINAL DATA. — Only a single specimen of *Doryrhina cyclops* was captured during our field surveys, which was mist-netted over a waterhole in an undisturbed lowland rainforest of Mount Cameroon at an altitude of 630 m a.s.l. (Table 1) Fedden & MacLeod (1986) captured this species only in primary forests on Mount Cameroon, while Eisentraut (1963) captured it only at the lowland rainforest of Mount Cameroon.

HABITATS AND DISTRIBUTION. — This species is widely distributed in West and Central Africa, with a few isolated records from East Africa. This species principally inhabits undisturbed tropical rainforest (Happold 1987), including lowland, coastal, montane, swamp and mangrove forests (Fahr 2013c as *Hipposideros cyclops*). It has also been recorded in isolated forest patches on the edges of savannah (Decher & Fahr 2005) where it roosts singly, in pairs or in small groups in cavities of hollow standing trees. They have a preference for cavities located high above the ground, and often return to the roost to consume their prey (Happold 1987). Decher & Fahr (2005) mentioned that this species may be threatened by deforestation in some parts of its range.

REMARK. — We use the generic name *Doryrhina* based on the revision by Foley *et al.* (2017).

Genus *Hipposideros* Gray, 1831

Hipposideros beatus K. Andersen, 1906

Hipposiderus beatus K. Andersen, 1906: 275.

COMMON NAME. — English: Benito Roundleaf Bat. French: Phyllorhine de Benito.

MATERIAL EXAMINED. — 3 specimens. **Mount Cameroon** • 3 ♀♀; Malende; 4°21'00"N, 9°26'00"E; 150 m; 20.XII-27.XII.1957; Martin Eisentraut leg.; SMNS 8161, 8162, ZFMK 1961.0674.

ORIGINAL DATA. — The Benito roundleaf bat was not captured during our field surveys.

HABITATS AND DISTRIBUTION. — The Benito roundleaf bat has been recorded across the forest zone of West, Central, and East Africa (Monadjem *et al.* 2017d). Happold (1987) noted that this species

inhabits tropical lowland forests, where it roosts singly, or in small groups in the cavities of fallen logs, hollow trees close to the ground and in road culverts. He further pointed out that this species has a preference for habitats close to water bodies. This species is threatened by habitat loss (Monadjem *et al.* 2017d).

Hipposideros caffer (Sundevall, 1846)

Rhinolophus caffer Sundevall, 1846: 118.

COMMON NAME. — English: Common African Leaf-nosed Bat. French: Phyllorhine de Cafre.

MATERIAL EXAMINED. — 28 specimens.

Mount Cameroon area • 1 ♀; Buea; 4°09'34"N, 9°12'00"E; 1850 m; 20.XI.1957; Martin Eisentraut leg.; SMNS 6584 • 7 specimens; Mubenge Isongo; 4°05'00"N, 9°00'00"E; 0 m; 20.II.1938; Martin Eisentraut leg.; ZMB 67683, 67728 to 67763 • 4 specimens; Mukonje; 4°35'02"N, 9°30'18"E; 113 m; 16.II.1938; Martin Eisentraut leg.; ZMB 67683, 67728 to 67730.

Other localities of Cameroon • 1 specimen; Mamfe; 5°46'00"N, 9°17'00"E; 459 m; Mansfeld leg.; ZMB 67688 • 2 specimens; Mounjo river; 4°02'50"N, 9°33'41"E; Buchholz leg.; ZMB 5005, 8390 • 1 specimen; Bonge river; 4°28'00"N, 12°22'00"E; Sjöstedt Yngve Bror leg.; ZMB 6945 • 2 specimens; Ndian river; 4°45'00"N, 8°44'00"E; Sjöstedt Yngve Bror leg. ZMB 6944, 6946b • 1 specimen; Yaoundé; 3°52'00"N, 11°31'00"E; 726 m; Zenker Georg August leg.; ZMB 8424 • 5 specimens; Bipindi; 3°05'00"N, 10°25'00"E; 184 m, Zenker Georg August leg.; ZMB 10166, 10167, 67704 to 67706 • 4 specimens; Nsanakang; 5°53'00"N, 8°59'00"E; 137 m; Diehl E leg.; ZMB 67691, 67761 to 67763.

ORIGINAL DATA. — The occurrence of this species in Mount Cameroon was mentioned by Hill (1968), but we did not capture any individual attributed to this species during our field surveys.

HABITATS AND DISTRIBUTION. — *Hipposideros caffer* is widespread in most biotic zones of sub-Saharan Africa, particularly woodland savannah habitats, extending into some suitable localities in the rainforest zones (Happold 1987; Bernard & Happold 2013). The species generally prefers savannah habitats but has also been recorded in coastal forest and bushveld habitats close to water bodies (Bernard & Happold 2013). Large colonies roost in caves, mines, buildings and culverts (Happold 1987; Monadjem *et al.* 2010).

REMARK. — *Hipposideros caffer* is regarded as a species complex (Kock *et al.* 2008; Vallo *et al.* 2008). Three subspecies were recognized by Simmons (2005), including: *H. c. angolensis* Seabra, 1898; *H. c. nanus* J.A. Allen, 1917; and *H. c. tephros* Cabrera, 1906. Vallo *et al.* (2008) recognized two distinct clades, *H. c. caffer* inhabiting southern Africa and *H. c. tephros*, inhabiting the Maghreb, West Africa and Arabian Peninsula. Additional molecular data are required to resolve the taxonomy of the caffer/ruber complex.

Hipposideros cf. ruber (Noack, 1893)

(Fig. 14, Table 3)

Phyllorhina rubra Noack, 1893: 586.

COMMON NAME. — English: Noack's Leaf-nosed Bat. French: Phyllorhine de Noack.

MATERIAL EXAMINED. — 137 specimens (including original data). **Mount Cameroon area** • 14 specimens; Mubenge - Isongo; 4°05'00"N, 9°00'00"E; 0 m; Martin Eisentraut leg.; SMNS 3453, 3454, ZMB 67679 to 67682, 67684, 93814 to 93820 • 4 ♀♀, 6 ♂♂, 2 specimens; Buea; 4°09'00"N, 9°12'00"E; 1050 m; 18.I.1954-30.XII.1957;



FIG. 13. — *Doryrhina cyclops* (Temminck, 1853). Photo: © Aaron Manga Mongombe.

