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SMALL MAMMALS OF UGANDA

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BONNER ZOOLOGISCHE MONOGRAPHIEN

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Erik Thorn & Julian Kerbis Peterhans

with contributions from Jonathan Baranga, Michael Huhndorf, Rainer Hutterer, and Robert Kityo

SMALL MAMMALS OF UGANDA

Bats, shrews, hedgehog, golden-moles, otter-tenrec, elephant-shrews, and hares

CONTENTS

ABSTRACT

This volume covers a numerous but hitherto poorly-documented portion of the mammal fauna of Uganda, and presents a definitive reference to identification and distribution of species, and to research on them within that country. It covers all known Chiroptera (bats), Soricidae (shrews), Chrysochloridae (golden-moles), Macroscelididae (elephant-shrews), Leporidae (hares), and the single species each of Erinaceidae (hedgehog) and Potamogalidae (otter-tenrec). It complements Delany's (1975) treatment of Uganda rodents (which now needs much updating).

The project began with identification of a year's collection (Donald A. Smith Collection, DAS) from Uganda taken by the senior author's friend Donald A. Smith of Ottawa; mostly of rodents, bats, and shrews, recently donated to Royal Ontario Museum. In the decades since, collections from over 15 major institutions in North America and Europe have been studied and analyzed. We are grateful for the initial contribution of Jonathan Baranga. Also chapters on the 4 Uganda species of elephant-shrews and 3 of leporids owe much to previous studies by Gordon Corbet (BMNH) and John Flux respectively. Sources of specimens from each locality, and references to them are given. We list the museums and their hosting staff, and those whose correspondence aided us. Over the whole project, good friends Donald Smith, Allan Brooks † of Miracle Beach, B.C., (who often provided literature from his library), Murray Johnson † of Tacoma, WA, and specially Dieter Kock (SMF), Karl Koopman † (AMNH), and John Hill † (BMNH) gave needed encouragement. Robert Wilihnganz helped with computer problems († deceased).

A total of 95 species of bats were identified by us from Uganda specimens and 3 more are considered valid records although Uganda specimens have not been located: 2 species from the late Robert Hayman (BMNH), and 1 from John Williams (NMK). We welcome details of several rare and newly discovered Uganda bats in a chapter by Robert Kityo, Julian Kerbis Peterhans, Michael Huhndorf, and Rainer Hutterer. 33 species of shrews were identified in museums, including description of a new species (see chapter by Julian Kerbis Peterhans and Rainer Hutterer). One given Type locality is corrected from Uganda to Kenya, another may be changed from D. R. Congo to Uganda. It is hoped that these records will be of considerable use not only to zoologists, but also to medical, agricultural, forestry, and conservation workers.

Key words: *Small mammals, Chiroptera, Eulipotyphla, Afrosoricida, Lagomorpha, identification keys, anatomy, morphology, zoogeography, taxonomy, systematics, behavior, ecology,* Suncus hututsi **sp. nov.**, *Uganda, Africa.*

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ABBREVIATIONS

AMNH	American Museum of Natural History, New York
BMNH	Natural History Museum, London
BINP	Bwindi-Impenetrable National Park
C^1C^1	greatest width across outer bases of upper canines, to nearest tenth mm
CM^3	length of upper toothrow, canine to last molar
confl	Confluence of
Congo(B)	Congo Republic, capital Brazzaville
D. R. Congo	Democratic Republic of Congo, capital Kinshasa
CR (12)	crown/rump length of embryo (in mm)
DAS	collection Donald A. Smith, now in ROM
E	height of ear to nearest half mm
FA	length of FA in bats
FMNH	Field Museum of Natural History, Chicago
FR	Forest Reserve
GR	Game Reserve
HB	head and body length
HBBC	height from bottom of auditory bulla to top of braincase
HCOR	height of coronoid process above ramus of mandible
HF	length of hindfoot, usually including claws, except for elephant-shrews and hares
HMZ	Harrison Zoological Museum, Sevenoaks, U.K.
I	Island
ITFC	Institute of Tropical Forest Conservation
I^1, I_2	first upper incisor, second lower incisor, etc.
km	kilometers
KMB	Koenig Museum, Bonn
KVNP	Kidepo Valley National Park
KFNP	Kibale Forest National Park
LACM	Los Angeles County Museum, Los Angeles
LTR	complete lower toothrow
mm, cm, m	millimeter, centimeter, meter
M^2	second upper molar
M^3M^3, M^2M^2	greatest width to outside of upper molars
MAN	length of mandible including incisors
MCZ	Museum of Comparative Zoology, Harvard U.
MENP	Mt Elgon NP
MFNP	Murchison Falls NP
MGNP	Mgahinga Gorilla National Park
MHBC	median height from basioccipital to top of parietal (crest) of braincase
MSNG	Museo Civico di Storia Naturale, Genova
MUZM	Makerere University Museum of Zoology, Kampala
MZUT	Universita di Torino
n, c, s, e, w	northern, central, southern etc.
NHMW	Naturhistorisches Museum, Vienna
NMK	National Museum of Kenya, Nairobi
NP, PN	National Park
NRMS	Naturhistoriska Riksmuset, Stockholm
P	Parish
P^1, P_2	first upper premolar, second lower premolar

PCM	Carnegie Museum, Pittsburgh
R	River
RMNP	Ruwenzori Mountains National Park
ROM	Royal Ontario Museum, Toronto
s Africa	southern Africa
S Africa	Republic of South Africa
SK	greatest length of skull
SKCC	condylo-canine length of skull
SKCI	condylo-incisive length of skull
SMF	Senckenberg Museum, Frankfurt
SMNS	Staatliches Museum für Naturkunde, Stuttgart
T	length of external tail
TIB	length of tibia
U^1, U_2	first upper unicuspid, second lower unicuspid
UCN	University College, Nairobi
UFD	Uganda Forestry Department
USNM	Smithsonian Institute, Museum of Natural History, Washington
UTR	length maxillary toothrow
WSP	total span to oustretched wing tips
WTG	weight to nearest half gram
XBC	greatest width of braincase
XIO	least interorbital length
XM^1	width of first upper molar
XMST	width across mastoid processes
XMX	width across maxillary
XPG	post glenoid width
XSO	width across supra-orbitals
XZ	width across zygomatic arches
ZMA	Zoological Museum, Amsterdam
ZMB	Zoological Museum, Berlin
ZMK	Zoological Museum, Copenhagen
IV 25+12+10	fourth digit, etc. (wing), length metacarpal, phalanges
> 5, < 5	over 5 mm, under 5 mm

In this work, external body measurements are quoted to the nearest tenth mm.

1. INTRODUCTION

Although it straddles the equator, Uganda's generally raised altitude moderates its climate and affects its flora and fauna. The area of 236 580 km^2 is crossed by the Nile system out of Lake Victoria (elevation 1346 m) flowing to where it leaves Uganda into Sudan (600 m). Extreme altitudes in western (Mt Ruwenzori, 5109 m), eastern (Mt Elgon 4321 m) and southwestern Uganda (Mt Muhavura 4127 m) provide substantial areas of alpine and montane habitats. Central Uganda is a gentle saucer holding

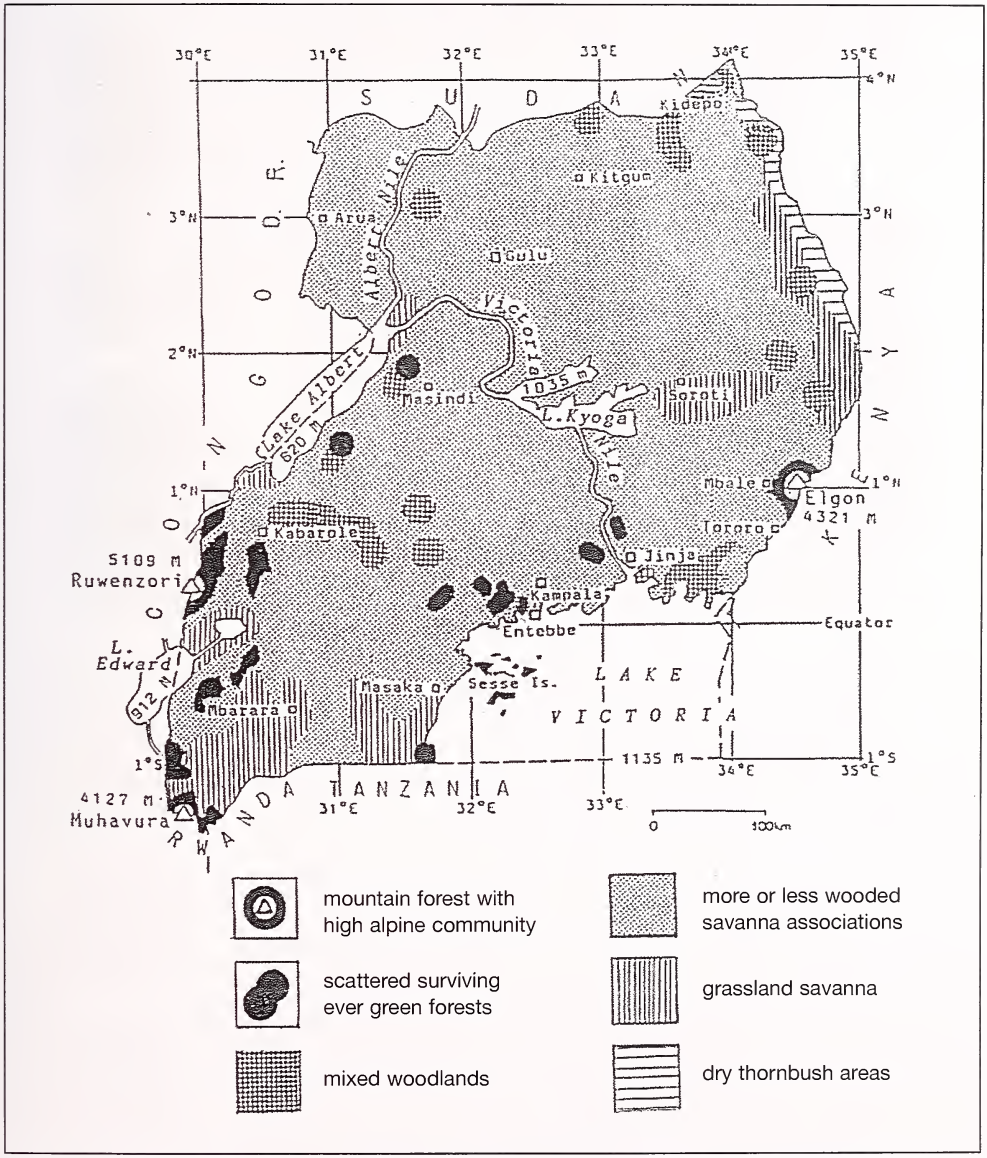

FIG. 1. Ecological regions of Uganda.

FIG. 2. Habitat Preferences of some small mammals of Uganda. Human settled areas: + – *Chaerephon pumilus*; 2 – *Pipistrellus nanus*; 3 – *Crocidura olivieri*. Evergreen Rainforest: 4 – *Scutisorex somereni*; 5 – *Epomops franqueti*. Alpine Environments: 6 – *Crocidura montis*; 7 – *Chrysochloris* (*C. stuhlmanni*, *C. fosteri*). Decidous Woodlands: 8 – *Hipposideros gigas*; 9 – *Poelagus marjorita*. Dry Thicket Area: a – *Atelerix albiventris*; b – *Tadarida aegyptiaca*; c – *Crocidura parvipes*. Grasslands Savannas: d – *Elephantulus rufescens*; e – *Lavia frons*; f – *Lepus capensis*.

marshy Lake Kyoga. Scattered over this are hills originally covered in woodland, which graduate to wooded savanna over much of the country with areas of grassland, and of dry bush along the Kenya border. Ecologists disagree somewhat in detailing the classification, but the version shown here (Fig. 1) is a reasonable compromise. Remains of once extensive evergreen rainforests and deciduous woodland are only now afforded a measure of official (often ineffective) protection.

Various habitats are the first choices of different small mammals and the degree to which they can stray beyond them varies enormously (Fig. 2). Obviously bats generally have a mobility not available to small ground species, and still less to specialized burrowing animals. Some versatile species occur widely and thrive in the fields, houses, water conduits etc.; they may ruin cultivated crops, or they may reduce pest insects or pest rodents, but are themselves sometimes

suspect in transmission of diseases. Some very local forms (such as burrowing golden-mole species) have either spread at a geologic time more widely suitable to them, or have evolved from widespread and less specialized ancestors.

In 1900, Uganda's human population was estimated at one and one half million, in 1950 as five and one half million. At the beginning of the twenty-first century, despite appalling civil wars (or perhaps the cause of them), it is about 20 million. Needs for subsistence or demands of cash crops (including virgin timber) clear woodland, change grassland, spoil water. Some small mammals, as well as large ones have almost nowhere left for their survival. Bunyoro rabbit and giant otter-tenrec may be examples.

The Ugandan small mammals of this publication include about 40 terrestrial insectivorous species, several elephant shrews, hares, and nearly 100 taxa of bats. We have chosen to concentrate on these because they have never been studied overall in any depth. Uganda rodents (75 to 125 species) were summarized by Delany (1975). Other species that could be considered "small mammals" might also include bushbabies (primates), dwarf mongooses (carnivores), blue duikers and chevrotains (ungulates), and hyraxes, none of which we include here.

It is hoped that more positive identifications and verified locality records from these chapters will help in other studies of disease transmission, conservation, and pest reduction.

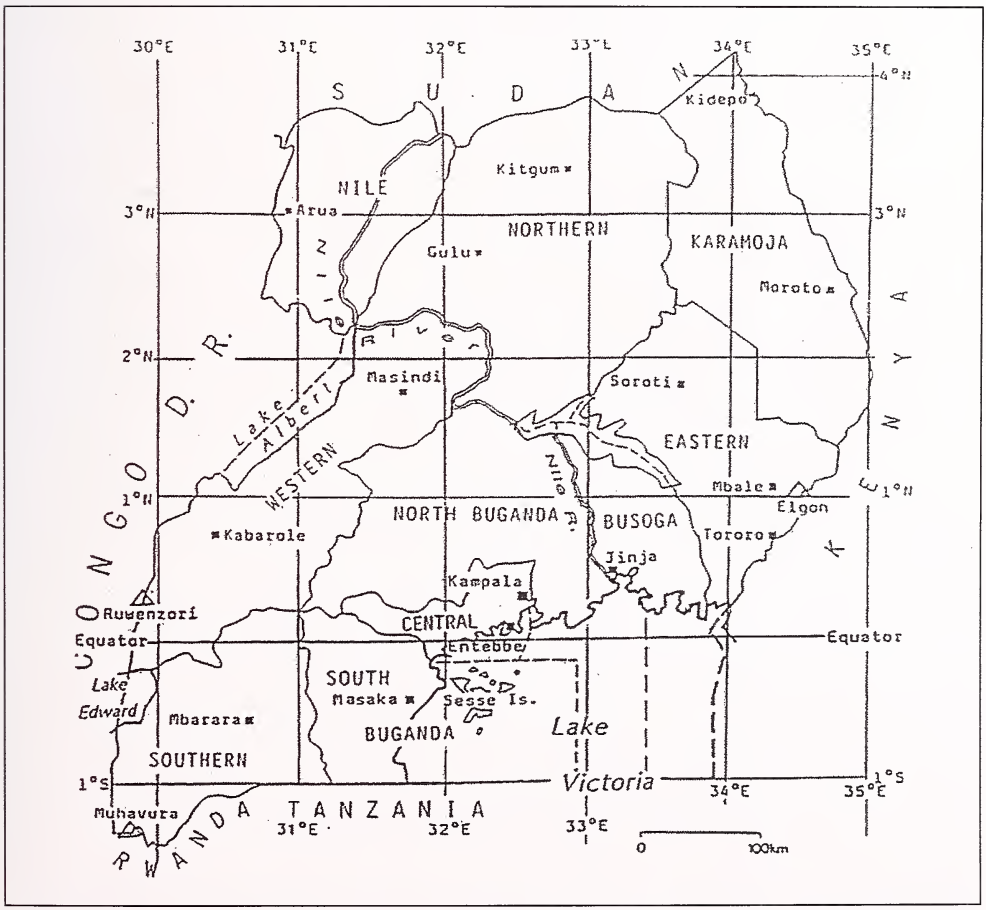

FIG. 3. Uganda with its pre-1996 provinces, as used for orientation in this publication.

2. CHIROPTERA

PTEROPODIDAE

Large fruit-eating bats with big eyes; external tail absent or very short and not supporting a usable interfemoral membrane; long thumb and second finger each armed with a claw. Always lack a noseleaf.

Key to Uganda species (*underlined italics*), and others likely to occur there (*plain italics*)

1a) Forearm (FA) 37-46; muzzle slender; tongue long with pointed and densely brushed tip; cheek-teeth extremely reduced ..... *Megaloglossus woermanni* Fig. 5B

1b) FA 47-137; tongue with rounded tip and not densely brushed; muzzle heavier; cheek-teeth not extremely reduced..... (2) Fig. 5A, C

2a) FA 47-56..... (3)

2b) FA 56-137..... (5)

3a) Facial pattern with both white nose spot and white eye patches, but basal white ear-tufts absent.. (4) Fig. 5L

3b) Facial pattern not as above; basal white ear-tufts present FA 46-55; SK 28-31..... *Micropteropus pusillus* Fig. 5J

4a) Post-dental palate present; FA 45-55; SK 24-27..... *Scotonycteris zenkeri*

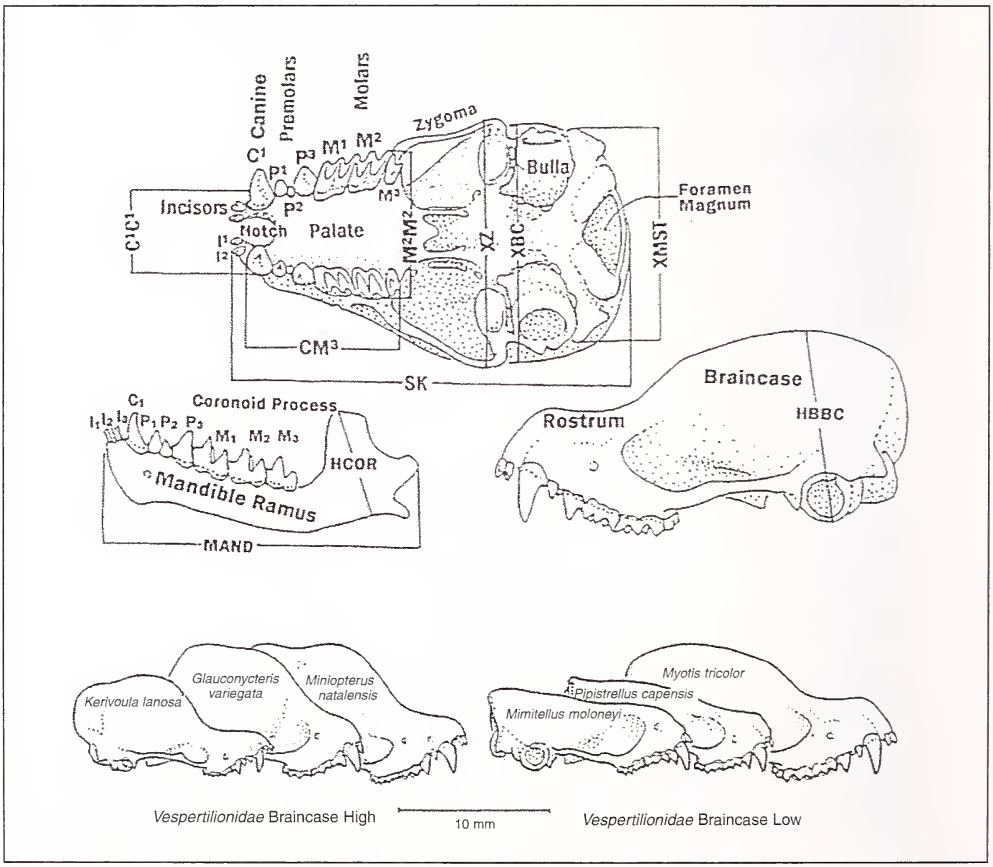

FIG. 4. Parts of a *bat's skull* (*Myotis bocagii*) as measured and examples of high and low braincases in *Vespertilionidae*.

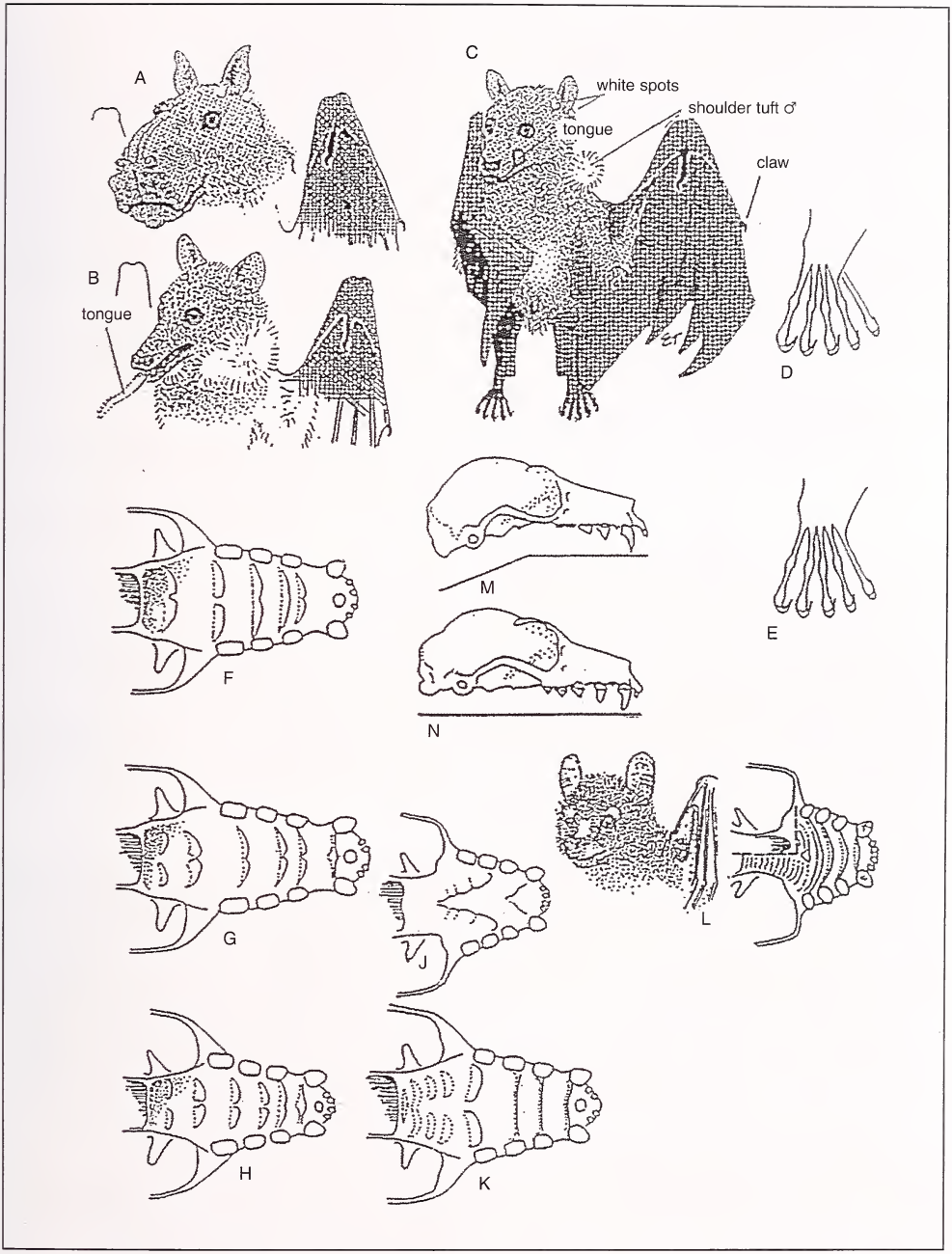

FIG. 5. Pteropodidae: A – *Hypsignathus monstrosus* ♂; B – *Megaloglossus woermanni* ♂; C – *Epomophorus labiatus* ♂; D – *Rousettus lanosus* (dorsal view right foot, wing attachment); E – *Rousettus egyptiacus* (dorsal view right foot, wing attachment). Palates showing gum ridges: F – *Epomophorus wahlbergi*; G – *Epomophorus gambianus*; H – *Epomophorus labiatus*; J – *Micropteropus pusillus*; K – *Epomops franqueti*; L – *Casinycteris argynnis*; M – *Rousettus lanosus*; N – *Rousettus angolensis*.

4b) Post-dental palate absent; wings yellowish..... *Casinycteris argynnis* Fig. 5L

5a) Ear without basal white tuft; 5 upper and 6 lower post-canine teeth.... (6)

5b) Ear with basal white tuft; 3 upper and 5 lower post-canine teeth ..... (10) Fig. 5C

6a) FA 109-130..... *Eidolon helvum*

6b) FA 54-106..... (7)

7a) FA 54-67; collar of stiff hairs in adult ♂ SK 31-33; M^2 only about half size of M^1 ..... *Myonycteris torquatus*

7b) FA 67-106; present or absent collar of stiff hairs in adult ♂ SK 38-47; M^2 about same size as M^1..... (8)

8a) Wing attached to first (outer) toe; FA 85-106; adult ♂ without stiff hair collar; cheek-teeth large, rectangular..... *Rousettus aegyptiacus* Fig. 5E

8b) Wing attached to second toe; FA 67-93; stiff hair collar optional..... Fig. 5D for adult ♂..... (9)

9a) Rear of braincase angled down from horizontal plane of toothrow; molars narrow and weak; FA 84-93 adult ♂ without stiff hair collar ..... *Rousettus lanosus* Fig. 5M

9b) Rear of braincase in line with toothrow (from side-view)..... Fig. 5N molars large, rounded or squared; also FA 67-86, adult ♂ with collar of stiff hair..... *Rousettus angolensis*

10a) FA 118-137; largest bat; adult lacks white shoulder-tufts; heavy horse-like non-tapering muzzle, specially adult ♂..... *Hypsignathus monstrosus* Fig. 5A

10b) FA 53-105; adult ♂ with conspicuous white shoulder-tufts; muzzle tapers towards nostrils.. (11) Fig. 5C

11a) FA 80-100; post-dental palate flat posteriorly, with 3 thick fleshy palate ridges between toothrows, followed by 5-6 less prominent thin, serrated curved ridges ..... *Epomops franqueti* Fig. 5K

11b) Post-dental palate concave posteriorly; with 4 thick inter-dental fleshy palate ridges, followed by 1-2 small post-dental ridges..... (12) Fig. 5F, G, H

12a) FA 53-67; belly usually with pale patch..... *Epomophorus minimus*

12b) FA 67-93..... (13)

13a) 2 post-dental palate ridges, bony palate length of adult 59-68% of greatest skull length; SK 83-94; FA 44-63; belly uniform gray ..... *Epomophorus gambianus* Fig. 5G

13b) bony palate length of adult 50-60% of SK..... (14)

14a) SK 37.5-48.6; 2 post dental palate ridges; FA 66-77; usually whitish patch on belly ..... *Epomophorus labiatus* Fig. 5C, H

14b) SK 44-55; 1 post dental palate ridge; FA 73-89; belly usually uniform .... *Epomophorus wahlbergi* Fig. 5F

Eidolon helvum

Vespertilio vampyrus helvus Kerr 1792, Animal Kingdom 1, p. 91; assumed to have come from Senegal.
Eidolon helvum Rafinesque 1815, Analyse de la Nature, p. 54; based on Kerr 1792.
Pteropus stramineus Temminck 1837; Monogr. Mammalogie, p. 84; Sennaar Sudan; (ex E. Geoffroy St. Hilaire 1803; Cat. Mamm. Mus. Hist. Nat., p. 48,

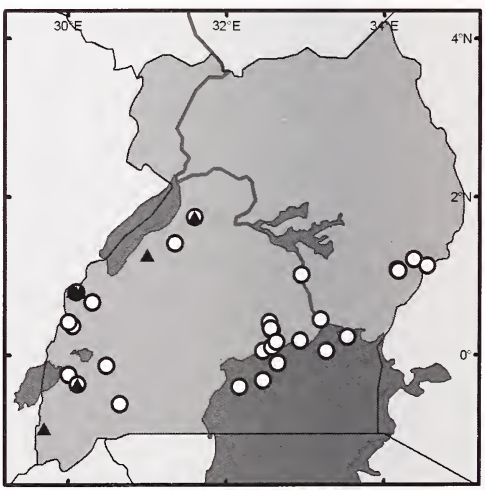

FIG. 6. Distribution of select Pteropodidae: *Myonycteris torquata* (▲), *Eidolon helvum* (O). Shaded areas indicate lakes.

No locality, unpublished, see Ellerman *et al.* 1953, see Koopman 1975).

Range. Thomas (1902) listed the species for Uganda as *Rousettus stramineus*. It occurs throughout most savanna parts from S Africa to Eritraea and west to Mauritania. Fig. 6 displays the Ugandan distribution.

Western. Budongo (LACM); Bwamba (LACM); Fort Portal (Bergmans 1990); Hoima (Kityo & Kerbis 1996); Mihunga (MCZ, Allen & Loveridge 1942); Ruwenzori 2000 m (Kingdon 1974).

Southern. Near Ibanda (Bergmans 1990); Kalinzu (Osmaston 1953); near Mbarara (Bergmans 1990); Queen Elizabeth NP (Williams 1967).

S. Buganda. Bugala I. (MSNG, DeBeaux 1922); Limaiba I. (MSNG, DeBeaux 1922).

Central. Entebbe (ROM, SMF; Bergmans 1990, Ogen-Odoi 1983, Simpson *et al.* 1968); Kampala (AMNH, ROM, SMF; Baranga 1984, Bergmans 1990, Ogilvie & Ogilvie 1964, Mutere 1965); Katalemwa (DAS, ROM); Kiuulu (ROM); Kyembogo (Bergmans 1990); Makerere (ROM); Namulusi I. (Kingdon 1974).

N Buganda. Bussu (MSNG, DeBeaux 1922); Ngamba I (Zwick & Lloyd 1998b).

Busoga. Busoga (MSNG, DeBeaux 1926, Bergmans 1990); Jinja (Mutere 1966a, Simpson *et al.* 1968); Namagasali (Kityo 2000).

Eastern. Buluganya (BMNH, Bergmans 1990); Malukhu (BMNH, Bergmans 1990); Mbale (Mutere 1966); Mt Elgon, 'upper forest' (Kingdon 1974; Mutere 1970a, b).

Measurements. (♂ Budongo) HB 203; T 11; HF 34; E 29; FA 125; SK 56.5; XZ 35.2; CM 22.0; M^2M^2 16.5. (♀ Kampala) HB 180; T 16; HF 30; E 28; FA 128; SK 56; XZ 35.2; XIO 10.2; CM^2 23.7; M^2M^2 16.7; MAND 43.6; CM^2 20.5.

The species is a seasonal wanderer, and scattered records from northern Uganda are to be expected. Kingdon (1974) and Baranga (1984) noted its fidelity at the Nakivubo (Kampala) roost since 1930 in exotic planted *Eucalyptus*. It hangs up only in big trees. Population and other studies were carried out by Mutere (1980), Baranga & Kiregyera (1982). From populous roosts its foraging flights are regular and spectacular (Osmaston 1953). Mutere (1965, 1966) showed that delayed implantation at Kampala produces births between November and March. Simpson & O'Sullivan (1968) tested it locally as host in the spread of viruses. Osmaston (1965) studied its role in seed and pollen dispersal of several important trees.

Special Literature. DeFrees & Wilson, 1988.

Rousettus (Rousettus) egyptiacus leachi, Fig. 5E

Pteropus egyptiacus E. Geoffroy St. Hilaire 1810, Ann. Mus. Hist. Nat. 15: 96; Lower Egypt.

Pteropus leachi A. Smith, 1829, Zool. Journal 4: 433; Cape of Good Hope (valid subspecies for east Africa: Eisentraut 1959, Bergmans 1994).

Range. Apparently not cited for Uganda until Ellerman *et al.* (1953). The species uses a wide choice of habitat through its total range from Senegal to South Africa to Egypt, and beyond to Syria and Pakistan. Fig. 7 displays the Ugandan distribution.

Western. Bundimusuba (LACM); Bwamba (LACM); Kibale (LACM); Magamoto (Dulic & Mutere 1973); Ntandi (LACM, MFNP; Williams 1967).

Southern. Byumba 1540 m (FMNH); Echuya 2380 m (FMNH); Kalinzu (Kityo & Kerbis 1996); Kasyoha-Kitomi (Kityo & Kerbis 1996); Maramagambo

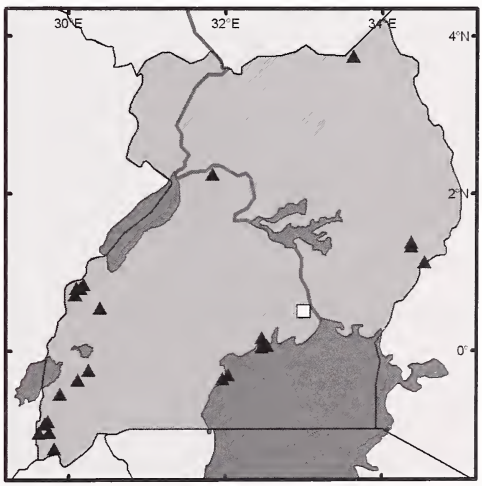

FIG. 7. Distribution of select Pteropodidae: *Rousettus egytpiacus* (▲), *Casinycteris argynnis* (□). Shaded areas indicate lakes.

(Mutere 1966, Kock 1978); Ngoto 1500 m (FMNH); Ruhija (LACM); Nteko Parish 1600 m (FMNH); Queen Elizabeth NP (Williams 1967).

S Buganda. Bugabo (Addy *et al.* 1978); Bukakata (NMK, Kock 1978); Kasokero Cave (Simpson *et al.* 1968, Okia 1987); Nabugabo Lake (BMNH, Mutere 1966, Kock 1978).

Central. Entebbe (Addy *et al.* 1978, Ogen-Odoi 1983); Zika (Addy *et al.* 1978).

Eastern. Kyema (ROM); Sipi (MCZ, Allen & Lawrence 1936); Mt Elgon (BMNH, Bergmans 1994).
Karamoja. Kidepo Valley NP (Williams 1967).
Measurements. (♂ Elgon, Kibale) HB 140-160; T 19-25; HF 21; E 25; FA 95-98; SK 42.5-44.0; XZ 25.0-27.2; XMST 16.5-17.0; CM^2 16.0-17.0; M^2M^2 13.0. (♀ Elgon, Ntandi) HB 142-161; T 16-22; HF 21-23; E 17-21; FA 95; SK 42.5; XZ 26.0; XMST 15.0; XIO 9.0; CM^2 15.8; M^2M^2 13.0.

The species occurs in the mountain forests of extreme southern Sudan close to the Uganda border (Koopman 1975), so it may be expected in Northern Province as well as at Kidepo. Its need for fruitbearing forests with large undisturbed caves is satisfied at Kasokero (about 1200 m) (Mutere 1970a), as at Ruhija (2135 m), and it similarly flourishes to the southwest in Rwanda and D. R. Congo. Mutere (1968a) found two peaks of birth in February and September. Dulic & Mutere (1973) obtained karyotype of 2N = 36 FN = 66 at Magamoto. Research by Addy *et al.* (1978) reported it "likely to play the greatest role in maintenance and circulation of both bat and human arboviruses." Baranga (1978, 1980, 1984) studied adrenal and spleen functions. Baranga (1982) described cannibalism in the species.
Special Literature. Kwiecinski & Griffiths (1999).

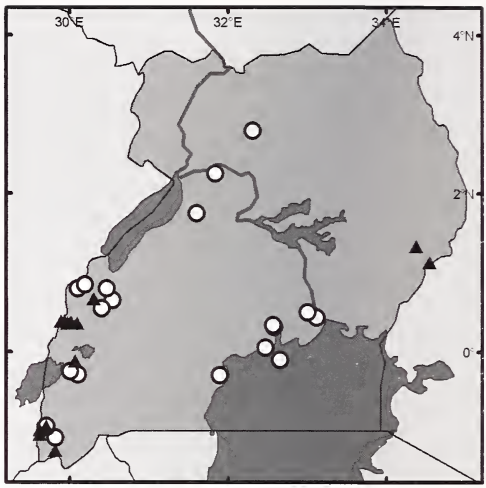

FIG. 8. Distribution of select Pteropodidae: *Rousettus lanosus* (▲), *Hypsignathus monstrosus* (●). Shaded areas indicate lakes.

<u>*Rousettus* (*Stenonycteris*) *lanosus*</u>, Fig. 5D,M
Rousettus lanosus Thomas 1906, Ann. & Mag. Nat. Hist. 7 (18): 137; Ruwenzori East, Uganda.
Rousettus kempi Thomas 1909, Ann. & Mag. Nat. Hist. 8 (4): 543; Kirui, Elgon, (Kenya 0°48'N, 34°39'E).
Range. An east African mountain forest species first found in Uganda. Fig. 8 displays the Ugandan distribution.
Western. Bujuku (UCN, Kock 1978); Fort Portal (ROM); John Mate Camp 3400 m (FMNH, Kerbis-Peterhans *et al.* 1996); Mubuku = Ruwenzori East at 3975 m (Type BMNH 6.7.1.2, Thomas 1906, Thomas & Wroughton 1910); Mubuku/Kyoha Rivers 1890 m; Nyabitaba 2700 m (FMNH, Kerbis-Peterhans *et al.* 1996); Ruwenzori 2067 m, 2917 m, 3683 m (Kityo & Kerbis 1996).
Southern. Buhoma 1500 m; Bwindi 2150 m (LACM, Kityo & Kerbis 1996); Echuya 2380 m (FMNH); Itama (LACM); Kayonza (PCM); Kyambura GR (Lloyd & Zwick 1997); Nteko P 1600 m (FMNH).
Eastern. Mt Elgon, Uganda 3505 m (BMNH); Sipi (MCZ; Allen & Lawrence 1936).
Measurements. (♂ Mubuku Valley 3975 m, Type *R. lanosus*) HB 134; T 16; E 23; FA 88; SK 42.0; XZ 25.0; XMST 17.4; CM^2 14.5. (♂ Fort Portal) HB 148; T 16; HF 27; E 23; FA 89; WTG 130; SK 41.8; XZ 24.7; XMST 17.1; XIO 8.3; CM^2 14.3; M^2M^2 11.5. (*R. l. kempi* ♂ Mt Elgon) FA 86-95; SK 43.0-47.0; XZ 26.4-26.7; XMST 16.8-18.2; CM^2 16.5-16.7; M^2M^2 12.8. (♀ Mt Elgon) FA 82-94; SK 40.0-43.5; XZ 23.0-25.0; XMST 15.5-16.8; CM^2 13.6-14.8; M^2M^2 11.3-12.3.

Being a cave-dweller of mountain forests (from 1500 m to 3975 m in Uganda), has led to isolation of *R. l. lanosus* in mountains rimming the Congo basin, from *R. l. kempi* on Mt Elgon and other highlands of Kenya, south Sudan, and Ethiopia. However Bergmans (1994) doubted the validity of these subspecies. Delicate dentition and bones of *lanosus* suggest a different lifestyle from the sturdier, widespread *R. egyptiacus* and *L. angolensis*.

<u>*Rousettus angolensis ruwenzorii*</u>, Fig. 5N
Cynonycteris angolensis Bocage, 1898, J. Sci. Math. Nat. Lisboa ser. 2: 133; Pungo Andongo (Angola 9°40'S 15°40'E).
Rousettus (*Lissonycteris*) *angolensis* Andersen, 1912, Cat. Chiropt. 23.