Martin Eisentraut leg.; SMNS 5199 to 5206, 6593 to 6595, ZFMK 1961.0650 • 3 specimens; Koto - Barombi; 4°27'57"N; 9°16'01"E; 457 m; 16.I.1958; Martin Eisentraut leg.; ZFMK 1961.0651, ZFMK 1963.0448, 0449 • 1 specimen; Musake; 4°12'00"N, 9°12'00"E;

2000 m; 19.II.1966; Martin Eisentraut leg.; ZFMK 1969.0447 • 55 specimens; Kumba; 4°38'38"N, 9°26'19"E; 257 m; 15.XII-19.XII.1957; Martin Eisentraut leg.; SMNS 33121 to 33137, 6585 to 6592, ZFMK 1961.0634 to 0663 • 1 ♀; Mabeta; 4°01'20"N,



FIG. 14. — *Hipposideros cf. ruber* (Noack, 1893). Photo: © Aaron Manga Mongombe.

9°17'08"E; 151 m; 8.III.1938; Martin Eisentraut leg.; SMNS 5600a • 7 specimens; Mukonje; 4°35'02"N, 9°30'18"E; 113 m; 16.II.1938; Martin Eisentraut leg.; ZMB 67673 to 67678, ZMB 93813.

Other localities of Cameroon • 1 ♂; Nyasoso; 4°49'42"N, 9°40'55"E; 1078 m; 5.IV.1954; Martin Eisentraut leg.; SMNS 5207 • 1 specimen; Mount Kupe; 4°48'05"N, 9°42'29"E; 1078 m; 26.XI.1966; Martin Eisentraut leg.; ZFMK 1969.0446 • 1 ♂; Tombel; 4°45'06"N, 9°40'22"E; 593 m; 19.II-22.II.1938; Martin Eisentraut leg.; SMNS 5600.

ORIGINAL DATA. — A total of 41 specimens of this species were capture during our surveys, of which most were in the understory canopy of primary forest at an altitude of 630 m a.s.l. (Table 1). This corroborates the report by Fedden & MacLeod (1986), who mostly recorded this species at low altitude. Eisentraut (1963) noted that *Hipposideros ruber* inhabits lowland regions, but could extend into montane forest.

DIAGNOSIS. — The forearm measurement of these specimens are 49.1 to 53.4 mm (Table 3). Other features stated by Happold (1987), such as the variable color phases ranging from orange-rufous to greyish-brown were present in these specimens. Also the ears are large and pointed and the antitragus is well developed. The species is distinguishable from *Hipposideros caffer* by the larger forearm length of above 50 mm (Patterson & Webala 2012) (Table 3).

HABITATS AND DISTRIBUTION. — This species has been recorded throughout much of West, Central, and East Africa and part of southern Africa (Monadjem *et al.* 2017c). According to Happold (1987), this species mostly inhabits lowland tropical rain forest, but can also be found in relic and riverine forests in savannah regions where large colonies roost in caves, rocky cavities and abandoned mineshafts.

REMARK. — The species is well known for its variable color phases. The pelage gradually changes from grey or brown just after they early molt to bright russet, as it is oxidized by ammonia fumes within the roosts (Fedden & MacLeod 1986). Recent molecular evidence place *Hipposideros ruber* as belonging to the caffer/ruber complex whose taxonomy is still confused (Vallo *et al.* 2008, 2011; Monadjem

et al. 2013). Hence while waiting for additional molecular data to resolve the taxonomy of this complex we tentatively include all records from Mount Cameroon in *H. cf. ruber*.

Genus *Macronycteris* Gray, 1866

Macronycteris gigas (Wagner, 1845)
(Fig. 15, Table 3)

Rhinolophus gigas Wagner, 1845: 148.

COMMON NAME. — English: Giant Leaf-nosed Bat. French: Chauve-souris de Commerson à nez feuillu.

MATERIAL EXAMINED. — 4 specimens (including original data). **Other localities of Cameroon** • 1 ♀; Dikume - Balue; 4°14'42"N, 9°29'36"E; 1100 m; 6.III.1967; Martin Eisentraut leg.; ZFMK 1969.0463.

ORIGINAL DATA. — Three individuals attributed to the Giant Leaf-nosed Bat were captured during our field surveys. Two males (Table 1) were captured in a cultivated farm near a river at an altitude of 470 m a.s.l. One female (Table 1) was also netted over a water hole in a primary forest at an altitude of 630 m a.s.l.

HABITATS AND DISTRIBUTION. — This species is widely distributed in West Africa from Senegal to Cameroon, with a number of additional records further east to Tanzania and south to Namibia, Zimbabwe and Mozambique (Monadjem *et al.* 2010). This species generally inhabits lowland tropical rainforest (including secondary and riverine forest) and mesic savannah (Monadjem *et al.* 2010), where small colonies typically roost in caves, but occasionally could be found roosting in dense vegetation (Happold 1987). In Liberian Mount Nimba this species was captured in forested and disturbed habitats, ranging from 460 m to 1060 m a.s.l. (Monadjem *et al.* 2016). According to Happold (1987) this species does not hunt daily, it preys mostly on large beetles and often return to the roosts to consume prey.

REMARK. — We adopt the generic name *Macronycteris* based on the revision by Foley *et al.* (2017).

Family Nycteridae Van der Hoeven, 1855
Genus *Nycteris* G. Cuvier and E. Geoffroy, 1795

Nycteris arge Thomas, 1903

Nycteris arge Thomas, 1903: 633.

COMMON NAME. — English: Bates's Slit-faced Bat. French: Nyctère de Bates.

MATERIAL EXAMINED. — 10 specimens.

Mount Cameroon area • 3 ♂♂, 2 ♀♀; Malende swamp area; 4°21'00"N, 9°26'00"E; 50 m; 8.XII.1938; Martin Eisentraut leg.; SMNS 6569, 8160, ZFMK 1961.0648, 0649; ZFMK 1973.0193 • 1 ♀, 2 ♂; Mubenge-Isongo; 4°04'44"N, 9°01'26"E; 5 m; 9.III.1938; Martin Eisentraut leg.; SMNS 3449, 5588, 5589.

Other localities of Cameroon. Bitey • 1 ♀; 3°01'00"N, 12°22'00"E; 616 m; Bates George Latimer, Rosenberg G leg.; ZMB 33342 • Bipindi • 1 specimen; 3°05'00"N, 10°25'00"E; 184 m; Zenker Georg August leg.; ZMB 53848.

ORIGINAL DATA. — Our recent field surveys did not yield any specimens attributed to this species.



FIG. 15. — *Macronycteris gigas* (Wagner, 1845). Photo: © Aaron Manga Mongombe.

HABITAT AND DISTRIBUTION. — This species is widely distributed over much of West and Central Africa from Sierra Leone in the West, through the Congo Basin to East Africa and the Democratic Republic of the Congo. *Nycteris arge* is predominantly a lowland rainforest inhabitant, although in southern Africa it can be encountered in forest edges (Monadjem *et al.* 2010). It roosts singly or in small groups in hollow cavities of trees with large trunks, especially trees with opening near the ground (Happold 1987). According to Rosevear (1965), this species forages in forest clearing and may enter houses to hunt insects attracted to strong light. This species has been listed to occur on Mount Cameroon (Van Cakenbergh & De Vree 1985).

Nycteris grandis Peters, 1865

Nycteris grandis Peters, 1865: 358.

COMMON NAME. — English: Large Slit-faced Bat. French: Grande Nyctère.

MATERIAL EXAMINED. — 4 specimens

Mount Cameroon area • 1 ♀; Mubenge - Isongo; 4°05'00"N, 9°00'00"E; 0 m; 5.III-25.III.1938; Martin Eisentraut leg.; SMNS 3448.

Other localities of Cameroon • 1 ♀, 1 ♂; Sangmelima; 2°56'00"N, 11°59'00"E; 543 m; 3.III.1938; Perret J.L leg.; ZFMK 1962.0203,

0204 • 1 ♀; Bonge; 4°28'00"N, 12°22' 00"E; 8.I.1957; Sjøstedt Yngve Bror leg.; ZMB 7044.

HABITATS AND DISTRIBUTION. — It is predominantly a lowland rainforest species, but it also occurs in savannahs, and along riparian forest where it roosts in hollows of large trees, holes or small caverns in rocks and artificial structures such as disused water tower (Happold 1987; Monadjem *et al.* 2010). It is broadly distributed in West, Central and East Africa (Monadjem *et al.* 2017a). It forages close to the ground, in open forests, and near edges of clearings and over streams. Arthropods and small vertebrates such as frogs, birds, fish and small bats constitute the diet of this species making it the only truly carnivorous bat in Africa that eat vertebrate prey (Fenton *et al.* 1983). This species had previously been signalled in the Mount Cameroon area (Van Cakenberghe & De Vree 1985). During our field surveys, no individuals attributed to this species were recorded. This species may be threatened in some parts of its range by habitat conversion and overharvesting for food (Monadjem *et al.* 2017a).

Nycteris hispida (Schreber, 1774)

Vespertilio hispidus Schreber, 1774: 169.

COMMON NAME. — English: Hairy Slit-faced Bat. French: Nyctère hérissé.

MATERIAL EXAMINED. — 33 specimens.

Mount Cameroon area • 2 ♀♀; Buea; 4°09'00"N, 9°12'00"E; 1050 m; 24.II-17.IV.1954; Martin Eisentraut leg.; SMNS 5120, 5121 • 1 ♀; Mueli; 4°23'00"N, 9°07'00"E; 600 m; 12.II.1958; Martin Eisentraut leg.; ZFMK 1963. 0194 • 2 ♀♀, 1 ♂; Mubenge-Isongo; 4°05'00"N, 9°00'00"E; 0 m; 3.III.1938; Martin Eisentraut leg.; SMNS 3450, 5590, ZMB 93850.
Other localities of Cameroon • 1 ♂; Nyasoso; 4°49'42"N, 9°40'55"E; 1078 m; 14.XI.1948; Martin Eisentraut leg.; ZFMK 1969.0486 • 11 ♀♀, 13 ♂♂, 2 specimens; Waza; 11°23'41"N, 14°34'09"E; 321 m; Böhme Wolfgang Hartwig leg.; ZFMK 1974.0313 to 0325; 0418A to 0418M; ZMB 53893.

ORIGINAL DATA. — We did not record any individuals attributed to this species during our field surveys, but the species has previously been recorded at Buea, Mount Cameroon by Eisentraut (1963).

HABITATS AND DISTRIBUTION. — This species is widely distributed throughout sub-Saharan Africa (Van Cakenberghe & De Vree 1993). The species occupies a variety of habitats including savannah, woodland and forest where it roosts in dense bushes, houses, hollow trees, and caves (Monadjem *et al.* 2010). The occurrence of this species on Mount Cameroon was previously documented by Eisentraut (1963), but no individual was recorded during our field surveys. Fedden & MacLeod (1986) noted that this species has a wide African distribution, and is often associated with human habitation and common in cultivated areas. In Liberian Mt. Nimba it was recorded sparsely in open savannah (Monadjem *et al.* 2016). This ubiquitous species roosts singly or in groups in holes in the ground or on twigs close to the ground (Happold 1987). Its diet consists of insect such as moths and mantises which are apprehended by slow-hawking or gleaning (Happold 2013f).

Nycteris intermedia Aellen, 1959

Nycteris intermedia Aellen, 1959: 218.

COMMON NAME. — English: Intermediate Slit-faced Bat. French: Nyctère d'Aellen

HABITATS AND DISTRIBUTION. — We did not encounter this species during our field surveys and did not examine any specimen of this species. *Nycteris intermedia* has been widely documented in West and Central Africa (Van Cakenberghe & De Vree 1985). The species mainly inhabits lowland rainforest and coastal forest (Monadjem *et al.* 2010; Denys *et al.* 2013; Fahr 2013d). The species was listed to occur in Mount Cameroon by Van Cakenberghe & De Vree (1985). It forages by gleaning insects close to the ground in the understory of forest (Fahr 2013d).

Nycteris major (K. Andersen, 1912)

Petalia major K. Andersen, 1912: 547.

COMMON NAME. — English: Dja Slit-faced Bat. French: Nyctère de Ja.

MATERIAL EXAMINED. — 3 specimens.

Mount Cameroon area • 2 ♀♀, 1 ♂; Mubenge - Isongo; 4°05'00"N, 9°00'00"E; 0 m; Martin Eisentraut leg.; SMNS 3450, 5590; ZMB 93805.