Lissonycteris angolensis Schwarz, 1920, 1046; (*in*) H. Schubotz, (ed.) Deutsche zweite Zentral Afrika Expedition. V 15. (Leipzig).

Rousettus angolensis ruwenzorii Eisentraut 1965, Bonn. Zool. Beitr. 16: 3; Ruwenzori East, Uganda.

Range. Thomas (1902) first noted this species in Uganda as "*Rousettus collaris.*" Lawrence & Novick (1963) showed behavior reasons for full generic status of *Lissonycteris*, followed by Bergmans (1997). Sierra Leone to Ethiopia, south to Angola and Zimbabwe. Fig. 9 displays the Ugandan distribution.

Western. Budongo (FMNH, LACM, ROM; Kingdon 1974); Bugoma (LACM); Kanyawara (BMNH); Kibale (LACM); Mubuku (BMNH, Thomas & Wroughton 1910; USNM, Hollister 1918); Kinyala Estates, 14 mi W Masindi (BMNH), confl. Kyoha/Mubuku R. 1890 m (FMNH), confl. Mahoma/-Mubuku R. 2100 m (FMNH); Mwela (LACM); Ntandi (LACM); Nyabitaba 2700 m (FMNH, Kerbis Peterhans *et al.* 1996); Ruwenzori E. (Type *ruwenzorii* BMNH 6.12.4.1, Eisentraut 1965); Sambiye R. (NMK, Kock 1978).

Southern. Buhoma 1500 m (FMNH); Byumba 1540 m (FMNH 160283-160292, 160333-160336); Bwindi (LACM); Ishasha R. (AMNH, Bergmans 1997); Enkombe Sawmill 1480 m (FMNH); Itama (LACM); Kalinzu (LACM, Kityo & Kerbis 1996); Kasyoha-Kitomi (MUZM, Kityo & Kerbis 1996); Kayonza (LACM, PCM); Kita Melira (Bergmans 1997) = Kitabulira (AMNH); Kyambura (Lloyd & Zwick 1997); Maramagambo Forest-South 1090 m (FMNH); Ngoto 1500 m (FMNH); Nteko Parish 1600 m (FMNH); Omubiyanja 1850 m (FMNH); Ruhija 2350 m (LACM, FMNH).

S Buganda. Bukasa I. (MSNG, DeBeaux 1922; BMNH, FMNH 149691-149693; Kityo & Kerbis 1996); Maiba I. (MSNG, DeBeaux 1922); Malabigambo (LACM); Mwana I. (BMNH, Bergmans 1997).

Central. Entebbe (Mutere 1966); Kampala (SMF, Kock 1978).

N Buganda. Dwaji I. (MSNG, DeBeaux 1922).

Eastern. Bulago (BMNH, Bergmans 1997); Butandiga (MCZ, Allen & Lawrence 1936); Kwapur Cave (BMNH, Bergmans 1997); Mt Elgon cave (Mutere 1966); Sipi (MCZ, Allen & Lawrence 1936).

Nile. Kinyala (ROM).

Measurements. (Ruwenzori East, Type *ruwenzorii*, and another ♂) HB 114-117; T 11-13; HF 17-20; E 20-24; FA 75-76; TIB 31; SK 42.0-43.1; XZ 25.3-25.8; XMST 16.1-16.4; XIO 6.9-7.0; CM^2 15.5-16.0; M^2M^2 12.5-13.1. (♂ Nyabitaba) HB 131; T 13; HF 22; E 25; FA 79; TIB 29; SK 42.0; XZ 24.5; XMST 15.7; XIO 6.4; CM^2 15.3; M^2M^2 13.5; HBBC 12.8.

The cave shelter and forest fruits required by this wide-ranging very social species seem fulfilled in Uganda between 1200 m and 2700 m. However it is rarely collected away from substantial areas of existing primeval forest in the southwest and Elgon, where it shares caves with *R. lanosus* and *R. egyptiacus*. We are unaware of cave colonies in central Uganda and large hollow trees may shelter small groups there (Kingdon 1974) as in Togo (Hayman 1954). Established presence of *L. angolensis* in hill forests of southern Sudan (Koopman 1975) account for the present single locality captures in Northern Province. Hayman (1954) and Rosevear (1965) describe color variation in BMNH Ruwenzori specimens from very dark gray brown to Tawny. This occurs elsewhere too. Neal (1971) described a cave containing "tens of thousands" of rousettes (likely this species) in Maramagambo Forest, one of the bats was albino. De Beaux (1922), records pregnancies in June in Sesse Islands.

Special Literature. Eisentraut (1965).

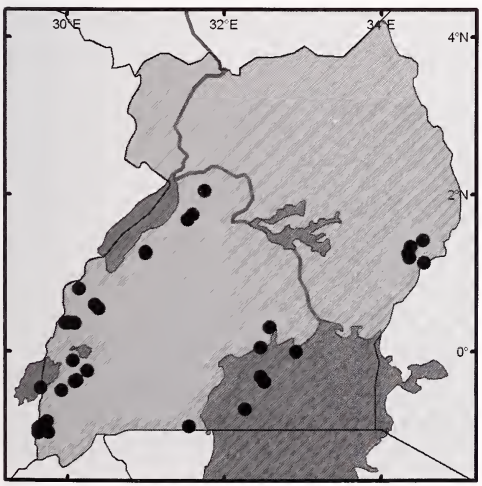

FIG. 9. Distribution of select Pteropodidae: *Rousettus angolensis* (●). Shaded areas indicate lakes.

Myonycteris torquata

Cynopterus collaris Gray, 1870, Cat. Monkeys, Lemurs, Fruit-eating Bats in Brit. Mus., p. 123 "W. Africa" = lower Congo (Allen 1939).

Cynonycteris torquata Dobson, 1878, Cat. Chiroptera in Brit. Mus p. 76 (changed to *torquata* due to priority of *collaris* in *Cynonycteris*).

Xantharpia (*Myonycteris*) *torquata* Matschie 1899, Megachiroptera, Berlin Mus., p. 61, 63.

Range. Mumford (1970) first reported the species from Uganda. These are the most eastern records; *M. torquatus* seems to prefer forest margins through the Congo basin and w Africa. A separate species *M. relicta* occurs in southeastern Kenya and c Tanzania. Fig. 6 displays the Ugandan distribution.

Western. Budongo (FMNH 165117); Bwamba 762 m (ROM, Mumford 1970; LACM); Mwela (LACM); Ntandi (LACM); Semliki Reserve (Kityo 2000).

Southern. Byumba 1540 m (FMNH 160253); Kalinzu (MUZM, Kityo & Kerbis 1996).

Measurements (♂ Bwamba) HB 102; T 4; HF 15; E 18; FA 61; SK 33.2; XZ 19.4; XBC 13.0; CM^2 12.3; M^2M^2 8.6. (♀ Byumba) HB 100; T 12; HF 14; FA 63; E 18; TIB 23; SK 31.6; XZ 20.0; XIO 5.6; XMST 12.9; CM^2 11.8; M^2M^2 9.0; HBBC 9.2.

A rare species, apparently rather solitary, in forested western Uganda from 700 m to 1500 m. In a pair taken in Kalinzu on 6 March, the ♀ bore one embryo 2.6 long (Kityo & Kerbis 1996).

Epomops franqueti, Fig 5K

Epomophorus franqueti Tomes, 1860, Proc. Zool. Soc. Lond., p. 4; Gabon.

Epomops franqueti Gray, 1870, Cat. Monkeys, Lemurs, and Fruit-eating Bats in Brit. Mus., p. 126.

Range. DeBeaux (1922) seems to have given the first published Uganda record of this central equatorial bat, and the Mt Elgon locality mapped in Bergmans (1989) was an error (Bergmans in litt.; also we question Kidepo, below). Its absence from the well-studied Kakamega Forest of W Kenya also suggests that Central Province of Uganda may be its eastern limit. Fig. 10 displays the Ugandan distribution.

Western. Budongo (DAS, FMNH, LACM); Bundibugyo (Bergmans 1989); 40 km ESE of Fort Portal (Bergmans 1989); Fort Portal (Mutere 1966); Hakitengya (Bergmans 1989); Kahunge (Bergmans 1989); Karongo (Bergmans 1989); Kibale Forest (LACM, Mutere 1966); near Kijura (Bergmans 1989); Kyabazala (Bergmans 1989); Mongiro (LACM); Munteme (Bergmans 1989); Murchison NP (Williams 1967); Mwela (LACM); Ntandi (LACM); Nyabirongo (Bergmans 1989).

Southern. Buhoma 1500 m (FMNH); Byumba (FMNH); Enkombe Saw Mill, Kigezi Game Reserve (AMNH, FMNH); Ishasha R. (AMNH); Itama (LACM); Kalinzu (LACM, Kityo & Kerbis 1996); Kasyoha-Kitomi (Kityo & Kerbis 1996); near Kanungu (Bergmans 1989); Kitu Metira (AMNH = Kitahulira); Ndeke (Bergmans 1989); Ngoto 1500 m (FMNH); Nteko P 1600 m (FMNH, Kityo & Kerbis 1996).

S Buganda. Bufumira I. (FMNH, Kityo & Kerbis 1996); Bugala I. (MSNG, DeBeaux 1922; FMNH, Kityo & Kerbis 1996); Bukakata (FMNH, Kityo & Kerbis 1996); Bukasa I. (FMNH, Kityo & Kerbis 1996); Katera (Bergmans 1989); Malabigambo (LACM); Masaka (Addy *et al.* 1978); Semuganja I. (Kityo & Kerbis 1996).

Central. Buloba (Bergmans 1989); Entebbe (Mutere 1966, Okia 1974, 1987; Ogen-Odoi 1983); Katalemwa (Bergmans 1989); Lunyo (Addy *et al.* 1978); Zika (Addy *et al.* 1978); Bugabo (Addy *et al.* 1978).

N. Buganda. Kayunga (Bergmans 1989); Mubende (Bergmans 1989); Nakkasajja (Bergmans 1989); Nsadzi Island (Zwick & Lloyd 1998).

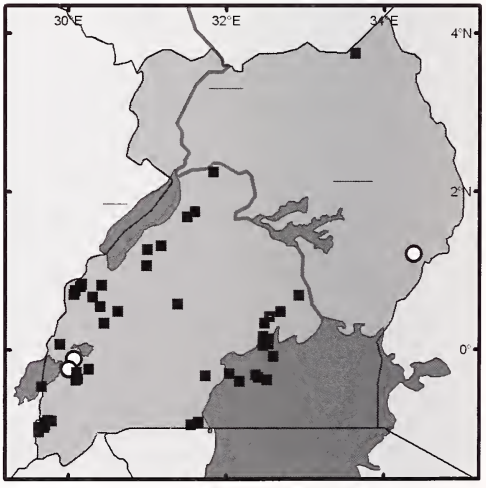

FIG. 10. Distribution of select Pteropodidae: *Epomophorus wahlbergi* (O), *Epomops franqueti* (■). Shaded areas indicate lakes.

? Karamoja. Kidepo Valley NP (Williams 1967). This record needs verification.

Measurements. (♂ Budongo) HB 143-162; T 0; HF 21-22; E 25-28; FA 85-96; SK 44.8-50.7; XZ 26.5-27.9; CM^2 15.0-16.7; M^2M^2 13.5-15.2; XIO 7.3-7.7. (♀ Budongo) HB 144; T 0; HF 20; E 22-24; FA 85; SK 44.8; XZ 24.9; CM^2 15.0; M^2M^2 14.0.

E. franqueti is a solitary bat that shelters on tree branches, so it attracts less attention than communal species. Okia (1974, 1987) found two birth peaks at Entebbe, February and September. Kityo & Kerbis (1996) reported gravid ♀ with mostly single embryos, rarely twins. Addy *et al.* (1978) discovered it as a reservoir and possible disseminator of Rift Valley Fever arbovirus.

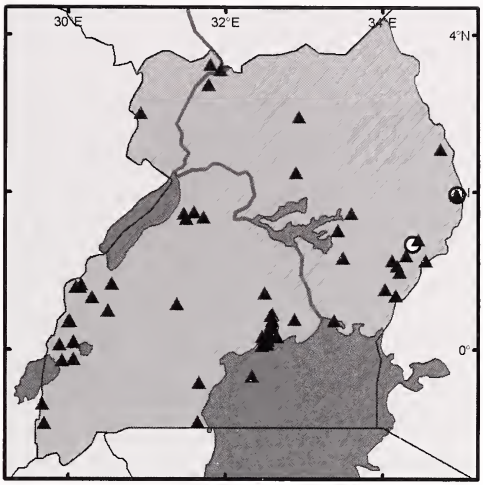

FIG. 11. Distribution of select Pteropodidae: *Epomophorus labiatus* (▲), *Epomophorus minimus* (O). Shaded areas indicate lakes.

Epomophorus wahlbergi, Fig. 5F

Pteropus wahlbergi Sundevall, 1846, Ofversigt Vetenskap. Akad. Forhandl. 3: 118; Port Natal (= Durban, S. Africa).

Range. Earlier reports sometimes confused with *E. labiatus*, *E. minimus*, *E. gambianus* (as in Allen & Lawrence 1936, p. 36, Kingdon 1974); firm identity of Uganda material from Bergmans (1988). Locally, Africa south of 5° N. Fig. 10 displays the Ugandan distribution.

Eastern. Buluganya (BMNH 64.69, 64.70 alcohol collection; Bergmans in litt. 1994, Van Cakenberghe in litt. 1994).

Southern. ?Kyambura ("*gambianus*" Lloyd & Zwick 1997); ?Queen Elizabeth NP ("*gambianus*" Delany & Happold 1979).

Measurements. (♀ Buluganya, BMNH alcohol) FA 81. (♂ Kitale, Kenya) HB 151; T 4; HF 20; E 24; FA 81; SK 51.0; XZ 27.3; XMST 17.6; CM^2 18.0; M^2M^2 14.3. (♀ Kitale) FA 79; SK 45.5; XZ 25.8; XMST 17.2; CM^2 16.0; M^2M^2 13.9.

Alcohol specimens from Tororo (ROM 60000, 60003, 60009, 60012, ♂ FA 73-74, ♀ 68-70) may be small *wahlbergi* or large *labiatus*. Krampitz (1968) reported *wahlbergi* from Tororo with no details. A general description by Watson (1951) agrees with *wahlbergi* and the record was mapped by Kingdon (1974). All the above need confirmation from skulls with exposed palates. MCZ 31122 from Sipi (Eastern) is considered *E. minimus* (q.v.). Further alcohol specimens from Mt Moroto (Karamoja) (LACM 19755, 19756, FA 64, 62) are probably *E. labiatus*, not *E. wahlbergi*.

E. wahlbergi has been commonly collected in the hill ranges of W Kenya (where the FA is large, ♂ 77-89, ♀ 78-87, Bergmans 1988), but seems rare on the western (Uganda) slope of these same hills. It has also been identified from NW Tanzania (Bergmans 1988), and from Rutshuru, D. R. Congo (Hayman *et al.* 1966), although Bergmans (1988) did not find it in SW Uganda or in Rwanda. Northward (Torit, S Sudan) specimens examined (ZMK 203-204; FA 68-71; SK 47.0; CM^2 15.3-16.0) seem to be small *E. wahlbergi*. SMNS 29854, 29857, 29865, 29886 from extreme S. Sudan were considered *E. gambianus* by Bergmans (1988), but *E. wahlbergi* by Claessen & DeVree (1990). In any case, new records of a large *Epomophorus* can be expected on the Uganda side of the border in Northern Province in the future. Wide Uganda distribution of *E. wahlbergi* as stated by Bere (1962) and Williams (1967) seem based on misidentification.

Special Literature. Acharya (1992).

Epomophorus labiatus, Fig. 5C

Pteropus labiatus Temminck, 1837, Monographies de Mammalogie 2: 83; Abyssinia = Ethiopia.

Pteropus schoensis Ruppell 1842, Verzeichnis der in. Mus. Senck. Samml. Säugethiere. Mus. Senckenberg 3: 154; Shoa, Ethiopia.

Epomophorus anurus Heuglin, 1864, Nov. Act. Acad. Caes. Leop. Carol. 31: 12; Bongo (Sudan 6°40'N 29° 40'E).

Epomophorus minor Dobson, 1880, Proc. Zool. Soc. Lond. (for 1879), p. 715; Zanzibar. (re Type, see Claessen & DeVree 1991, Bergmans 1997).

Range. Neumann (1900) first noted this species from Uganda as *Epomophorus schoensis*. In Uganda it is the commonest fruit bat in a variety of savanna and farmed habitats at moderate altitudes, and elsewhere it extends from Malawi to Ethiopia and Sudan. Fig. 11 displays the Ugandan distribution.

Western. Budongo (FMNH, LACM, ROM; Bergmans 1988); Bunyoro (BMNH, Claessen & DeVree 1991); Busingiro (DAS); Bwamba (LACM, PCM; Addy *et al.* 1978, Bergmans 1988); Fort Portal (Addy *et al.* 1978); Kabatoro (Mutere 1966); Masindi (BMNH, FMNH 29431; Andersen 1912, Bergmans 1988); Mokia (BMNH, Thomas & Wroughton 1910); Mongiro (LACM, Bergmans 1988); Mubuku (BMNH, Thomas & Wroughton 1910); Ntandi (LACM, Bergmans 1988); 20 km S Ntorako (LACM, Bergmans 1988); Nyabirongo (ROM); Ruwenzori East (BMNH, Andersen 1912); Ruwenzori Southeast (BMNH, Claessen & DeVree 1991); Semiliki Flats, 15 mi s Ntoroko (LACM 31766); Toro (MZUT, Festa 1909, Claessen & DeVree 1991).

Southern. Byumba 1540 m (FMNH 160204-160208); Kigezi Game Reserve, 5 km ne Ishasha & Bwentale (FMNH); Kyambura (?"*E.minimus* = *anurus*" Lloyd & Zwick 1997a).

S. Buganda. Buddu (MSNG, DeBeaux 1922); Katera (LACM, Bergmans 1988); Sesse Is (MSNG, DeBeaux 1922).

Central. Entebbe (AMNH, BMNH, MSNG; Andersen 1912, DeBeaux 1922, Ogen-Odoi 1983, Bergmans 1988, Claessen & DeVree 1991); Bugabo (Addy *et al.* 1978); Kabanyola (DAS); Kajansi (Mutere 1966); Kamamboga (DAS); Kampala (PCM, ROM, USNM; Hollister 1918, Watson 1951, Mutere 1966, Bergmans 1988, Claessen & de Vree 1991); Kisubi (Mutere 1966, Dulic & Mutere 1973, Addy *et al.* 1978); Lunyo (Addy *et al.* 1978); Mengo (BMNH, Andersen 1912, Bergmans 1988, Claessen & DeVree 1991); Namalere (Bergmans 1988, Claessen & DeVree 1991); Port Alice = Entebbe (BMNH, Andersen 1912, Bergmans 1988, Claessen & DeVree 1991); Soweh I. (ZMB, Bergmans 1988); Zika (Addy *et al.* 1978).

N. Buganda. Bukalasa (BMNH, Mutere 1966, Claessen & DeVree 1991); Mubende (Addy *et al.* 1978); Namagunga (ROM).

Busoga. Lubwa's (ZMB, BMNH; Neumann 1900, Andersen 1912).

Eastern. Buhivu (NHMV, Claessen & DeVree 1991); Buhuru (Bergmans 1988); Kabwangasi (Mutere 1966); Mbale (BMNH, Addy *et al.* 1978, Claessen & DeVree 1991); Nabumali (BMNH, Claessen & DeVree 1991); Ngongera (ZMA, Bergmans 1988); Sebei (Okia 1974, Addy *et al.* 1978); Serere (BMNH, ROM, Watson 1951, Claessen & DeVree 1991); Soroti (FMNH 73074, Addy *et al.* 1978, Claessen & DeVree 1991); Teso (BMNH, Claessen & DeVree 1991); Tororo (ROM, Addy *et al.* 1978).

Karamoja. Amudat (USNM, Claesen & DeVree 1991); Mt Moroto (BMNH, Dollman 1914, Claessen & DeVree 1991).

Northern. Lira (Addy *et al.* 1978); Pajule (BMNH, Claessen & DeVree 1991).

Nile. Arua (ROM); Ajumani (FMNH); Dufile (FMNH); Metu (FMNH).

Measurements. (♂ Amudat, Budongo, Busingiro, Bwamba, Entebbe, Kampala, Tororo) HB 129-143; T 0-3; HF 18-22; E 20-24; FA 67-74; SK 42.5-47.3; XZ 22.8-25.1; XMST 15.7-17.2; XIO 6.8-7.4; CM^2 15.0-15.7; M^2M^2 11.5-13.5. (♀ Buhivu, Bwamba, Entebbe, Kampala, Masindi, Mbale, Tororo) HB 108-130; T 0; HF 18-20; E 19-23; FA 66-76; SK 41.5-45.0; XZ 21.1-23.3; XMST 15.3-16.3; XIO 6.8-6.9; CM^2 13.0-15.0; M^2M^2 10.8-13.0.

The commonest and most widely distributed fruit bat, almost throughout Uganda in wooded savanna and forest clearings up to about 1540 m. Flocks up to 40 disperse into several trees, where individuals hang singly on branches. Repeated piping calls of courting males are hard to locate. Numbers concentrate on fruiting mangoes, figs, bananas to feed at night. Sometimes they hang singly on rafters of schools, churches, or unoccupied houses with open access.

Dulic & Mutere (1973b) published karyotype 2N = 36, FN = 72 for *E. anurus* from Kisubi. Okia (1974) found births biseasonal with peaks in February and September at Entebbe and Elgon. AMNH 184227 from Entebbe has both nipples and small shoulder brushes.

Epomophorus minimus

Epomophorus minimus Claessen & DeVree, 1991, Senck. Biol. 71: 216; Bahadu (Ethiopia 10°6'N 40° 36'E, 600 m).

Epomophorus minor in part, various authors referring to Kenya, Somalia, Ethiopia, incl. Koopman 1994 (not of Dobson 1880, Proc. Zool. Soc. Lond., for 1879: 716).

Range. This newly described taxon occurs mostly in dry low altitude savanna, where, as at Amudat, it may coexist with *E. labiatus*. While Anderson 1912, Bergmans 1997, and others recognized small *Epomophorus* along the eastern part of east Africa, sympatric with middle-sized *E. labiatus*, the Zanzibar Type chosen to represent *E. minor* is now thought to be a young *E. labiatus*. Fig. 11 displays the Ugandan distribution.

Eastern. Sipi (MCZ 31122, Allen & Lawrence 1936). Originally classed as *E. wahlbergi* with unusual palate said to be due to immaturity; subsequently placed with *Micropteropus pusillus*, but see measurements below.

Karamoja. Amudat (USNM 436488, 436489; Claessen & DeVree 1991).

Measurements. (♂ Amudat) HB 105; T 0; HF 19; E 22; FA 65; SK 39; XMST 14.3; XZ 21.5; CM^2 13.1; M^2M^2 11.0 (♀ Amudat) HB 102; T 0; HF 17; E 19; FA 61; SK 36.0; XMST 13.4; XZ 20; CM^2 12.2; M^2M^2 10.5. (Sipi juv.) HB 100; HF 17; E 18; FA 55; SKCC 31.8; XMST 13.2; CM^2 10.7; M^2M^2 9.9.

Claessen & DeVree (1991) found only two examples from Uganda, but similarity of this species to *E. labiatus* and *Micropteropus* suggests that others may be presently misidentified in collections. However reports from western moist forest at Kasyoha-Kitomi and Itwara (Kityo & Kerbis 1998) are surprising and we have not examined the material; the same paper reported *minimus* also from drier situations on Mt Kei and Mt Otzi, but the reference to it as "the second most abundant bat in northern biotic" zone suggests confusion with *E. labiatus*. Claessen & DeVree (1991) failed to find it alongside *labiatus* at Pajule or in S Sudan.

Micropteropus pusillus, Fig. 5J

Epomophorus pusillus Peters, 1867, Mber. Preuss. Akad. Wiss., p. 870; Yoruba (SW Nigeria) with reference to Tomes (1860, Proc. Zool. Soc. Lond., p. 56); misidentified "*Epomophorus schoensis*" from Gambia (see Bergmans 1989).

Epomophorus (*Micropteropus*) *pusillus* Matschie, 1899, Megachiroptera des Berliner Mus. f. Naturk., p. 57.

Range. Thomas (1902) attributed Uganda specimens to Neumann (1900), who however collected it only from Mara River of NW Tanzania. But it is marginal to Tanzania and W Kenya, occurring through equatorial forest edges from Angola to W Ethiopia, to Senegal. Fig. 12 displays the Ugandan distribution.

Western. Budongo (LACM, ROM, FMNH; Bergmans 1989); Bunsingiro (DAS); Ntandi; (LACM, Bergmans 1989).

S Buganda. Bugabo (Addy *et al.* 1978); Bufumira I. (FMNH); Bugala I. (FMNH, MSNG; DeBeaux 1922, Kityo & Kerbis 1996); Bukasa I. (FMNH, Bergmans 1989).

Central. Entebbe (FMNH; Mutere 1966, Bergmans 1989); Katalemwa (Bergmans 1989); Lunyo (Okia 1987); Makerere (Mutere 1966, Okia & Anyonge 1972); Namalere (Bergmans 1989); Zika (Addy *et al.* 1978).

N Buganda. Bussu (MSNG, DeBeaux 1922); Ngamba Island (Zwick & Lloyd 1998b), Nsadzi Island (Zwick & Lloyd 1998a).

Busoga. Busoga (MSNG, DeBeaux 1926; BMNH, Bergmans 1989).

Eastern. Bulugeni (Bergmans 1989); Mbale (BMNH); Nabumali (BMNH); Sore (Okia 1987); Soroti (Addy *et al.* 1978).

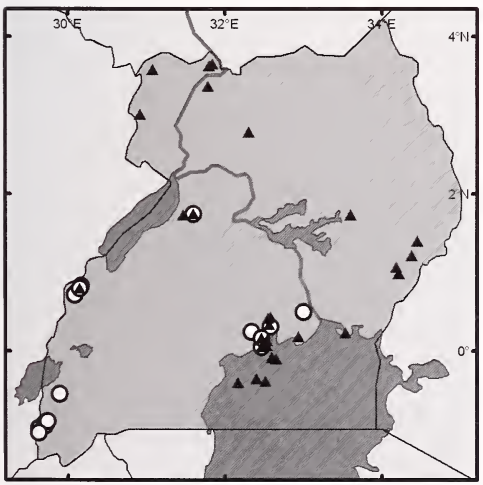

FIG. 12. Distribution of select Pteropodidae: *Micropteropus pusillus* (▲), *Megaloglossus woermanni* (O). Shaded areas indicate lakes.

Northern. Gulu (ROM, USNM; Bergmans 1989).
Nile. Ajumani (FMNH); Arua (Bergmans 1989); Metu (FMNH); Mt Kei (Kityo & Kerbis 1996); 16 km E of Moyo (ROM).
Measurements. (♂ Budongo, Bunsingiro) HB 81-95; T 1-3; HF 15-16; E 16-17; FA 48-53; SK 28.7-29.4; XZ 18.2-19.1; XBC 12.8-13.0; CM^2 8.9-9.6; M^2M^2 9.5-10.0. (♀ Budongo, Gulu) HB 84-92; HF 14-16; E 16-18; SK 27.0-29.1; XZ 15.4-17.8; XBC 12.6; CM^2 8.5-9.0; M^2M^2 8.9-9.9.

This little fruit bat in Uganda has a wide distribution through wooded savannas where singles or pairs hang in bushes or low in trees. Kityo & Kerbis (1996) regarded it as "most abundandant bat in (Uganda's) northern biotic." Along Uganda's eastern border it co-exists with *Epomophorus minimus* which it closely resembles. Okia (1987) reported breeding in Nov. and Mar. Simpson *et al.* (1968) studied possible arbovirus infection in specimens from Entebbe.
Special literature. Owen-Ashley & Wilson (1998).

Casinycteris argynnis, Fig. 5L
Casinycteris argynnis Thomas 1910, Ann. & Mag. Nat. Hist. 8 (6): 111; Bitye (Cameroon 3°10'N 12°20'E).
Range. This is the first record from Uganda, and the most eastern example. The species is rare in its whole range from S Cameroon through equatorial D. R. Congo. See Kityo, Kerbis, & Huhndorf in this volume for details (p. 127) also colour photo of Uganda specimen by Huhndorf. Fig. 7 displays the Ugandan distribution.
N Buganda. Mabira (ZMU).
Measurements. (Irangi, NE D. R. Congo) ♂ FA 50-54; SK 24; XZ 19; CM^2 8. (Irangi) ♀ FA 55-59; WTG 24-31; SK 26; XZ 20; CM^2 9.

Heller *et al.* (1994) and Bergmans (1990) both describe material from Irangi (1°54'S 28°27'E) which lies 600 km SW of the new specimen.

Hypsignathus monstrosus (male), Fig. 5A
Hypsignathus monstrosus H. Allen, 1861, Proc. Acad. Nat. Sci. Philadelphia, p. 157; West Africa (= Gabon).
Range. The first record of this species in Uganda was in Ellerman *et al.* 1953. It occurs through forested equatorial Africa from N Angola to Burkina, S Sudan, from Sierra Leone to W Kenya (Fleetwood 1962). Fig. 8 displays the Ugandan distribution.
Western. Budongo (LACM, ROM); Butiti (Bergmans 1989); Bwamba (Kingdon 1974); Itwara (MUZM, Kityo & Kerbis 1996); Kibale (LACM); MFNP (Williams 1967); Sempaya (Bergmans 1989).
Southern. Impenetrable (LACM); Itama (LACM); Kayonza (Williams 1967); Ndeke (Bergmans 1989); Queen Elizabeth NP (Williams 1967).
S Buganda. Kayanja (Kityo 2000).
Central. Entebbe (Mutere 1966, Williams 1967, Simpson *et al.* 1968); Kampala (HZM); Makerere (Mutere 1966).
N Buganda. Bulamagi (Bergmans 1989); Mabira (ROM, map Kingdon 1974); Ngamba I. (Kityo 2000).
Busoga. 64 km SW of Tororo (ROM).
Northern. Gulu (ROM).
Measurements. (♂ 64 km SW of Tororo) HB 210; T 0; HF 38; E 32; FA 132; SK 69.4; XZ 36; XBC 21.5; XIO 13.3; CM^2 22.5; M^2M^2 20.7. (♀ Budongo) HB 198; HF 32; E 30; FA 110; SK 58.5; XZ 32.8; XIO 11.5; CM^2 19.4; M^2M^2 17.2.

The largest bat of continental Africa, but smaller than *Pteropus seychellensis comorensis* of Mafia I. or *Pteropus voeltzkowi* of Pemba I. (FA 145-163) off the east African coast. A predominantly high-forest dweller dependant on daily fruit. Its occurrence in a place like Gulu (80 km away from any substantial forest), seems a tribute to its powerful wings rather than a deliberate choice of permanent habitat. Clusters of a dozen or more often hang in dense tree foliage, but in the mating season (? Feb./Mar. in SW Uganda, Kingdon 1974) harsh clanging cries of competing males in a "lek" courtship valley are boldly conspicuous. It does not extend into mountain forests over 2000 m and probably avoids swamp forests (Bergmans 1989).
Special Literature. Langevin & Barclay (1990).

Megaloglossus woermanni
Megaloglossus woermanni Pagenstecher 1885, Zool. Anz. 8: 245; Sibange-Farm (Gabon 0°25'N 9°28'E).
Megaloglossus woermanni prigoginei Hayman 1966, in Hayman, Misonne, & Verheyen Ann. Mus. Roy. Afr. Centr. 8vo, 154: 26; Kiliza (D. R. Congo 3°49'S 28°10'E).
Range. Mutere (1966) seems to have been the first published Uganda record of this, the smallest and most specialized of African fruit bats. It occurs in closed forests from Liberia (Bergmans 1997) to Central Province of Uganda, as far south as central Angola and S D. R. Congo. Fig. 12 displays the Ugandan distribution.

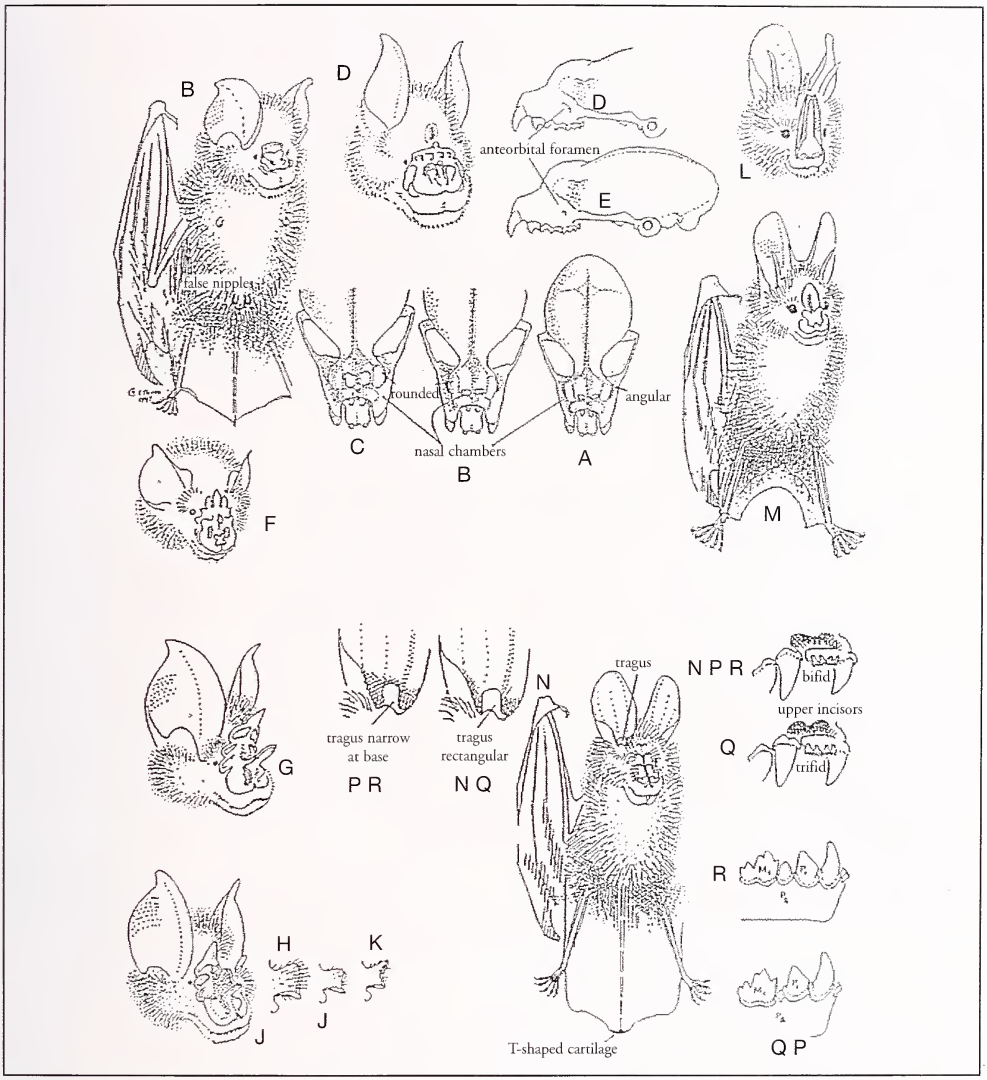

FIG. 13. Hipposideridae: A – *Hipposideros beatus*; B – *H. caffer*; C – *H. ruber*; D – *H. cyclops*; E – *H. camerunensis*; F – *Triaenops persicus*. Rhinolophidae: G – *Rhinolophus ruwenzorii*; H – *R. fumigatus*; J – *R. clivosus*; K – *R. landeri*. *Megadermatidae*: L – *Lavia frons*; M – *Cardioderma cor*. Nycteridae: N – *Nycteris macrotis*, P – *N. thebaica*, Q – *N. grandis*, *N. hispida*, R – *N. arge*, *N. nana*.

Western. Budongo (Kityo 2000); Bundimusuba (LACM); Mongiro (LACM); Ntandi (LACM, ROM; Mumford 1970).

Southern. Buhoma 1500 m (FMNH); Byumba 1540 m (FMNH); Itama (LACM, Kingdon 1974); Maramagambo (MUZM, Kityo & Kerbis 1996); Ngoto 1500 m (FMNH 160250-160251); Nteko P. 1600 m (FMNH).

N Buganda. Mabira (Kityo 2000).

Central. Entebbe (Okia 1987); near Kampala (Kingdon 1974); Mabale "22 miles W of Kampala, Mawakota County" (BMNH; Mutere 1966, Hayman &

Hill 1971, Kingdon 1974); Zika (Bergmans 1997). Measurements. (♂ Ntandi) HB 74-80; T 0; HF 13; E 16; FA 46; SK 27.1-27.5; XZ 13.9-14.2; XBC 11.4; XIO 4.0-4.5; CM^2 8.4-9.0; M^2M^2 6.1-6.2. (♀ Byumba) HB 77; T 0; HF 13; E 15; FA 47; SK 27.6; XZ 13.1; XIO 3.8; XBC 10.5; CM^2 10.0; M^2M^2 6.0; HBBC 8.9; MAND 20.5.

Megaloglossus is uniquely adapted to nectar licking from flowers such as *Kigelia*, and to pollen eating as well as fruit sucking (*Ficus*, *Musa*). Okia (1987) found that near Entebbe young are mostly born Feb-Mar and Aug-Sep. At Maramagambo in March a ♀ carried a single embryo (Kityo & Kerbis 1996).

HIPPOSIDERIDAE

Nearly 20 species of Hipposideros and three other genera (including *Triaenops*) occur through much of Africa; others occur in the tropics east to Japan and Australia. *H. megalotis* with enormous ears might be found in dry northeastern Uganda, but most species live in savannas and forests. Noseleaves differ with species, but never show a prominent sella and connecting-process as in Rhinolophidae, nor do the ears have the long tragus of Megadermatidae. Skeletal differences from *Rhinolophus* are the two only phalanges of the outer four toes, larger closer cochleae, and two only lower premolars. Many species (apparently not *H. cyclops* or *H. beatus*) occur in a bright red-brown phase as in Rhinolophidae also. Rounded wings and rather short tail web enable them to forage through tangled terrain and hover to capture flying insects located by frequent brief high powerful echolocation pulses.

Key to Uganda species (*underlined italics*) and others likely to occur there (*plain italics*)

1a) With a round fleshy disk on the nose having an overhanging indented ledge on its upper part (but no midline forward-projecting "sails", nor nipple-like projections)..... (2)
1b) Similar round fleshy nose disk but bearing at its top 3 nipple-like projections..... (3)
2a) Tail equals length of the hind legs, supporting a substantial tail-web ..... (4)
2b) Tail and tail-web very much shorter than legs each side of it..... (8)
3a) Ear 10-15 long and pointed FA 45-61..... *Triaenops persicus* Fig. 13F
3b) E 15-19 long and pointed FA 49-55 (nearest, Kenya/Tanzania coast)..... *Asellia tridens*
3c) E 8-12, conspicuously round, FA 30-39 (nearest, Tanzania coast) ..... *Cloeotis percivali*
4a) E 20-21 > half length FA 37-39, ears joined across forehead (Kenya adjacent to Karamoja) ..... *Hipposideros megalotis*
4b) Ears separate and about one quarter to one third as long as FA..... (5)
5a) FA > 53..... (6)
5b) FA < 54..... (8)
6a) E >19, nose disk with 3 pairs of supplementary leaflets at sides, SK 22.5-24.2..... *Hipposideros abae*
6b) E < 19, disk with 2 pairs supplementaryleaflets, SK 21-23.5 ..... *Hipposideros fuliginosus*
6c) SK < 20.5..... (7)
7a) SK 18-20.3; CM^3 6.4-7.1; nasal chambers large, FA 52-57 fur usually unicolor dark red-brown ..... *Hipposideros ruber* Fig. 13C
7b) SK 17-20.1; CM^3 5.2-6.6; M^2M^2 5.6-6.4; nasal chambers small, FA 48-55; fur usually bright unicolor orange-brown ..... *H. caffer angolensis* Fig. 13B, B

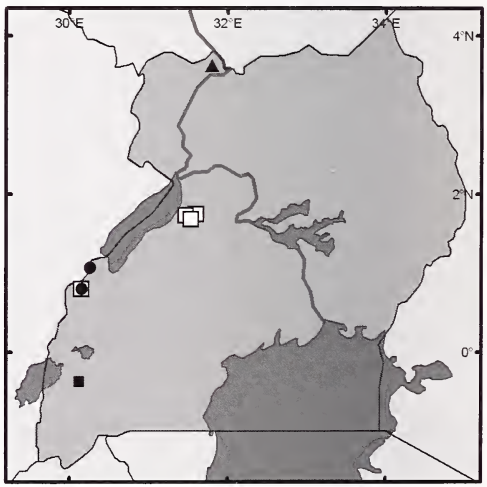

FIG. 13. Distribution of select Hipposideridae: *Hipposideros fuliginosus* (■), *Hipposideros gigas* (●), *Hipposideros abae* (▲), *Hipposideros beatus* (□). Shaded areas indicate lakes.