ORIGINAL DATA. — Previously, this species has been recorded at the southwestern slope of Mount Cameroon by Eisentraut (1973), but no individuals were encountered during our field surveys.

HABITATS AND DISTRIBUTION. — This species is distributed in West and Central Africa (Mickleburgh *et al.* 2008b). It is principally associated with lowland rainforest and coastal forest (Monadjem *et al.* 2010; Fahr 2013e). As this species requires large trees for roosting, it is presumably threatened by deforestation (Mickleburgh *et al.* 2008b).

Family Molossidæ Gervais, 1856

Genus *Chaerephon* Dobson, 1874

Chaerephon major (Trouessart, 1897)

(Fig. 16, Table 3)

Nyctinomus (Nyctinomus) pumilus var. *major* Trouessart, 1897: 146.

COMMON NAME. — English: Large Wrinkle-lipped Bat. French: Tadaride à oreillettes.

MATERIAL EXAMINED. — 1 specimen (see Table 1).

ORIGINAL DATA. — During our field surveys, a single male was captured above a stream in cultivated farm at an altitude of 20 m a.s.l. This specimen was the first recorded from Mount Cameroon area. We did not examine any museum specimens belonging to this species.

DIAGNOSIS. — The measurement of the forearm is 42.4 mm (Table 3), that fits well within the range of *Chaerephon major* (Happold 2013g, as *Tadarida major*). A distinct central lappet of skin projects between inner bases of ears. The dorsal and ventral pelage is greyish-brown, with a white central area and whitish flank-stripe ventrally. Other external measurements fit within those provided by Happold (2013g) by Happold (2013g) (Table 3).

HABITATS AND DISTRIBUTION. — This lowland species is found throughout much of West Africa, as well as along the Nile River from Sudan to Uganda. It has also been recorded in Uganda, Kenya and Tanzania (Happold 2013g as *Tadarida major*). In Cameroon, the species has been recorded previously in the Sahelian zone of northern Cameroon (Bakwo Fils *et al.* 2014) The species primarily inhabits savannahs but has also been recorded in rainforest habitats where it roosts in hollow trees and holes in walls of buildings (Happold 2013g). It is threatened in some part of its range by habitat loss and disturbance of old building (Monadjem *et al.* 2017b).



FIG. 16. — *Chaerephon major* (Trouessart, 1897). Photo: © Aaron Manga Mongombe.

Genus *Mops* Lesson, 1842

Subgenus *Mops (Xiphonycteris)* Dollman, 1911

Mops (Xiphonycteris) nanulus J. A. Allen, 1917
(Fig. 17, Table 3)

Mops (Allomops) nanulus J. A. Allen, 1917: 477.

COMMON NAME. — English: Dwarf Free-tailed Bat. French: Tadaride naine.

MATERIAL EXAMINED. — 5 specimens (see Table 1).

ORIGINAL DATA. — 5 individuals of the Dwarf free-tailed bat were mist-netted over a slow flowing stream in a fallow farmland, at an altitude 470 m a.s.l. These specimens were the first recorded in the Mount Cameroon area. We did not examine any museum specimens attributed to this species.

DIAGNOSIS. — The forearm measurement of this species is 28.7–30.2 mm (Table 3), which concurs with measurements provided by Happold (2013h) as *Tadarida nanula*. The dorsal and flank pelage is brown, contrasting with creamy-white chest and belly (Fig. 17). Ears are large with large flap of skin joining the inner surfaces. The wing membranes are whitish, and each jaw possesses two lower incisors. External measurements (Table 3) and skull measurements (Table 4) of one preserved bat are within the range given by Happold (2013h as *Tadarida nanula*).

HABITATS AND DISTRIBUTION. — The Dwarf free-tailed bat is widely, but patchily, recorded in West, Central and East Africa from Sierra Leone and Guinea through Cameroon, to western Ethiopia and southward to Democratic Republic of the Congo (Happold 2013h



FIG. 17. — *Mops (Xiphonycteris) nanulus* J. A. Allen, 1917. Photo: © Aaron Manga Mongombe.

as *Tadarida nanula*). It is principally associated with lowland closed forest habitat (Happold 1987; Monadjem *et al.* 2010). It has also been recorded in mesic savannah (Kingdon 1974), where it roosts in small colonies in roofs of thatched huts and tree hollows (Happold 1987).

Mops (Xiphonycteris) thersites (Thomas, 1903)
(Table 3)

Nyctinomus thersites Thomas, 1903: 634.

COMMON NAME. — English: Railer Mops Bat. French: Tadaride de Railer.

MATERIAL EXAMINED. — 2 specimens (including original data).
Other localities of Cameroon • 1 specimen; Bipindi; Zenker Georg August leg.; ZMB T10542.

ORIGINAL DATA. — During our field surveys, a single individual (Table 1) attributed to this species was capture over a slow flowing

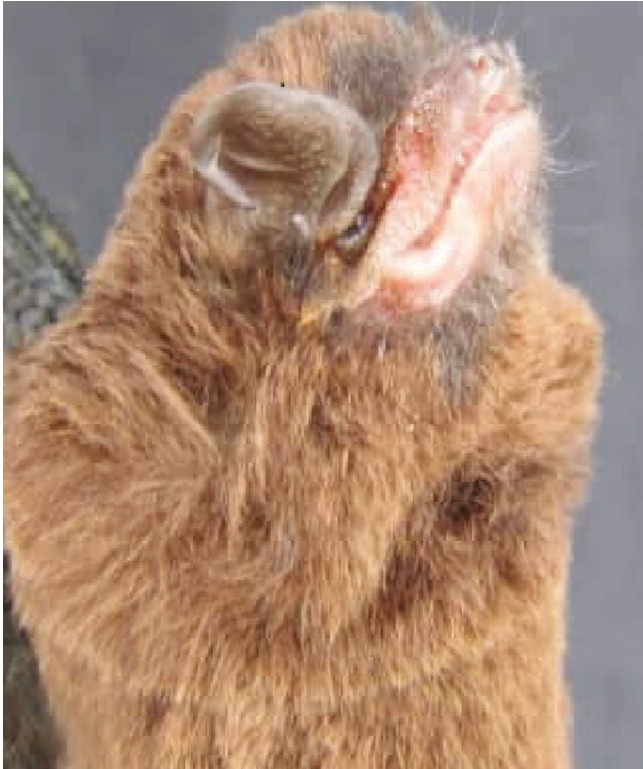


FIG. 18. — *Miniopterus cf. minor* Peters, 1867. Photo: © Aaron Manga Mongombe.

stream at an altitude of 470 m a.s.l. This specimen was the first recorded from the Mount Cameroon area, but this species had previously been recorded from Sahelian zone of northern Cameroon (Bakwo Fils *et al.* 2014). We did not examine any museum specimens.