Plate 1. Upper left: *Hipposideros caffer caffer*. Lower right: *Hipposideros beatus*.

7c) SK 16-18; CM^3 5.0-6.1; M^2M^2 5.2-6.0; nasal chambers small, P^1/P_1 > half P^2/P_2; FA 43-52, fur usually tricolor medium gray, or bright orange-brown..... *H. caffer caffer*

7d) SK 17-18; CM^3 5.1-6.1; M^2M^2 5.2-6.0; nasal chambers small, P^1/P_1 < half P^2/P_2; FA 40-48; fur tricolour very dark gray-brown ..... *Hipposideros beatus maximus* Fig. 13A

8a) T very short, supporting web, FA 85-112; SK 38-43 ..... *H. gigas*

8b) T short, FA 62-72; SK 27-30; CM^3 9.0-11.0; anteorbital fossa 7-15 diameter..... *Hipposideros cyclops* Fig. 12D

8c) T short, FA 72-76; SK 29-32; CM^3 9.511.5; anteorbital 3-7 ..... *H. camerunensis* Fig. 13E

?Hipposideros gigas niangarae

Rhinolophus gigas Wagner, 1845, Arch. f. Naturgesch. 11: 148; Benguela, Angola.

Hipposideros gigas niangarae J. Allen 1917 Bul. Amer. Mus. Nat. Hist. 37: 438; Niangara (D. R. Congo 3°43'N 27°52'E).

Range. The map in Kingdon (1974) and list of Kityo *et al.* (1994) included Uganda in the range of this species without details. Hayman *et al.* (1966) referred all specimens from adjacent D. R. Congo and Rwanda to *H. g. marunguensis* but included *niangarae* as

synonym of *H. g. gigas*; Koopman (1994) regarded these as *H. g. niangarae*. Recently, (McWilliam quoted in Racey 1982, Cotterill & Fergusson 1999, Simmons 2004) separated *gigas*, from Gambia to Ethiopia to northern S Africa. Fig. 13 displays the Ugandan distribution.

Western. Rwanasenge (LACM 51910, 51911).

Measurements. (Rwanasenge, Niangara, Congo K) HB 104-109; T 30-36; HF 24-26; E 32-36; FA 103-106; WTG 74-80; SK 35.3-38.6; XZ 20.0 20.3; XMST 15.8-16.5; XIO 4.5-4.8; CM^3 13.5-14.2; M^2M^2 13.6-14.2.

Hipposideros abae

Hipposideros abae J. Allen 1917, Bul. Amer. Mus. Nat. Hist. 37: 432; Aba (D. R. Congo 3°53'N 30°17'E).

Range. The first Uganda record and most eastern limit for this very local savanna species was in Hill (1963: 98). Verschuren (1957) described a large series from northeastern D. R. Congo and Koopman (1994) listed it from Bisau to Sudan. Fig. 13 displays the Ugandan distribution.

Nile. Metu (BM 62.2006, in alcohol; Hill 1963); Mt Otze (MUZM 1423, Kityo & Kerbis 1996).

Measurements. (Meta, Aba, & Garamba, Congo K, Yambio, Sudan) HB 60-70; T 32-40; HF 11-13; E 20-22; FA 55-62; SK 21.9-23.7; XZ 13; XMST 11; CM^3 8.2; M^2M^2 8.2-8.8.

Hipposideros fuliginosus

Phyllorhina fuliginosa Temminck 1853, "Esqisses zoologiques sur la cote de Guine" 1: 77 (Brill, Leiden); Ghana.

Range. This is the first record published for Uganda. It is a rainforest species which shelters in large hollow trees; a small number have been long known from Ghana to Cameroon; there are also specimens from Ituri Forest (eastern D. R. Congo, Hayman *et al.* 1966) and W Ethiopia at 2000 m (Largen *et al.* 1974). Fig. 13 displays the Ugandan distribution.

Southern. Kalinzu (LACM 35672, 35675).

Measurements. (Kalinzu) HB 67-70; T 37-40; HF 13-14; E 18-19; FA 63-64; WTG 18-20; SK 23.0-23.4; XZ 12.9; XMST 11.1-11.5; XIO 3.6; CM^3 8.5; M^2M^2 8.6-8.7.

Hipposideros caffer caffer, Pl. 1

Rhinolophus caffer Sundeval 1846, Ofvers. Vetensk. Akad. Forh. Stockholm, 3: 118; Near Port Natal = Durban.

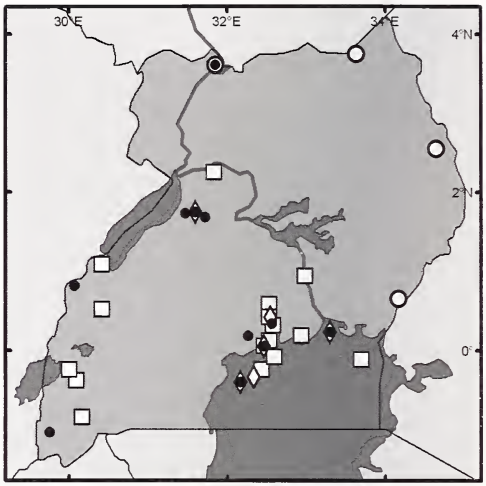

FIG. 15. Distribution of select Hipposideridae: *Hipposideros ruber* (●), *Hipposideros caffer caffer* (O), *Hipposideros caffer angolensis* (◊), *Hipposideros caffer group* sp.? (□). Shaded areas indicate lakes.

Range. The subspecies *H. caffer caffer* has not previously been noted from Uganda, as a larger form was thought to replace it here (Hill 1963, Koopman 1994). However Koopman (1975), and Aggundey & Schlitter (1984) identified it in adjacent dry areas of Sudan and Kenya, and it probably will be collected through northern and eastern savannas of Uganda. Fig. 15 displays the Ugandan distribution.

?Eastern. Sukulu (ROM 60056, 60062) although in alcohol with skulls inside, seem to be this form, not "*H. beatus*." Sukulu is savanna country.

Karamoja. Moroto (BMNH, Watson as "*H. caffer centralis*"); ?Kidepo NP (Williams 1967).

?Nile. Mt Otze (MUZM 1410, 1411, 1412; Kityo & Kerbis 1996).

Measurements. (Sukulu, Sigor, Kenya, Gondokoro, Sudan) HB 44-54; T 21-31; HF 7-9; E 12-15; FA 43-48; WTG 6.7; SK 16.6; SKCC 14.8; XZ 9.1; XIO 2.9; XMST 8.9; CM^3 5.5-5.8; M^2M^2 5.7-6.0.

Our findings show the presence of two ecologically differing subspecies of *H. caffer* in Uganda.

Hipposideros caffer angolensis, Fig. 13B, Pl. 1

Phyllorhina angolensis Seabra 1898, J. Sci. Math, Phys. Nat. Lisboa, 2 (5): 256; Rio Coroca (Angola 15°55'S 12°5'E).

Range. Previous confident records of *angolensis* have mostly been from near the west coast of equatorial

Africa. Andersen (1906), Hill (1963), and Koopman (1975) assumed that a form "*H. caffer* centralis" or "*H. c. ruber*" replaced smaller *H. c. caffer* through Uganda, and Hill attributed a wide range of dimensions to it. Our incomplete study using the nasal chamber criteria of Lawrence (1964) and considering the audiograms of Pye (1972), indicates a relatively large subspecies of *Hipposideros caffer* that shares much of central and western Uganda with true *H. ruber ruber*. This large *H. caffer* also occurs in western highland forests of Kenya, and in northeastern D. R. Congo (Heller 1992). J. Allen (1917) considered it possible that some of his specimens from D. R. Congo were *H. c. angolensis*. Lawrence (1964) was aware that large *H. caffer* overlaps in range with *H. ruber*, but her attribution of it to (small) *H. caffer nanus* (Allen 1917) seems untenable. Aellen (1952) and Booth (1960) reported *H. c. angolensis* from Cameroon and Ghana. The western Uganda *H. caffer* is comparable in size with typical *angolensis* and seems generally confused with *H. ruber ruber* in collections, with which it overlaps in size (Hill & Morris 1971). Our criteria of echolocation differences may or may not be reconcilable with recent studies (Guillen *et al.* 2000). Fig. 15 displays the Ugandan distribution.

Western. Budongo (LACM).

Plate 2. Upper left: *Hipposideros ruber*. Lower right: *Hipposideros caffer angolensis*.

S Buganda. Bugala I. (FMNH 137480-137488, 137630-137632; MSNG; DeBeaux 1922); Sesse Is (MSNG).
Central. Entebbe (BMNH, FMNH 67918-67924, DAS) (?Pye 1972, see also Fenton 1986, Heller 1982, Jones *et al.* 1993); Katalemwa (DAS).
N Buganda. Bussu (MSNG, DeBeaux 1922); Buvumu I (MSNG, DeBeaux 1922).
Measurements. (Budongo, Entebbe) HB 52-55; T 28-38; HF 8-11; E 14-17; FA 47-53; WTG 10-13; SK 17.0-18.5; XZ 9.3-10.4; XMST 8.9-9.2; CM^3 5.8-6.7; M^3M^3 5.7-6.8.

Previous work on "*Hipposideros caffer*" cannot be definitely attributed to this form or to *H. ruber ruber*: Jobling 1954, Craig & Ssenkubuge 1968, Williams *et al.* 1978, Theodor 1968, Mutere 1968, 1970; Dulic & Mutere 1974, Okia 1987. However Mutere's (1970) reproduction study of "*H. caffer*" in the Entebbe region must have included the present form, although he was unaware of *H. ruber* also in his 900 examples. He found all births to occur once a year in March-April. DeBeaux (1922) found most Sesse Is ♀ pregnant in Feb.

Hipposideros ruber ruber, Fig. 13C, Pl. 2
Phyllorhina rubra Noack 1893, Zool. Jb. Syst. 7: 586, pl.18 (14,15); Lugerrunjere (= Ngerengere R., Tanzania 7°S 38°E).
Hipposideros caffer centralis Andersen 1906, Ann. & Mag. Nat. Hist 7 (17): 227; Entebbe, Uganda.
Range. Hollister (1918) recognized the distinctness of *H. ruber* and cited specimens from "Gondokoro, Uganda" (today = extreme S Sudan). DeBeaux (1922) separated his large collection from C Uganda by size but skulls were not studied, and our own brief examination of the same alcohol material left all middle-sized examples undetermined. Pye (1972) found only 1 of 14 *Hipposideros* at Entebbe with low kHz calls typical of *ruber* (136.7-138.2 kHz) (Fenton 1988, Heller 1992). Fig. 15 displays the Ugandan distribution.
Western. Budongo (BMNH, FMNH 165161-165167, LACM, ROM); Busingiro (BMNH); Masindi (LACM); Semliki FR (Kityo & Kerbis 1996).
Southern. Ruhija (Kityo & Kerbis 1996).
S Buganda. Bugala I (MSNG; DeBeaux 1922, Kityo & Kerbis 1996).
Central. Entebbe (BMNH 99.8.4.8 Type *H. caffer. centralis*, and part of series); Kampala, Makerere (Kityo & Kerbis 1996); Mpanga (PCM).
N Buganda. Buvuma I (MSNG, DeBeaux 1922); Bussu (MSNG, DeBeaux 1922).
Nile. Mt Otze (Kityo & Kerbis 1996).
Measurements. (Budongo, Entebbe, Mpanga) HB 58-81; T 30-37; HF 8-11; E 12-14; FA 52-55; SK 19.6-20.3; XZ 10.0-10.3; XMST 10.2-10.6; XIO 3.2; CM^3 6.8-7.0; M^2M^2 6.8-7.0.

In adjacent Rwanda, Baeten *et al.* (1984) found only *ruber*, with FA 51-54 SK 17.9-19.1 and nasal chambers as described by Lawrence (1964) and Kock (1969). Mutere (1970) found births of "*H. caffer*" in Entebbe region to occur in Mar-Apr. He was aware of only one species, but almost certainly there were *H. ruber* in his large sample. Brosset (1968) in equatorial Gabon, found two birth peaks: October ("austral" cycle for the smaller taxon *?caffer*) and March ("boreal" cycle for the larger taxon *?ruber*). In Uganda rainfall (and perhaps peak insect food) is more concentrated in March-May while in Gabon nearly twice more annual rain is divided by a very dry June-August period, exaggerating equatorial bimodalism, and encouraging competitive closely related species of *Hipposideros* to choose different reproductive periods. However, births reported from other regions by Kityo & Kerbis (1996) for "*H. ruber*" differ from Mutere's dates: one advanced pregnancy Sep. at Ruhija; 4 pregnant ♀ in June at Semliki; a pregnant ♀ at Mt Otze (? Jan); a ♂ with enlarged testes in Oct. on Bugala I.

FIG. 16. Distribution of select Hipposideridae: *Hipposideros cyclops* (□), *Hipposideros camerunensis* (■), *Triaenops persicus* (O). Shaded areas indicate lakes.

Hipposideros caffer Group indeterminate
Fig. 15 displays the Ugandan distribution.
Western. Ngogo (BMNH); Toro (Festa 1909); Murchison N P.
Southern. Kaina Mine (Theodor 1968); Queen Elizabeth NP (Williams 1967).
S Buganda. Kitobo I. (DeBeaux 1922).
Central. Entebbe (Theodor 1968); Kampala (Mutere 1966, 1968); Kawanda (Mutere 1966, Williams *et al.* 1967); Kisubi (Dulic & Mutere 1974) who reported a karyotype.
N Buganda. Bombo Rd.; Bussu (MSNG, DeBeaux 1922); Nsadzi Island (BMNH).
Busoga. Kakindu (MSNG, DeBeaux 1922); Lolui I (Mutere 1966).

Hipposideros beatus maximus, Fig. 13A, Pl. 1
Hipposideros beatus Andersen 1906, Ann. & Mag. Nat. Hist. 7 (17): 279; 15 miles from Benito R. (= Mbini R. Equatorial Guinea 1°33'N 9°38'E).
Hipposideros beatus maximus Verschuren 1957, Chiropteres PN Garamba, Inst. Parcs Ntl. Congo Belge 7: 362; Pidigala-Nord (D. R. Congo 4°38'N 29°42'E).
Range. This is the first record of *H. beatus* in Uganda, and the farthest east yet found. All the Uganda localities are in dense forest and are about 350 km from Garamba and the half dozen nearby reports from D. R. Congo and Sudan (Hayman *et al.* 1966, Koopman 1975); and a little farther from a new find W of L. Kivu (D. R. Congo) (Heller *et al.* 1994). Fig. 13 displays the Ugandan distribution.
Western. Budongo (LACM); Busingiro (FMNH 165156); Ntandi (LACM); Nyabyeye (FMNH 165157).
Measurements. (Budongo, Ntandi) HB 50-54; T 25-31; HF 7-10; E 15-18; FA 48-49; WTG 10-11; SK 17.5-18.0; XZ 9.9-10.5; XMST 9.5-9.8; XIO 3.0; CM^3 6.3-6.5; M^2M^2 6.5-7.3.

Hipposideros cyclops, Fig. 13D
Phyllorhina cyclops Temminck 1853, "Esquisses Zoologiques sur la Cote de Guine" 1: 75 (Brill, Leiden); Boutry R. (Ghana 4°50'N 1°54'W).
Hipposideros langi J. Allen 1917, Bul. Amer. Mus. Nat. Hist. 37: 434; Avakubi (D. R. Congo 1°24'N 27°40'E).
Range. A spectacular rainforest species first reported from Uganda by G. Allen & Loveridge (1942); widespread through D. R. Congo to W Africa also taken near the N boundary of Uganda at Issore (Sudan) Koopman (1975); and from Kenya 50 km SE of Uganda border town of Busia (Hayman 1935). Its presence may depend on huge hollow tree trunks in dense forest. Fig. 16 displays the Ugandan distribution.
Western. Bisu (MCZ, Allen & Loveridge 1942); Budongo (FMNH 164973, 165159, 165160); Bwamba (FMNH 73076, ROM); Mongiro (BMNH, Kityo & Kerbis 1996); Ntandi (LACM); Nyabyeye (USNM).
S Buganda. Malabigambo (LACM).
Measurements. (Bwamba, Budongo, Marabigambo) HB 85-95; T 20-40; HF 18-23; E 32-36; FA 62-71; WTG 35-37; SK 27.5-30; XZ 15-15.4; XMST 11.9-13; CM? 10.2-10.8; M^2M^2 11.0-11.2.

Hipposideros camerunensis
Hipposideros camerunensis Eisentraut 1956. Zool. JB. Syst. 84: 256; Buae (Cameroon 4°9'N 9°13'E).
Range. Examples from western Uganda were mentioned by Kingdon (1974) without details and he queried their comparattively slight advantage in measurements over the sibling form *H. cyclops* which sometimes occurs in the same locality. This is apparent in our quoted figures for Uganda specimens in the two. Nevertheless, the anteorbital foramen of larger *camerunensis* is noticeably smaller than in *cyclops*, as noted by Hill (1063). The species also occurs w of L. Kivu (D. R. Congo) and in Kakamega Forest (W Kenya, Schlitter *et al.* 1986), restricted to intact rainforests. Fig. 16 displays the Ugandan distribution.
Western. Budongo (ROM 46736).
Southern. Itama (LACM 35621).
Measurements. (Budongo, Itama) HB 93; T 26-30; HF 23-29; E 35-36; FA 74-75; WTG 40-44; SK 30.0-30.7; XZ 15.5-16.5; XMST 12.6; XIO 3.4; CM^3 10.5-10.8; M^2M^2 11.3-11.5.

Triaenops persicus majusculus, Fig. 13F
Triaenops persicus Dobson 1871. J. Asiatic Soc. Bengal. 40 (2): 455; Shiraz (Iran 29°38'N 52°34'E).
Triaenops persicus majusculus Aellen & Brosset 1968. Rev. Suisse Zool. 75: 450; Doumboula Cave, Loudima (D. R. Congo 4°15'S 13°E).
Range. After the generalization "rarely far inland" Hayman & Hill (1971) first mentioned the Uganda colony found in 1963 near the Nile in extreme north. Hill (1982) identified Uganda material with recently described *majuculus* from the lower Congo region, rather than relatively nearer, but smaller *T. p. afer* (Peter 1977) from Kenya. Fig. 16 displays the Ugandan distribution.
Nile. 11 km S Moyo (BM 65.138-65.151, ROM 68694-702).

Measurements. (Moyo) HB 62-66; T 28-33; HF 8-10; E 12-14; FA 53-59; SK 19.5-21.2; XZ 9.0-9.8; XMST 8.8-9.2; CM^3 6.7-7.3; M^2M^2 7.0-7.4.
The population at Moyo includes both gray and rufous phases in both sexes.

RHINOLOPHIDAE

All species of *Rhinolophus* (the only genus, with nearly 30 species in Africa, and far more from Europe to Japan and Australia), show a conspicuous sail-like connecting-process rising out of the flat, centrally-notched fleshy plate between the tiny eyes. Ears without tragus pick up echolocation sounds rebounding from cave walls, branches, and flying insect prey. These powerful medium-frequency sounds originate out of the larynx, through the nostrils, and are focused by the noseleaf; their constant frequency part is of longer duration than similar calls by hipposiderids. Toes (except the inner) have 3 phalanges, but wings and short tail-supported uropatagium are generally as in most *Hipposideros*. There are 3 lower premolars, and small cochleae are usually further apart than in hipposiderids.
Special Literature: Csorba *et al.* (2003).

Key to Uganda species (*underlined italics*) and others likely to occur there (*plain italics*)

1a) long transverse fleshy lobe projects from nose disk, quite separated from triangular peak above it; FA 53..... *Rhinolophus ruwenzorii* Fig. 13G
1b) extended bilobed midline connecting-ridge from nose disk..... (2)
2a) connecting-ridge front lobe rounded in profile..... (3)
2b) connecting-ridge front lobe an erect point..... (6)
3a) FA 60-67; fur all dark brown; SK 26-28; CM^3 9.3-10.6 ..... *R. hildebrandti*
3b) noseleaf as above, hairy; body smaller, paler..... (4a,b)
3c) noseleaf like above but nearly naked, body smaller and dark.... (5)
4a) FA 54-61; fur medium brown, occasionally orange; SK 22.5-27.0; CM^3 8.5-9.7; usually forest edges ..... *R. eloquens* Fig. 13H
4b) FA 47-55; fur medium brown; SK 22-24; CM^3 7.5-8.1; hairy noseleaf; usually open savanna ..... *R. fumigatus exsul* Fig. 13H
5a) FA 49-55; medium to dark brown, SK 21.5-24.5; CM^3 7.8-8.6; M^3M^3 8.3-8.4; noseleaf near naked; usually forested hills..... *R. clivosus zuluensis* Fig. 13J, J
5b) FA 47-51; fur medium to dark brown; SK 20.0-21.9; CM^3 7.0-7.9; M^3M^3 8.0-8.3; noseleaf as above; usually open savannas.... *R. c. acrotis* Fig. 13J, J
5c) FA 48-55; fur as above; noseleaf as above; SK 23.0-23.3; CM^3 8.6-9.0; M^3M^3 8.8-9.1; (nearest, Kenya coast)..... *R. deckeni*
5d) FA 43-50; noseleaf as above; SK 18.5-20.6; CM^3 7.1-7.8; C^1 touches large Premolar; M^3M^3 7.2-8.0; (nearest example from Serengeti,Tanzania)..... *R. darlingi*
5e) FA 40-49; noseleaf as above; SK 17.9-19.5; CM^3 6.3-7.0; M^3M^3 6.0-6.7; small P^1 between $C^1$and large Premolar..... *R. simulator*
6a) FA 50-53; noseleaf connecting-ridge has upper lobe an erect point; SK 23.0-24.0; CM^3 8.5-9.0; M^3M^3 8.3-8.8; small P between C^1 and large P; ♂ often has glandular brush in armpit; bright orange brown phase is very common; forests..... *R. alcyone*

FIG. 17. Distribution of select Rhinolophidae: *Rhinolophus eloquens* (▲), *Rhinolophus alcyone* (O), *Rhinolophus ruwenzorii* (□). Shaded areas indicate lakes.

6b) FA 38-46; noseleaf as (6a); SK 17.3-20.0; CM^3 6.4-7.0; M^3M^3 6.4-7.0; small P between C^1 and large P, often armpit brush, bright orange brown or gray-brown phases..... *R. landeri* Fig. 13K

Rhinolophus ruwenzorii, Fig. 13G
Rhinolophus ruwenzorii J. Eric Hill 1942, Amer. Mus. Nov. 1180: 1; Butahu Valley (= Buhuta V., D. R. Congo 0°22'N 29°44'E).
Rhinolophus maclaudi ruwenzorii Smith & Hood 1980 (including *R. hilli* Aellen 1973 from Uwinka, Rwanda 2°9'S 29°12'E); assumed conspecific with *R. maclaudi* (Poussargues 1897 Conakry, Guinee 9°30'N 13°43'W).
Rhinolophus ruwenzorii Fahr, Vierhaus & Hutterer 2002.
Range. We accept (with some doubt) the renewed separation of *R. ruwenzorii* from *hilli*, but it seems evident with 4500 km isolation, and size difference that larger *maclaudi* is not conspecific, despite Smith & Hood (1980), and Koopman (1994); so we follow Fahr *et al.* 2002. Bogdanowicz & Owen (1992) found it systematically not far from the *hildebrandti/eloquens/fumigatus* group. Fig. 17 displays the Ugandan distribution.
Western. Mahoma R. (BMNH, Hayman 1957); Mahoma/Mubuku R. 2100 m (FMNH 144309); Nyabitaba 2670 m (AMNH, FMNH 144310-144312, LACM; Smith & Hood 1980, Kityo & Kerbis 1996, Kerbis Peterhans *et al.* 1998).
Southern. Itama (LACM); Ruhija (LACM); Nteko P (FMNH 160357).
Measurements. (Itama, Ruhija, Mahoma, Nyabitaba) HB 60-72; T 26-34; HF 11-13; E 28-38; FA 55-57; SK 24.2-26.0; XZ 10.5-11.2; XMST 11.2-12.0; CM^3 8.2-8.5; M^2M^2 7.5-8.2.

This is a rock cave dweller, but has only been found in small numbers and feeds on middle-sized moths (Smith & Hood 1980).

Rhinolophus eloquens, Fig. 13H
Rhinolophus hildebrandti eloquens Andersen 1905, Ann. & Mag. Nat. Hist. 7 (15): 74; Entebbe (Uganda).
Rhinolophus fumigatus eloquens Hayman & Hill 1971 Chiroptera *in* H. Setzer & J. Meester (eds.) "Mammals of Africa: An Identification Manual" (Smithsonian, Washington).
Range. There have been decades of debate about the true systematics of *R. eloquens* and the present status follows Koopman (1994). Although genuine *R. hildebrandti* (FA 60-67; SK 26-28) has been found in S Sudan (FMNH, Koopman 1975) and C Kenya (BM, USNM), we have not seen examples from Uganda (*contra* DeWinton 1897, Pearl 1994, Kityo 1994). *R. eloquens* occurs through woodland areas from S Sudan to Tanzania sheltering in caves and sometimes under building-roofs. Fig. 17 displays the Ugandan distribution.
Western. Budongo (ROM); Kichwamba (AMNH).
Southern. Ruhiza (MUZM, Kityo & Kerbis 1996 as *'hildebrandti'*); Kayonza F.; Queen Elizabeth NP (?*"hildebrandti"* Lloyd & Zwick 1997b).
S Buganda. Malabigambo (LACM).
Central. Entebbe (BMNH including Type of *eloquens* BM 99.8.4.4; ROM, MSNG; DeBeaux 1922, Simpson *et al.* 1968); Roberts (1972) as *"fumigatus"*?
N Bugunda. Bussu (MSNG, DeBeaux 1922).
Busoga. Busoga (MSNG, DeBeaux 1926).
Eastern. Kabei (ROM).
Karamoja. Debasien (MCZ, Allen & Lawrence 1936).
Measurements. (Budongo, Kabei, Entebbe, Rondo, Kenya) HB 69-77; T 26-35; HF 14-15; E 21-28; FA 55-60; WTG 23-40; SK 23.5-25.6; XZ 12.4-12.8; XMST 12; XIO 3.5; CM^3 9.0-9.4; M^2M^2 8.7-8.8.

Mutere (1970a), describing the monoestrous breeding of *"hildebrandti"* and its occupation of roofs as well as caves, was probably working with the present species, cited as *"fumigatus"* in Kingdon (1974). Theodor (1968) described Streblidae from an Entebbe *R. eloquens*. Simpson *et al.* (1968) studied viability

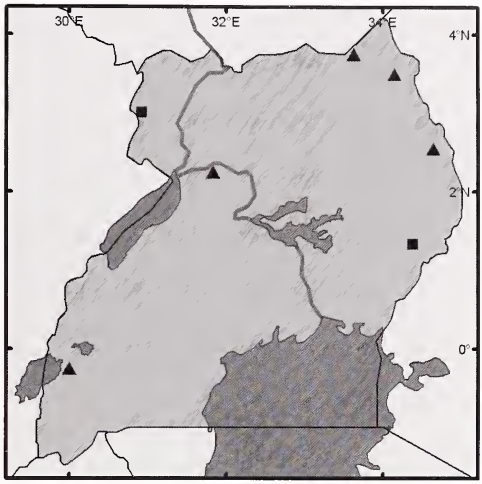

FIG. 18. Distribution of select Rhinolophidae: *Rhinolophus landeri* (▲), *Rhinolophus fumigatus* (■). Shaded areas indicate lakes.

of arboviruses in Ugandan *R. eloquens*. Echolocation of *"R. fumigatus"* at Kampala described by Roberts (1972).

<u>*Rhinolophus fumigatus exsul*</u>, Fig. 13H
Rhinolophus fumigatus Ruppell 1842, Mus. Senck. 3: 132; Shoa (Ethiopia, region around Addis-Ababa).
Rhinolophus fumigatus exsul Andersen 1905, Ann. & Mag. Nat. Hist. 7 (15): 74; Kitui (Kenya 1°22'S 38°E).
Range. More a dry country bat than *R. eloquens*. But like it occurs in neighbouring S Sudan and W Kenya. Listed by Kityo (1994). Fig. 18 displays the Ugandan distribution.
Eastern. Sipi (ROM).

FIG. 19. Distribution of select Rhinolophidae: *Rhinolophus clivosus acrotis* (▲), *Rhinolophus clivosus zuluensis* (■). Shaded areas indicate lakes.

Nile. Arua (ROM).
Measurements. (Arua, Sipi, Aba, D. R. Congo) HB 50-65; T 22-28; HF 10-12; E 21-24; FA 50-54; SK 21.9-23.6; XZ 11.3-12.2; XMST 11; XIO 3; CM^3 7.6-7.8; M^2M^2 7.8-8.5.

(<u>*Rhinolophus clivosus*</u>)
Rhinolophus clivosus Cretzschmar 1830, "Reise ins nördl. Afrika." (Frankfurt), p. 47; Mohila (Saudi Arabia 27°40'N 35°30'E).

<u>*Rhinolophus clivosus zuluensis*</u>, Fig. 13J,J
Rhinolophus augur zuluensis Andersen 1904, Ann. & Mag. Nat. Hist. 7 (14): 383; Insuzi (S. Africa 28°53'S 31°3'E).
?Rhinolophus keniensis Hollister 1916, Smiths. Misc. Coll. 66 (1): 2; Mt Kenya 2134 m.
?Rhinolophus ferrumequinus keniensis (Hollister) Harrison 1959, Occ. Pap. Ntl. Mus. S. Rhod. 23B: 230-231.
Range. Hayman & Hill (1971) rejected the concept of Ugandan or east African forms as subspecies of Eurasian *R. ferrumequinum*; however, there is little difference between *keniensis* reported on Mt Elgon (Granvik 1924, Koopman 1966, 1975), and *R. c. zuluensis* specimens from W Uganda, eastern D. R. Congo, and Rwanda (Koopman 1975). In Uganda the subspecies seems to prefer high altitudes, but it is not very common. A smaller subspecies occurs in light forests of E Uganda. Fig. 19 displays the Ugandan distribution.
Western. Budongo (ROM).
Southern. Kisoro (FMNH 26511-26515, HZM; Koopman 1975, Kityo & Kerbis 1996); Lake Mutanda (FMNH 26510, 30579-30613); Ruhija 2438 m (AMNH, FMNH 160356, LACM; Smith & Hood 1980).
Eastern. Mt Elgon (BMNH, Kityo & Kerbis 1996).
Measurements. (Budongo, Kisoro, Ruhija, Mt Elgon) HB 55-67; T 28-36; HF 9-12; E 17-23; FA 51-55; SK 21.1-22.7; XZ 11.1-11.7; XMST 9.6-10.5; XIO 3.0; CM^3 7.5-8.4; M^2M^2 7.8-8.5.

Dulic & Mutere (1974) reported on the karyotype of this species from 1800 m on Mt Elgon just over the Kenya border, and the small differences from South African samples were annotated by Zima *et al.* (1992). Jobling's (1954) *Nycteribosca africana* on "*R. deckeni* Kisoro" was probably from the present species.

<u>*Rhinolophus clivosus acrotis*</u>, Fig. 13J,J
Rhinolophus acrotis Heuglin 1861, Nov. Act. Acad. Leop. Carol 29 (8): 4; Keren (Eritrea 15°46'N 38°30'E).
Range. Qumsiyeh (1985) and Koopman (1975) discussed the subspecies present in Egypt, Sudan, and E Africa; middle-sized *R. c. acrotis*, or, possibly *clivosus*, seems to be general through eastern and southern Sudan. The present specimens ROM 38346, 38347 were originally considered *R. darlingi*, but the skulls were too long, metacarpals too even in size, and the FA of one was too long. Fig. 19 displays the Ugandan distribution.
Eastern. Soroti (ROM). Koopman (1975) referred to "E Uganda" (locality?).
Measurements. (Soroti) HB 54-55; T 22-26; HF 12(?); E 22-24; FA 47-50.5; WTG 12-14; SK 21.4-21.9; XZ 10.7-10.8; XMST 9.6-10.0; XIO 2.9-3.0; CM^3 7.7-7.8; M^2M^2 7.7-8.0.

Plate 3. *Lavia frons*.

Rhinolophus alcyone, Fig. 13K
Rhinolophus alcyone Temminck 1852, "Esquisses zoologiques sur la Cote de Guine" (1), (Brill, Leiden), p. 80; Boutry R. (Ghana 4°50'N 1°54'W).
Range. This species has been found at relatively few locations across the equatorial rainforest belt from Senegal to northeastern D. R. Congo and Uganda (Pye 1969, Kingdon 1974). Fig. 17 displays the Ugandan distribution.
Western. Budongo (FMNH 165132-165155, LACM, ROM).
Eastern. Kabei (ROM).
Measurements. (Budongo) HB 54-69; T 26-30; HF 13-15; E 18-24; FA 51-55; WTG 14-19; SK 22.1-23.9; XMST 10.4-10.7; XZ 11.1-12.4; XIO 3.2; CM^3 8.8-9.1; M^2M^2 8.5-9.0.

Some examples had been misidentified as *R. deckeni*. Details of reproduction etc., were given by Kingdon (1974). Echolocation was studied by Roberts (1972).

Rhinolophus landeri lobatus, Fig. 13K
Rhinolophus landeri Martin 1838, Proc. Zool. Soc. Lond. 5: 101; Fernando Poo (= Bioko Island, Equatorial Guinea).
Rhinolophus lobatus Peters 1852, "Reise nach Mossambique" (Berlin) 1: 41; Sena (Mozambique 17°24'S 35°5'E).
Rhinolophus axillaris J. Allen 1917, Bul. Amer. Mus. Nat. Hist. 37: 429; Aba (D. R. Congo 3°53'N 30°16'E).
Range. Watson (1951) seems to be the first record of *R. landeri* in Uganda, although it is well known through much of African savannas from Gambia to Ethiopia south to Angola and n S Africa. Fig. 18 displays the Ugandan distribution.
Western. Murchison NP; may inhabit a large bat colony in a cave at Murchison Falls.
Southern. Queen Elizabeth NP (Williams 1967).
Karamoja. Moroto (BMNH); Kaabong (Watson 1951); Kidepo N P (Williams 1967).
Measurements. (Moroto, Naivasha and Amboseli, Kenya, Muheza, Tanzania) HB 46-49; T 25-28; HF 10; E 16-18; FA 43-45; WTG 7; SK 18.1-18.6; XZ 9.4-9.6; CM 6.5; M^2M^2 6.6.
Special Literature. Brown & Dunlop (1997).

FIG. 20. Distribution of select Megadermatidae: *Lavia frons* (▲), *Cardioderma cor* (O). Shaded areas indicate lakes.

MEGADERMATIDAE

The two medium-sized species found in drier, open parts of Uganda are the only ones in Africa, but a few other Megadermatidae occur through tropical Asia to Australia. Their common characteristics are long ears joined at the mid-forehead, very large eyes, no tailbones in the tail-web, and simple noseleaves (small in *Cardioderma*, long in *Lavia*). They lack upper incisors. Pairs of these bats hunt in evening and dawn, and sometimes in broad daylight, watching and listening for prey while hanging from low branches. *Lavia* seems mostly to catch large insects, but *Cardioderma* is known to catch little bats and frogs also. Low vocalizations (audible to humans) seem to be used for territory claims, and perhaps courtship, rather than to locate prey. DNA tests indicate their alliance with Rhinolophidae.

Lavia frons affinis, Fig. 13L, Pl. 3
Megaderma frons E. Geoffroy 1810, Ann. Mus. Hist. Nat., Paris. 15: 192; Senegal.
Lavia frons Gray 1828 Mag. Zool. & Bot. 2: 490, based on Geoffroy.
Lavia frons affinis Andersen & Wroughton 1907, Ann. & Mag. Nat. Hist. 7 (19): 140; Kaka (Sudan 10°35'N 32°10'E).
Range. Thomas (1888) reported this wide-ranging African savanna bat taken by Emin Pasha in northwest Uganda. Diurnal habits and yellow wings made it an easy target for early collectors. Fig. 20 displays the Ugandan distribution.
Western. Kabamba (ZMK); Kasese (Kityo & Kerbis 1996); Katwe (ROM); Mokia (BMNH, Thomas & Wroughton 1910); Murchison Falls NP (Williams 1967); Semliki flats (ROM, LACM 31857).
Southern. Kigezi Game Reserve, 5 km ne of Ishasha (FMNH); L. Mburo (Kityo & Kerbis 1996); Mulema (BMNH, Thomas & Schwann 1904); Kyambura (Lloyd & Zwick 1997); Ruwenzori NP = QE NP (Williams 1967).
Central. Entebbe (MSNG, DeBeaux 1922); Zika (Addy *et al.* 1978)
Eastern. Greeki R. (Allen & Lawrence 1936); Ssio Bay (Neumann 1900); Teso district without locality (Watson 1951).
Karamoja. Bokora (BMNH, Dollman 1914); Kidepo NP (Williams 1967); Lotome (AMNH); Moroto (BMNH, Dollman 1914); Navtakwai (ROM).
Northern. Pader (BMNH, Dollman 1914).
Nile. Rhino Camp (USNM, Hollister 1918; FMNH 30700-30702); Wadelai (BMNH, Thomas 1888).
Measurements. (Rhino Camp) HB 54-89; T 0; HF 15-21; E 30-45; FA 56-61; SK 23.5-24.7; XZ 13.4-14.6; CM^3 8.4-9.4; M^2M^2 8.4-9.0.

From Uganda, general observations of *Lavia*'s natural history were made by Heller & Loring, in Roosevelt (1910), and by Watson (1951) Addy *et al.* (1978) tested arbovirus immunity of *Lavia* and other bats.
Special Literature. Vonhof & Kalcounis (1999).

Cardioderma cor, Fig. 13M
Megaderma cor Peters 1872 Monatsber. Preuss. Akad. Wiss. Berlin, p. 194 Abyssinia (= Ethiopia)
Range. First reports of this E African bat came from Williams (1967). Two specimens from another locality have now been studied in the Uganda Forestry collection, Kampala. Fig. 20 displays the Ugandan distribution.
Karamoja. Kidepo NP (Williams 1967); Lopodet (UFD 1560, 1561).
Western. Murchison NP (Williams 1967).
Measurements. (Lopodet, Murukurun, Sudan) HB 62-78; T 0; HF 15-19; E 38-40; FA 49-52; WTG 18; SK 25.0; XZ 15.5; XBC 12.0; CM^3 9.4; M^2M^2 9.2.
Special Literature. Csada (1996).

NYCTERIDAE

Most species of *Nycteris* (the only genus) live in Africa or Madagascar, although two occur in SE Asia. All bear a similar vertical groove down the muzzle, flanked with lappets; the slit opens when the bat is vocalizing. Ears are large with a small tragus, but separated externally. Tiny eyes are hidden in the long fur. Tail bones ending in a T-shaped cartilage control the very broad tail web; the wings are also broad. *Nycteris* species most often glean insects, scorpions, frogs, or even mice or smaller bats from bushes or from the ground, locating minute telltale sounds from the prey. Their own echolocation is a faint whisper sweeping down from about 100 kHz, which may help to navigate in crowded places. DNA tests (Hutcheon & Kirsch 2004) suggest that Nycteridae are closer to Molossidae than to Rhinolophoidea, notwithstanding much apparent similarity to the latter.

Key to Uganda species (*underlined italics*) and others likely to occur there (*plain italics*)

1a) Posterior lower premolar large: equal, or close to the height of anterior cusp on M1
Tragus with concavity at center of posterior margin, giving the tragus a 'constricted neck'..... (2)

1b) Posterior lower premolar small or minute: its height barely reaching the cingula of anterior premolar and first molar
Tragus without marked concavity at center of posterior margin of tragus (although there may be a concavity at the base of the tragus)..... (4)

2a) FA 32-36.0; SK < 17.0
..... *Nycteris nana*

2b) FA > 36.0; SK > 18.0..... (3)
FA 36.5-46.0; SK 18.0-20.9
... *Nycteris arge* (includes *N. intermedia*

3b) FA 47.3-50.0; SK 21.0-22.5
..... *Nycteris major*

4a) Upper incisors trifid..... (5)
Tragus semi-lunate, outer margin with smooth curve, broadest in the middle

4b) Upper incisors bifid..... (6)
Tragus pyriform or with flat top edge

5a) FA 37-41; SK 16.4-17.4
..... *Nycteris hispida*

5b) FA 57-66; SK 23-25
..... *Nycteris grandis*

6a) Tragus the shape of upside-down pear (pyriform)
Tragus with shallow notch at base of posterior margin
CM^3 6.2-7.0..... *Nycteris thebaica*

6b) Tragus with straight and + horizontal top edge, rectangular in appearance
Tragus without notch at base of posterior margin
CM^3 7.0-7.6..... *Nycteris macrotis*

Nycteris grandis, Fig. 13Q,Q
Nycteris grandis Peters 1871 Monatsber. Preuss. Akad. Wiss. Berlin (for 1870), p. 906; "Guinea."
Nycteris proxima Lonnberg & Gyldenstolpe 1925 Arkiv f. Zool. 19B: 1 Kartoushi (D. R. Congo 0°44'N 29°34'E)
Range. No Uganda voucher specimen has been located by us, but the late Robert Hayman (1967, and Hayman & Hill 1971) listed this rare wide-ranging equatorial forest bat from Uganda. Neither his colleague John Hill, nor the numerous eminent museums contacted could detail the record. However the nearby occurrence of *N. g. proxima* in nearby Rwanda (Kityo *et al.* this volume) lends support to this leading Chiropterist of an interesting addition to the fauna.
Measurements. (Kartoushi & Kisanga, D. R. Congo) HB 60-66; T 57-70; HF 14-16; E 28-30; FA 58-59; SK 24.0; XZ 15.6; CM^3 8.9; M^2M^2 10.

Nycteris hispida, Fig. 13Q,Q
Vespertilio hispidus Schreber 1774 "Die Saugethiere" p. 169, Senegal.
Nycteris pallida J. Allen 1917 Bul. Amer. Mus. Nat. Hist. 37: 425 Faradje (D. R. Congo 3°45'N 29°42'E).
Range. Thomas (in Johnston 1902) misinterpreted Neumann (1900) to have collected *hispida* in Uganda. But Thomas & Wroughton (1910) published records of it from the Ruwenzori Expedition. The species occurs in a variety of open habitats from Senegal to Ethiopia to Angola and Mocambique. Fig. 21 displays the Ugandan distribution.
Western. Budongo (ROM, Van Cakenberghe & De-Vree 1993; FMNH 165131); Bwamba (LACM); (Ka) Balegi (ROM); Katwe (ROM, CASF; Van Cakenberghe and de Vree, 1993); Koba (MSNG, DeBeaux 1922); Masindi (BMNH); Mokia, Mubuku 1600 m (both BMNH, Thomas & Wroughton 1910); Murchison NP (Williams 1967); Ntandi (LACM); Wasa R. (BMNH).

Southern. Mbarara (BMNH); Queen Elizabeth NP (Williams 1967).
S Buganda. Bubeke I.; Bugala I.; Bukasa I.; Kitobo I.; (all 4 MSNG, DeBeaux 1922); Bugala I. (FMNH); Bufumira I. (FMNH 149695).
Central. Entebbe (MSNG, DeBeaux 1922; BMNH); Moffats I. (BMNH).
N. Buganda. Kasenyi (CASF, Van Cakenberghe and de Vree 1993); Ngamba I. and Nsadzi I. (Zwick & Lloyd 1998a, b).
Eastern. 40 km N Soroti (FMNH 67886, 67887, 667976-67984); Sukulu or Tororo (Krampitz 1968).
Karamoja. Kidepo NP (Williams 1967); Moruita (BMNH).
Measurements. (Budongo, Ntandi, Entebbe) HB 40-45; T 41-51; HF 9-10; E 19-21; FA 37-41; WTG 5-7; SK 16.4-17.4; XZ 9.7-10.6; XMST 7.4-8.5; CM^3 5.3-5.6; M^2M^2 6.2-6.5.

Although *N. hispida* has been collected most from moderately low forest country, and rarely in the mountains of SW Uganda. It occurs in caves about 1600 m on Ruwenzori, and apparently to 2400 m on the Kenya side of Elgon (Granvik 1924).

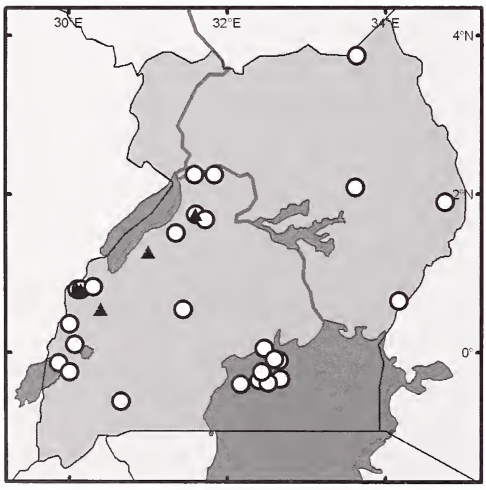

FIG. 21. Distribution of select Nycteridae: *Nycteris hispida* (O), *Nycteris arge* (▲). Shaded areas indicate lakes.

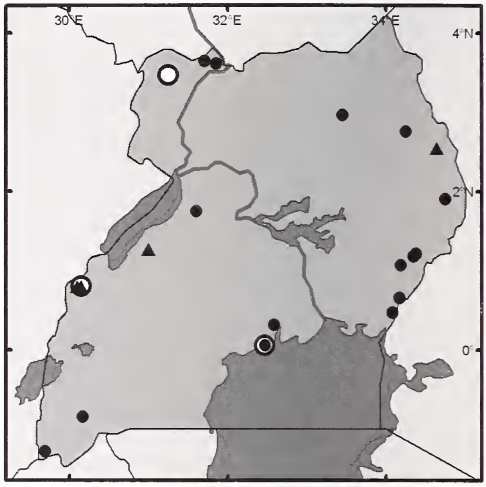

FIG. 22. Distribution of select Nycteridae: *Nycteris thebaica* (●), *Nycteris nana* (▲), *Nycteris macrotis* (O). Shaded areas indicate lakes.

<u>*Nycteris thebaica labiata*</u>, Fig. 13P,P
Nycteris thebaicus E. Geoffroy 1818, "Description de l'Egypte" 2: 119; Thebes (= Luxor, Egypt) (Anderson 1902).
Nycteris labiata Heuglin 1861, Nov. Acta. Acad. Caes. L-Carol. Halle 29: 5; Keren (Eritrea 15°46'N 38°30'E).

Range. Thomas (*in* Johnston 1902) listed the first BMNH specimen from Uganda. This is the most widespread species of *Nycteris*, throughout savannas of the continent and often into adjacent woodlands. Fig. 22 displays the Ugandan distribution.
Western. Budongo (LACM)
Southern. Kaina Mine (BMNH); Kisoro (as *N. capensis* (syn.) Verschuren 1967).
Central. Entebbe (Ogen-Odoi 1983); Kampala (BMNH).
Eastern. 3 miles Bulaganya (BMNH); Bumasifwa (BMNH); Busia (AMNH); Mbale (BMNH); Sukulu (ROM).
Karamoja. Central Karamoja (BMNH); Moruita (BMNH).
Northern. Amiel (BMNH).
Nile. Moyo (BMNH); Mt Otze (MUZM, Kityo & Kerbis 1996).
Measurements. (Amiel, Budongo, Kampala, Moruita, Sukulu) HB 47-52; T 47-56; HF 10-12; E 29-32; FA 42-46; WTG 8-10; SK 18.3-19.2; XMST 8.1-8.3; XZ 10.5-10.8; CM^3 5.8-6.1; M^2M^2 5.8-6.3.

Ogen-Odoi (1983) found so few that he had no useful breeding data of *N. thebaica* in his study. The same specimens in MUZM (1417 & 1418) were mistakenly listed as *hispida* and *thebaica* in Kityo & Kerbis 1996. These specimens are *thebaica* (Kityo in litt.).

<u>*Nycteris arge*</u>, Fig. 13R,R
Nycteris arge Thomas 1903, Ann. & Mag. Nat. Hist. 7 (12): 633; Efulen (Cameroon 2°42'N 10°30'E).

Range. A Uganda specimen of *N. arge* was listed by Van Cakenberghe & DeVree (1985) although its presence there was presumed by Kingdon (1974, map) based on longstanding records from W Kenya. The *arge* complex includes three (Rosevear 1965, Koopman 1975) or four species (Van Cakenberghe 1985, Thomas *et al.* 1994, Koopman 1994), but definitions of *major*, *arge*, *N. intermedia*, and *N. nana* are still in some disagreement. *N. arge* is the most common of these taxa, in equatorial forests from Sierra Leone to S Sudan, W Kenya, and W Tanzania. Fig. 21 displays the Ugandan distribution.

Western. Budongo (ROM, Van Cakenberghe & DeVree 1985); Bwamba (LACM); Kibale (in litt. Monadjem 2005); Mwela (LACM); Ntandi (LACM).

Measurements. (Budongo, Mwela, Ntandi) HB 48-53; T 50-54; HF 10-11; E 29-32; FA 42-45; WTG 10-11; SK 18.9-20.2; XZ 10.8-11.6; XMST 9.6; CM^3 6.4-6.5; M^3M^3 6.9-7.1.

The poorly defined taxon *N. intermedia* has been reported from several localities in NE D. R. Congo (Hayman *et al.* 1966, Van Cakenberghe & DeVree 1985) and it is quite possible that extraction of more skulls from alcoholic material may reveal differences consistent with that form in Uganda collections.

<u>*Nycteris nana*</u>, Fig. 13R,R

Nycteris nana Andersen 1912, Ann. & Mag. Nat. Hist. 8 (10): 546; Benito R. (= Mbini R. Equatorial Guinea 1°33'N 9°38'E).

Nycteris nana tristis G. Allen & Lawrence 1936, Bul. Mus. Comp. Zool. Harvard 79: 47; Kaimosi (Kenya 0°8'N 34°51'E).

Range. This species ranges through about the same equatorial forests as *N. arge*, but is much rarer. However records from W Kenya (Hollister 1918) and NE D. R. Congo (Frechkop 1938) long anticipated the first Uganda report (Watson 1951). Fig. 22 displays the Ugandan distribution.

Western. Bwamba (ROM, Van Cakenberghe & DeVree 1985); Mwela (LACM); Ntandi (LACM).

?Karamoja. Moroto (?BMNH, Watson 1951) (no specimen has been seen, and Watson's description is not helpful; it is uncertain whether Hayman was involved).

Measurements. (Bwamba, Ntandi) HB 39-40; T43-46; HF 9-10; E 20-24; FA 32-36; WTG 4-5; SK 16.0-16.6; XZ 9.2-9.4; XMST 7.8; CM^3 5.0-5.5.

As stated above we are not certain how to evaluate Watson's (1951) data which includes a general idea of his encounter with *Nycteris*. Kingdon (1974) described behavior by pairs in W Uganda. LACM 51711 taken at Mwela in mid-December contained an embryo.

<u>*Nycteris macrotis luteola*</u>, Fig. 13N,N

Nycteris macrotis Dobson 1876 Monogr. Asiatic Chiroptera Indian Museum London, p. 80; Sierra Leone.

Nycteris aethiopica Dobson 1878, Cat. Chiroptera in British Museum London, p. 165; Kordofan (Sudan, see Koopman 1975, p. 378).

Nycteris aethiopica luteola Thomas 1901; Ann. & Mag. Nat. Hist. 7 (8): 30; Ukamba, Kitui (Kenya 1°22'S 38°1'E).

Petalia aethiopica aethiopica (Dobson) Hollister 1918, Bul. U.S. Ntl. Mus. 99: 74; Gondokoro (Sudan 4°54'N 31°40'E).

Range. Virus studies on Uganda *N. macrotis* by Simpson *et al.* (1968) and a Uganda photograph of it in Pye (1969) seem to be the earliest mentions of the species here; there was Uganda material in BMNH in 1906, and the species was long listed for Kenya, Sudan, Tanzania, and for NE D. R. Congo (Fain 1953). Hollister's (1918) record from "Gondokoro, Uganda" refers to Sudan of today. *N. macrotis* occurs widely in savannas from the southern edge of the Sahara to Zimbabwe, right across the continent. Fig. 22 displays the Ugandan distribution.

Western. Ntandi (LACM).

Central. Entebbe (BMNH, Van Cakenberghe & DeVree 1985, Simpson *et al.* 1968).

Nile. Yumbe (BMNH, Van Cakenberghe & DeVree 1985).

Measurements. (Gondokoro) HB 61; T 58; E 22-26; HF 14; FA 48; SK 20.0; XZ 11.8; XMST 9.3; XIO 5.4; CM^3 7.0; M^2M^2 8.0.

Simpson *et al.* (1968) studied arbovirus transmission potential in this species from Uganda.

RHINOPOMATIDAE

Mouse-tailed bats are medium-sized insectivores, unmistakeable with slender whip-like tail extending far beyond the brief uropatagium. The eyes are large. The cone-shaped muzzle ends in a pig-like rhinarium, usually with an upturned point above the nostrils. Ears are erect from the sides of the head but joined across the forehead, and project forward-curving sickle-shaped tragus straps. Echolocation supplements good eyesight, and narrow wingtips enable rapid swooping flight. Most occurrences are in subdesert conditions, where they shelter in caves or stone buildings; they seem to become periodically very fat.

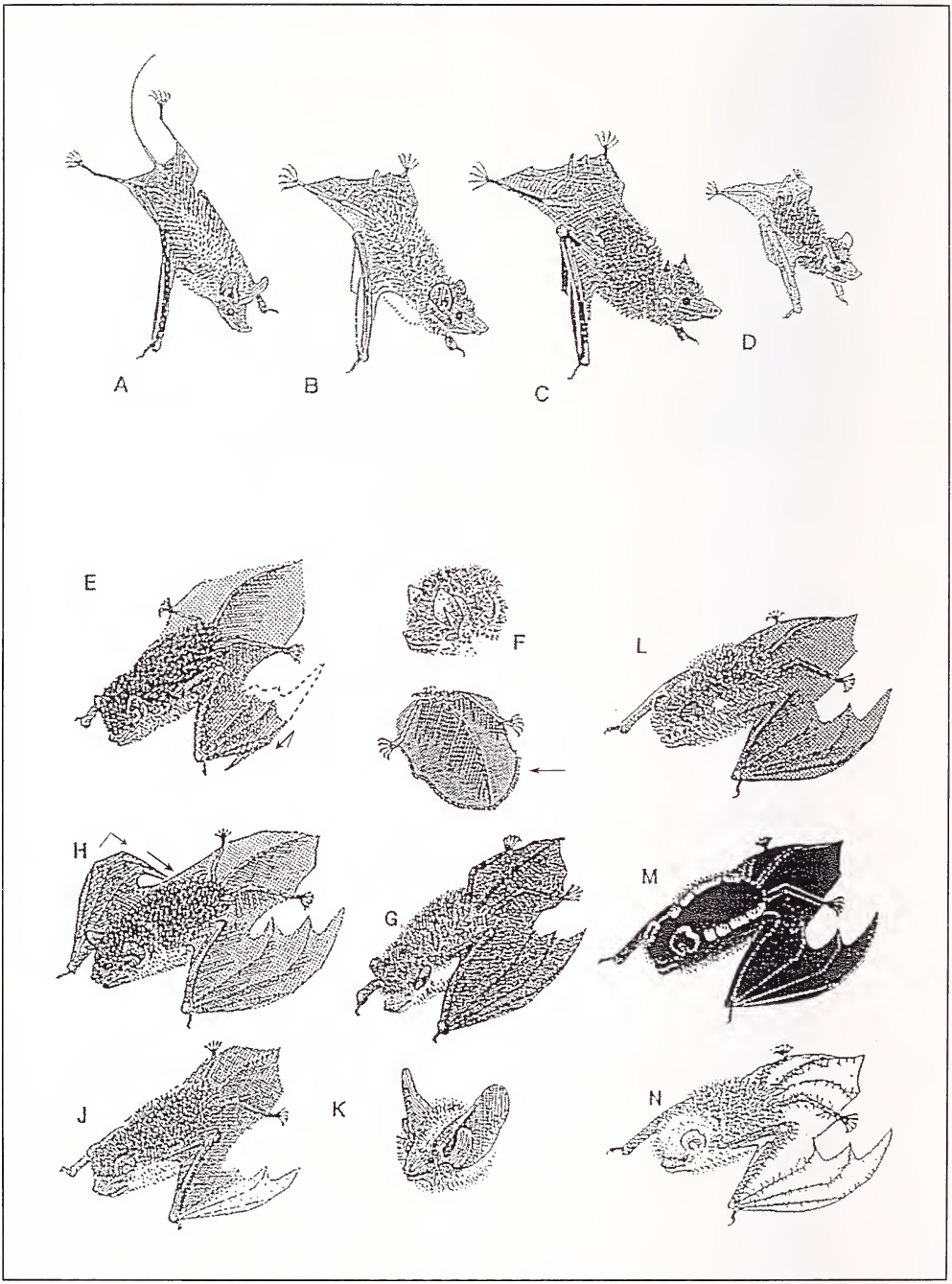

FIG. 23. Rhinopomatidae: A – *Rhinopoma*. Emballonuridae: B – *Taphozous mauritianus*; C – *Taphozous nudiventris*; D – *Coleura afra*. Vespertilionidae: E – *Miniopterus*; F – *Kerivoula lanosa*; G – *Nycticeinops schlieffeni*; H – *Scotophilus*; J – *Mimetillus*; K – *Laephotis wintoni*; L – *Glauconycteris humeralis*; M – *Glauconycteris egeria* ssp. (?); N – *Glauconycteris gleni*.

Rhinopoma sp?, Fig. 23A
?Rhinopoma cystops macinnesi Hayman 1937, Ann. & Mag. Nat. Hist. 10 (19): 530; Bat Island, L. Rudolf = L. Turkana (Kenya 3°27'N 36°4'E).
Rhinopoma hardwickei in Williams 1967, Field Guide to National Parks of East Africa, Collins, London, pp. 137, 174; L. Rudolf; Lokomorinyang; and "northeastern Karamoja, Kidepo N. P., Uganda."
?Rhinopoma hardwickei macinnesi Kock 1969, Abh. Senck. Naturf. Ges. 521: 52; material from Bat I. and Lokomorinyang (Sudan, Kenya 5°2'N 35°36'E).
?Rhinopoma hardwickei macinnesi Hayman & Hill (1971); Koopman (1975); Hill (1977); material from Bat I. and Lokomorinyang.
?Rhinopoma macinnesi in Van Cakenberghe & DeVree (1994); L. Turkana, L. Baringo, Ethiopia, Somalia.
?Rhinopoma hardwickei arabium Thomas 1913; Van Cakenberghe 1994; Lokomorinyang; C Sudan, Ethiopia, Somalia.
Range. A distinctive bat listed for Uganda by John Williams (1967), an expert bat collector; but specimens are needed for exact systematic position in Uganda.
Karamoja. "Kidepo National Park northeastern Karamoja," Williams (1967: 137, 174).
Measurements. (Lake Turkana, Kenya) HB 51-60; T 58-66; FA 45-48; HF 16; E 15-19; SK 15.9-16.4; XZ 8.3-9.1; XMST 8.1; CM^3 5.1-5.2; M^3M^3 6.6-6.7. (Lokomarinyang, Sudan/Kenya) HB T 61; FA 48; SK 16.4; XZ 9.8; CM^3 5.6; M^3M^3 7.3.

There is a strong probability of this species almost anywhere along the Kenya border of Karamoja, but we have been unable to locate a specimen or further confirmation; the most likely sources have not answered our queries to date.
Special Literature. Qumsiyeh & Jones (1986).

EMBALLONURIDAE

The sheath-tailed bats of Uganda range from small to huge insectivorous bats, immediately recognizable by the distal part of the tail which freely protrudes outside and above the uropatagium through which the basal part of the tail is loosely embedded. At rest the long narrow wing tip, apparently good for fast aerial pursuit of high-flying insect prey, folds conveniently upwards at first joint of finger II, then backwards at second joint. In fact common *T. mauritianus* are very alert at day rest on walls and tree trunks, watching intruders intently with their large eyes, and scuttling nimbly out of the way. The muzzle tends to be tapered to a small rhinarium; the ears are wide-spaced with small tragus lobes. They are known to echolocate.

Key to Uganda species (*underlined italics*) and others likely to occur there (*plain italics*)

1) FA 78-95; WSP 575-685; Blackish fur covers all parts of the head and body..... *Saccolaimus peli*
2) FA 57-67; fur covers most of head and body
(a) E.19-21; SK 19-23; fur above grizzled with white tips and roots, below pure white except dark throat, wing with large pale area ..... *Taphozous mauritianus* Fig. 23B
(b) E.17-20; SK 18.5-20; fur above dark brown with white roots, below pale gray; wing all dark ..... *Taphozous perforatus haedinus*
similar to above except wing whitish..... *T. perforatus sudani*
3a) FA 61- 69; fur above and below dark brown with pale roots, but narrow naked area on edge of rump and inguinal area; E 20 rounded, wing dark; SK 21-22 ..... *Taphozous hamiltoni*
3b) FA 66-79; fur above and below medium gray-brown with white roots, but major naked areas across rump and flanks and lower belly; wing medium to dark brown; E 20-25 pointed; SK 24.5- 26 0 ..... *Taphozous nudiventris* Fig. 23C
4) FA 43-53; fur above and below medium to dark brown with paler roots; wings and ears pale; E 15-17; SK 16.5-18..... *Coleura afra* Fig. 23D

Taphozous mauritianus, Fig. 23B
Taphozous mauritianus E. Geoffroy-St. Hilaire 1818, Description de l'Egypte, 2: 127; Mauritius Island, Indian Ocean.
Taphozous (*Taphozous*) *mauritianus* Thomas 1922, Ann. & Mag. Nat. Hist. 9 (9): 266-267.
Range. Thomas & Wroughton (1910) first recorded this widespread but local species from Uganda; its habit of roosting in buildings was the cause of its discovery in a "rest house." Fig. 24 displays the Ugandan distribution.

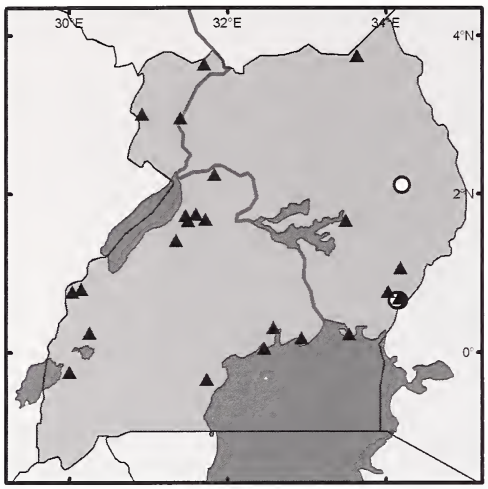

FIG. 24. Distribution of select Emballonuridae: *Taphozous mauritianus* (▲), *Taphozous perforatus* (O). Shaded areas indicate lakes.

Western. Budongo (ROM); Busingiro (DAS); Hoima (ZMK); Humia R. (LACM); NE of Lake George (BMNH); Masindi (BMNH, USNM); Murchison NP (Williams 1967); Ntandi (LACM); Unioro = Bunyoro (MSNG, DeBeaux 1926).
Southern. Queen Elizabeth NP (Williams 1967).
S Buganda. Masaka (Watson 1951, quoting Pitman).
Central. Entebbe (BMNH, Thomas & Wroughton 1910, Watson 1951); Kampala (Kityo 2000).
N Bugunda. Bussu (MSNG, DeBeaux 1922).
Busoga. Busoga (MSNG, DeBeaux 1926).
Eastern. Mbale (MSNG, DeBeaux 1922); Ngongere (ROM); Teso (Watson 1951); Tororo (Krampitz 1968).
Karamoja. Kidepo NP (Williams 1967).
Nile. Arua (ROM); Moyo (ROM); Rhino Camp (USNM, Hollister 1918).
Measurements. (Budongo, Masindi, Busingiro, Rutshuru) HB 77-86; T 17-23; FA 61-62; HF 12-15; E 18-19; WTG 28; SK 20.5-21.8; XZ 12.3-13.4; XMST 10.6-11.0; XIO 5.0; CM^3 9.0-9.2; M^2M^2 8.9-9.1.

Watson (1951) gave a brief account of its behaviour in Karamoja, as did Kingdon (1974) for E Africa. Krampitz (1968) found no fleas on ten examples studied. At Rutshuru (just W of Uganda in D. R. Congo) Verschuren (1967) found a juvenile in Nov.

A mite *Ugandobia barnleyi* (Dusbabek 1969) was taken from an unidentified bat at Kampala; the genus and species have subsequently been associated with *Taphozous* and *Coleura* (Fain 1978) and the present species is the most likely host.
Special Literature. Dengis (1996).

Taphozous perforatus haedinus
Taphozous perforatus E. Geoffroy-St. Hilaire 1818, Description de l'Egypte, 2: 126; gen. nov., sp. nov. Selected Type locality. Ombos (Egypt 24°28'N 32°57'E) see Kock 1969, p. 74.
Taphozous sudani Thomas 1915, (in part) Ann. & Mag. Nat. Hist. 8 (15): 561; Mongalla (Sudan 5°11'N 31°49'E).
Taphozous perforatus haedinus Thomas 1915, J. Bombay Nat. Hist. Soc. 24: 62; Chanler Falls (Kenya 0°47'N 38°5'E).
Range. A very wide-ranging species from W Africa to India, and south to Zimbabwe. Although long known from Kenya and Sudan, the first record from Uganda was Kock (1974). Harrison (1962) regarded white-winged *sudani* and dark-winged *perforatus haedinus* as separate species but Rosevear (1965), Kock (1969), and Koopman (1975) believed *sudani* to be a dry country subspecies. Specimens attributable to *sudani* from Nimule (Sudan, on the Uganda northern border) anticipate the finding of white-winged *T. p. sudani* one day in Northern or Nile provinces. Fig. 22 displays the Ugandan distribution.
Eastern. Sukulu (NMK, Kock 1974; ROM).
Karamoja. Alekilek (2°7'N 34°12'E, ZMMU); see article this volume by Kityo *et al.*
Measurements. (Sukulu) HB 76-78; T 22-26; FA 62-65; HF 10-12; E 18-20; SK 19.0-19.5; XZ 11.8; XIO 6.0; XMST 9.3-9.5; CM^3 8.1-8.3; M^2M^2 8.4-8.6.

Taphozous (Liponycteris) nudiventris, Fig. 23C
Taphozous nudiventris Cretzschmar 1826, Reise ins nördliche Afrika, Saugethiere, p. 70, fig. 27b; Egypt. Lectotype from Giza, Kock 1969.
Taphozous (*Liponycteris*) *nudiventris* Thomas 1922, Ann. & Mag. Nat. Hist. 9 (9): 267; subgen. nov.
Range. Found through most of N Africa and east through Asia to Thailand. The species was listed for Uganda by Hayman (1969) and by Hayman & Hill (1971) without detail. The nearest specimens to Uganda of *nudiventris* that we have seen or heard of are from Torit and Calamari (S Sudan, FMNH and ZMK), Lodwar (W Kenya, BMNH), and Shandwa (NW Tanzania, MCZ) .The late John Hill replied to our query that he did not know the source of his colleague's listing, nor did the curators of a number of European museums who kindly answered our search. But we feel justified in this inclusion due to

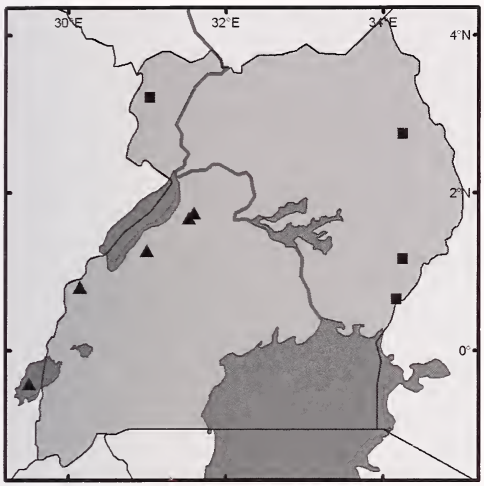

FIG. 25. Distribution of select Emballonuridae: *Saccolaimus peli* (▲), *Coleura afra* (■). Shaded areas indicate lakes.

the extraordinary knowledge of bat records by the late Robert Hayman. Probably a specimen will turn up.
Measurements. (Torit) HB 90; T 32; FA 75; HF 17; E 23; SK 25.2; XZ 12.2; XMST 11.1; CM^3 10.4; M^3M^3 10.2.

Saccolaimus peli
Taphozous peli Temminck 1853, "Esquisses Zool ... Cote de Guine" (1), 82; Boutry R. (Ghana 4°50'N 1°54'W).
Saccolaimus peli Thomas 1915, J. Bombay Nat. Hist. Soc. 24: 57-63 genus reinstated, priority over *Taphonycteris*.
Range. This is the largest insectivorous bat in Africa, (though not as enormous as *Macroderma gigas* of Australia). *S. peli* has been found locally in undisturbed rainforest from Liberia to W Kenya. An early record of it from "East Africa" is in Dobson (1875), who donated an alcohol specimen so-labelled, which he seems to have discarded as Type of "*Taphozous major*" (unpublished), to University of Cambridge Zoology Museum; specimen E5824A is still in good condition (Adrian Friday, in litt.) Rosevear (1965) referred to a "Uganda" specimen in BMNH, probably the same that Hayman (1963) cited from Nandi (W Kenya); Nandi was in early days part of Uganda Protectorate. Kingdon (1974) described it in Uganda and mapped approximately Budongo, Bwamba, Ruwenzori, and Kampala. Fig. 25 displays the Ugandan distribution.
Western. Budongo (ROM, Shortt (1975: 226); LACM); Mwela (LACM); Nyabyeya (USNM); Ntandi (LACM).
Southern. Lake Edward (MCZ, Koopman 1975).
?Central. Kingdon's map (1974) shows this part of Uganda. Perhaps in the West Mengo relict Forest. No details obtainable.
Measurements. (Budongo, Nyabyeya, L. Edward) HB 108-111; T 35-37; FA 78-79; WTG 105; HF 19-23; E 24-31; SK 30.0-31.0; XZ 20.6-21.5; XIO 7.1; XMST 17.4; CM^3 12.4-12.6; M^3M^3 13.7.
Kingdon (1974) gave an account of the biology of this species in Uganda. Shortt (1975) described it briefly in Budongo Forest.

Coleura afra, Fig. 23D
Emballonura afra Peters 1852, Reise nach Mossambique, 51, pls. 12, 13; Tette, (Mocambique 16°10'S 33°35'E).
Coleura afra Peters 1867, Monber. Preuss. Akad. Wiss., 479; new genus.
Coleura gallarum nilosa Thomas 1915, Ann. & Mag. Nat. Hist. 8 (15): 577; mouth of Bahr el Zeraf, (Sudan 9°25'N 31°10'E).
Range. This is the smallest member of Emballonuridae in Uganda. It is found locally from far W Africa, to Somalia, south to Angola and Mozambique. It was already known from Sudan, E and C Kenya, NE D. R. Congo, and N Tanzania (Allen & Loveridge 1933), before Watson (1951) mentioned it in Uganda. Fig. 25 displays the Ugandan distribution.
Eastern. Sukulu (ROM), Teso (Watson 1951).
Karamoja. Karamoja (ROM, BMNH; Watson 1951).
Nile. Mt Watti (ROM).
Measurements. (Karamoja, Sukulu; 25 mi. E of Kakamega, Kenya; Mwanza, N Tanzania) HB 55-65; T 16-20; FA 49-52; HF 9-11; E 15-17; WTG 7-12; SK 17.2-17.7; XZ 9.6-10.3; XMST 9.0-9.5; XIO 2.9-3.5; CM^3 7.0-7.1; M^3M^3 7.9-8.0.
Watson (1951) described the species as something of a nuisance under roofs in Karamoja. Kingdon (1974) gave its general biology for East Africa.
Special Literature. Dunlop (1997).

VESPERTILIONIDAE

Small to medium-sized insect-eating bats with inconspicuous nostrils set in the end of a small conical nose, and having the tail bones supporting the tail web (uropatagium) to its end. The numerous species are now divided into four subfamilies. With genus *Miniopterus* in Miniopterinae (see 2a below), *Kerivoula*

in Kerivoulinae (3a), and all other African genera in Vespertilioninae. All species use echolocation in the dark, and have small eyes. With new tools for systematic study (morphmetrics, electron microscopy of hair and sperms, karyotypes, DNA, sonograms, radiotracking, and other advanced behavior study techniques), some species are being critically revised, particularly among "*Pipistrellus.*" But at times sophisticated testing has been based on misidentified material. There remains an even greater need for refined morphological study.

Key to Uganda Vespertilionidae (*underlined italics*) and others likely to occur (*regular italics*)

Keyed first to genus, then identification within species groups.

1a) braincase very high above top of rostrum.....(2),(3)

1b) braincase slightly above top of rostrum or level with it.....(4)

2a) 2 pairs upper Incisors, 2 pairs upper Premolars ($P^{1,2}$), 3 pairs lower ($P_{1,2,3}$), Tragus long, wing tip folds

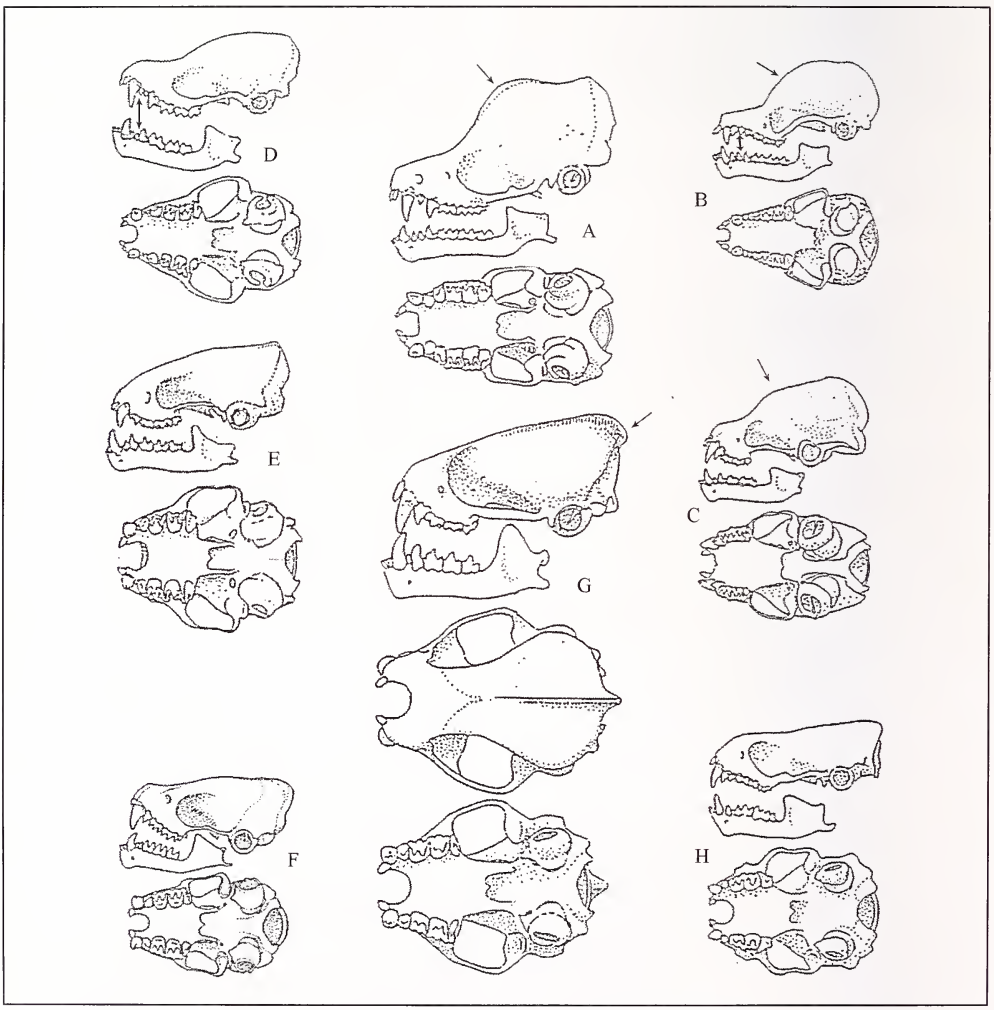

FIG. 26. Skulls of Vespertilionidae: A – *Miniopterus inflatus*; B – *Kerivoula phalaena*; C – *Glauconycteris egeria* ssp. (?); D – *Myotis bocagii*; E – *Scotoecus hindei*; F – *Nycticeinops schlieffeni*; G – *Scotophilus dingani*; H – *Mimetillus moloneyi.*

Plate 4. Above left: *Pipistrellus tenuipinnis*. Above right: *Scotoecus albofuscus*. Below left: *P. rueppelli*. Below right: *Mimetillus moloneyi*.

directly under metacarpal, phalange 2 of 3, three times length of phalanx 1; Tragus short, curved ..... *Miniopterus* (12)

2b) 2 pairs upper Incisors; Tragus long; wing tip swings sideways; phalance 2 of 3 not very different from length of phalange 1..... (3)

3a) 3 pairs upper Premolars, 3 pairs lower Premolars; Tragus long; Ears stop behind eye above corner of mouth..... *Kerivoula* (14)

3b) 1 pair upper Premolars; 2 pairs lower Premolars; Tragus short, round; lower rim of Ear curves around corner of mouth ..... *Glauconycteris* (18)

4a) 3 pairs upper Premolars, 3 pairs lower P; Tragus long, slender ..... *Myotis* (23)

4b) less than 3 pairs upper, 3 pairs lower Premolars..... (5)

5a) 1 pair upper Incisors..... (6)

5b) 2 pairs upper Incisors..... (8)

6a) skull with sharp backward projection of occipital/parietal suture = "helmet", 1 upper Premolar, front lower P_1 is half height rear P_2; Tragus long > 7 mm, sickle shaped; Forearm > 40mm... *Scotophilus* (36) Figs. 23H, 26G

6b) 2 pairs upper Premolars; Tragus fairly short; FA 28-38..... (7)

7a) thick Canines; first lower Premolar half height of second; SK 12.2-13.5; fur brown above, white below; FA 30-33..... *Nycticeinops schlieffeni* Figs. 23G, 26F

7b) slender Canines; one obvious upper Premolar, sometimes with a minute Premolar inside the row touching Canine, 2 lower Premolars; Tragus short, rounded; Penis very long, 13 mm..... *Scotoecus* (38) Fig. 26E, Pl. 4

8a) braincase very low and flat; HBBC 5.5; SK 14; XMST 8.5; one Premolar above, two Premolars below; wing very short and narrow, FA 26-29; metacarpal of 3 about 28 ..... *Mimitellus moloneyi* Figs. 23J, 26H, Pl. 4

8b) wing not noticeably short or narrow..... (9)

9a) Braincase slightly raised; one upper Premolar, two lowers; upper Incisors remote from small Canine; Ears over 18 mm..... *Laephotis wintoni* Fig. 23K

9b) outer upper Incisors near or touching Canine; Ear under 18..... (10)

10a) SK > 20; only one upper Premolar; occipital/parietal suture forms "helmet;" FA > 45 mm ..... *Eptesicus hottentotus*

10b) SK < 20..... (11)

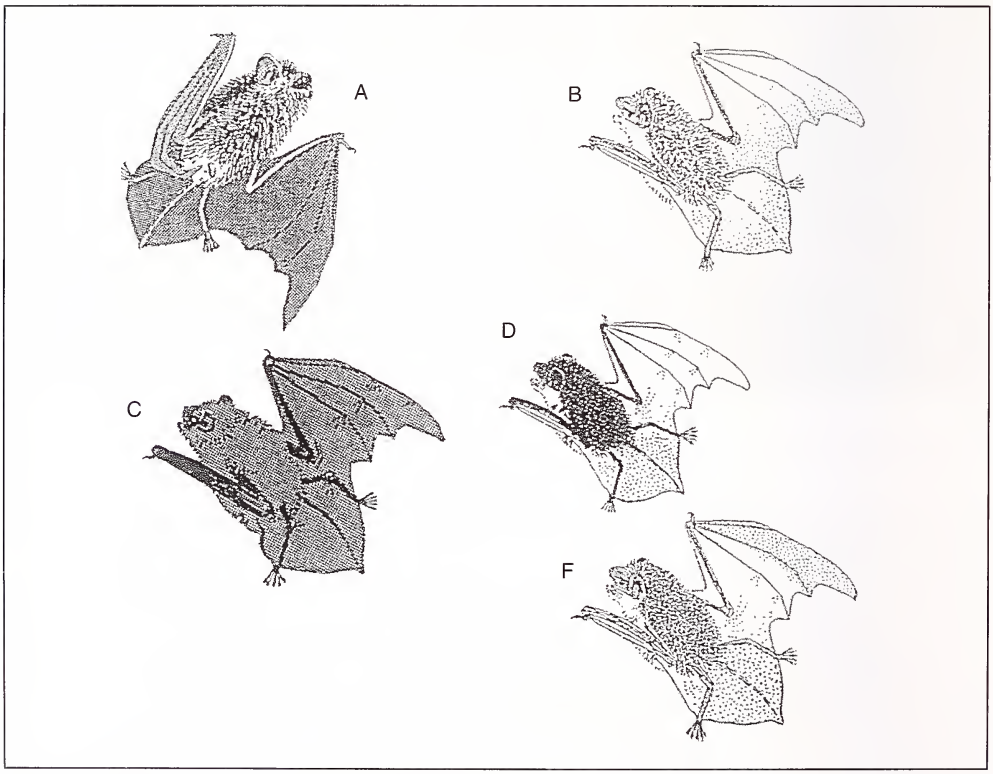

FIG. 27. *Pipistrellus*: A – *Pipistrellus c. garambae*, *P. s. ugandae*, *P guineensis*, *P. r. marrensis*, *P. hesperidus*, *P. nanus*, *P. eisentrauti*; B – *P. rueppeli*; C – *P. nanulus*, *P. crassulus*, *P. hesperidus fuscatus*; D – *P. tenuipinnis*; E – *P. rendalli*.