DIAGNOSIS. — This specimen possesses the characteristic dark colored wings and conspicuous blackish flanks below wings between the leg and arm described by Patterson & Webala (2012) and Happold (2013i as *Tadarida thersites*). Other features mentioned by Happold (2013i) are also typical such as a forearm length of 35 to 42 mm. The external and skull measurements are provided in Table 3 and Table 4, respectively.

HABITATS AND DISTRIBUTION. — This species has been widely recorded from much of western and Central Africa (Happold 2013i). It has been recorded mostly from lowland rainforest and secondary forest, but also occurs in mesic savannah and adjacent grassland habitats (Monadjem *et al.* 2010; Happold 2013i). It roosts in small groups in tree hollows, under roof of houses and cracks of building (Happold 1987; Monadjem *et al.* 2010).

Family MINIOPTERIDAE Dobson, 1875
Genus *Miniopterus* Bonaparte, 1837

Miniopterus cf. minor Peters, 1867
(Fig. 18, Table 3)

Miniopterus minor Peters, 1867: 870.

MATERIAL EXAMINED. — 11 specimens (see Table 1).

ORIGINAL DATA. — A total of 11 individuals attributed to this species were obtained from a cave at an altitude of 1400 m a.s.l. during our field surveys.

DIAGNOSIS. — The species has a forearm length of 41.0–44.9 mm (Table 3), and possesses features typical of the genus in having a dome-shaped forehead (Fig. 18), and a second phalanx of third finger which is greatly elongated and folds back completely on metacarpals and first phalanx when at rest. The pelage is brownish dorsally and a paler brown ventrally. The interfemoral and wing membranes are brownish. The skull is characteristically large with a greatest length of 13.9–16.5 mm (Table 3), other external measurements are presented in Table 3.

REMARK. — The genus *Miniopterus* has a number of cryptic species with two listed to occur in Cameroon by Happold & Happold (2013): *Miniopterus schreibersii* (Kuhl, 1817) and *Miniopterus fraterculus* Thomas and Schwann, 1906. But *Miniopterus schreibersii schreibersii* is restricted to northern Africa (ACR 2018), while *Miniopterus fraterculus* is endemic to South Africa and Swaziland (Monadjem *et al.* 2010). *Miniopterus minor* Peters, 1867 has been recorded in isolated localities of central and eastern Africa (ACR 2018). Therefore further molecular investigations are required to clarify the taxonomic status of the species present in Cameroon.

Miniopterus inflatus Thomas, 1903

Miniopterus inflatus Thomas, 1903: 634.

COMMON NAME. — English: Greater Long-fingered bat. French: Grand minioptère africain

HABITATS AND DISTRIBUTION. — We did not examine any specimen attributed to this species. This species was also not recorded during our field surveys, but has been signalled in the Mount Cameroon Highlands by Eisentraut (1956, 1963). In Liberian Mount Nimba, it was recorded from 500 m to 1000 m a.s.l. in a variety of forested and disturbed habitats (Monadjem *et al.* 2016). According to Monadjem *et al.* (2010), it is recorded in a number of savannah habitats where it roosts in caves.

Miniopterus schreibersii schreibersii (Kuhl, 1817)

Vespertilio schreibersii Kuhl, 1817: 14.

COMMON NAME. — English: Common Bent-winged Bat. French: Minioptère à langues ailes.

MATERIAL EXAMINED. — 49 specimens
Mount Cameroon area • 10 ♀♀, 7 ♂♂; 3 specimens; Buea; 4°09'00"N, 9°12'00"E; 1050 m; 1.IV.1954; Martin Eisentraut leg.; SMNS 5209 to 5225, 8157 to 8159 • 22 specimens; Musake; 4°12'00"N, 9°12'00"E; 2000 m; 8.IV.1958; Martin Eisentraut leg.; SMNS 5226 to 5230, 6572 to 6579, 8157 to 8159, ZFMK 1961.0664 to 0666, 0668, 0670, 0671.

Other localities of Cameroon • 2 specimens; Bansa Highlands; 6°10'00"N, 10°40'00"E; 1850 m; Martin Eisentraut leg.; ZFMK 1969.0432, 0438 • 5 specimens; Mount Kupe; 4°48'05"N, 9°42'29"E; 1078 m; 1.XI.1966–2.XII.1966; Martin Eisentraut leg.; ZFMK 1969.0433, 0435, 0437, 0439 0441.

HABITATS AND DISTRIBUTION. — This species inhabits West and Central African forest (Fedden & MacLeod 1986). According to Eger (2013), this species can be encountered in lowland forest, montane forest and farmlands where it roosts in caves. The species had previously been recorded from Mount Cameroon (Eisentraut 1963, 1973; Hill 1968; Fedden & MacLeod 1986), but we did not capture any specimen during our field surveys. Eisentraut (1963) recorded this species in primary montane forest at elevations from 1200 m up to 2260 m a.s.l., where it roosted in large caves.

TABLE 4. — Cranial and dental measurements (mm) of preserved bats capture for the first time in the Mount Cameroon Region (November 2016–November 2018). Abbreviations explained in the Material and Method section.

Species	GLS	CBL	CCL	ZB	BB	C-M ³	C-M ³	M
<i>Mops (X.) nanulus</i>	18.2	17.7	16.9	13.3	11.7	7.1	7.5	11.9
<i>Mops (X.) thersites</i>	20.6	20.1	19.2	14.5	12.9	8.8	9.2	14.6
<i>Glauconycteris egeria</i>	13.5	13.0	12.2	8.4	6.7	4.9	5.3	10.4

Family VESPERTILIONIDAE Gray, 1821
Genus *Glauconycteris* Dobson, 1875

Glauconycteris argentata (Dobson, 1875)

Chalinolobus argentatus Dobson, 1875: 385.