11a) usually with only one fairly big upper Premolar..... *Pipistrellus* (formerly called "*Eptesicus*") Fig. 27 (*P. capensis*, *P. s. ugandae*, *P. guineensis*, *P. rendalli*, *P. grandidieri*, *P. tenuipinnis*, the last two sometimes have minute upper Premolar wedged between Canine and large Premolar, on one side or both.....(25)(26)(27)(28)

11b) usually with two upper Premolars, one large, and a tiny one wedged next to Canine *Pipistrellus* (part) *crassulus*, *P. hesperidus*, *P. rusticus*, *P. eisentrauti*, *P. nanulus*, *P. nanus* (also *P. rueppelli*...26c).....(29) Fig. 27

12a) FA 47-52; SK 16.0-17.0; HBBC 7.1-7.9..... *Miniopterus inflatus* Figs. 23E, 26A

12b) SK16.5-17.8; XMST 8.6-9.5; HBBC 7.6-8.1..... *Miniopterus africanus*

12c) FA < 47.....(13)

13a) XMST < 8.0 ..... *Miniopterus fraterculus*

13b) XMST > 8.0; CM^3 5.6-6.0 ..... *Miniopterus natalensis*

13c) XMST 8.3-8.7; CM^3 6.3-6.7 ..... *Miniopterus schreibersi*

14a) tail web trailing edge with comb-like fringe of stiff hairs.....(15)

14b) tail web trailing edge with only irregular scattered soft hairs.....(17)

15a) FA 34-39; fur above reddish brown, below buff or whitish; SK 15.0-16.1..... *Kerivoula argentata*

15b) FA 26 -32; fur above dark gray brown, with whitish tips scattered or extensive; SK 11.5-13.5 ..... *Kerivoula lanosa muscilla* Fig. 23F

16a) FA 32-35; SK >13.0; dark brown grizzled with whitish tips.....(17)

16b) FA 26-29; fur medium brown without grizzled tips ..... *Kerivoula phalaena* Fig. 26B

17a) lower outer Incisor unicuspid (others tricuspid); upper Incisors long; tragus with terminal pencil of hairs.....*?Kerivoula smithi*

17b) lower outer incisor tricuspid as others; upper incisor short (may be variation of *smithi*) ..... *?Kerivoula cuprosa*

18a) wing and tail web white, entirely covered with dark veins (reticulations); fur above without pale flank stripe; E 12-13 ..... *Glauconycteris variegata* Pl. 5

18b) wing and tail membrane white with sparse dark reticulation outlining bones of wing and tail; general fur color pale. Slightly paler below; E 13-15; FA 38-42; SK 13.2-14.6 ..... *Glauconycteris gleni* Fig. 23N

18c) wing and tail membrane brown or blackish.....(19)

19a) wing and tail membrane pale brown without dark reticulation; fur above medium brown with white flank stripe, below medium brown; E 8.0-14; SK 12.1-13.3 ..... *Glauconycteris argentata*

19b) wing and tail web dark, body fur black with contrasting white flank stripes.....(20)

19c) wing and tail web dark, body fur brown, may have white spots or stripes.....(21)

20) FA<42; SK<13.5; E 13-16; (but Type of *G. egeria* is brown without spots)..... *Glauconycteris egeria* (ssp?) Figs. 23M, 26C

21a) fur color medium gray brown above and below.....*Glauconycteris poensis*

21b) fur color dark brown above and below.....(22)

22a) often with white shoulder spots; FA 35-39..*Glauconycteris humeralis* Fig. 23L

22b) often with white shoulder spots and white flank stripe; FA 39-44 ..... *Glauconycteris alboguttatus*

23a) wings bright orange with black spots; FA 52-59... *Myotis welwitschii* Pl. 5

23b) wings dark brown to blackish..(24)

24a) FA 46-52; above and below fur tricolor, roots black, pale band, brown tips; SK 18.0-19.5 ..... *Myotis tricolor*

24b) FA 36-41; fur tips reddish brown above with black roots, whitish or buff below; SK 14.2-15.3 ..... *Myotis bocagii* Fig. 26D

25a) wings white or buff.....(26)

25b) wings dark brown or black.....(27)

Plate 5. Above left: *Scotophilus dingani*. Above right: *Myotis welwitschii*. Below: *Glauconycteris variegata*.

26a) FA 27-32; SK 11.6-13.3; I^2 sub-equal to I^1; back fur dark; belly white tips over black roots ..... *Pipistrellus tenuipinnis* Figs. 27D, 28H, J, M

26b) FA 32-36; SK 13-14.2; I^2 as above; gray over whitish..... *P. rendalli* Figs. 27E, 28H, J, M

26c) FA 28-35; above gray with white grizzling; I^1 bifid; I^2 tiny ..... *P. rueppelli* Figs. 27B, 28E, P

27a) FA 26-30; SK 11.3-11.9 ..... *Pipistrellus guineensis* Figs. 27A, 28A, J, N

27b) FA 2-36; SK >11.9..... (28)

28a) FA 27-32; SK 12.0-12.8; C'C' 3.1-3.8; SK even of older examples without "helmet" (see below); upper inner incisor often with medial secondary cusp, and sometimes with another cusp as well, outer upper incisor short but slightly longer and thinner than in *capensis* (see below) ..... *Pipistrellus ?somalicus ugandae* Figs. 27A, 28J, L

28b) FA 27-33; SK 12.0-13.7; C'C' 3.7-4.3; SK of older examples with parietal/occipital suture raised to form "helmet;" outer upper incisor very stubby; inner incisor usually unicuspid, occasionally with minor secondary cusp inside ..... *Pipistrellus ?capensis garambae* Figs. 27A, 28J, K

28c) FA 31-36; SK 12.3-15.0; C'C' 4.4-4.7; braincase somewhat raised above rostrum, and rounded at back; rostrum rounded over the top; fur above pale brown without dark roots, below all whitish ..... *Pipistrellus grandidieri*

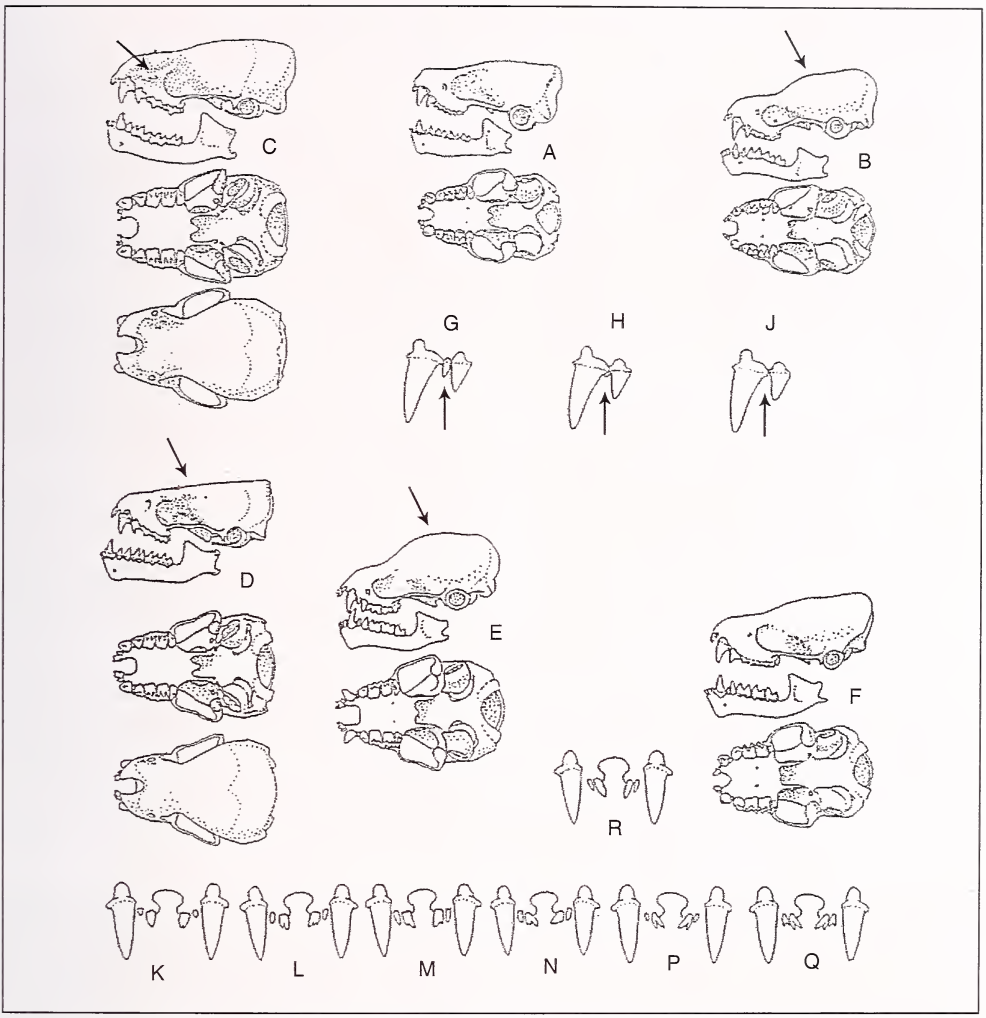

FIG. 28. Skulls of Vespertilionidae (*Pipistrellus*): A – *P. guineensis*; B – *P. nanus*; C – *P. eisentrauti*; D – *P. crassulus*; E – *P. rueppeli*; F – *P. hesperidus*. Occurrence and size of an Upper Anterior Premolar: G – *P. nanus* (first upper premolar plainly visible); H – *P. crassulus*, *P. eisentrauti*, *P. hesperidus*, *P. nanulus*, *P. rueppelli*, *P. r. marrensis*, *P. rendalli*, *P. tenuipinnis* (first upper premolar hidden behind canine and large premolar); J – *P. c. garambae*, *P. guiniensis*, *P. rendalli*, *P. c. ugandae*, *P. tenuipinnis* (no minute upper premolar at all). Shapes of Upper Incisor: K – *P. c. garambae*; L – *P. s. ugandae*; M – *P. tenuipinnis*, *P. rendalli*, *P. r. marrensis*, *P. nanus*; N – *P. guineensis*; P – *P. rueppelli*, *P. crassulus*, *P. eisentrauti*; Q – *P. nanulus*, *P. eisentrauti*.

29) wing dark, fur below fairly dark specially at roots..... (30)
30a) upper outer incisor about $^2/_3$ length of upper inner incisor... (32)
30b) upper outer incisor short < $^1/_2$ length of inner..... (31)

31a) upper inner incisors unicuspid; SK 12.5-14.0.... *Pipistrellus hesperidus* Figs. 27A, C, 28F, H, R
31b) incisors as above; SK 10.9-12.2 ..... *Pipistrellus rusticus*

32a) SK >12.0..... (33)
32b) SK 11.0-11.8; both upper incisors bifid; braincase slightly above rostrum; FA 24 -31; fur very dark brown..... *Pipistrellus nanulus* Figs. 27C, 28H, Q
32c) SK 11.3-12.4; braincase fairly high above rostrum; upper outer incisor fairly long unicuspid, inner often bifid; fur red-brown to medium brown with conspicuous black roots, ears dark ..... *Pipistrellus nanus* Figs. 27A, 28B, G, M
32d) very like *nanus*, but ears pinkish, belly fur paler, sometimes has glands along tail, baculum different ..... *Pipistrellus helios*
33a) SK 12.8-13.5; braincase hardly raised above rostrum; M^2M^2 5.7-6.2; FA 28-32; fur very dark brown..... *Pipistrellus crassulus* Figs. 27C, 28D, H, P
33b) SK 13.5-15.0; braincase somewhat raised above rostrum, rostrum flat with edges forming nearly a diamond shape; M^2M^2 6.0-6.8; FA 30-36; very dark brown ..... *Pipistrellus eisentrauti* Figs. 27C, 28C, H, P, Q
34a) FA 43- 53; fur above dark brown, below pale grayish brown; SK 16.8-17.6; M^2M^2 7.8-8.0 ..... *Scotophilus nigritellus*
34b) FA 47-60; SK 18.0-21.0; M^2M^2 8.0-8.8.....(35)
35a) fur above dark olive-brown, usually with pale roots, below usually strong yellow or orange; FA 47-57; M^2M^2 8.1-8.8..... *Scotophilus dingani* Figs. 23H, 26G
35b) fur above and below dark brown; FA 52-62; M^2M^2 8.8-9.5 ..... *Scotophilus nux*
36a) outer part of wing white or buff ..... *Scotoecus albofuscus*
36b) entire wing and tail web dark...(37)
37a) FA 29-33 (♀ small, ♂ big); medium brown above, gradually shading to pale mid belly; SK 12.5-14.0..... *Scotoecus hirundo*
37b) FA 32-38 (♀ small, ♂ big); color as above, sometimes pure white stripe mid belly; SK 13.5-15.0 ..... *Scotoecus hindei* Fig. 10E

Miniopterus inflatus rufus, Figs. 23E, 26A
Miniopterus inflatus Thomas 1903, Ann. & Mag. Nat. Hist. 7 (12): 634; Efoulen (Cameroon 2°42'N 26°4'E).
Miniopterus rufus Sanborn 1936, Field (Chicago) Mus. Nat. Hist. Zool. 20: 107; Katobwe (D. R. Congo 8°54'S 26°4'E).
Range. Liberia through D. R. Congo at least to W Kenya; Koopman (1975) mentioned Uganda. Fig. 29 displays the Ugandan distribution.
Western. Ruwenzori 2300 m Mubuku R. confluence of Mahoma R. (FMNH 144314, Kityo & Kerbis 1996, Kerbis Peterhans *et al.* 1998).
Southern. Itama (LACM).
Eastern. Busia (AMNH, Koopman 1975, Uchikawa 1985); Tororo (ROM).
Measurements. (Busia, Itama, Tororo) HB 51-59; T 48-58; HF 10-11; E 9-12; FA 47-49; SK 16.0-17.0; XZ 8.9-9.5; XIO 3.8-4.1; XMST 8.9-9.3; CM^3 6.2-6.5; M^3M^3 6.6-6.9.

Following Sanborn (1936), Peterson *et al.* (1995), *M. africanus* may be a separate species, occurring at least as far west as Gilgil, Kenya (ROM). Specimens in AMNH, HZM, LACM, ROM, USNM, from Kakamega, Kenya, seem to be *M. inflatus rufus*. Small unidentified insectivorous bats were observed high on

FIG. 29. Distribution of select Vespertilionidae: *Miniopterus inflatus* (△), *Miniopterus fraterculus* (□), *Miniopterus natalensis* (●). Shaded areas indicate lakes.

Mt Elgon by V. Clausnitzer and P. Taylor of Durban (Clausnitzer 1999, also Taylor in litt.) "hunting even on cold nights (below 0° at ground) altitudes up to 4000 m." Bat detector recordings could not be identified. It is worthwhile noting that Yalden (1988) reported *M. inflatus* (= *africanus?*) up to 3280 m in Bale Mountains N P (Ethiopia).

Miniopterus natalensis arenarius

Vespertilio natalensis A. Smith 1833, S. Afr. J. 2: 59; Natal, S. Africa; Roberts (1951) designated Durban as Type locality.

Miniopterus natalensis arenarius Heller 1912, Smiths. Misc. Coll. 60 (12): 2; Guaso Nyuki (N Kenya 0°21'N 36°55'E).

Miniopterus schreibersi (part, Uganda localities) Kingdon 1974.

Range. E Africa from S Africa to Ethiopia (Koopman 1994); Kingdon's (1974) "*schreibersi*" in Uganda probably is *M. natalensis*. No previous records. Fig. 29 displays the Ugandan distribution.

Eastern. Busia (AMNH); Kabei Cave (DAS).

Nile. Metu (ROM); Mt Watti (ROM); Zoka (MUZM, Kityo & Kerbis 1966).

Measurements. (Busia, Metu, Mt Watti) HB 52-63; T 48-55; HF 8-10; E 9-11; FA 43-45; SK 15.0-15.5; XZ 8.3-8.5; XMST 8.6-8.8; CM^3 5.6-5.7; M^2M^2 5.9-6.0.

This species is difficult to separate from *M. schreibersi*, of which a form *M. s. villiersi* was reported from NE D. R. Congo (Hayman *et al.* 1966). Baeten *et al.* (1964) listed *M. schreibersi* from Rwanda. But small measurements suggest *M. n. arenarius*. Koopman (1975) considered examples from S Sudan to be *M. arenarius*, although he then attached them to *M. schreibersi*. The adjoining ranges in Kenya and Tanzania remain unclear, but in Uganda *M. n. arenarius* seems to prefer hill forests.

Miniopterus fraterculus vicinior

Miniopterus fraterculus Thomas & Schwann 1906, Proc. Zool. Soc. Lond., 162; Knysna (S Africa 35°56'S 23°6'E).

Miniopterus breyeri vicinior J. Allen, 1917, Bul. Amer. Mus. Nat. Hist. 37: 45; Aba (D. R. Congo 3°53'N 30°16'E).

Range. These (determined by Dr. Koopman) are the first Uganda examples. The species occurs sporadically from Cameroon to Kenya, to S Africa. Fig. 29 displays the Ugandan distribution.

Eastern. Busia (AMNH 184361-184363).

The only located Uganda collection of this species were these three specimens taken in February 1950 together with specimens of *M. i. rufus* and *M. n. arenarius*. Hayman *et al.* (1966) reported it from a second place in D. R. Congo across Lake Albert from the Western Province of Uganda.

Measurements. (Busia) HB 50-56; T 43-49; HF 11; E 11-12; FA 43-44; SK 14.9-15; XZ 8.0; XMST 8.0; CM^3 5.5-5.6; M^2M^2 5.6-5.9.

Kerivoula ?cuprosa

? Kerivoula cuprosa Thomas 1912, Ann. & Mag. Nat. Hist. 8 (10): 41; Bitye (Cameroon 3°1'N 12°20'E).

? Kerivoula smithi Thomas 1880, Ann. & Mag. Nat. Hist. 5 (6): 166; Calabar (Nigeria 4°58'N 8°22'E).

? Kerivoula cuprosa J. Allen 1917, Bull. Amer. Mus. Nat. Hist. 37: 452, 542 (?not of Thomas 1912). Akenge and Medje, northern D. R. Congo.

Range. *K. cuprosa* (or *K. smithi*) is new for Uganda. *K. cuprosa* occurs sparsely from forests of Nigeria to Kenya. Relationship with earlier *K. smithi* uncertain. Fig. 30 displays the Ugandan distribution.

Western. Mwela (LACM 52041, 52043); Kanyawara: Monadjem 2005; (see Kityo *et al.* in present volume for new material).

Measurements. (Mwela, Avakubi) HB 39; T 40; HF 8; E 14; FA 34-35; SK 13.3-13.9; XZ 8.4; XMST 7.5; XIO 3.3; CM^3 5.1-5.2; M^2M^2 5.2.

Kerivoula smithi is recorded from NE D. R. Congo at Avakubi (AMNH) and Irangi (Rahm 1966) and from NE Kenya (Harrison 1963, Aggundey & Schlitter 1984). It is a rare Afrotropical form having different (unicuspid) outer lower incisor from typical

FIG. 30. Distribution of select Vespertilionidae: *Kerivoula lanosa* (▲), *Kerivoula phalaena* (O), *Kerivoula ?cuprosa* (■). Shaded areas indicate lakes.

cuprosa. Harrison (1957) reported *cuprosa* from Kenya (0°36'S 36°46'E, 2743 m). The Mwela female taken 26 Nov held a small embryo. Jacob Fahr is presently studying these two forms.

<u>*Kerivoula phalaena*</u>, Fig. 26B
Kerivoula phalaena Thomas 1912, Ann. & Mag. Nat. Hist 8 (10): 281; Bibianaha (Ghana 6°27'N 2°20'W).
Range. A new species for Uganda. Previously known from W Africa, Liberia to NE. D. R. Congo. Fig. 30 displays the Ugandan distribution.
Western. Ntandi (LACM 51974).
Southern. Kayonza (ROM 59191).
Measurements. (Ntandi, Kayonza) HB 35-38; T 35-41; HF 7-8; E 14; FA 26-27; SK 12.0-12.7; XZ 7.2-7.4; XMST 6.8; XIO 2.8-3.0; CM^3 4.3-4.6; M^2M^2 4.2-4.5.

These two examples seem to be the easternmost records of *K. phalaena*. The male from Kayonza was taken from the nest of an *Apalis* warbler, presumably abandoned voluntarily. These small birds commonly weave enclosed nests with a hole near the top (see also Schulz 1995).

<u>*Kerivoula lanosa*</u> ?ssp, Fig. 23F
Vespertilio lanosus A. Smith 1847, Illustr. Zool. S. Afr. (Mammals) pl. 50 and text. 200 miles E of Cape Town. Knysna S Africa designated by Roberts (1951).
? Nycticejus eriophorus Heuglin 1877, Reise nach Ost-Afrika 2, 34; Belegaz (Ethiopia 12°52'N 38°40'E) prior name for *K. harrisoni*, see Kock (1984); but Koopman 1994 suggested it may be prior name for *K. africana*.
Kerivoula harrisoni Thomas 1900, Proc. Zool. Soc. Lond. 802; Walamo (Ethiopia 7°N 38°E).
Kerivoula muscilla Thomas 1906, Ann. & Mag. Nat. Hist. 7 (18): 28; Ja R. (Cameroon 3°10'N 12°20'E).
Range. *K. lanosa* is less rare than most species of *Kerivoula*, but has not previously been recorded for Uganda, only once in NE D. R. Congo (Hayman *et al.* 1966), once in W Kenya (Taylor 1971, Aggundey & Schlitter 1984). Fig. 30 displays the Ugandan distribution.
Western. Ntandi (LACM 51973).
Measurements. (Ntandi, E of Kampene, Zaire) HB 34; T 37; HF 8; E 8; FA 31 (SK 11.7; XMST 6.4; XIO 2.9; CM^3 4.7; M^2M^2 4.7).
We follow Hill (1977) and Kock (1984) to include *K. muscilla*, *K. harrisoni* = *K. eriophora* in *K. lanosa*. The present specimen has a fringe on the uropatagium, and dark roots to the belly fur. Unfortunately the skull is completely smashed, so skull measurements in brackets above are substituted from BMNH 52.1613, from CE D. R. Congo 3°30'S 26°50'E.

<u>*Myotis welwitschii*</u>, Pl. 5
Scotophilus welwitschii Gray 1866, Proc. Zool. Soc. Lond., 211, pl. 24; Angola (probably near Pungo Andongo, see Cabral 1989, p. 17).
Vespertilio venustus Matschie 1899, Sitzb. Ges. Naturf. Freunde, 74; Kinole (Tanzania 0°50'S 37°42'E).
Range. This is the first Uganda specimen of this spectacular bat (Stanley *et al.* 1996), ranging from northern S Africa to Ethiopia to Guinea. Fig. 31 displays the Ugandan distribution.
Western. Kyoha R. 2066 m (FMNH 144313) ♀ not pregnant. 16 Nov 1990.
Measurements. HB 62; T 65; HF 10; E 19; FA 59; TIB 26; WTG 16; SK 19.9; XZ13.5; XMST 9.9; XIO 5.0; CM^3 7.7; M^2M^2 8.9.

Previous records of *M. welwitschii* from Kakamega (ROM) and elsewhere in W Kenya (Aggundey & Schlitter 1984), from Rwanda (Baeten *et al.* 1984), from NE D. R. Congo (Hayman *et al.* 1966), and from extreme S Sudan (Dieterlen & Rupp 1979), suggest that this may be found much more widely in Uganda. However the Uganda site at 2066 m seems to be the highest altitude yet reported.
Special Literature. Ratcliffe (2002).

<u>*Myotis tricolor*</u>
Vespertilio tricolor Temminck 1832, in Smuts, "Enum. Mamm. Cap.," 106; Cape Town, S Africa.
Epetiscus (sic.) *loveni* Granvik 1924, Lunds Univ. Aarskr N.F. 2, 21: 12; eastern slope Mt Elgon, Kenya (see Schlitter & Aggundey 1986).

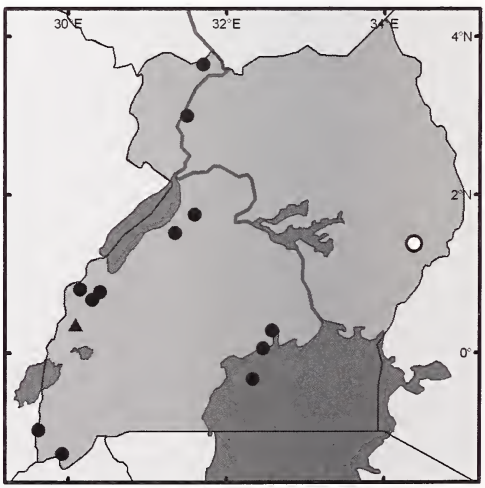

FIG. 31. Distribution of select Vespertilionidae: *Myotis welwitschii* (▲), *Myotis tricolor* (O), *Myotis bocagii* (●). Shaded areas indicate lakes.

Range. The specimen BMNH 40.771 referred to by Ellerman *et al.* (1953) as from "Mt Elgon, Uganda" was actually from Kapretwa on the Kenya side. However there is a more recent specimen in BMNH from the Uganda side. *M. tricolor* is known sparsely from Ethiopia down the E side of Africa to Cape Town, and locally in S and W D. R. Congo. Fig. 31 displays the Ugandan distribution.

Eastern. Kyema Cave, Sipi (BMNH 64.172).

Measurements. HB 52-58; T 45-52; HF 10-12; E 17-19; FA 48-52; SK 17.0-19.3; XZ 8.5-9.5; XIO 3.9-4.4; XMST 8.4-8.6; CM^3 7.1-7.3; M^2M^2 7.3-7.6.

In E Africa, most collections have been made in recent volcanic areas, such as Mts Suswa and Menengai (FMNH, USNM) in Kenya; in Rwanda (Baeten *et al.* 1984), also at 1770 m on volcanic mountains in D. R. Congo adjacent to SW Uganda (Verschuren 1967).

Myotis bocagii bocagii, Fig. 26D

Vespertilio bocagii (sic) Peters 1870, J. Sci. Math. Phys. Nat. Lisboa 1: 125; Duque de Braganca (Angola 9°23'S 15°53'E).

Myotis hildegardeae Thomas 1904, Ann. & Mag. Nat. Hist. 7 (13): 209; Fort Hall (= Muranga, Kenya 0°4'S 39°41'E).

Myotis bocagei cupreolus Thomas 1904, Ann. & Mag. Nat. Hist. 7 (13): 407; Efoulen (Cameroon 2°51'N 10°33'E).

Range. First reported for Uganda by Matschie (1895). Widespread in forests from Senegal to Ethiopia and S to Angola and northern S Africa. Fig. 31 displays the Ugandan distribution.

Western. Budongo (ROM); Fort Portal (AMNH, Koopman 1975); Koba (MSNG, DeBeaux 1922); Harubale (BMNH); Ntandi (LACM).

Southern. Buhoma 1500 m (FMNH 160362); Lake Bunyoni (FMNH 26501, 30614-30620, USNM).

S Buganda. Sesse Islands (DeBeaux 1922).

Central. Mengo (Matschie 1895); Entebbe (BMNH).

Nile. Moyo (ROM); Nile Province (DeBeaux 1926).

Measurements. (Ntandi, Budongo, Entebbe) HB 42-57; T 42-53; HF 9-11; E 14-16; FA 38- 42; SK 14.9-15.2; XZ 8.8-9.1; XMST 7.6-7.8; XIO 3.5; CM^3 5.0-6.0; M^2M^2 5.5-6.0.

The species has not been taken in S Sudan yet (Koopman 1986) so Moyo may be its northern limit in Uganda. Specimens from Yala River, W Kenya (USNM) as well as others from Kenya and Ethiopia indicate that *M. bocagii* will probably be found in E Uganda forested areas. Anciaux (1981) and Baeten *et al.* (1984) reported it from Rwanda, while Fain (1953), and Hayman *et al.* (1966) record it as reasonably common in northeastern D. R. Congo. It likes to hunt along streams and has been taken in grassland at 1830 m. DeBeaux (1922) reported a newborn in February in Sesse Islands. Variety of general color (at Moyo for example) leads to the conclusion of Hayman (in Fain 1953) that ssp. *M. hildegardeae* is not recognizable. Baeten *et al.* (1984) considered that two forms occurred in Rwanda, dark rainforest-haunting *cupreolus*, and brighter *bocagii* in more open areas.

Pipistrellus nanus, Figs. 27A, 28B, G, M

?Vespertilio pipistrellus var. *africanus* Ruppell 1842, Mus. Senck. 3: 156; Shoa, Ethiopia (Dr. D. Kock pers. comm. 1999 explained to us that complications attending this earlier synonomy make its use inadvisable).

Vespertilio nanus Peters 1852, "Naturwissenschaftliche Reise nach Mossambique": Säugethiere (Reimer, Berlin), p. 63, pl. 16 (2); Inhambane (Mozambique 23°45'S 35°28'E).

Pipistrellus abaensis J. Allen 1917, Bull. Amer. Mus. Nat. Hist. 37: 442; Aba (D. R. Congo 3°53'N 30°17'E).

Pipistrellus (*Hypsugo*) *nanus* Hill & Harrison 1987, Bull. Brit. Mus. Nat. Hist. (Zool.) 52: 245.

Neoromicia nanus Volleth *et al.* 2001, Chromosome Research 9: 25-46, (Also) Kearney *et al.* 2002, Acta Chiropterologica 4: 55-76.

Range. Thomas (1902) mentioned specimens in BMNH from Uganda. Occurs virtually throughout woodland in Africa from Senegal to Ethiopia and south to Cape Town. Fig. 32 displays the Ugandan distribution.

Western. Budongo (AMNH, LACM, FMNH 152769-152770); Bugoma (LACM), Bundibugyo (LACM); Bunyoro (MSNG, DeBeaux 1926); Fort Portal (MZMU, Festa 1909); Kibale (LACM, MCZ; Allen & Loveridge 1942); Koba (MSNG, DeBeaux 1922); Masindi (BMNH); Murchison Falls NP (Williams 1967); Mubuku Valley 1525-1830 m (BMNH, Thomas & Wroughton 1910; USNM, Hollister 1918); Mwela (LACM); Ntandi (LACM); Semliki (Kityo & Kerbis 1996); Toro (MUZM, Festa 1909).

Southern. Buhoma (FMNH); L. Bunyoni (FMNH); Byumba 1540 m (FMNH); Enkombe Saw Mill, Kigezi Game Reserve (AMNH, FMNH); Kalinzu (LACM); Kiduha (BMNH); Kisoro (SMF); Kyambura (Lloyd & Zwick 1997a); Maramagambo FR (south); Ngoto (FMNH); Ruhija (LACM).

Queen Elizabeth NP (Williams 1967).

S Buganda. Bugala Island (MSNG, DeBeaux 1922, Kityo & Kerbis 1996); Bukasa Island (Kityo & Kerbis 1996); 97 km W of Entebbe (BMNH).

Central. Entebbe (BMNH; DeBeaux 1922, Kock 1969, Ogen-Odoi 1983); Kabanyola (DAS); Katalemwa (DAS, ROM); Kyambogo (BMNH).
N Buganda. Bussu (MSNG, DeBeaux 1922); Kome I (DeBeaux 1922); Kyagwe I (DeBeaux 1922); Mitiama (MUZM, Festa 1909).
Busoga. Busoga (DeBeaux 1926); Lugala (ROM).
Eastern. Sukulu (ROM); Mt Kokanjero (BMNH); Mbale (DeBeaux 1926).
Karamoja. Lotome (Watson 1951).
Nile. Arua (ROM); Moyo (ROM).
Measurements. (Katalemwa) HB 41-47; T 29-35; HF 6-7; E 10-11; FA 29-30; SK 11.2-12.0; XZ 6.7-7.3; XMST 6.1-6.7; XIO 3.0-3.4; CM^3 3.7-4.0; M^2M^2 4.3-4.9.

One of the most commonly collected bats in Uganda, probably in all forested areas, and common in adjacent parts of all neighboring countries. There is considerable variation in fur color, with generally dark individuals from rain forest zones and paler, brighter ones in savanna woodland; juveniles quite dark. However we are not convinced that *Pipistrellus helios* is conspecific, contra Koopman (1975, 1994). Hill & Harrison (1987) found appreciable difference in the baculum, also the Type series of *P. helios* and others from N Kenya and S Somalia differ in average smaller skulls, more bifid inner incisors and pinkish rather than blackish ears. We have not seen specimens from Uganda that seem to represent *P. helios*, although it is expected in NE Uganda. DeBeaux (1922) lists a number of *P. nanus* juveniles taken on Sesse Island (?June), and two sets of twin embryos; from near Kampala (DAS) includes embryos 28 March, males in breeding condition in Feb. and March. Kityo & Kerbis (1996) list condition of maturity of several examples, and a pregnant ♀ in June from Semliki forest.
Special Literature. Lausen & Barclay (2005).

<u>*Pipistrellus hesperidus fuscatus*</u>, Figs. 27A, C, 28F, H, R
Vespertilio hesperida Temminck 1840 "Monographies de Mammalogie ... dans les ... Musees de l'Europe." 2: 211; (van der Hoek/d'Ocagne-Bertrand, Leiden/Paris); "Red Sea coast near Abyssinia" (but probably Shoa (Ethiopia), Ruppell collection, see Kock 2001, who studied types of *P. hesperida*, *P. africana*).
Pipistrellus kuhli fuscatus Thomas 1901, Ann. & Mag. Nat. Hist. 7 (8): 34; Naivasha, Kenya. Not conspecific with *Vespertilio kuhli* Kuhl 1819 from Trieste, Italy.
Range. Thomas (in Johnston 1902) reported *P. k. fuscatus* from Uganda, probably a specimen from what is now W Kenya (formerly "Uganda Protectorate").

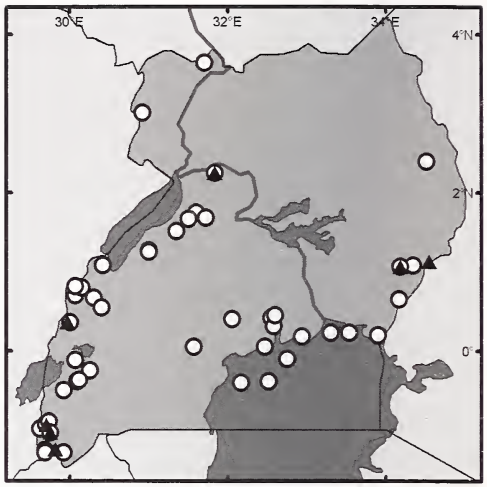

FIG. 32. Distribution of select Vespertilionidae: *Pipistrellus hesperidus* (▲), *Pipistrellus nanus* (O). Shaded areas indicate lakes.

Also listed by Kityo *et al.* 1994. Forms called "*kuhli*" scattered through most of Africa. Fig. 32 displays the Ugandan distribution.
Western. Murchison Falls NP (ROM); Nyabitaba 2670 m (FMNH 144317; Stanley *et al.* 1996, Kerbis Peterhans *et al.* 1998).
Southern. Bwindi, 7000' (LACM 35535-35536); Echuya (FMNH 161041); Ruhija 2350 m (FMNH 160363-160364).
Eastern. Mt Elgon NP (SMF); Mbale (FMNH 154294-154295; Stanley *et al.* 1996).
Measurements. (Budongo, Echuya, Mbale, Murchison) HB 41-43; T 32; HF 6-8; E 11; FA 32-35; TIB 14; WTG 8; SK 12.5-13.2; XZ 8.4; XBC 7.1-7.3; XIO 3.5-3.7; CM^3 4.2-4.9; M^2M^2 5.1-5.8. (Ruhija) T 35; HF 8; TIB 12; E 11; FA 35; SK 12.8-13.1; XZ 8-3; XBC 7.2-7.4; XIO 3.4-3.9; CM^3 4.5-4.8; M^2M^2 5.3-5.4.

A few specimens from S Sudan (Koopman 1986), Rwanda (Baeten *et al.* 1984); Ngorongoro, Tanzania (Transvaal Museum) seem to be outliers of *fuscatus*, as these from W Uganda. This is in contrast with its abundance in collections from C Kenya (Aggundey & Schlitter 1987). Discovery that S African *P. "k." broomi* differs in karyotype from Tunesian and European *P. k. kuhli* (Rautenbach *et al.* 1993) makes it very likely that the largely isolated E African population *fuscatus* may be a sibling species rather than true *P. kuhli*. We are unable to explain the variance found in Ruhija specimen FMNH 160364, which we

tentatively include in *P. hesperidus fuscatus*; this and FMNH 160363 are almost unicolor black, the darkest examples for this taxon that we have seen. In 160364, small anterior upper premolars on both sides are centered in the toothrow and clearly separate the canine from the large second premolar, unlike other representatives of *P. hisperidus fuscatus*, where this premolar is minute and hidden inside the row. Dr. V. Van Cakenberghe (in litt. 2000) was inclined to regard this specimen as aberrant "*P. kuhli*" in his recent study of the genus. USNM 350977 (Kakamega, W Kenya) has similar dentition and color, but with larger and broader skull it was considered unusual *P. eisentrauti* by one of us (E. T.).

Pipistrellus rusticus marrensis, Figs. 27A, 28H, M, R
Scotophilus rusticus Tomes 1861, Proc. Zool. Soc. Lond., p. 35; Damaraland, Namibia.
Pipistrellus marrensis Thomas & Hinton 1923, Proc. Zool Soc. Lond., p. 249; Jebel Marra, Sudan.
Range. Listed for Uganda by Kityo *et al.* 1994. We follow Koopman (1975), and Hill (1976) to include *marrensis* in the southern species *P. rusticus*. It has a wide savanna range from Liberia to Ethiopia to northern S Africa. Fig. 33 displays the Ugandan distribution.
Western. Budongo (LACM, ROM).
Measurements. (Budongo) HB 44-46; T 26-28; HF 6; E 10; FA 27-28; SK 11.5-11.7; XZ 8.0-8.1;

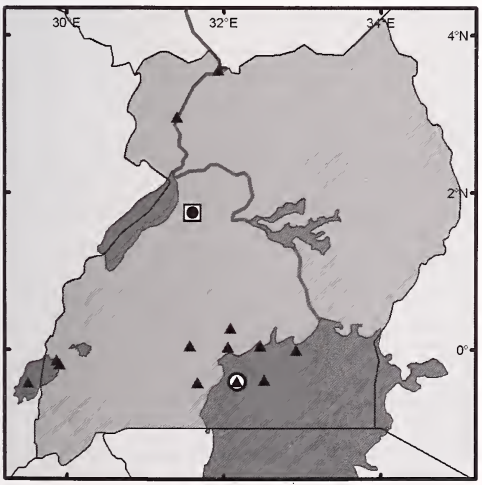

FIG. 33. Distribution of select Vespertilionidae: *Pipistrellus rusticus* (□), *Pipistrellus rueppelli* (▲), *Pipistrellus rendalli* (O), *Pipistrellus eisentrauti* (●). Shaded areas indicate lakes.

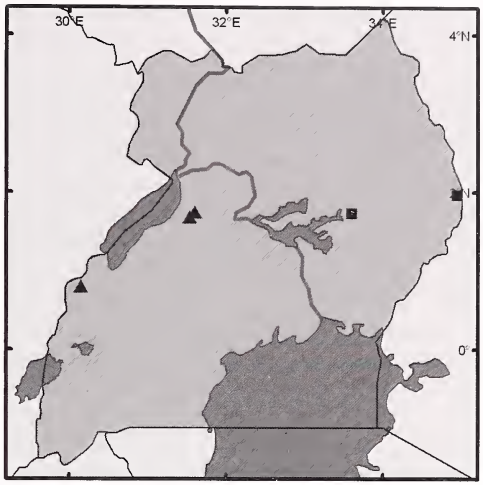

FIG. 34. Distribution of select Vespertilionidae: *Pipistrellus crassulus* (▲), *Pipistrellus guineensis* (■). Shaded areas indicate lakes.

XMST 7.0; XIO 3.6; CM^3 3.8; M^2M^2 5.0.

There are specimens from W Kenya (Hill 1976) as well as Sudan.

Pipistrellus eisentrauti, Figs. 27C, 28C, H. P, Q
Pipistrellus eisentrauti J. Hill 1968, Bonn. Zool. Beitr. 19: 45; Rumpi Highlands (Cameroon 5°N 9°15'E).
Hypsugo eisentrauti Volleth *et al.* 2001, Chromosome Research 9: 27.
Range. This is the first record of this species from Uganda, although Varty & Hill (1988) questionably reported its range from Cameroon to Kenya and Ethiopia. Fig. 33 displays the Ugandan distribution.
Western. Budongo (ROM 46613, FMNH 165169).
Measurements. (Budongo) HB 46; T 30-39; HF 7-8; E 11; FA 34-36.5; WTG 4.5-5; SK 13.5-14.3; XZ 9.0; XMST 7.6-8.0; XIO 3.8-3.9; CM^3 4.9-5.1; M^2M^2 5.9-6.2.

Other examples of *P. eisentrauti* are USNM 350977 from Kakamega in W Kenya and SMF 79444 from N Rwanda (Heller *et al.* 1994) so that the species probably occurs in other forest areas of Uganda.

Pipistrellus crassulus, Figs. 27C, 28D, H, P
Pipistrellus crassulus Thomas 1904, Ann. & Mag. Nat. Hist. 7 (13): 206; Efoulen (Cameroon 2°51'N 10°33'E).
Hypsugo crassulus Volleth *et al.* 2001 Chromosome Research 9: 27.

Range. Peterson *et al.* (1995, p. 92) used *P. crassulus* from Uganda and Kenya for their comparisons. Tropical forests from Cameroon to Kenya. Fig. 34 displays the Ugandan distribution.
Western. Budongo (ROM, DAS, FMNH 165171); Ntandi (LACM); Nyabyeya Forestry School (FMNH 165170).
Measurements. (Budongo, Ntandi) HB 45-51; T 25-32; HF 6-7; E 8-11; FA 27-32; SK 12.3-13.0; XZ 8.4-9.3; XMST 7.5-8.0; XIO 3.7-3.9; CM^3 4.3- 4.8; M^2M^2 5.5-5.6.

The species has been taken in outlying forest in S Sudan (Koopman 1986), as well as at Kakamega, W Kenya (USNM 350976, PCM 98036, FMNH 152767), and W of L. Kivu in D. R. Congo (Hayman *et al.* 1966, Heller *et al.* 1994); LACM 52008 is unusual in color, being above and below rich chestnut-orange-brown instead of blackish brown.

Pipistrellus nanulus, Figs. 27C, 28H, Q
Pipistrellus nanulus Thomas 1904, Ann. & Mag. Nat. Hist. 7 (14): 198; Efoulen, Cameroon.
Range. Kingdon (1974) referred to a specimen from S Uganda. Forests from Sierra Leone to Kenya. Fig. 35 displays the Ugandan distribution.
Western. Budongo (FMNH 152771, LACM, ROM).
Southern. Ishasha R.; Queen Elizabeth NP (DAS).
Central. Budo, Kampala (BMNH); Katalemwa, Kampala (DAS); Kabanyola (DAS).

FIG. 35. Distribution of select Vespertilionidae: *Pipistrellus nanulus* (▲), *Pipistrellus ?somalicus* (O). Shaded areas indicate lakes.

Measurements. (Budongo, Ishasha R, Kampala, Kabanyola) HB 38-47; T 21-31; HF 5-7; E 8-10; WTG 3-5.4; FA 26-28.5; SK 10.7-11.7; XZ 7.4-7.8; XMST 6.5-7.0; XIO 3.4-3.6; CM 3.8- 4.2; M^2M^2 4.8-5.3; HBBC 4.9-5.6.

Although reasonably well represented from Uganda, there seems a large gap through most of D. R. Congo from Cameroon and W African collections (see Koopman 1965, p.13 for the Avakubi, D. R. Congo specimen). Two specimens in USNM from Kakamega, W Kenya, formerly both called *P. "nanulus"*, seem to be *P. eisentrauti* and *P. crassulus*. LACM 36159 is brighter red-brown than usual with a sharply paler brown crown and underside. DAS 67-522 from Kampala 17 Feb. contained twin embryos CR 10, 11. Kingdon (1974) wrote of twin embryos in Jan, lactation in March.

Pipistrellus rueppelli fuscipes, Figs. 27B, 28E, H, P; Pl. 4
Vespertilio temmincki Cretschmar 1826 (in Rüppell) "Atlas… Reise ins nördl. Afrika" 17, pl. 6; Dongola; Lectotype from Shendi, Sudan (Nader & Kock 1983). (Not *V. temminckii* Horsfield 1824 = *Scotophilus kuhli*).
Vespertilio rueppelli Fischer 1829, "Synopsis Mamm.," p. 109. Renamed above.
Vespertilio pulcher Dobson 1875, Proc. Zool. Soc. Lond. p. 471; Zanzibar.
Pipistrellus fuscipes Thomas 1913, Ann. & Mag. Nat. Hist. 8 (11): 315; 60 miles W of Entebbe 3700 m.
Range. Thomas & Wroughton (1910) listed *P. pulcher* from Uganda, subsequently the Type of *P. fuscipes*. *P. rueppelli* occurs in small numbers from Morocco to Egypt and Iraq, in dry zones south to northern S Africa. Fig. 33 displays the Ugandan distribution.
Western. Katwe (AMNH); Mweya (DAS, ROM, HZM).
Southern. L. Edward (ROM).
S Buganda. Bugala I. (DeBeaux 1922; SMF, Nader & Kock 1983); Bukasa I. (MSNG, DeBeaux 1922); Bugoma-Sesse (DeBeaux 1922); Masaka/Buddu (DeBeaux 1922).
Central. Entebbe (MSNG, DeBeaux 1922; AMNH, BMNH, MNHN); 60 miles W of Entebbe (BMNH 6.7.1.5 Type of *P. fuscipes*), Nkozi Hospital (Kityo & Kerbis 1996).
N Buganda. Dwaji I. (DeBeaux 1922).
Nile. Dufile (FMNH 149697-149698); Rhino Camp (FMNH 29432, Nader & Kock 1983).
Measurements. (Mweya, L. Edward, Entebbe) HB 43-55; T 36-41; HF 8-10; E 10-13; FA 32-36; SK 13.1-14; XZ 8.1-8.6; XMST 7.5-7.6; CM^3 4.3-4.8; M^2M^2 5.3-5.5.

This distinctive species is not uncommon in more open areas of W Uganda. It follows the whole Nile

basin in Sudan (Koopman 1975), but seems strangely rare in Kenya (Aggundey & Schlitter 1984). As *Vesperugo temminckii*, Matschie (1895) reported it from "central Africa, Lake Albert" and Hayman *et al.* (1966) listed several from E D. R. Congo. DeBeaux (1922) had in his collection females bearing twins. Hill & Harrison (1987) showed the baculum of a Uganda specimen among others. A few examples have ochraceous chests (DeBeaux 1922) but according to Happold *et al.* (1987) this color fades out in alcohol, so it is probably a secretion, or a stain from certain insects, as in dormice. Ueshima (1968) recorded Cimicidae parasites from Uganda specimens.

Pipistrellus rendalli phasma, Figs. 27E, 28H, J, M; Pl. 4
Vesperugo (*Vesperus*) *rendalli* Thomas 1889, Ann. & Mag. Nat. Hist. 6 (3): 362; Bathurst = Banjul, Gambia.
Eptesicus phasma G. Allen 1911, Bul. Mus. Comp. Zool. 54: 321; Meru R. N of Mt Kenya (Kenya 0°31'N 37°40'E).
Eptesicus faradjius J. A. Allen 1917, Bul. Amer. Mus. Nat. Hist. 37: 444; Faradje, NE D. R. Congo.
Pipistrellus (*Neoromicia*) *rendalli* Hill & Harrison 1987, Bul. Br. Mus. Nat. Hist. (Zool.) 52: 250; generic revision based on baculum and other morphology.
Nycterikaupius rendalli Menu 1987, Palaeovertebrata, Montpellier 17: 108-109; new genus based on dental morphology.
Range. Hollister's (1918) "Uganda" specimens from Gondokoro are now from Sudan (Koopman 1975); Hill & Harrison (1987) probably gave first proven Uganda record. DeBeaux (1922) listed 45 ♂, 47 ♀ collected by Bayon from Bukasa, Bussu, Entebbe, Dwaji I. and Kabulamuliro. Kindness of MSNG Curator Dr. G. Doria allowed the senior author to measure a third of these alcohol specimens as time permitted, and most seem *P. tenuipinnis*. Perhaps Ueshima's (1968) Cimicidae parasite (Entebbe ex MSNG) was from *tenuipinnis*. Fig. 33 displays the Ugandan distribution.
S Buganda. Bugala I. (BMNH, Hill & Harrison 1987).
Measurements. (Gondokoro, S Sudan; Meru R, Kenya; Faradje, D. R. Congo). HB 45-56; T 35-43; HF 7-9; E 10-12; FA 32.5-36; SK 13.5-13.8; XZ 8.8-9.0; XMST 7.8-8.2; XIO 3.6-3.8; CM^3 4.6-4.8; M^2M^2 5.6-5.8.
Hill & Harrison (1987) showed the baculum of Uganda and other specimens of *P. rendalli* and revised its generic and subgeneric standing, which was followed by Koopman (1994).

Pipistrellus tenuipinnis ater, Figs. 27D, 28H, J, M; Pl. 4
Vesperus tenuipinnis Peters 1872, Mber. Preuss. Akad. Wiss., p. 263; "Guinae."
Vesperugo tenuipinnis DeWinton 1897, Ann. & Mag. Nat. Hist. 6 (20): 316.
Vespertilio tenuipinnis Thomas 1902, *in* Johnston "Uganda Protectorate."
Eptesicus tenuipinnis Miller 1907, Bul. U.S. Ntl. Mus. 57: 209.
Eptesicus ater J. Allen 1917, Bul. Amer. Mus. Nat. Hist. 37: 443; Faradje, northeastern D. R. Congo.
Pipistrellus (*Neoromicia*) *tenuipinnis* Hill & Harrison 1987, Bul. Brit. Mus. Nat. Hist. (Zool.) 52: 250.
Nycterikaupius tennuipinnis Menu 1987, Palaeovertebrata 17: 109.
Range. DeWinton 1897 was the first to recognize this species from Uganda. As mentioned under *P. rendalli*, at least some from each locality listed by DeBeaux (1922) are really *P. tenuipinnis*. All these, in fluid (and two from Nimule, Sudan) had small forearms, ♂ (some with large testes) FA 28-32, ♀ 28-34. One large ♂, temporarily dried, revealed white-tipped belly fur of *P. tenuipinnis*. Clearly DeBeaux was unaware of *P. tenuipinnis*. Fig. 36 displays the Ugandan distribution.
Western. Budongo (LACM, ROM); Butiaba (BMNH); Semliki Valley (BMNH); Sonso R. (HZM).
Southern. Queen Elizabeth NP (Lloyd & Zwick 1997b).

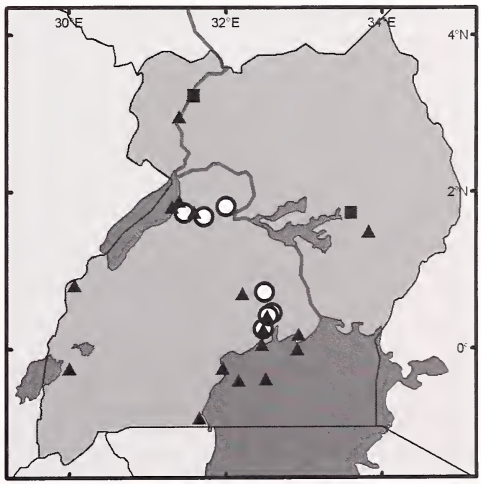

FIG. 36. Distribution of select Vespertilionidae: *Pipistrellus tenuipinnis* (▲), *Pipistrellus capensis* (O), *Nycticeinops schlieffeni* (■). Shaded areas indicate lakes.

S Buganda. Bugala I. (MSNG); Bukasa I. (MSNG); Jubiya (SMF, Kock 1981); Sango Bay (LACM).
Central. Budo (HZM); Entebbe (BMNH, DeWinton 1897; FMNH 67930-67931, ROM, MSNG, DeBeaux 1926); Kawanda (ROM).
N Buganda. Bussu (MSNG); Dwaji I. (MSNG); Kabulamuliro (MSNG, both DeBeaux 1922).
Eastern. Ajeluk (NMK, Watson 1951).
Nile. Rhino Camp (USNM, Hollister 1918); Zoka (Kityo & Kerbis 1996).
Measurements. (Entebbe, Budongo, Sango Bay) HB 47-62; T 26-30; HF 7; E 12; FA 29-31; SK 12.5-13.2; XZ 8.0-8.3; XMST 6.8-7.5; XIO 3.4-3.7; CM^3 4.3-4.5; M^2M^2 5.0-5.2.
This species seems to vary from readily obtainable to scarce; in contrast with Bayon's big collection in 1909, Mutere & Ssenkubuge (1965) mist-netted intensively at Entebbe from Sept. to Nov. catching over 1000 of one common species but took only one *P. tenuipinnis*. Some examples have been taken in mid to late Aug. and in late Nov. at Entebbe. Ogen-Odoi (1983) discussed possible causes of the absence phenomenum in Uganda. Kingdon (1974) reported breeding in Uganda specimens: lactation in January, males with large testes in June, Oct., Nov. Verschuren (1967) recorded a flying juvenile in October from D. R. Congo adjacent to SW Uganda. Mutere (1970a) found some sheltering in roofs of buildings as well as in caves. *P. tenuipinnis* has been reported from many stations in northeastern D. R. Congo (Hayman *et al.* 1966), from W Kenya (Aggundey & Schlitter 1984), and the S shore of Lake Victoria in Tanzania (Swynnerton & Hayman 1951), but not in Sudan, nor in Rwanda. Hayman (1954), Schlitter *et al.* (1982), and McBee *et al.* (1987) have all found instances where this species has a supernumerary minute upper premolar behind the canine as in typical *Pipistrellus*. LACM 36153 from Budongo is unusual with whitish tips frosting some of the fur of the lower back. Ueshima's (1968) Cimicidae parasite from "*E. phasma*" was more likely from *P. tenuipinnis*.

<u>*Pipistrellus capensis garambae*</u>, Figs. 23A, 27J, K
Vespertilio capensis A. Smith 1829, Zool. J. 4: 435; "the Cape." Lectotype (Thomas 1926) probably does not match the Grahamstown Type-locality selected by Roberts (1951), Thorn (1988).
Vespertilio minutus somalicus Senna 1906 Arch. Zool. Ital. Torino & Napoli 2: 286 (not Thomas 1901) = *capensis* (Koopman in Largen *et al.* 1974, p. 243).
Eptesicus capensis Miller 1907, Bul. U.S. Ntl. Mus.57: 209.
Eptesicus garambae J. Allen 1917, Bul. Amer. Mus. Nat. Hist. 37: 445; Garamba NE D. R. Congo; valid subspecies of *P. capensis* (Koopman 1965, p. 16).
Pipistrellus (*Neoromicia*) *capensis* Hill & Harrison 1987, Bul. Brit. Mus. Nat. Hist. (Zool.) 52: 249. *Neoromicia* Roberts, as subgenus, based on baculum.
Nycterikaupius capensis Menu 1987, Palaeovertebrata 17: 109. New genus based on dentition.
Range. There continues to be much uncertainty over identity and distribution of *P. capensis garambae* and *P. somalicus ugandae*, so that all earlier records are untrustworthy for E Africa. While Koopman (1975) sorted them for Sudan (although differently from Kock 1969), Kock (1981) gave probably the first reliable record for Uganda. Fig. 36 displays the Ugandan distribution.
Western. Busingiro (DAS); Kigumba (FMNH 86012); Masindi (BMNH).
Central. Budo (BMNH); Kabanyola (DAS); Katalemwa (DAS, ROM).
N Buganda. Bukalasa (SMF, Kock 1981).
Measurements. (Busingiro, Katalemwa, Kabanyola) HB 43-54; T 26-31; FA 29-31.5; HF 6-7.5; E 11-13; SK 12.4-13.4; XMST 6.7-7.6; XZ 7.9-8.5; XIO 3.3-3.8; CM^3 4.2-4.7; M^2M^2 5.0-5.8; HBBC 5.3.

As well as S Sudan (Koopman 1975, McLellan 1986), *P. ugandae* occurs in NE D. R. Congo (Koopman 1965), and W Kenya (USNM, ROM, BMNH from Mt Elgon; Aggundey & Schlitter 1984). From Kampala area 2 ♀ in Feb. were pregnant, one with a single embryo 8 mm crown-rump, one with twins 7 mm C-R; another female was non-pregnant but lactating in April. These few data conform to the "boreal breeding cycle" of Anciaux (1983), as in Verschuren (1957, 439) for Garamba (4°N, D. R. Congo). The case for conspecificity with S African *P. capensis* remains tenuous without E African genetic studies. The difference in size between *P. c. garambae* and *P. s. ugandae* is no more than between *P. c. capensis*, and *P. c. gracilior*.

<u>*Pipistrellus ? somalicus ugandae*</u>, Figs. 23A, 27J, L
?Vespertilio minutus somalicus Thomas 1901, Ann. & Mag. Nat. Hist. 7 (8): 32; Hargeisa, Somalia. Not yet proved conspecific, we think.
Pipistrellus deserti Dollman 1914, Proc. Zool. Soc. Lond. 131: 308; Mt Moroto Uganda (not of Thomas 1902, but = *ugandae fide* Koopman 1975, p. 401).
Eptesicus ugandae Hollister 1916, Smiths. Misc. Coll. 60 (1): 3; Ledgus (Sudan 4°11'N 31°32'E); Ledgus was at that time within Uganda Protectorate.

Eptesicus somalicus ugandae Koopman 1965 Amer. Mus. Nov. 2219: 15.
Range. Koopman (1975, p. 401) mentioned the re-identification of the above Uganda specimen misnamed by Dollman. Koopman (1994) listed the range of *ugandae* as Sudan, Uganda, NE D. R. Congo, and included S African *zuluensis* in species *somalicus*, a broad view not accepted by all. Fig. 35 displays the Ugandan distribution.
Western. Budongo (ROM); Masindi (BMNH).
Central. Budo (BMNH, HZM); Kabanyiro (DAS); Katalemwa (DAS).
Karamoja. Mt Moroto (BMNH; Dollman 1914, Watson 1951, Koopman 1975).
Nile. Arua (ROM).
Measurements. (Ledgus, Sudan, Arua, Budongo, Kampala) HB 46; T 34; HF 7.5; E 11-12; FA 29.5-32.5; SK 12.2-12.8; XZ 7.5-8.0; XMST 6.5-7.2; CM^3 4.0-4.4; M^2M^2 4.8-5.1.

This form, in size between *P. capensis* and *P. guineensis*, overlaps both. From the few specimens available it seems that a larger I^2 and multiple- notched I^1 in *P. ugandae*, also lack of "helmet" at back of skull are fairly diagnostic; the braincase seems comparatively higher than in *P. capensis garambae*. Color is indistinguishable for these two, but generally *P. guineensis* is paler and more yellowish ochre. *somalicus somalicus* from Somalia and Kenya is paler and more orange dorsally, and whiter below than *ugandae*; two specimens seen are of this color, ROM 46646 from Budongo, and HMZ 4.18818 from Kampala (this lacks skull and has a rather long penis for this taxon). Also Watson's (1951) description from Karamoja sounds more like *P. s. somalicus*. Koopman (1975, 1994) included *P. zuluensis* (Roberts 1924) as subspecies of *P. somalicus*, but Rautenbach *et al.* (1993) disagreed because of different karyotypes. Peterson *et al.* (1995) believed that many E African specimens, including USNM "*somalicus*" from N Guaso Nyiro (which Hollister 1916 used for comparison) were actually *P. zuluensis*. Our own examination of Uganda material (ROM) persuades us that here at least Peterson's northern "*zuluensis*" are actually *P. guineensis*. More material with genetic study may ultimately resolve this difficult group.

<u>*Pipistrellus guineensis rectitragus*</u>, Figs. 23A, 27A, J, N
Vesperus guineensis Bocage 1889, J. Sci. Math. Phys. Nat. ser. 2 (1): 6; Bissau (Guinea-Bissau 11°52'N 15°39'W).
Eptesicus rectitragus Wettstein 1916 Anz. Kais. Akad. Wiss. Wien 53: 191; Dilling (Sudan 12°2'N 29°40'E).
? Eptesicus zuluensis Peterson, Eger, Mitchell 1995 in part, Faune de Madagascar 84 Chiropteres, pp. 95-99 (not of Roberts 1924, S Africa).
Range. Long known from W Africa (*E. minutus* Monard 1938, *E. guineensis* Rosevear 1965), Koopman (1975) recognized it in Sudan as *E. g. rectitragus*, and these below are the first from Uganda. Fig. 34 displays the Ugandan distribution.
Eastern. Soroti (ROM 38348).
Karamoja. Amudat (USNM 436712).
Measurements. (Amudat, Soroti) HB 45-48; T 33-35; HF 7; E 10-11; FA 28-30; SK 11.6-11.9; XMST 6.6-6.7; XIO 3.3-3.4; CM^3 3.9-4.0; M^2M^2 4.4-4.9.
We outline above the varied taxonomic treatment of these little bats under *P. somalicus ugandae*. The upper outer incisor is relatively longer and more slender than in *P. ugandae* or *P. garambae*. The upper inner incisor is often shallowly bifid, but in the two present specimens is worn down so that this is hardly noticeable.

<u>*Laephotis wintoni*</u>, Fig. 23K
Laephotis wintoni Thomas 1901, Ann. & Mag. Nat. Hist. 7 (7): 460; Kitui (Kenya 1°22'S 38°1'E). Type BMNH 1901.5.6.5.
Range. This extremely long-eared vespertilionid was expected both by Kingdon (1974), and by us when composing our keys, but we are delighted that a specimen from Karamoja, Uganda has been collected in 2004. See Kityo *et al.* in this volume for details. The species occurs at least from C Ethiopia to C Tanzania. Several other species have been named in the genus from southern Africa, and *L. wintoni* was tentatively listed from there also (Bronner *et al.* 2003), but with some doubt. Probably limited to the dry regions of Karamoja. Field-notes from S Africa found it in cliff fissures; and a colony of closely related *L. angolensis* were found in D. R. Congo under loose tree bark (Hayman 1957). Fig. 41 displays the Ugandan distribution.
Special Literature. Jacobs *et al.* (2005).

<u>*Nycticeinops schlieffeni*</u>, Figs. 23G, 26F
Nycticejus schlieffeni Peters 1859, Monatsber. Kais. Preuss. Akad. Wiss. Berlin, p. 223; Cairo.
Scotophilus minimus Noack 1887, Zool. Jb. Syst. 2: 280; Qua Mpala (D. R. Congo 6°43'S 29°31'E).
Nycticeius africanus G. Allen 1911, Bul. Mus. Comp. Zool. 54: 540; Meru R., N of Mt Kenya (Kenya 0°29'N 37°40'E).
Scotoecus cinnamomeus Wettstein 1916, Anz. Kais. Akad. Wiss. Wien 53: 191; Nubakka (Sudan 12°47'N 30°46'E).

Nycticeinops schlieffeni Hill & Harrison 1987, Bul. Brit. Mus. Nat. Hist, Zool. 52: 254; new genus based on study of baculum.
Range. The first report of this species in Uganda was Kityo *et al.* (1994). The uncommon species occurs in Egypt and Arabia, Ethiopia to Senegal in dry areas S to Tanzania. Apparently replaced by sibling species *N. australis* in southern Africa. Fig. 36 displays the Ugandan distribution.
Eastern. Soroti (ROM 38054, 38351).
Nile. Zoka (Kityo & Kerbis 1996).
Measurements. (Soroti) HB 46; T 33-35; HF 7:8; E 12-13; FA 32.5; SK 13.7; XMST 8.0; XIO 3.9; CM^3 4.5-4.8; M^3M^3 6.2.
Despite close external resemblance of this species to some *Scotoecus* this species is distinguished by a sharp pointed tragus. Karyotypes of *Nycticeinops* were found to differ in Somalia (2N = 36, FN = 52, Ruedas *et al.* 1990) from S Africa (2N = 42, FN = 50, Rautenbach *et al.* 1993).

<u>*Scotoecus hirundo*</u> ssp?, Fig. 26E
Scotophilus hirundo DeWinton 1899, Ann. & Mag. Nat. Hist. 7 (4): 355; Gambaga (Ghana 10°31'N 0°22'W).
Range. Hayman & Hill (1971) gave the first record for Uganda. Despite much uncertainty over systematics of the genus, *S. hirundo* is the earliest species named, and seems to be a slightly smaller dark-winged taxon of wooded savannas from Senegal to Ethiopia; so far not known from northern D. R. Congo. Fig. 37 displays the Ugandan distribution.

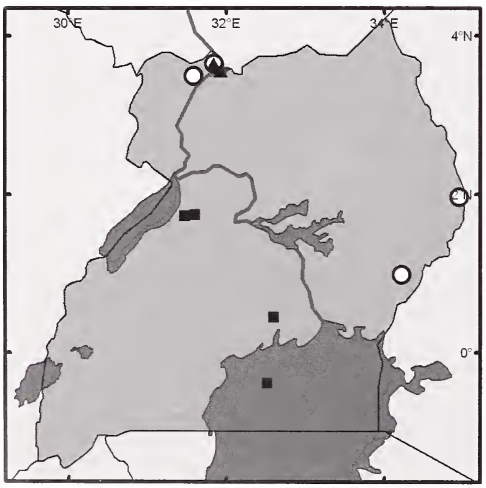

FIG. 37. Distribution of select Vespertilionidae: *Scotoecus hindei* (○), *Scotoecus albofuscus* (▲), *Scotoecus hirundo* (■). Shaded areas indicate lakes.

Western. Budongo (BMNH, Hill 1974; LACM); Busingiro (DAS).
Southern. 0.5 km S Ishasha Rd; Kigezi GR (FMNH 154076).
S Buganda. Bukasa I. (MSNG).
Central. Kabanyolo (DAS).
Measurements. (Budongo ♂) FA 31.5-32; SK 14.3; XZ 9.7; XMST 8.6; XIO 4.5-4.6; CM^3 5.1-5.2; M^2M^2 6.3-6.6. (Budongo ♀) FA 30-32; SK 13.0-13.4; XZ 9.6; XMST 8.3-8.5; XIO 4.4-4.7; CM^3 4.8-5.1; M^2M^2 6.3-6.6.

Hill (1974) monographed the genus, separating large *S. hindei hindei* and *S. hindei albigula* from smaller *S. hirundo*, with both species sympatric in Cameroon, Uganda, and Ethiopia. *S. hirundo* and *S. hindei* were considered conspecific by Robbins (1980) who noted that most of Hill's *S. hirundo* were ♀ (averaging smaller than ♂) and most of his *S. hindei* and *S. albigula* were ♂; Koopman (1975) and (1994) considered *S. albigula* and *S. hindei* both as subspecies of *S. hirundo*. Analysis of the same material by Taylor & VanderMerwe (1998) emphasized differences between all three taxa. Absence of dark-winged *Scotoecus* between Cameroon and Uganda makes it unsatisfactory to use W African subspecies names *S. h. hirundo* or *S. h. falabae* for small W Uganda material. Although differences in size are not great, it seems that larger *S. hindei albigula* coexist in NW Uganda with smaller *S. hirundo*, as well as with small white-winged *S. albofuscus*.

Kingdon (1974) gave breeding information for Budongo: 2 pregnant ♀ in early March, each with twins; also a lactating ♀ and a juvenile in May.

<u>*Scotoecus hindei albigula*</u>
Scotoecus hindei Thomas 1901 Ann. & Mag. Nat. Hist. 7 (7): 263; Kitui (Kenya 1°22'S 38°1'E). Description of new genus, new species.
Scotoecus albigula Thomas 1909, Ann. & Mag. Nat. Hist. 8 (4): 544; Kirui, 1830 m (Kenya 0°50'N 34°40'E).
Range. After some consideration (see *S. hirundo*) we follow Hill (1974) to unite *S. hindei* and *S. albigula* but to separate them from *hirundo*. Largen *et al.* (1974) seemed to have found coexistence of two forms in Ethiopia, as did Koopman (1986) in S Sudan, although Koopman (1994) united all three forms under *S. hirundo*. Hill (1974) recorded *S. hindei* from all E African countries, also Angola and Nigeria. Fig. 37 displays the Ugandan distribution.
Eastern. Nabumali (BMNH, Hill 1974).
Karamoja. Amudat (USNM).
Nile. 16 km E Moyo (ROM); W Madi (BMNH, Hill 1974).

Measurements. (Nabumali) FA 32.5; SK 14.2; XMST 9.2; XIO 4.7; CM^3 5.4; M^2M^2 6.5. (Amudat) HB 61; T 36; HF 9; E 9; FA 34; SK 14.2-14.4; XMST 9.2-9.3; XIO 4.8; CM^3 5.3-6.0; M^2M^2 7.1-7.5; C^1C^1 5.0. (W Madi Moyo; Nimule, Sudan;) HB 53-54; T 31-35; FA 34; SK 13.5-14.4; XZ 10.5; XMST 8.8-9.0; XIO 4.5-4.6; CM^3 5.2-5.3; M^2M^2 6.5-7.0. (16 km E Moyo) HB 53; T 31; HF 7; E 12; FA 30; SK 13.5; XZ 9.6; CM^3 5.0; M^2M^2 6.5.

Two specimens from Moyo and two from Amudat in both sexes show a 15 mm wide central band of white fur below as in typical *S. albigula*. A minute upper P immediate behind C^1 is common in *S. hindei* and *S. hirundo* but rare in *S. albofuscus*.

Scotoecus albofuscus woodi, Pl. 4

Scotophilus albofuscus Thomas 1890, Ann. Mus. Stor. Nat. Genova 1 (29): 84; Bathurst = Banjul (Gambia).

Scotoecus woodi Thomas 1917 Ann. & Mag. Nat. Hist. 8 (19): 280; Chiromo (Malawi 16°33'S 35°8'E).

Range. The species was first listed for Uganda by Kityo *et al.* (1994) without details. Hill (1974) showed a few records from W Africa and also near Lakes Nyasa and Tanganyika. The previous farthest north in E Africa was SE Kenya (Whittaker & Mumford 1978). Fig. 37 displays the Ugandan distribution.

Nile. Dufile (FMNH 149696); 16 km E Moyo (ROM 59139, 59140).

Measurements. (Moyo) HB 55; T 31; HF 8; E 10; FA 29-31; SK 13.3-14; XMST 8.4; XZ 9.6-10.2; CM^3 5.0-5.1; M^2M^2 6.5.

The present examples are markedly darker umber dorsally and ventrally than ones from Malawi. On the other hand those from Cameroon and west which have similar dark colored fur seem to have only that part of the wing beyond digit V in translucent white not white back to the elbow/knee as in the two from Moyo.

Scotophilus dinganii colias, Figs. 23H, 26G; Pl. 5

Vespertilio dinganii A. Smith 1833, S Afr. J. 2: 59; between Port Natal and Delagoa Bay, S Africa. See also Robbins (1978), Robbins *et al.* (1985), Lectotype from Durban.

Scotophilus nigrita DeWinton 1897, Ann. & Mag. Nat. Hist. 6 (20): 317, not of Schreber 1774.

Scotophilus nigrita colias Thomas 1904, Ann. & Mag. Nat. Hist. 7 (13): 207; Fort Hall = Muranga (Kenya 0°43'S 37°9'E).

Scotophilus leucogaster colias Koopman 1994, "Chiroptera" *in* Handbuch der Zoologie 8, part 60, p. 128.

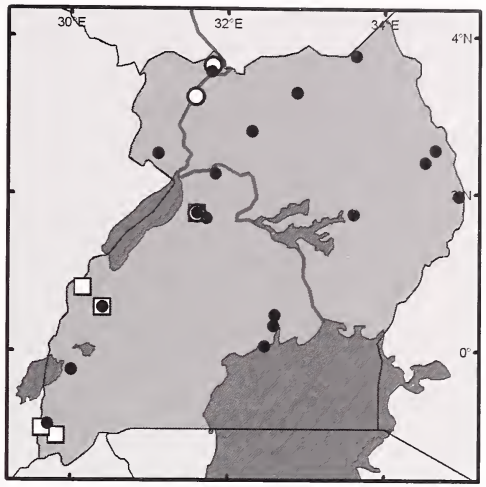

FIG. 38. Distribution of select Vespertilionidae: *Scotophilus nux* (□), *Scotophilus dinganii* (●), *Scotophilus nigritellus* (O). Shaded areas indicate lakes.

Range. Robbins *et al.* 1985, showed this species through most of Africa south of 10°N latitude. DeWinton (1897) first mentioned it from Uganda. Before 1978 nearly all references to it were under "*S. nigrita,*" the name proper to a much larger rarer W African species. Fig. 38 displays the Ugandan distribution.

Western. Budongo (FMNH, LACM, ROM, USNM; Robbins *et al.* 1985); Kibale = Kabala (LACM); Masindi (BMNH, Kityo & Kerbis 1996); Murchison NP (Williams 1967).

Southern. Near Kayonza Forest (Kingdon, map, 1974); Queen Elizabeth NP (Williams 1967).

Central. Entebbe (BMNH, DeWinton 1897; MSNG, DeBeaux 1922, Ogen-Odoi 1983, Robbins *et al.* 1985, Okia 1987); Kabanyolo (DAS); Kampala (Kingdon 1974).

Eastern. Soroti (ROM, Robbins *et al.* 1985).

Karamoja. Amudat (USNM); Kidepo N.P. (Williams 1967); Lotome (BMNH, Watson 1951); Moroto (BMNH, Dollman 1914, Kityo & Kerbis 1996).

Northern. Gulu (ROM, Robbins *et al.* 1985); Kitgum (BMNH, Kityo & Kerbis 1996).

Nile. 10 miles E Moyo (ROM, Robbins *et al.* 1985); near Nebbi (Kingdon, map, 1974).

Measurements. (Budongo, Moyo ♂) HB 74-85; T 57-62; HF 11-12; E 15-18; FA 53-55; SK 20.0-21.2; XMST 12.1; XZ 14.1-15; XIO 4.8-5; CM^3 6.9-7.0; M^2M^2 8.7-9.2. (Budongo ♀) HB 72-87; T 53-56;

HF 10-13; E 16-17; FA 55-56; SK 19.7-20.2; XZ 14.6; XMST 12.5; XIO 5.0; CM^3 6.7-7.0; M^2M^2 8.5-10.0.

Of two females from Kampala area in May, one was lactating, another was not pregnant but carried a heavy layer of fat (DAS); a juvenile in June/July from "Uganda" has FA 47, HF 13, III 34+13+16, CM^3 7 (ZMK). Okia (1987) found twin embryos in the right side of the uterus in Feb. near Entebbe and flying young there in May. Ogen-Odoi (1983) netted the species at Entebbe only from Feb. to Aug. Kingdon (1974) repeated practically all these observations for E Africa; described mother and newborn behavior and questioned whether there might be some displacement during Sept. to Jan. The species boldly lives in city house roofs.

Scotophilus nux

Scotophilus nigrita nux Thomas 1904, Ann. & Mag. Nat. Hist. 7 (13): 206; Efoulen, Cameroon (*nigrita* sensu Thomas 1904, p. 207; = *dingani*, not *nigrita* Schreber 1774).

Scotophilus nux Thomas 1915, Ann. & Mag. Nat. Hist. 8 (16): 468.