COMMON NAME. — English: Common Butterfly Bat. French: Glauconyctère argentée.

MATERIAL EXAMINED. — 2 specimens.

Other localities of Cameroon • 1 specimen; Ayos; Reichenow Anton leg.; ZMB 67657 • 1 ♀; Ndian River; 4°45'00"N, 8°44'00"E; Sjøstedt Yngve Bror leg.; ZMB 6946a.

ORIGINAL DATA. — This species was not netted during our field surveys, but was previously recorded from Mount Cameroon by Eisentraut (1973).

HABITATS AND DISTRIBUTION. — This species is distributed in Central and East Africa from Cameroon through Uganda to northwestern Angola. Happold (2013j) indicated that this species inhabits rainforest habitats, miombo woodland and coastal forests where it roosts in vegetation.

Glauconycteris egeria Thomas, 1913
(Table 3)

Glauconycteris egeria Thomas, 1913: 144.

COMMON NAMES. — English: Bibundi Butterfly Bat. French: Glauconyctère de Bibundi.

MATERIAL EXAMINED. — 1 specimen (Table 1).

ORIGINAL DATA. — A single female individual was captured in a grassland patch at the submontane forest, at an altitude of 1590 m a.s.l. This represented the first record of this species in the Mount Cameroon area. We did not examine any museum specimen attributed to this species.

DIAGNOSIS. — The species is a small microbat with a forearm length of 38.5 mm, and head body length of 43.8 mm (Table 3). The dorsal pelage is dark with conspicuous whitish flank-stripe, ears with pale rim. The external and skull measurements are similar to those given by Happold (2013k) (Table 3, 4).

HABITATS AND DISTRIBUTION. — This species had previously been recorded in Cameroon, Central African Republic and western Uganda (Thomas 1913; Hassani *et al.* 2018). According to Happold (2013k), this species is endemic to Africa where it inhabits the rainforest.

Genus *Myotis* Kaup, 1829

Myotis bocagii (Peters, 1870)

Vespertilio bocagii Peters, 1870: 125.

COMMON NAME. — English: Rufous mouse-eared bat. French: Murin roux.

MATERIAL EXAMINED. — 1 specimen.

Other localities of Cameroon • 1 specimen; Ayos; 3°32'24"N, 12°32'39"E; Reichenow Anton leg.; ZMB 40656.

ORIGINAL DATA. — This species was not trapped during our field surveys. Two individuals of this species had previously been recorded at the beach in Batoke and in disturbed forest and plantations (Fedden & MacLeod 1986), but this species was not sampled during our field surveys.

HABITATS AND DISTRIBUTION. — This species is widely distributed in sub-Saharan Africa (Monadjem *et al.* 2016), from Sierra Leone to Ethiopia and southward to northeastern South Africa. This species inhabits tropical rainforest and wooded savannah where it roosts singly or in small groups within hollow trees, furled leaves, and under dead leaves of banana plants (Happold 1987; Monadjem *et al.* 2010a; Happold 2013l). Happold (1987) noted that this species prefers habitats close to rivers and streams, bordered by forest perhaps because they hunt prey above water bodies.

Genus *Neoromicia* Roberts, 1926

Neoromicia nana (Peters, 1852)
(Table 3)

Vespertilio nanus Peters, 1852: 156.

COMMON NAMES. — English: Banana Pipistrelle Bat. French: Pipistrelle naine.

MATERIAL EXAMINED. — 9 specimens (including original data).

Mount Cameroon area • 2 ♂♂; Above Buea; 4°09'34"N, 9°14'12"E; 1850 m; 12.XI.1954–6.I.958; Martin Eisentraut leg.; SMNS 5208, 6571 • 1 ♀, 1 specimen; Buea; 4°09'00"N, 9°12'00"E; 1050 m; 26.X.1957; Martin Eisentraut leg.; SMNS 6570, ZFMK 1963.0189 • 1 ♀; Victoria; 4°00'46"N, 9°13'13"E; 136 m; Preuss P leg.; ZMB TO94444.

Other localities of Cameroon • 2 ♂♂; Mount Manengouba; 5°00'00"N, 9°50'00"E; 1000 m; Martin Eisentraut leg.; ZFMK 1961.0672, 0673 • 1 ♂; Dikume-Balue; 4°14'42"N, 9°29'36"E; 1100 m; Martin Eisentraut leg.; ZFMK 1969.0490.

ORIGINAL DATA. — A single male (Table 1) individual of the banana pipistrelle was captured in the understory of the montane forest at an altitude of 1800 m a.s.l. Previously this species was documented as *Pipistrellus nanus* at altitudes from 1000 m up to 1600 m a.s.l. on Mount Cameroon (Eisentraut 1963; Fedden & MacLeod 1986).

HABITATS AND DISTRIBUTION. — *Neoromicia nana* is widely distributed in sub-Saharan Africa, occurring from Senegal in the west to Ethiopia and Somalia in the east and south to southern Africa (Monadjem *et al.* 2010). This species primarily inhabits lowland and montane tropical rainforest, as well as savannah habitats where it roosts singly or as small colonies in young, terminal and furled banana and plantain leaves (Happold 2013m; Monadjem *et al.* 2010). They have also been recorded to roost between “hands” of bunches of banana fruit, thatch huts, oil palms, roofs of houses and road culverts (Happold 1987).

Neoromicia tenuipinnis (Peters, 1872)
(Table 3)

Vesperus tenuipinnis Peters, 1872: 263.

COMMON NAMES. — English White-winged Bat. French: Pipistrelle à ailes blanches.

MATERIAL EXAMINED. — 13 specimens (including original data). **Mount Cameroon area** • 3 ♀♀, 2 ♂♂; Mubenge - Isongo; 4°05'00"N, 9°00'00"E; 0 m; Martin Eisentraut leg.; SMNS 3458, 3459, 5602, ZMB 9304, 93807 • 2 ♂♂; Debunscha; 4°06'00"N, 8°59'00"E; 36 m; Martin Eisentraut leg.; SMNS 5603, 5604. **Other localities of Cameroon** • 1 specimen; Douala; 4°04'00"N, 9°43'00"E; 0 m; SMNS 2362b • 1 ♀; Bitye; 3°01'00"N, 12°22'00"E; 616 m; 13.XII.2014; Rosenberg W.F.H leg.; ZFMK 1979.0647.