Range. Robbins *et al.* (1984) first recorded this species for Uganda. There are also specimens from forest in northern D. R. Congo (USNM), and Kakamega, W Kenya (LACM, ROM, USNM). Fig. 38 displays the Ugandan distribution.

Western. Budongo (LACM, ROM); Ntandi (LACM); Kibale (Monadjem in litt. 2004).

Southern. Impenetrable Forest (LACM); Omubiyanja Swamp 1850 m (FMNH 160378-160384).

Measurements. (♂ Budongo, Impenetrable) HB 75-84; T 42-51; HF 10-14; E 14-20; FA 52-54; SK 19.8-20.2; XZ 14-14.8; XMST 12; XIO 5.3; CM^3 7.0-7.1; M^2M^2 9.0. (♀ Ntandi) HB 77; T 54; HF 11; E 14; FA 54; SK 20.0; XZ 14.8; XMST 12.0; CM^3 7.0; M^2M^2 9.0.

Measurements hardly seem to support separation of ROM 59245 as "*S. nucella*" (contra Robbins 1983) and it has here been included with *S. nux*. Presence of both typical *S. dingani* and typical *S. nux* together at Budongo means that the latter is unlikely to be a subspecies of the former, nor both subspecies of *S. leucogaster* (contra Koopman 1994). Either *S. nux* is a separate species as given here, or (less likely) it could be a melanic mutant occurring in dense rainforests. Ruedas *et al.* (1990) found only small genetic differences between *S. nux*, *S. dingani*, and *S. viridis*, and all are 2N = 36, FN = 50. Monadjem (in litt. 2004) studied echolocation by *S. nux* at Kibale.

Scotophilus ? nigritellus

Scotophilus nigritellus DeWinton 1899, Ann. & Mag. Nat. Hist. 7 (4): 355; Gambaga (Ghana 10°31'N O°22'W).

?Scotophilus nigrita leucogaster Koopman 1975, Bul. Amer. Mus. Nat. Hist. 154, p. 414; S Sudan (not *S. nigrita* Schreber 1774 = *S. gigas* Dobson 1875).

?Scotophilus nigritellus Koopman 1984, Proc. 6 Int'l. Bat Res. Conf., Ife, Nigeria p. 104.

Scotophilus viridus nigritellus Robbins *et al.* 1985, Ann. Mus. Roy. Afr. Centr. 8vo (Zool.) 246: 73.

Scotophilus borbonicus nigritellus Koopman 1994, "Chiroptera" *in* Handbuch der Zoologie 8. part 60, p. 128.

Range. Theodor (1968) described a *Nycteribiidae* parasite on "*Scotophilus leucogaster altilis*" from Metu Uganda (BMNH). We are inclined not to include this taxon in S and E African *S. viridis* (contra Robbins *et al.* 1985) leaving the presumed range of *S. nigritellus* as N equatorial from Gambia to Ethiopia. Fig. 38 displays the Ugandan distribution.

Western. Budongo (HZM, LACM, ROM).

Nile. Metu (BMNH, Theodor 1968); Zoka (*leucogaster* Kityo & Kerbis 1996).

Measurements. (♂ Budongo) HB 67; T 44-50; HF 8-10; E 14-15; FA 45-50; SK 17.0-17.6; XZ 12.5; XMST 10.6-10.7; XIO 5.2; CM^3 6.0-6.1; M^2M^2 7.8-7.9. (♀ Budongo) HB 66-73; T 46-53; HF 9-10; E 13-14; FA 43-48; SK16.8-17.0; XZ 12.6-13.1; XMST 11.0; CM^3 6.0-6.3; M^2M^2 8.0.

Kingdon 1974, 295 under *Scotophilus leucogaster* seems to have referred to this species specimens from near Nakasongola (N Buganda), and near Kampala which we have not seen. Also there is material in ROM from the W Kenya border (near Tororo, Uganda). We have seen no evidence of typical *S. viridis* (sensu Robbins 1985) as listed by Peterson *et al.* (1995, 107) from Uganda. Differing arrangements in the genus *Scotophilus* by Koopman (1975, 1984), Robbins *et al.* (1985) and Hill (1980) all omitted reference to a sympatric dark-winged taxon smaller than *S. dingani*. In Uganda Kingdon (1974) took 4 pregnant ♀ Feb. and Mar., each with twins.

Glauconycteris argentata

Chalinolobus (Glauconycteris) argentatus Dobson 1875, Proc. Zool. Soc. Lond., p. 385; Mt Cameroon.

Glauconycteris argentatus Miller 1907, Bul. U.S. Ntl. Mus. 57: 221.

Chalinolobus (Glauconycteris) argentatus Koopman 1971, Amer. Mus. Nov. 2451 (reestablishment in Chalinolobus (after Ryan 1966) on dental characteristics).

Glauconycteris argentata Hill & Harrison 1987, Bull. Br. Mus. Nat. Hist. (Zool.) 52 (reestablishment in *Glauconycteris* on baculum characteristics).
Range. Peterson & Smith (1973) listed this species from Uganda, without details and Kingdon (1974) mapped it from Uganda. It has also been reported in northeastern D. R. Congo (Fain 1953, Hayman *et al.* 1966), Kenya (Aggundey & Schlitter 1984) and there is a specimen from Kakamega in PCM, also Rwanda (Baeten *et al.* 1984). Fig. 39 displays the Ugandan distribution.
Western. Budongo (FMNH 152695 & 152697, LACM, ROM); Busingiro (DAS).
Southern. Bwindi (LACM 35532).
Measurements. (Budongo) HB 44-59; T 38-50; HF 6-9; E 10-12; FA 37-42; SK 10.9-12.3; XZ 8.3- 8.5; XMST 7.5-7.8; CM^3 3.8-4.0; M^2M^2 5.3- 5.4.

While there may still be new evidence (genetic information for example) for the choice of genus for these African bats, we currently follow Hill & Harrison (1987), Menu (1987), and Koopman (1995) to use *Glauconycteris*. Also apparently baculum differences (Hill & Harrison 1987) do not support uniting *G. argentata* with *G. poensis* (see Koopman 1971).

Glauconycteris ? alboguttatus
Glauconycteris alboguttatus J. Allen 1917, Bull. Amer. Mus. Nat. Hist. 37: 449; Medje (NE D. R. Congo 2°26'N 27°17'E).

FIG. 39. Distribution of select Vespertilionidae: *Glauconycteris gleni* (□), *Glauconycteris egeria* (▲), *Glauconycteris argentata* (●), *Glauconycteris albogutatta* (■). Shaded areas indicate lakes.

Range. *G. alboguttatus* is known with confidence from very few specimens, none previously from Uganda. Hayman & Hill (1971) listed most of the likely examples and rejected Koopman's (1965) former suggestion that it might be the same as *G. humeralis*. FA quoted as from that species ranges 35-42; SK 13.1-13.2. Peterson & Smith (1973) covered an additional specimen from Cameroon. Another specimen which we are inclined to accept is PCM 86658 from Yalasembe (D. R. Congo 2°35'N 21°51'E), FA 39; SK 12.5; XZ 9.5; XMST 8.3; XIO 4.4; CM^3 4.3; M^2M^2 6.3. It differs from the Type in having tricolor fur above and below with medium brown tips, but has the typical white pattern, the flight membranes are dark but the ears are medium brown; the upper inner incisors are stout and bicuspid. Fig. 39 displays the Ugandan distribution.
Southern. Itama (LACM 35532).
Measurements. HB 52; T 45; FA 44; SK 12.6; XZ 9.8; XMST 8.5; CM^3 4.4; M^2M^2 6.3.

In general color our bat resembles the Yalasembe example (above), but lacks any typical white shoulder spots and flank lines. In fact it looks only a little darker than *G. argentata* from W Uganda however the skull is distictly wider and larger, and the incisors heavier.

Glauconycteris egeria ? ssp., Figs. 23M, 26C
Glauconycteris egeria Thomas 1913, Ann. & Mag. Nat. Hist. 8 (11): 144; Bibundi (Cameroon 4°16'N 8°56'E).
Glauconycteris egeria Peterson & D. A. Smith 1973.
Glauconycteris superba Kingdon 1974, p. 300 (not of Hayman 1939, 1947).
Range. The form briefly described by Peterson & Smith (1973) is certainly one of the most striking bats in Uganda, resembling Hayman's *G. superba* in black and white pattern, but smaller. Other than the Type of *G. egeria*, there are three specimens believed conspecific in ROM from s Cameroun, these are dark brown but with white pattern as in the present form. Fig. 39 displays the Ugandan distribution.
Western. Budongo (LACM 28254, ROM 46641, ROM 59138).
Measurements. (Budongo) HB 45-47; T 38-39; HF 8-9; E 15-16; FA 38; SK 13.0-13.1; XZ 8.6-9.0; XMST 8.3-8.4; XIO 4.2; CM^3 4.0; M^2M^2 5.7-6.1. (Cameroon BMNH 12.12.13.3, Type) HB 43; T 41; E 13.5; FA 38; SK 13.3; XMST 8.1 (*fide* Peterson, not 7.9 as in Rosevear 1965) XIO 3.8; CM^3 4.3; M^2M^2 5.8.

Differences from the Type have been reconciled by Peterson in London with the new material in hand (J. Eger, pers. comm.). The Type skull was remeasured, and the ears of the partly decomposed Type were compared with the fresh material. However, the color and pattern (Thomas 1913, Rosevear 1965) are plainly different, and the incisors are more clearly bifid in the Type than in the Uganda ones. Based on other species recently seen it seems a fair interpretation that color may vary in a given species from tricolor medium brown to very dark brown or even black, and that white spots are also optional (see Hayman & Jones 1950). Incisor cusps undoubtedly vary (see Koopman 1971: 8). Even FA seems less reliable than commonly supposed (see Hayman & Hill 1971: 48, under *alboguttatus*).The skull measurements seem somewhat variable too. With this in mind, we provisionally put ROM, and LACM *egeria* ssp? (and also LACM *alboguttatus*) on the Uganda list.

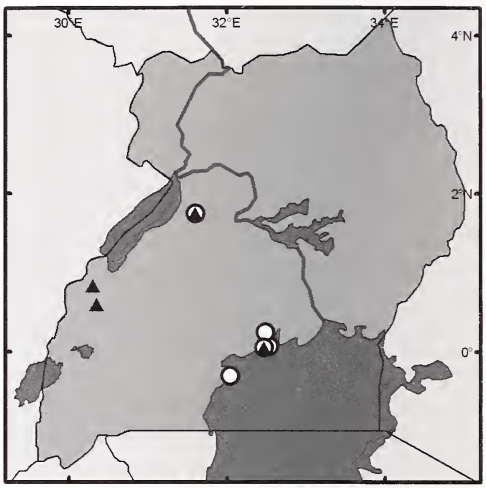

FIG. 40. Distribution of select Vespertilionidae: *Glauconycteris humeralis* (▲), *Glauconycteris variegata* (O). Shaded areas indicate lakes.

<u>*Glauconycteris humeralis*</u>, Fig. 23L

Glauconycteris beatrix Thomas 1913, Ann. & Mag. Nat. Hist. 8 (11): 145; Entebbe, Uganda (not of Thomas 1901 from Equatorial Guinea).

Glauconycteris humeralis J. A. Allen 1917, Bul. Amer. Mus. Nat. Hist. 37: 448; Medje (D. R. Congo 2°25'N 27°18'E).

Glauconycteris poensis humeralis Hayman & T. Jones 1950, Ann. & Mag. Nat. Hist. 12 (3): 763.

Glauconycteris beatrix humeralis Koopman 1971 Amer. Mus. Nov. 2451, 8.

Range. Baculum differences (Hill & Harrison 1987) support the species level distinction between *humeralis* and *beatrix* or *poensis* (but seem to link the latter two). Thomas (1913: 145) listed a specimen from Entebbe as *beatrix*. Fig. 40 displays the Ugandan distribution.

Western. Budongo (ROM 46461, LACM 28366, FMNH 152703, 165168); Kibale Forest NP (FMNH); Wasa River (BMNH 30.11.11. 173-175).

Southern. Bwindi, 7000' (LACM 35533).

Central. Entebbe (BMNH 6.3.8.13, Thomas 1913: 145).

Measurements. (Budongo, Kabale, Wasa, Bwindi, Entebbe) HB 44-50; T 38-50; HF 6-7; E 10-11; FA 36-39; SK 10.8-11.1; XZ 8.2-8.4; XMST 7.5; XIO 4.4; CM^3 3.3-3.9; M^2M^2 4.8-5.4.

One of the Wasa specimens identified by Hayman as *humeralis* had its baculum extracted and drawn by Hill & Harrison (1987); it is a slender wedge-shaped bone quite different from the wide V baculum of a Cameroon bat identified as *G. beatrix* (the latter described by Hayman in Sanderson 1940 as FA 35; SK 11.6; skull detail as in the Type) without further criteria to apply we are unable to distinguish two species in our Uganda sample and wonder in fact whether true *beatrix* occurs as far east as Uganda. The presence of white shoulder and flank spots seems an unsatisfactory character. Upper inner incisors of Uganda specimens are moderately to strongly bifid as in the Types of both *beatrix* and *humeralis*. Heller *et al.* (1994) described specimens of *G. poensis* and what they identified as *G. beatrix* from northeastern D. R. Congo and showed a baculum of each; that from *beatrix* is a very slender V and seems to us more like the Wasa *humeralis* than Cameroun *beatrix* of Hill & Harrison (which resembles a small-scale *poensis*). As topotype bacula of neither *beatrix* nor *humeralis* have ever been studied, and karyotypes are unknown, all these identifications must be regarded as somewhat tentative.

<u>*Glauconycteris variegata variegata*</u>, Pl. 5

Scotophilus variegatus Tomes 1861, Proc. Zool. Soc. Lond. 36; Otjihoro (Namibia 17°54'S 15°38'E).

Glauconycteris papilio Thomas 1905, Ann. & Mag. Nat. Hist. 7 (15): 77; Entebbe, Uganda (Koopman 1994 considered *papilio* a synonym of *G. v. variegata*).

Range. The species was listed by DeWinton 1897, Ann. & Mag. Nat. Hist. 6 (20): 317; from the example which Thomas later took as the Type of *papilio*. Today specimens are known from savanna woodland through most of Africa S of the Sahara including S Sudan (McLellan 1986), northeastern D. R. Congo (Hayman *et al.* 1966), Kenya (Aggundey & Schlitter 1984). Fig. 40 displays the Ugandan distribution.
Western. Budongo (LACM, ROM).
S Buganda. Bukakata (FMNH 149694, Kityo & Kerbis 1996).
Central. Budo (HZM); Bugabo (Addy *et al.* 1978); Entebbe (AMNH, BMNH 99.8.4.14 Type of *papilio*).
Measurements. (Budongo, Entebbe) HB 57-66; T 43-51; HF 8-9; E 12-13; FA 40-43; SK 12.8-13.5; XZ 10.1-11.5; XMST 9.1-9.2; XIO 4.5-4.8; CM^3 4.4-5.0; M^2M^2 6.9-7.0.

Kingdon (1974) reported sexually active ♂ July and October from S Uganda, and that stomachs contained moth remains.

FIG. 41. Distribution of select Vespertilionidae: *Mimetillus moloneyi* (■), *Laephotis wintoni* (●). Shaded areas indicate lakes.

Glauconycteris gleni, Fig. 23N
Glauconycteris gleni Peterson & Smith 1973, Roy. Ont. Mus. Life Sci. Occas. Pap. 22: 3; Lomie (Cameroon 3°9'N 13°35'E).
Range. Peterson & Smith refer (p. 7) to specimens also from Malabigambo, Uganda. Subsequently found, PCM 86664 from Yalasemba (D. R. Congo 2°35'N 21°51'E) helps to fill the void between Cameroon and Malabigambo. Fig. 39 displays the Ugandan distribution.
S. Buganda. Malabigambo Forest (LACM).
Central. Kingdon (1974) reported it also from Kampala; we have been unable to obtain any information about it.
Measurements. HB 52; T 45-47; HF 9; E 14-15; FA 40-42; SK 14.2-14.3; XZ 9.6-10.0; XMST 8.3; XIO 4.4; CM^3 4.4-4.6; M^2M^2 6.3-6.5.

This recently discovered species is, as Peterson & Smith (1973) said, intermediate in most characteristics between *argentata* and *variegata*; LACM 28355 and 28356 have whitish heads as in some *variegata*, a variation not noted in the original description. Kingdon (1974) mentions that two January specimens were lactating. Aellen (1952) under *Glauconycteris argentata* described from Kribi (Cameroon 2°57'N 9°56'E), what seems to be *gleni*, one of which, contained an advanced embryo with a similar wing color and pattern.

Mimetillus moloneyi moloneyi, Figs. 23J, 26H, Pl. 4
Vesperugo (Vesperus) moloneyi Thomas 1891, Ann. & Mag. Nat. Hist. 6 (7): 528; Lagos, Nigeria.
Mimetillus moloneyi Thomas 1904, Abstr. Proc. Zool. Soc. Lond. pp. 10, 12; and Proc. Zool. Soc. Lond. 1904 pt. 2, p. 188.
Range. Kingdon (1974) referred to ten specimens from mapped localities in Uganda (without locality names). Fig. 41 displays the Ugandan distribution.
Western. Budongo (ROM); Mwela (LACM); Ntandi (LACM).
Southern. Impenetrable Forest 2377 m (LACM 52065); near Kabale (mapped by Kingdon 1974).
Central. Budo (HZM).
Nile. 16 km E of Moyo (SMF, Koch-Weser 1984).
Measurements. (Budongo) HB 53; T 30-31; HF 7; E 11; FA 29; SK 13.2-13.7; XZ 9; XMST 8.9; CM^3 4.8; M^2M^2 6.8.

There are specimens from W Kenya (Aggundey & Schlitter 1984), which indicate that *Mimitellus* may be found also through E Uganda woodlands and forests. Kingdon (1974) citing reproductive states of ten examples from Uganda, found pregnancies in January and June, and a subadult in December, also speculated on the behavior of this uniquely short-winged species.

MOLOSSIDAE

Medium-sized to small insectivorous bats with squarish wrinkled muzzle (often called "mastiff-bats" or "bulldog-bats"); the comparatively wide mouth and powerful jaw may at times handle large armored prey such as beetles. Fleshy ears tend to droop over the muzzle and may be joined by a thick skin bridge between them. A long, very thick tail supports all the tail-web (uropatagium), which loosely slides up and down rather as a sail on a mast, hence the usual name "free-tailed bats." Sturdy hind legs help them to scramble within restrictive, crowded, sometimes suffocatingly hot day-shelters, and the toes bear strange thick bristles. Long narrow wings enable aerial swooping for insects, but when landed the wings fold considerably, with a rotary motion of fingers III and IV and a reflex fold of the tip, so the wings are less of a handicap in climbing or scampering. *Otomops*, *Myopterus*, and *Mormopterus* are distinctive, but the remaining forms have had many interpretations. Although sometimes put into genera *Xiphonycteris* and *Tadarida* (the latter with subgenera *Chaerephon*, *Tadarida*, *Mops*) we prefer to follow the arrangement of Freeman (1981) and Koopman (1994).

Tadarida-front of palate with wide notch, ears separate, M^3 large. *Chaerephon*-palate of all except two of our species without a notch but in four species the adjoining palatal foramina (= holes) are large; ears bridged by fleshy band; M^3 large; scent glands around the base of the tail in *C. bemmeleni*.

Mops-palate not notched (except in *M. nanulus*, *M. demonstrator*, *M. thersites*), the ears are bridged, M^3 is slender except in *condylurus*; scent glands open around the base of the tail in ♂ *M. demonstrator*. Breeding ♂ (and rarely ♀) of certain species develop, in particular -seasonal molts, glandular brushes on the crown, partly pocketed behind the fleshy bridge between the ears. These occur in most *Mops* (except *midas*) and in *Chaerephon* (notably in *chapini*, *pumilus*, and *major*). Also naked flanks dorsally and/or naked rumps with long covering bristles occur in some *Mops*. Because of their irregular occurrence these modifications are not featured in the key below (Allen *et al.* 1917, Braestrup 1933). Rusty colored phases (aberrants) are not uncommon in this family.

Key to Uganda Species (*underlined italics*) and others likely to be found there (*regular italics*).

1a) Ear (E) 22- 42 extends beyond nostril when pressed forward; Forearm (FA) 56-74.....(2)

1b) E not surpassing nostril; FA < 60; Skull (SK) < 27.5.....(4)

2a) E > 32; tragus vestigial; FA > 62; back and belly fur in remarkable black and white patterns; SK about 27; zygoma with very high lobe .....*Otomops martiensseni* Fig. 42A

2b) E < 32; tragus large enough to be seen easily; FA 56-66.....(3)

3a) Ears quite separated; fur above dark brown, white nape patch, below pure white; FA 56-63; SK 22.5-23.5.....*Tadarida lobata* Fig. 42D

3b) Ears joined by fleshy bridge, tragus moderate in size; fur gray above and below; FA 57-66; SK 24.0-29.0 .....*Mops midas* Fig. 42E, E

4a) Ears separate, not surpassing nostrils.....(5)

4b) Ears united by fleshy bridge, not surpassing nostrils.....(9)

5a) FA < 56.....(7)

5b) FA > 56.....(6)

6a) FA 56-62; overall gray or brown, irregular white midline below; SK 22.0-24.4; lower first premolar (P_1) half the height of P_2 .....*Tadarida fulminans*

6b) FA 61-66; similar; SK 23.5-26.0; P_1 and P_2 same height .....*Tadarida ventralis*

7a) FA 45-55; SK 18-22 .....*Tadarida aegyptiaca* Fig. 42F, F

7b) FA < 40.....(8)

8a) Wing whitish; FA 33-37; ears pale and widely separated; fur above with dark brown tips, below white .....*Myopterus whitleyi* Fig. 42B

8b) Outer half of wing and tail web pale, inner half dark, FA with sharp scales; fur above gray, below pure white.....*Platymops setiger* Fig. 42C

9a) FA < 32; dark with pale tip; fur above dark brown,below gray SK 15.5-17.3; front of palate notched.....*Mops nanulus*

9b) FA > 32.....(10)

10a) Crown distinctly blackish; back dark brown, pale below with white axilar flank-stripe; FA 40-44; scent glands; SK 20-22 .....*Mops demonstrator* Fig. 42M

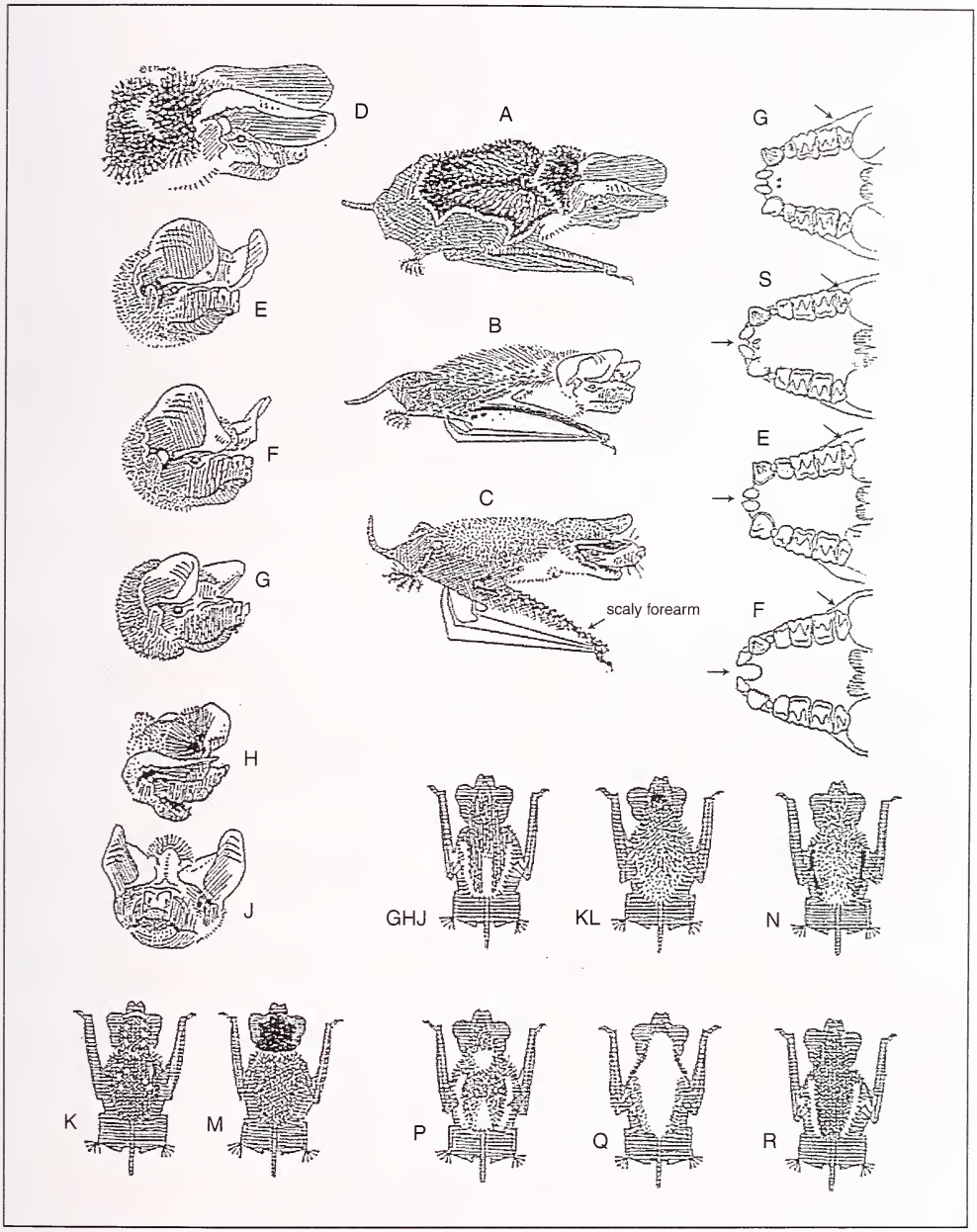

FIG. 42. Molossidae: A – *Otomops martiensseni*; B – *Myopterus whitleyi*; C – *Mormopterus setiger* (scales on forearm); D – *Tadarida lobata*; E – *Mops midas* (head, palate); F – *Tadarida aegyptiaca* (head, palate); G – *Mops condylurus* (head, palate esp. M^3); H – *Chaerephon pumilus* ♂ (showing frontal brush); J – *Chaerephon major* ♂ (showing frontal brush); G, H, J – *Mops condylurus*, *C. pumilus*, *C. major* (venter); K – *Chaerephon bivittatus* (dorsum); K, L – *Chaerephon bivittatus*, *C. ansorgei* (venter); M – *Mops demonstrator* (dorsum); N – *Mops thersites* (venter); P – *Chaerephon bemmeleni* (venter); Q – *Mops brachypterus* (venter); R – *Chaerephon nigeriae* (venter); S – *Chaerephon aloysiisabaudiae* (palate).

10b) Crown not distinctly different from back..... (11)
11a) Axilar flank-stripe black but belly pale gray; back and wings dark; FA 39-42; SK 17-21; front of palate notched..... *Mops thersites* Fig. 42N
11b) Neither axilar stripe black, nor crown contrasting with back...(12)
12a) Belly all pure white (or slightly orange); FA 34-41..... (13)
12b) Belly pale or dark but not pure white or pale orange..... (14)
13a) Belly all pure white/very pale orange (also see 10a, above); FA 35-39; SK 18.0-21; palate notched ..... *Mops brachypterus* Fig. 42Q
13b) Belly pure white, back pure gray or rust; FA 34-39; tall bicolored ♂ brush; SK 15-17; palate usually entire, foramina large ..... *Chaerephon chapini*
14a) Belly almost as dark as back, axilar flankstripe same color..... (15)
14b) Belly medium or pale, contrasting with back..... (17)
15a) Belly almost as dark as back, axilar stripe same; FA 52-59; SK 24.9-27.4; XIO > 8.0..... *Mops congicus*
15b) FA < 54; SK < 25 (usually < 24); XIO < 6.O; body all dark..... (16)
16a) SK 23.5-25.1; palate not notched, slender M^3..... *Mops trevori*
16b) SK 20.4-22.1; palate not notched, big foramina; big M^3 ..... *Chaerephon aloysiisabaudiae* Fig. 42S
17a) Chin blackish contrasting with throat (sometimes in 16 b) too..... (18)
17b) Chin about same tone as throat and belly..... (19)
18a) Head and shoulders with conspicuous pattern of white spots; FA 42,5-52; SK 19.3-25.0; palate not notched but large foramina, M^2M^2 > 8.4; M^3 large ..... *Chaerephon bivittatus* Fig. 42K, K
18b) Head and shoulders usually plain or a few random spots; FA 43-49; SK 18.3-20.6; palate usually notched, M^3 large; M^2M^2 < 8.4 ..... *Chaerephon ansorgei* Fig. 42L
19a) Axillar and belly pale brown; FA 42-47; SK 17.8-19.4 ..... *Chaerephon russatus*
19b) Axillar stripe white, contrasting with belly as dark as back; FA 44-51; SK 19.0-20.1.. *Chaerephon nigeriae* Fig. 42R
19c) Axilar stripe white but belly not white only paler than back.....(20)
20a) Above dark brown, belly pale, mid-ventral white; wings dark; FA 43-51; SK > 19.4; M^3 large ..... *Mops condylurus* Fig. 42G, G
20b) As above but SK < 19.4.....(21)
21a) Body color as *M. condylurus*; but wings pale or dark, FA 35-41; SK 15.6-17.0; dorsal profile sinuous, palate entire, no foramina ..... *Chaerephon pumilus* Fig. 42H, H
21b) FA 39-48; SK 16.5-19.0..... (22)
22a) Mid-abdomen pale patch extends unbroken to chest; wings pale or dark; FA 39-48; adult ♂ noticeable glands each side of anus; SK 16-19; dorsal profile very flat, large foramina..,..... *Chaerephon major* Fig. 42J, J
22c) Throat and mid-abdomen pale patches separated by dark zone; FA 41-48; SK 16.5-18.9; dorsal profile arched, palate notched ..... *Chaerephon bemmeleni* Fig. 42P

Otomops martiensseni, Fig. 42A

Nyctinomus martiensseni Matschie 1897, Arch. Naturgesch. 63: 84; Magrotto Plantation (Tanzania 5°7'S 38°45'E).

Otomops martiensseni Thomas 1913, J. Bombay Nat. Hist. Soc. 22: 91; new genus, specimen from Poko (northeastern D. R. Congo).

Otomops icarus Chubb 1917, Ann. Durban Mus. 1: 433; Durban, S. Africa (used as species identity of Uganda specimen, Peterson *et al.* 1995).

Range. Although uncommon in collections, this species has been found widely from Durban north to Djibouti west to Ghana and Angola. Large colonies occur in some remote volcanic caves. It was not taken in Uganda until 1968, and first listed for the country by Kityo *et al.* (1994). Specimens from Kenya, Rwanda, and eastern D. R. Congo were listed by Aggundey & Schlitter 1984, Hayman *et al.* 1966, Monfort 1992. Fig. 43 displays the Ugandan distribution.

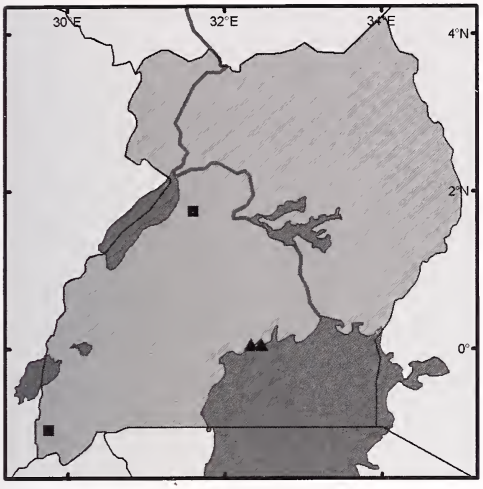

FIG. 43. Distribution of select Molossidae: *Myopterus whitleyi* (▲), *Otomops martiensseni* (■). Shaded areas indicate lakes.

Western. Budongo (ROM 46695, Peterson *et al.* 1995: 180).
Southern. Ruhiza 2286 m (LACM 35538).
Measurements. (Budongo) HB 92; T 44; FA 65; HF 13; E 37; WTG 30; SK 26.0; XZ 13.4; XBC 12.9; XIO 5.6; CM^3 9.9; M^2M^2 10.0.

<u>*Myopterus whitleyi*</u>, Fig. 42B
Mormopterus whitleyi Scharff 1900, Ann. & Mag. Nat. Hist. 7 (6): 569; Benin City (Nigeria 6°19'N 5°41'E).
Eomops whitleyi Thomas 1905, Ann. & Mag. Nat. Hist. 7 (16): 572.
Myopterus whitleyi Thomas 1915, Ann. & Mag. Nat. Hist. 8 (16): 468.
Range. This rare bat is clearly a forest species, now known from Ghana to Uganda and southern D. R. Congo. The single one, and then four, taken from two locations in central Uganda in 1907 and listed without comment by DeBeaux (1922) remain the only Uganda specimens. Possibly deforestation since then has destroyed the only habitat suitable for a very susceptible species, but elsewhere examples (two and four together) were taken in a house (Cabrera & Ruxton 1926), and two in a rubber-packing shed (Sanderson 1940), suggest some ecological flexibility. Fig. 43 displays the Ugandan distribution.
Central. Entebbe (DeBeaux 1922; MCG, BMNH, MNHN, ZMB; Kock in litt. 1994).
N Buganda. Bussu (DeBeaux 1922, MCG).
Measurements. (Rosevear 1965) HB 56-66; T 25-33; FA 33-36; SK 17.8-19; XZ 9.8-10.5; XMST 8.9-9.9; CM^3 6.3-6.6; M^3M^3 7.0-8.0.

<u>*Tadarida aegyptiaca*</u>, Fig. 42F, F
Nyctinomus aegyptiacus E. Geoffroy St. Hilaire (1818) "Description de l'Egypte: Mammiferes" 2: 128; Giza (Koopman 1975, p. 422).
Tadarida aegyptiaca Hill & Carter 1941, Bul. Amer. Mus. Nat. Hist. 78: 54.
Range. Very widespread in dry hot areas from Egypt to Cape Town and Angola, recently discovered in Nigeria and Morocco. Several large colonies are well known in s Kenya, but it seems to have been first noted from Uganda by Kityo (1994). Fig. 44 displays the Ugandan distribution.
Karamoja. Amudat (ROM); Mount Moroto 1524 m (ROM).
Measurements. (Amudat, Mt Moroto) HB 75-85; T 40-45; HF 8-10; E 19-21; FA 48-50; WTG 18-21; SK 20.0-21.1; XZ 12.5-12.8; XBC 11.0-11.3; CM^3 7.5-8.0; M^2M^2 8.5; C^1C^1 5.0-5.4.

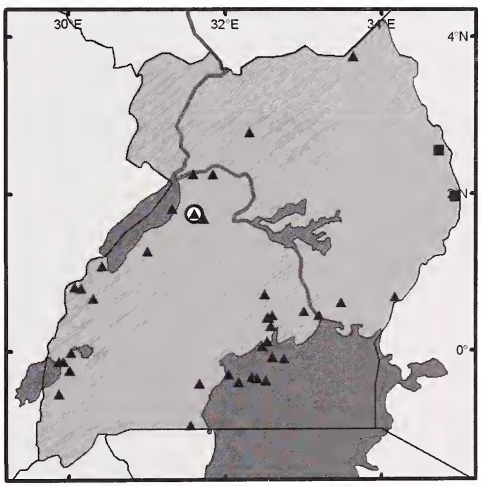

FIG. 44. Distribution of select Molossidae: *Tadarida aegyptiaca* (■), *Chaerephon pumilus* (▲), *Chaerephon chapini* (O). Shaded areas indicate lakes.

<u>*Mops midas*</u>, Fig. 42E, E
Dysopes midas Sundevall (1843), Kongl. Svenska Vetens. Akad. Handl. 1842, p. 207; Bahr el Abiad (Sudan 11°45N 33°30E) (see Kock 1969, p. 154, and Koopman 1975, p. 429).
Nyctinomus cestoni Thomas & Doria (1886) (not Savi 1825), Ann. Mus Civ. Genova (s2) 4: 201.

FIG. 45. Distribution of select Molossidae: *Mops demonstrator* (△), *Mops trevori* (●), *Mops midas* (□). Shaded areas indicate lakes.

Not *Dysopes rupelii* Temminck 1827 (= *Tadarida teniota*) as listed by Allen 1939; not Nyctinomus ventralis Heuglin 1861 (= *Tadarida ventralis*) also in Allen 1939.

Range. This species is widespread but local through the savannas of Africa from Morocco to Eritrea south to Botswana and occurs in neighboring Sudan, Rwanda, D. R. Congo, and Kenya. Kingdon (1974) detailed its biology in Uganda. Fig. 45 displays the Ugandan distribution.

Western. Budongo (AMNH).

Central. Budo (HZM).

Kingdon (1974) brought together his own observations from Kampala area and others in the literature on habits and breeding.

Special Literature. Dunlop (1999).

Mops congicus

Mops congicus J. A. Allen 1917, Bul. Amer. Mus. Nat. Hist. 37: 467, plate LIV (correction); Medje (D. R. Congo 1°55'N 27°15'E).

Range. Peterson (1972) reviewed *congicus* and its relatives, finding this species in only three equatorial forests from Cameroon to Uganda. Other finds are since recognized from Nigeria and Ghana. Fig. 46 displays the Ugandan distribution.

Western. Budongo (HZM, LACM, ROM).

Measurements. (Budongo) HB 86-101; T 42-51; FA 53-58; E 20-25; HF 13-16; WTG 43-62; SK 25.0-27.4; XZ 14.8-16.2; XMST 13.5-14.6; XIO 8.5-9.3; CM^3 9.3-10.2; M^3M^3 10.2-11.5; C^1C^1 7.2-8.1.

In addition to the information in Peterson (1972) relating mostly to Uganda specimens of *congicus*, an account of its breeding is found in Kingdon (1974).

Mops trevori

Mops trevori J. A. Allen 1917, Bul. Amer. Mus. Nat. Hist. 37: 469, pl. XLVIII; Faradje (D. R. Congo 3°44'N 29°43'E).

Mops niangarae J. A. Allen 1917 (ibid.), p. 468; Niangara (D. R. Congo 3°43'N 27°52E).

Range. Peterson (1972) claimed that the original description of *niangarae* with separated ears was an error due to the artificially removed fleshy bridge across the forehead by an overzealous taxidermist, and this is now generally accepted. He reviewed the species and found it in forest edges in W Uganda and northeastern D. R. Congo. DeBeaux (1922) sent one to BMNH. Fig. 45 displays the Ugandan distribution.

Western. Budongo (ROM, LACM); Semliki Plains (BMNH, Kityo & Kerbis 1996).

N Buganda. Bussu (DeBeaux 1922, MSNG; BMNH).

Nile. Metu (BMNH, ROM; Hayman & Hill 1971, Peterson 1972, Kityo & Kerbis 1996).

Measurements. (Metu, Budongo) HB 83-91; T 34-42; HF 11-15; E 18-25; WTG 46; SK 22.9-25.0; XZ 14.3-15.0; XIO 4.7-5.2; XMST 13.5-15.0; CM^3 8.7-9.0; M^3M^3 10.1-10.5.

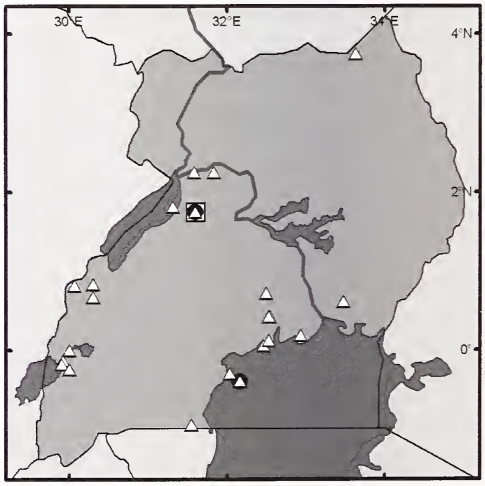

FIG. 46. Distribution of select Molossidae: *Mops brachypterus* (●), *Mops condylurus* (△), *Mops congicus* (□). Shaded areas indicate lakes.