ORIGINAL DATA. — 4 individuals (3 females and 1 male) (Table 1) of the white-winged serotine were captured over a slow flowing stream near a cultivated farm at an altitude of 470 m a.s.l. The species was originally documented in the Mount Cameroon area as *Eptesicus tenuipinnis* (Peters, 1872) (Eisentraut 1963).

HABITATS AND DISTRIBUTION. — The species is widely distributed in sub-Saharan Africa from West Africa through Central Africa and parts of East Africa (Monadjem & Fahr 2017). Although principally associated with lowland rainforest (Monadjem *et al.* 2010), it has also been recorded in forest, moist savannah, tropical dry forest and mangrove forest where small groups roost in roofs, eaves of houses, small crevices in houses and hollow trees (Happold 1987; Monadjem *et al.* 2010). Happold (1987) noted that this species may fly into houses to hunt insects around light.

Genus *Parahypsugo* Hutterer, Decher,
Monadjem & Astrin, 2019

Parahypsugo eisentrauti (Hill, 1968)
(Table 3)

Pipistrellus eisentrauti Hill, 1968: 45.

COMMON NAMES. — English: Eisentraut's Pipistrelle. French: Pipistrelle d'Eisentraut.

MATERIAL EXAMINED. — 5 specimens (including original data). **Other localities of Cameroon** • 2 specimens; Mount Kupe; 4°48'05"N, 9°42'29"E; 1078 m; 30.XI.1966; Martin Eisentraut leg.; ZFMK 1950.0198; ZFMK 1968.0006 • 2 specimens; Dikume-Balue; 4°14'42"N, 9°29'36"E; 1100 m; 18.II.1967; Martin Eisentraut leg.; ZFMK 1950.0498; ZFMK 1968.0005.

ORIGINAL DATA. — A single male (Table 1) was caught at the ecotone between montane forest and montane grassland at an altitude of 2130 m a.s.l. This species has previously been referred to as *Hypsugo eisentrauti* (Hill, 1968) and it was recorded from Mount Cameroon by Eisentraut (1968) as *Pipistrellus eisentrauti*. The new generic name is based on recent molecular and morphological results by Hutterer *et al.* (2019). Fedden & MacLeod (1986) mist-netted a total of 22 individuals in the montane forest of Mount Cameroon.

DIAGNOSIS. — The species is very small with a forearm length of 35.4 mm. The pelage is reddish-brown dorsally and slightly paler ventrally. The anterior upper premolar is visible above gum. The wings and interfemoral membrane are also reddish-brown. External measurements are presented in Table 3.

HABITATS AND DISTRIBUTION. — This species is probably restricted to the Cameroon Highlands, where it has been recorded on Mount Cameroon, Rumpi Highlands, and Mount Kupe by Eisentraut (Hill 1968). It is distributed principally in montane and submontane habitat from 750 m to 2235 m (Van Cakenberghe & Happold 2013).

Genus *Pipistrellus* Kaup, 1829

Pipistrellus nanulus Thomas, 1904

Pipistrellus nanulus Thomas, 1904: 198.

COMMON NAMES. — English: Tiny Pipistrelle. French: Pipistrelle minuscule.

MATERIAL EXAMINED. — We did not examine any specimen attributed to this species.

ORIGINAL DATA. — The tiny pipistrelle was not captured during our field surveys, but has previously been recorded from Mount Cameroon by Fedden & MacLeod (1986), who captured a single male in a primary forest at an altitude of 860 m a.s.l.

HABITATS AND DISTRIBUTION. — This species is widespread in West and Central Africa, with an isolated population occurring in East Africa. According to Van Cakenberghe & Happold (2013), this species principally inhabits tropical lowland rainforest, but has also been recorded in riverine forest, tropical dry forest and lowland and moist savannah. In Nigeria it is found in the rainforest zone extending northwards into derived and Guinea savannah zones and may be associated with banana plantations (Happold 1987).

DISCUSSION

Our study provides the most recent species list of the bat fauna of Mount Cameroon, with three new species added to the previous record. This emphasizes the importance of carrying out surveys that target different habitat types. However, the surveys conducted by Eisentraut (1963, 1964, 1968 & 1973) recorded more species (30) when compared to our surveys (21 species) (Table 2). This difference can be attributed to several factors, principal among which is the duration of capture which was markedly shorter in our field surveys. Also, the decline in species richness observed during our field surveys may be attributed to anthropogenic activity, which has led to changes in the natural landscape of the region over the past 40 years. Indeed, the natural environments of the Mount Cameroon region have suffered from extensive deforestation, with most of the lowland rainforest being replaced by farmland, agro-industrial plantation and human settlements (Forboseh *et al.* 2011). All these activities inevitably have a negative impact on the flora and fauna of the region. For instance, in our recent surveys, forest-dependent species such as *Hypsognathus monstrosus* and *Casinycteris ophiodon* were not recorded; this could be a sign of a heavily disturbed environment. As pointed out by Cosson *et al.* (1999), the fragmentation of tropical forest often lead to a rapid decline in the diversity of forest-dependent species in favor of generalist species. The generalists are able to thrive in modified habitats, due to their inherent ability to access additional resources such as food resources and manmade shelters (Coleman & Barclay 2012).

Moreover, there are further indications to support the assertion that deforestation and degradation of the lowland and montane forest of Mount Cameroon may have altered the chiropteran fauna. For example, few highly cluttered space insectivorous bats such as nycterids and vespertilionids were recorded during the recent surveys. Indeed, bats species that prefer cluttered habitat for foraging are more vulnerable to population decline with increase in deforestation due to a decline in resource availability (Threlfall *et al.* 2012). Additionally, the low number of insectivorous bats captured during our field surveys may be attributed to the use of ground-level mist nets only. As pointed out by Arita (1993), most vespertilionids and molossids are canopy foragers and as such are less frequently captured with ground-level mist nets. Also, insectivorous bats are known to easily escape from mist nets by chewing a hole through the mist nets if the nets are left unwatched even for just a short time (Vaughan 1986). Nevertheless we captured some vespertilionids and molossids mostly as they foraged over slow flowing streams (Table 1).

In order to conserve this exceptional biodiversity, Mount Cameroon National Park (MCNP) was created in 2010. One of the park's main priorities is to protect large mammals that are becoming rare in recent years. We are advocating that bats and other small mammals should also benefit from some of these conservation measures. Among the chiropteran fauna of Mount Cameroon, some species such as *Rousettus aegyptiacus*, *Myonycteris angolensis*, *Rhinolophus landeri* and *Hipposideros* cf. *ruber* roost in caves and rock crevices. We recommend that measures should be put in place not only to discourage poaching, but to protect caves against human encroachments. Other species such as *Eidolon helvum* and *Casinycteris ophiodon* are red-listed as Near Threatened while *Nycteris major*, *Parahypsugo eisentrauti*, *Glauconycteris egeria* and *Doryrhina camerunensis* are listed as Data Deficient. These species are particularly in need of dedicated conservation measures to prevent extinction. Thus establishing a checklist of bats will not only provide information on species richness, but can also be an important base for designing future studies and identifying species in need for conservation measures and management consideration.

Indeed, bats provide vital economic and ecological services to humans. Insectivorous bats consume between 50% and 100% of their body mass in insects each night, as such help to regulate nocturnal insect populations, including many agricultural pests (Boyles *et al.* 2011). Boyles *et al.* (2011) estimated that bats provide an estimated \$3.8 billion per year in North America alone in economic benefits to agriculture as natural control of agricultural pest. Also, Taylor *et al.* (2018) estimated economic benefits of natural regulation of agricultural pests by bats in South African Macadamia orchids at approximately \$613 per hectare, by reducing cost value between 9% and 23% of annual estimated cause damage by stink bugs. Plant-visiting bats typically play a very important role in ecosystem functioning and forest succession after anthropogenic landscape disturbances. Frugivorous bats are excellent seed dispersers that influence the plant species that will potentially recolonize

a given region (Henry & Jouard 2007). Nectarivorous and pollinivorous bats pollinate flowers of many species thus influence reproductive success of plants (Quesada *et al.* 2003). Konaté & Kampmann (2010) noted that almost 100 plant species in Africa are pollinated and or dispersed by bats including trees such as Baobab (*Adansonia digitata*), African Sausage Tree (*Kigelia africana*), Silk-cotton Tree (*Ceiba pentandra*), and the Iroko (*Milicia excelsa*). Moreover, bats are excellent bioindicators that show measurable responses to environmental stressors such climate change and habitat degradation which reflect the health of the entire ecosystem (Jones *et al.* 2009).

Our study adds three new species to the Chiropteran fauna of Mount Cameroon, increasing the number of known species to 38. Mount Cameroon now ranks second in terms of species richness on West African mountains after the Upper Guinean Mount Nimba with 59 species (Monadjem *et al.* 2016). Mount Cameroon is followed by the Simandou Range in Guinea with 35 bat species (Decher *et al.* 2015), and Mount Mulanje with 30 species (Curran *et al.* 2012). Our studies conducted at Mount Cameroon were mostly carried out on the seaward aspect of the mountain. We anticipate that further surveys targeting other aspects of the mountain, and using complementary study techniques such as a harp traps and ultrasound detectors will lead to the discovery of additional bat species.

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APPENDIX

APPENDIX 1. — Gazetteer of localities listed in the text. Gazetteer of localities listed in the text.

No	Localities	Latitude	Longitude	Altitude
1	Isobi	4°07'15"N	8°59'33"E	56 m
2	Bafia	4°45'00"N	11°14'00"E	467 m
3	Bambili	6°03'00"N	10°14'00"E	1354 m
4	Bamenda	5°56'00"N	10°10'00"E	1614 m
5	Bamundjinda	5°36'46"N	10°17'46"E	
6	Banso Highlands	6°10'00"N	10°40'00"E	1850 m
7	Basho	6°08'00"N	9°26'00"E	267 m
8	Batonga	4°01'49"N	9°06'04"E	79 m
9	Bimbia	3°57'16"N	9°14'42"E	98 m
10	Bipindi	3°05'00"N	10°25'00"E	184 m
11	Bitye	3°01'00"N	12°22'00"E	616 m
12	Bonge river	4°28'00"N	12°22'00"E	
13	Buea	4°09'00"N	9°12'00"E	1050 m
14	Debunscha	4°06'00"N	8°59'00"E	36 m
15	Dikume-Balue	4°14'42"N	9°29'36"E	1100 m
16	Douala	4°04'00"N	9°43'00"E	0 m
17	Isongo	4°04'44"N	9°01'26"E	5 m
18	Koto-Barombi	4°27'57"N	9°16'01"E	457 m
19	Kribi	2°57'00"N	9°55'00"E	13 m
20	Kumba	4°38'38"N	9°26'19"E	257 m
21	Lager I	4°09'34"N	9°14'12"E	1600 m
22	Lager III	4°09'00"N	9°13'00"E	1200 m
23	Lake Barombi	4°39'00"N	9°25'00"E	457 m
24	Longji	3°04'31"N	9°58'40"E	15 m
25	Mabeta	4°01'20"N	9°17'08"E	151 m
26	Malende	4°21'00"N	9°26'00"E	150 m
27	Malende swamp area	4°21'00"N	9°26'00"E	50 m
28	Mamfe	5°46'00"N	9°17'00"E	459 m
29	Mora	11°2'47"N	14°8'26"E	
30	Moungo River	4°02'50"N	9°33'41"E	
31	Mount Kupe	4°48'05"N	9°42'29"E	1078 m
32	Mount Manengouba	5°00'00"N	9°50'00"E	1000 m
33	Mount Oku	6°15'00"N	10°26'00"E	
34	Mubenge-Isongo	4°05'00"N	9°00'00"E	0 m
35	Mueli	4°23'00"N	9°07'00"E	600 m
36	Mukonje	4°35'02"N	9°30'18"E	113 m
37	Musake	4°12'00"N	9°12'00"E	2000 m
38	Ndian river	4°45'00"N	8°44'00"E	
39	Nicools-island Bimbia	3°57'16"N	9°14'42"E	98 m
40	Nsanakang	5°53'00"N	8°59'00"E	137 m
41	Nyasoso	4°49'42"N	9°40'55"E	1078 m
42	Sangmelima	2°56'00"N	11°59'00"E	543 m
43	Victoria (currently Limbe)	4°00'46"N	9°13'13"E	136 m
44	Waza	11°23'41"N	14°34'09"E	321 m
45	Yaounde	3°52'00"N	11°31'00"E	726 m