Mops condylurus, Fig. 42G,G
Nyctinomus condylurus A. Smith 1833, S. Afr. J. 2: 54; Port Natal (= Durban, S. Africa).
Nyctinomus angolensis Peters 1870, J. Sci. Math. Phys. Nat. Lisboa (s1) 3: 124; Quenza (= Cuanza River, Angola 9°20'S 13°E).
Mops (Allomops) osborni J. A. Allen 1917, Bul. Amer. Mus. Nat. Hist. 37: 473; as *Chaerephon (Allomops) osborni* (lapsus) in description of subgenus, p. 470; Kinshasa, D. R. Congo.
Chaerephon angolensis sabaudiae DeBeaux 1922: 371 (not Festa) see Lanza & Harrison 1963.
Tadarida (Mops) condylura Ellerman *et al.* 1953: 69.
Range. DeBeaux 1922 was probably the first to record this widely occurring species in Uganda, although he confused it with Festa's *aloysiisabaudiae* and abbreviated that name. *M. condylurus* frequently roosts in buildings, and is widely distributed through sub-Saharan Africa in savanna and forest regions. Fig. 46 displays the Ugandan distribution.
Western. Budongo (AMNH); Butiaba (ROM); Kabatora (Mutere 1966a); Kakumiro (Metselaar *et al.* 1966); Murchison Falls NP (Williams 1967, Metselaar et al. 1966); Mweya (BMNH); Semliki Valley (BMNH); Wasa R. (BMNH).
Southern. Queen Elizabeth NP (Williams 1967).
S Buganda. Bugala I. (MSNG, DeBeaux 1922); Bukakata (Kityo & Kerbis 1996); Malabigambo (LACM).
Central. Entebbe (AMNH, FMNH, MSNG; DeBeaux 1922, Mutere 1966a, Williams *et al.* 1964, Craig & Ssenkubuge 1968, Mutere 1969, Ogen-Odoi 1983); Katalemwa (Mutere 1966a); Kawanda (Mutere 1966a); Kisubi (Mutere 1966a, Dulic & Mutere 1973); Namagunga (Metselaar *et al.* 1966).
N Buganda. Bukalasa (Mutere 1966a, Williams *et al.* 1967, Mutere *et al.* 1967, Craig & Ssenkubuge 1968, Simpson & O'Sullivan 1968, Mutere 1969); Bussu (MSNG, DeBeaux 1922).
Busoga. Iganga (Mutere 1966a).
Karamoja. Kidepo NP (Williams 1967).
Measurements. (Budongo, Entebbe, Malabigambo,Wasa) HB 74-83; T 38-46; FA 45-50; HF 11-15; E 17-19; WTG 26-32; SK 20.0-22.2; XZ 12.2-13.5; XMST 11.5-11.9; XIO 4.4-4.8; CM^3 7.0-7.5; M^2M^2 8.7-9.2.

This species, and its frequent co-inhabitants under roofs, have been studied considerably in Uganda, particularly for their potential role in disease transmission (Mutere 1966b, Williams *et al.* 1978, Craig & Ssenkubuge 1968, Simpson & O'Sullivan 1968). A monthly net sample from Entebbe indicated presence nearly every month, and abundance in (dry) February (Ogen-Odoi 1983). Near Kampala, Mutere (1969, 1973) found births mostly April and October. In the same area Mutere (1965a, 1969) showed that some translocated *M. condylurus* quickly found their own way 72 km to the roost from which they had been taken in closed boxes. Mutere (1969) believed that *condylurus* aquired arboviruses from mosquitoes eaten. Ogen-Odoi (1983) found insect food most abundant July to September. A specimen label noted insect food 6 g, about one-fifth of the living animal's total body mass (LACM 52152). Dulic & Mutere (1973) karyotyped some at Kisubi by Entebbe as 2N = 48, FN = 56; subsequent studies in Somalia (Smith *et al.* 1986) and South Africa (Rautenbach *et al.* 1993) found FN = 66 in *condylurus*, (FN = 54 in *M. demonstrator*).

Mops demonstrator, Fig. 42M
Nyctinomus demonstrator Thomas 1903, Ann. & Mag. Nat. Hist 7 (12): 504; Mangala = Mongalla (Sudan, 5°10'N 31°47'E).
Mops (Allomops) faradjius J. A. Allen 1917, Bul. Amer. Mus. Nat. Hist 37: 476; Faradje (D. R. Congo 34°5'N 29°43'E).
Range. Harrison (1959), Ansell (1967) and others separated southern *niveiventer* from *angolensis* = *condylura*. Koopman (1965) found *faradjius* very like *demonstrator*, and (1975) *niveiventer*; all three regarded as conspecific in Koopman (1994). Hayman & Hill (1971) first reported *M. demonstrator* in northwest Uganda collections of BMNH. It is now known through savannas from Ghana, Burkina, D. R. Congo, Sudan, Rwanda, Tanzania, Mozambique to Angola. Fig. 45 displays the Ugandan distribution.
Western. Budongo (LACM); Sonso R. (BMNH, Hayman & Hill 1971; HZM, ROM).
Southern. Queen Elizabeth NP (MUZM, Kityo 2000).
Northern. Gulu (BMNH, Hayman & Hill 1971; ROM).
Nile. Moyo (BMNH, Hayman & Hill 1971; ROM).
Measurements. (Sonso, Gulu) HB 71-72; T 30-37; FA 41-44; HF 10; E 18; WTG 17; SK 20.3-22.0; XZ 12.2-13.0; XMST 11.2-12.0; XIO 4.0-4.3; CM^3 7.3-7.6; M^3M^3 9.2-9.5.

Mops brachypterus, Fig. 42Q
Dysopes brachypterus Peters 1852, "Reise nach Mossambique: Säugethiere" 59; Mozambique Island (Mozambique 15°3'S 40°46'E).

Nyctinomus leonis Thomas 1908, Ann. & Mag. Nat. Hist 8 (2): 373; Sierra Leone (no locality specified). Synonomized by El-Rayah 1981.
Nyctinomus ochraceus J. A. Allen 1917, Bul. Amer. Mus. Nat. Hist 37: 455; Medje (D. R. Congo 2°25'N 27°20'E).
Tadarida leonis Koopman 1975, Bul. Amer. Mus. Nat. Hist. 154: 420 (specimen from Budongo, Uganda).
Mops (Xiphonycteris) brachypterus Koopman 1994 Chiroptera (in) "Handbuch der Zoologie" (includes *leonis* = *ochraceus*).
Range. Dobson (1876: 722) recognized the similarity of W African forest specimens (subsequently named *leonis*) to Peters' E African *brachypterus* although Thomas (1908) rejected this. Rosevear (1965) and Hayman & Hill (1971) thought variants approached *M. thersites*. Koopman (1994) considered W Uganda specimens *M. b. brachypterus*, differing slightly from *M. b. leonis* from eastern. D. R. Congo, but on geographic grounds this is surprising. DeBeaux (1922) first recorded specimens from Uganda. Fig. 46 displays the Ugandan distribution.
Western. Budongo (AMNH, Koopman 1975; LACM, ROM).
S. Buganda. Bugala I. (MSNG, DeBeaux 1922, most).
Measurements. (Budongo) HB 63-67; T 26-33; FA 36-39; HF 9-10; E 14-20; WTG 13-18; SK 18.6-20.0; XZ 11.5-13.0; XMST 11-11.8; XIO 4.0; CM^3 6.8-7.2; M^2M^2 8.6.

Of alcohol specimens listed by DeBeaux, several larger ones seem to be *M. thersites*, for example MSNG 15214, and one of lot 15215 now in AMNH.

<u>*Mops thersites*</u>, Fig. 42N
Nyctinomus thersites Thomas 1903, Ann. & Mag. Nat. Hist. 7 (12): 635; Efoulen (Cameroon 2°51'N 10°33E).
Mops (Allomops) occipitalis J. A. Allen 1917, Bul. Amer. Mus. Nat. Hist. 37: 474; Avakubi (D. R. Congo 1°24'N 27°40'E).
Mops (Xiphonycteris) thersites Koopman 1994 (cited above).
Range. Like the previous species with which it has been frequently confused (Rosevear 1965), *M. thersites* occurs through high forest from extreme W Africa to Uganda, but is not known far south of the equator. It seems to have been reported first in Uganda by Kingdon (1974). Fig. 47 displays the Ugandan distribution.
Western. Budongo (AMNH, LACM, ROM); Bwamba (LACM).

FIG. 47. Distribution of select Molossidae: *Mops thersites* (O), *Mops nanulus* (▲). Shaded areas indicate lakes.

Southern. Omubiyanja Swamp (Bwindi Impenetrable NP, FMNH 160385-160387).
S. Buganda. Bugala I. (MSNG 15214, AMNH).
Central. Budo (HZM); Kabanyola (HZM); Kampala (Kingdon 1974).
Measurements. (Budo, Budongo, Bugala I.) HB 61-72; T 29-37; FA 40-41; HF 9-10; E 15; WTG 13-25; SK 17.5-19.7; XZ 11.6-12.6; XMST 11.5; XIO 4.3; CM^3 6.7-7.3; M^3M^3 8.4-8.9.

As mentioned under *M. brachypterus* in MSNG, several of that lot were misidentified, really *M. thersites* instead.

<u>*Mops nanulus*</u>
Mops (Allomops) nanulus J. A. Allen 1917, Bul. Amer. Mus. Nat. Hist. 37: 477; Niangara (D. R. Congo 3°45'N 27°54'E).
Chaerephon (Allomops) nanulus DeBeaux 1922 Ann. Mus. Civ. Stor. Nat. Genova 49: 372.
Tadarida (Mops) nanula Hayman & Hill 1971.
Mops (Xiphonycteris) nanulus Koopman 1994.
Range. We follow Koopman (1994) in choice of names for this equatorial forest bat. DeBeaux (1922) first found it in central Uganda: It also occurs in Kenya forests east of Mt Elgon (Hayman & Hill 1971) so probably will be discovered in E Uganda as well. Fig. 47 displays the Ugandan distribution.
Western. Budongo (AMNH, HZM, LACM, ROM).
Central. Budo (HZM).

N Buganda. Bussu (MSNG 17169, DeBeaux 1922). Measurements. (Budo, Budongo, Bussu I.) HB 39-60; T 21-25; FA 28-31; HF 6-8; E 10-14; WTG 8-14; SK 15.9-16.8; XZ 10-11; XMST 9.7-10; XIO 3.2-3.8; CM^3 6.1-6.5; M^2M^2 7.5-7.8.

Chaerephon aloysiisabaudiae, Fig. 42S
Nyctinomus Aloysii-Sabaudiae (sic.) Festa 1907, Bol. Mus. Zool. Anat. Univ. Torino 22: 1-2; Toro (Uganda appr. 1°N 30°22'E).
Nyctinomus Aloysii-Sabaudiae Festa 1909 Mammalia, 78 (in) "II Ruwenzori: Risultati d. Spedizione ... Duca d. Abruzzi" p. 1 (Milano).
Chaerephon sp. indet. J. A. Allen 1917 Bul. Amer. Mus. Nat. Hist 37: 460 "possibly. .. *N. aloysii-sabaudiae*" Avakubi (D. R. Congo) see Koopman 1965.
Tadarida (Chaerephon) aloysiisabaudiae Lanza & Harrison (1963).

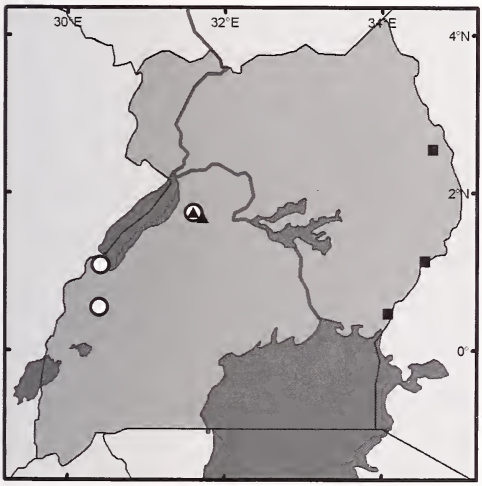

FIG. 48. Distribution of select Molossidae: *Chaerephon bivitattus* (■), *Chaerephon ansorgei* (▲), *Chaerephon aloysiisabaudiae* (O). Shaded areas indicate lakes.

Range. Lanza & Harrison (1963), Koopman (1965), Peterson (1967, 1969, 1972), Fenton & Peterson (1972), have published most of what we know of this equatorial forest bat, now sometimes taken to include *Tadarida cyclotis* Brosset (1966), and known to occur from Ghana to Uganda. Fig. 48 displays the Ugandan distribution.
Western. Budongo (ROM, Peterson 1967; LACM); Kibale (LACM, Peterson 1969); Toro (Mus. Zool. U. Torino 2144, Type, Festa 1907, 1909); Lanza & Harrison (1963).
Measurements. (Budongo, Kibale) HB 73-81; T 39-42; FA 51-53; HF 11-13; E 21-22; WTG 20-38; SK 21.0-21.5; XZ 12.1-12.5; XMST 11.1-11.5; XIO 4.3-4.6; CM^3 7.1-7.8; M^2M^2 8.4-8.6.

Lanza & Harrison (1963) found that "*Chaerephon angolensis sabaudiae*" of DeBeaux (1922) were actually *Mops condylurus*.

Chaerephon bivittatus, Fig. 42K, K
Nyctinomus bivittatus Heuglin 1861 Nov. Act. Acad. Caes. Leopold. Carol. 29: p. 4,13. Keren, Eritraea.
Chaerephon bivittatus Koopman 1994.
Range. This species was reviewed by Hayman & Harrison (1966), also by Eger & Peterson (1979). It was first reported in Uganda by Watson (1952). Koopman (1975), originally doubting its position in *Chaerephon*, cited specimens from Katire, southern Sudan near the northern border of Uganda. Fig. 48 displays the Ugandan distribution.
Eastern. Busia (AMNH, Eger & Peterson 1979); "Mt Elgon, Uganda" (NMK in Nairobi, Hayman & Harrison 1966).
Karamoja. Moroto (NMK Nairobi, Hayman & Harrison 1966, Watson 1952).
Measurements. (Busia, Kisumu, W Kenya) HB 73-85; T 37-44; FA 48-52; HF 10-13; E 17-19; WTG 17-20; SK 19.1-20.6; XZ 12.5-13.0; XMST 10.5-11.0; XIO 3.9-4.1; CM^3 7.5; M^2M^2 8.7-9.2.

To be expected through dry savannas of eastern Uganda as it ranges from Ethiopia and Sudan through Kenya to Zambia. Kingdon's (1974) reports of capture "on the edge of forest in western Uganda," and a Uganda pregnancy in March need checking.

Chaerephon ansorgei, Fig. 42L
Nyctinomus ansorgei Thomas 1913, Ann. & Mag. Nat. Hist. 8 (11): 318; Malange = Malanje (Angola 9°32'S 16°20'E).
Range. Freeman (1981) felt that this savanna species, like its close relative *bivittatus*, had more in common with *Chaerephon* than with *Tadarida* (as previously classified by Ellerman *et al.* (1953) and Koopman (1975)). It occurs from Ethiopia and S Sudan to Nigeria and S Africa. Hayman & Hill (1971) cited the first Uganda record. Fig. 48 displays the Ugandan distribution.
Western. Budongo (ROM, Eger & Peterson 1979); Masindi (BMNH, Hayman & Hill 1971, Kityo & Kerbis 1996).
Measurements. (Masindi, Budongo) HB 69; T 37; FA 48; HF 11; E 20; WTG 16; SK 19.1-19.2; XZ 11.2; XMST 10.8; XIO 4.1-4.4; CM^3 7.1; M^3M^3 8.1.
Special Literature. Bouchard (2001).

Chaerephon bemmeleni cistura, Fig. 42P
Nyctinomus bemmeleni Jentinck 1879, Notes Zool. Mus. Leyden 1: 125; Liberia (no exact locality).
Nyctinomus cisturus Thomas 1903, Ann. & Mag. Nat. Hist. 7 (12): 502; Mangala = Mongalla (Sudan 5°10'N 31°47'E).
Range. Peterson (1971) reviewed these two forms, declaring them conspecific. Hayman *et al.* (1966) reported the first specimen from Uganda, and Start (1969) described new east African material. Fig. 49 displays the Ugandan distribution.
Western. Budongo (ROM, Peterson 1971).
Central. Kampala (BMNH, Hayman *et al.* 1966, Start 1969).
Measurements. (Budongo, Kampala) HB 70; T 35; FA 46; HF 11; E 18; WTG 14; SK 18.4; XZ 10.5-11.1; XMST 10.3; XIO 4.1; CM^3 6.0-6.3; M^3M^3 7.8-8.2.

Bere (1962) was probably aware of the BMNH specimen from Kampala but his descriptions of *Tadarida cisturus* ... a "very common" Uganda bat, etc ... bear no relation to this species. The Kampala specimen was taken from a hole among rocks (Kingdon 1974); the Budongo one was netted over a dam at the edge of the forest (Peterson 1971).

Chaerephon major, Fig. 42J, J
Nyctinomus pumilus var. *major* Trouessart 1897, "Catalogus Mammalium" (ed. 1), 1, p. 146; based on Dobson 1878, unnamed, 428; Nile cataract (Sudan, probably near 5th cataract; Kock 1969).
Nyctinomus emini DeWinton 1901, Ann. & Mag. Nat. Hist. 7 (7): 40; Mosambiro = Usambiro (Tanzania 3°0'S 32°34'E).
Chaerephon (Lophomops) abae J. A. Allen 1917, Bul. Amer. Mus. Nat. Hist. 37: 464; Aba (D. R. Congo 3°53'N 30°17'E).
Range. A savanna species ranging from Liberia to Sudan and coastal Tanzania. Listed for Uganda by Hayman & Hill (1971). Fig. 49 displays the Ugandan distribution.
Western. Toro Game Reserve (Zool. Mus. Charles U. Prague, Nader & Kock 1980, D. Kock in litt. 1994, Nader & Kock 1980); Murchison Falls NP (Kityo 2000).
Southern. Queen Elizabeth NP (Lloyd & Zwick 1997b).
S Buganda. Ngamba I. (Zwick & Lloyd 1998).
?Central. ?Entebbe. Ogen-Odoi 1983 reported netting 23 examples in April and a further 31 through the rest of the year, amounting to 4.6% of the total 1200 bats taken. No voucher specimens have been seen by our contacts, and there have been no replies to our queries.

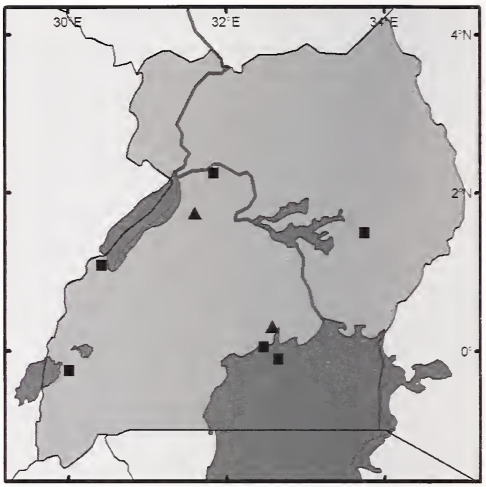

FIG. 49. Distribution of select Molossidae: *Chaerephon bemmeleni* (▲), *Chaerephon major* (■). Shaded areas indicate lakes.

Eastern. Ngora (BMNH 63.1, 63.2, 63.3; Kityo & Kerbis 1996).
Measurements. (Ngora, Toro, Gondokoro and Torit, Sudan) HB 64-75; T 33-50; FA 40,5- 45,5; HF 8; E 17; SK 18.0-18.8; XZ 11.2-12.2; XMST 10.8-10.9; XIO 4.1; CM^3 6.8-7.5; M^3M^2 8.2.
Gondokoro, Sudan is just beyond the present n boundary of Uganda, and in fact was part of Uganda during the USNM expedition (Hollister 1918). The species generally shelters in cracked rocks, but McLellan (1986) in Sudan found large colonies in buildings with *Scotophilus leucogaster*.

Chaerephon pumilus, Fig. 42H, H
Dysopes pumilus Cretzschmar 1826, Säug. (*in*) "Reise im nördl. Afr. v. Rüppell". 69, pl. 27; Massawa (Eritrea).
Dysopes limbata Peters 1852, Säug. (*in*) "Reise nach Mossambique", p. 56 Mocambique Island (Mocambique 15°3'S 40°46'E).
Nyctinomus hindei Thomas 1904, Ann. & Mag. Nat. Hist. 7 (13): 210; Fort Hall = Muranga (Kenya 0°43'S 37°10'E).
Tadarida (Chaerephon) faini Hayman 1951, Rev. Zoo. Bot. Afr. 45: 82; Wago (D. R. Congo 1°45'N 30°40'E).
Range. This species or species-complex is the most prolific of Molossidae in sub-Saharan Africa. Tentatively we follow Koopman (1994), to regard *pumilus*, *faini*, and *hindei* as probable subspecies in nor-

thern, western, and southeastern parts of Uganda respectively. However, Peterson *et al.* (1995) considered small *Tadarida (C.) limbata* the species of W Uganda forest (Budongo, Entebbe), *T. (C.) pumila* the species of SW Uganda. Wing and fur color once used to separate dark *pumilus* or pale *limbatus* seems individually variable in north-eastern Africa (Koopman 1975, Peterson *et al.* 1995). Strangely, the first note of this common bat in Uganda seems to be DeBeaux, 1922. Fig. 44 displays the Ugandan distribution.
Western. Budongo (BMNH, FMNH, LACM, ROM); Butiaba (LACM); Ft. Portal (Mutere 1966a); Kabatoro (Mutere 1966a); Katwe (LACM); Kakumiro (Metselaar et *al.* 1966); Kikirongo L. (Mutere 1966a); Masindi (BMNH); Murchison NP (Williams 1967); Mwela (LACM); Ntandi (LACM); Semliki Valley (BMNH); Thoro ? = Toro (MSNG, DeBeaux 1922); Toro Game Res. (Dusbabek 1983).
Southern. Queen Elizabeth NP (BMNH, Williams 1967, Lloyd & Zwick 1997b).
S Buganda. Buddu (MSNG, DeBeaux 1922); Bufumira I. (Kityo & Kerbis 1996); Bugala I. (BMNH, MSNG; DeBeaux 1922, Kityo & Kerbis 1996); Bukakata (FMNH 149704-149707); Bukasa I. (Kityo & Kerbis 1996); Malabigambo (LACM); Sesse Is. (BMNH, Braestrup 1933).
Central. Entebbe (BMNH, Braestrup 1933; HZM, ROM, MSNG; DeBeaux 1922, Mutere 1969, 1970a); Kabanyola (DAS); Kampala (SMF, Kock 1969); Katalemwa (DAS, Mutere 1966a); Kawanda (Mutere 1966a); Kisubi (Dulic & Mutere 1973).
N Buganda. Bukalasa (BMNH, Mutere 1970a); Kome Island (MSNG, DeBeaux 1922); Lwankima (Kityo & Kerbis 1996); Nsadzi Island (Zwick & Lloyd 1998).
Busoga. Jinja (Marshall & Corbet 1959); Iganga (Mutere 1966a).
Eastern. Tororo (Krampitz 1968).
Karamoja. Kidepo NP (Williams 1967).
Northern. Gulu (Williams *et al.* 1966); Paraa (DAS, Mutere 1966a).
Measurements. (Budongo, Entebbe) HB 54-68; T 27-36; FA 36-40; HF 8-10; E 15-19; WTG 9,5-14,5; SK 15.6-16.5; XZ 9.8-10.0; XMST 9.4-9.6; XIO 4.0; CM^3 5.4-5.7; M^2M^2 6.8-7.0. (Gondokoro, Sudan) FA 35-38; SK 15.5-16.5; XZ 9.3-10.2; XIO 3.7-3.8; XMST 8.8-9.4; CM^3 5.6-6.1; M^2M^2 6.8-7.2.

Of 36 examples from Budongo (LACM), 8 are very dark, 20 are of medium color, and 8 pale with translucent wings. Interestingly the Type and Co-type of *faini* are both blond erythristic mutants taken at the same time, and may have been ♀ and young, or young by the same ♂, as females normally bear single young. Reproduction has been much studied since Braestrup's (1933) paper on the crest; Marshall & Corbet (1959), Mutere & Mawajje (1967), Mutere (1965b, 1966a, 1968, 1973), and Okia (1987) found continuous breeding near Jinja and Entebbe. Mutere (1965a, 1969), Mutere & Ssenkubuge (1965), Mutere *et al.* (1967) studied displacement and roosting, and found remarkable homing ability. Ogen-Odoi (1983) seasonal food supply and biology. Various workers including Lumsden *et al.* (1957), Lumsden *et al.* (1961), Williams *et al.* (1964), Williams *et al.* (1967), Craig & Ssenkubuge (1968) explored relationship of these very commensal bats with viruses that hazard humans. Many workers identified parasites in Uganda *C. pumilus* including Usinger (1966), Theodor (1968), Krampitz (1968), Dusbabek (1980, 1983). Dulic & Mutere (1973) found the karyotype of this bat at Kisubi: 2N = 48, FN = 58.
Special Literature. Bouchard (1998).

Chaerephon chapini

Chaerephon (Lophomops) chapini J. A. Allen 1917, Bul. Amer. Mus. Nat. Hist. 37: 461; Faradje (D. R. Congo 3°45'N 29°42'E).
Range. This rare bat has been collected from Ethiopia to Zimbabwe and D. R. Congo to Namibia; there is one in ROM from Budongo mentioned by Hayman & Hill 1971, also two Kenya specimens (Baringo and W Pokot, ROM) alluded to by Kingdon (1974) and Peterson *et al.* (1995), which suggest that it may also turn up in eastern parts of Uganda. Fig. 44 displays the Ugandan distribution.
Western. Budongo (ROM 46733).
Measurements. (Budongo) HB 57; T 31; FA 36; HF 7; E 15; WTG 15 SK 16.1; XZ 9.8; XMST 9.1; XIO 3.6; CM^3 5.6; M^2M^2 6.7.

The crest of this 3 May male is 13 mm long: the wing distal to the elbow graduates to a translucent whitish tip.
Special Literature. Fenton, B., & J. Eger (2002).

REJECTED SPECIES REPORTS AND POSSIBLE ADDITIONS

All but three of the ninety-six species here listed for Uganda are from authenticated specimens. Reports for which no validation could be found, and species which are known from just outside the present Uganda border and likely to be found within are now

listed. The fine distinction between a report for which no specimen has yet been found by us but which has been quoted twice by such an eminent chiropterist as the late R. W. Hayman, or by others with slightly less meticulous credentials, has not been undertaken lightly.

Faunal lists are inevitably updated by further collecting and closer examination. So far only some of the few remaining intensely forested localities have been well studied, and the northern half of the country is still hardly known. There is also a time factor; and species of the once great forest blocks are likely decreasing or disappearing with the present rate of clearing and development. Savanna and anthropophile species however may be increasing.

Epomophorus gambianus. Bergmans (1988) reported this species from southern Sudan, but Claessen & DeVree (1990) reidentified the examples in SMNS as *E. wahlbergi*, and there now seems no link between *E. gambianus* in Republique Centrafricaine and the population in central Ethiopia.

Scotonycteris zenkeri. Hayman *et al.* (1966) list this species from two places just west of Uganda and it could be found in the nearby forests of Western Province. Check against *Casinycteris*.

Taphozous (Liponycteris) hamiltoni. Koopman (1975) and others have noted this species at a number of stations in extreme SE Sudan and NW Kenya, and we are sure that it will one day be found to occur in extreme northern parts of Uganda.

Hipposideros megalotis. This very rare and local species has not been found nearer to Uganda than Njoro (Kenya 0°20'S 35°36'E) but would seem suited to the Karamoja dry savanna 240 km northwest.

Rhinolophus darlingi. Until (1971) in Hayman & Hill, *darlingi* was presumed a species of southern Africa; they then reported a specimen in BMNH from Banagi (Tanzania 2°17'S 34°50'E), and Hill *et al.* (1988) extended the range by describing several from northern Nigeria, so its future discovery in Uganda is a slight possibility.

Rhinolophus deckeni. We have seen several Uganda museum specimens so-called and one was listed in Jobling (1954), but these have been reclassified as *R. clivosus zuluensis* or *R. alcyone*. To the best of our knowledge *R. deckeni* is strictly a species of the Kenya-Tanzania coast region: Aggundey & Schlitter (1984), Cockle *et al.* (1998).

Rhinolophus hildebrandti. Genuine examples of this large species have been taken just outside the Uganda borders in neighboring Sudan (Lokwi 4°2'N 32°30'E), Kenya (Nakuru), and Rwanda (Megashi 1°20'S 30°40'E) so it seems very likely to be found in Uganda. Confusion with *R. eloquens* accounts for its previous listing for Uganda.

Rhinolophus simulator. There seems no special reason why this species should not have been found in Uganda. It occurs in forested S Sudan and W Kenya (Koopman 1975) and at least in C Tanzania (Aellen 1957) as well as Ethiopia, southern D. R. Congo (Anciaux 1983), and parts of W Africa if *alticolus* is included (Koopman 1994).

Nycteris intermedia. A problematic species intermediate in size between *N. arge* and *N. nana*, upheld by Van Cakenberghe & DeVree (1985) and by Koopman (1994). Reported for PN desVolcans (D. R. Congo appr. 1°15'N 29°40'E), and for NW Tanzania by Kock & Howell (1988), it may well occur in Uganda.

Miniopterus africanus. As understood by Peterson *et al.* (1995) this is not conspecific with *M. inflatus* (contra Koopman 1994) and occurs in Ethiopia, Kenya (ROM material so identified from Gilgil, Nakuru, and Tsavo; LACM from Machakos) and also Tanzania. There may be overlap in W Kenya with *M. inflatus rufus*, and perhaps is yet to be found in E Uganda.

Miniopterus schreibersi. It is possible that this species also will be found in Uganda but its characteristics overlap, somewhat with *M. inflatus*, *M. africanus*, and *M. natalensis*. Early molecular analyses (Appleton *et al.* 2003, Miller-Butterworth *et al.* 2003), suggests much species/subspecies complexity.

Kerivoula argentata. Kingdon 1974 cited a specimen which hit a car in Uganda, but our correspondence has failed to elicit confirming evidence in this complex genus; Koopman's (1993) listing was based on the same report (pers. com.), it is not in Koopman (1994).The nearest identified specimens are from SE Kenya (Schlitter *et al.* 1986), and C Tanzania (Swynnerton & Hayman 1958).

Kerivoula africana. This species is mentioned only because of the queried name on the label of 2 specimens in LACM from Ntandi, which seem to key out to *K. lanosa muscilla*. As in Koopman (1994), Cockle *et al.* (1998) true *K. africana* seems to be a species only of the coastal strip of Tanzania.

Glauconycteris beatrix. Under *G. humeralis* text we have outlined our reason for rejecting this species. However at present the systematics of *Glauconycteris* is not well established.

Scotophilus nucella. Although this may be a good species in Ghana etc. (contra Koopman 1994), we found

the specimen of "*nucella*" in ROM among *S. nux* which seemed inseparable from it, and we believe Robbins *et al.* (1983) may have been mistaken to extend *nucella* from Ghana to Uganda without intermediate specimens.

Scotophilis viridis or *Scotophilus borbonicus viridis* are names often given to greenish and yellow bats (of the same size as our Uganda *S. nigritellus*), which however occur in E Kenya and E Tanzania southward. Robbins *et al.* (1985) included *nigritellus* in *viridis*, but none of the Uganda specimens seen have typical *viridis* color. Peterson *et al.* (1995), Koopman (1994), and Hill (1980) all had different interpretations of this complex, too.

Eptesicus zuluensis. Peterson *et al.* (1995) listed this S African species from Uganda and Kenya in their comparisons, differentiating it from *somalicus* (contra Koopman 1994); we regard both as *Pipistrellus* (following Hill & Harrison 1987), and believe the few Uganda examples we have seen to be *P. guineensis* as labelled in USNM. We note here that the illustration for Roberts (1924) does not well show the very slightly raised braincase we have seen in S African *zuluensis*, and may, through confusion of the artist, actually represent *P. nanus* (with which Roberts compared *zuluensis*).

Pipistrellus grandidieri. Only recently this species has been rediscovered and the skull studied (Thorn, Kock, and Cuisin 2007). Although not common, it seems to be widely distributed through E Africa, with specimens from E Kenya, N Tanzania, and Burundi. We were not aware of its morphology when studying BM 66.1171 from Kampala, tentatively labelled "?*inexspectatus*" (Koopman 1975: 397), and we then ascribed that specimen as a faded *P. eisentrauti* (a normally dark taxon with similar measurements).

We believe that we have seen similar misidentifications in other collections. Although we have been unable to re-examine the Kampala bat, it now seems likely that it is *P. grandidieri*. The latter has unicolor medium brown fur above, unicolor whitish below; FA 31 (33) 36; SK 12.3 (13.7) 13.7; XMST 7.1 (8.3) 8.1; XIO 3.5 (4.3) 4.2; CM^3 4.5 (5.1) 5.4; M^3M^3 5.8 (5.9) 6.4; above measurements of BM 66.1171 are in brackets, courtesy Meri Happold.

Pipistrellus inexspectatus. As above, BM 66.1171 bore tentative label "?*inexspectatus*." We studied the specimen and now believe it agrees more with *grandidieri* above. Although Koopman (1994) cited this BM record and also D. R. Congo and Kenya reports, Koopman *et al.* (1995) re-identified D. R. Congo and Kenya records as *eisentrauti*. In the single Type of *R. inexspectatus* from grass savanna 500 m, N Cameroon (Aellen 1952, 1959), the fur above was bright rust brown, below white, with blackish roots throughout, and a white trailing margin of the dark brown wings; FA 31; SK 13.1; XZ 28.6; XMST 7.3; CM^3 4.3; M^3M^3 5.3; (re-measured by DeVree 1972); P^1 minute and invisible from outside; braincase rounded. A further report of "*inexspectatus*" from hill forest at Ruhija, Uganda (Kityo & Kerbis 1996) without supporting data, is now regarded with considerable doubt.

Eptesicus hottentotus portavernus. This newly named subspecies from Hells Gate N P in Kenya (Schlitter & Aggundey 1986) lies so far from previous records of *hottentotus* in Malawi, that it may equally be found to occur in e Uganda. A like distribution, extending from S Africa to Kenya has recently been found for smaller but similar *Pipistrellus ("Eptesicus") "melckorum"* (sensu Ansell 1960) of which specimens are in ROM from Mara R. Kenya.

Tadarida fulminans. This large species has been taken at Nairobi (Harrison 1960, HZM) and Njoro (C Kenya, Schlitter *et al.* 1986, PCM), but we have been unable to locate any Uganda specimens or to learn the source for Kityo *et al.* (1994) listing it from Uganda.

Tadarida lobata. It would seem only a matter of time until Uganda specimens of this large spectacular bat appear, as it has been taken at several places in the dry hills of W Kenya: Turkwell, Cherengani, also S of Voi (Peterson 1974). To be expected in Karamoja.

Chaerephon nigeriae. In absence of any confirming answer to our queries and as no Uganda specimens have been turned up in our search or by our correspondents, we conclude that the twenty examples cited by Ogen-Odoi (1983) were mistaken for a commoner species (such as *C. bemmeleni* ?). However from its wide distribution elsewhere *nigeriae* seems likely to be found in Uganda in the future.

Chaerephon russatus. Three large examples of this species are in PCM from C Kenya (Schlitter *et al.* 1986); previously known in forests from Ghana, Cameroon, and D. R. Congo so almost certainly in Uganda.

Platymops barbatogularis (= *setiger*) was listed by Williams (1967: 137). For Kidepo NP. This small gray and white, flattened, warty-armed bat may be found wedged into crevices in the rock of Uganda's NE dry country, but we have found no specimens and are unsure if Williams actually identified it in Uganda, because on page 178 he wrote "only Kenya."

3. EULIPOTYPHLA

SORICIDAE

All African shrews have obvious external similarity, although they range considerably in size. All have moderately long pointed conical muzzles with long questing whiskers, tiny bright eyes, external ears, fairly long tails (often quite thick), and generalized 5-toed feet. The large sharply-downcurved upper incisors work as pincers against prominent straight lower incisors to stab small prey. Behind the incisors grow a series of 2 to 4 simple teeth (here called unicuspids), followed by a big premolar and 3 multi-cusped molars. Most identification depends on details of teeth and skull. Because the front teeth are exposed so well in life, the main genera can often be identified in fresh specimens with a handlens.

These voracious little hunters are active day or night to feed their high metabolism; different species are adapted to very different habitats through Africa, although none are specially adapted for swimming as on other continents. A few species invade villages and buildings killing insects and rodents, but also becoming suspect in transmission of disease.

Shrews and hedgehogs are now placed in the newly described mammalian order Eulipotyphla (a redefinition of the traditional order "Insectivora" without elephant-shrews, golden-moles, or tenrecs). This has emerged from the new technologies of molecular systematics (Douady *et al.* 2002, Querouil *et al.* 2001).

A note on dentition

The two to four simple teeth of shrews behind the large projecting upper and lower incisors, are here simply designated unicuspids U^1, U^2, U^3, U^4, U_1, U_2, U_3. There is quite a long literature on the exact evolutionary origin of these teeth, and on similarly unspecialized teeth of Tenrecidae and Chrysochloridae (Repenning 1967, and others).The unicuspids may represent more incisors, and may include mutated premolars and canines.

Key to skulls of shrew genera found in Uganda

1a) 3 pairs of upper Unicuspids; 2 pairs of lower Unicuspids; upper Incisor tip pointed..... *Crocidura*

1b) Unicuspid arrangement as above; but upper incisors chisel tipped (a rare blackish species with bristly tail found only in S and W forests and mountains)..... *Paracrocidura*

1c) 4 upper unicuspids; upper Incisors with pointed tips..... (2)

2a) Last upper unicuspid minute; 3 lower unicuspids with middle one very small; claws of front feet very long..... *Myosorex*

2b) Last (fourth) upper unicuspid small but not hidden; 2 lower unicuspids; claws normal..... (3)

3a) Skull very heavily built; 30-35 mm long; vertebral column remarkably convoluted and thick..... *Scutisorex*

3b) 4 upper unicuspids; lower Incisors very thick and smooth; skull strongly built; vertebral column not exceptionally heavy ..... *Ruwenzorisorex*

3c) 4 upper unicuspids; 2 lower unicuspids; lower incisor slender.....(4)

4a) Lower incisors always smooth on biting edge; tail often bristly ..... *Suncus*

4b) Lower incisors usually notched on biting edge; tail nearly naked ..... *Sylvisorex*

Key to shrews of Uganda (*underlined italics*) and others likely to occur there (*plain italics*)

1a) HF (with claw) 17 mm or more (2)

1b) HF < 17 (but see also *mutesae* synonym of C. *olivieri*)..... (3)

2a) Fur shaggy and long, dark brownish gray; humpbacked; HB 112-155; T 68-110; HF 18-27; SK 30.3-34.9; 4 upper unicupids ..... *Scutisorex somereni* Fig. 51H

2b) Fur short velvet-like, dark umber brown to medium orange brown; HB 95-145; T 60-90; HF 17-22 (in Type of *mutesae* HF only 16); SK 25-33.5; 3 upper unicuspids ..... *Crocidura olivieri*

3a) HF 13,5-17..... (4) (through to 26)

3b) HF 7-13,5..... (26) to (30)

4a) Belly contrasting whitish (at least tips pale, or pale gray in *C. roosevelti*); and see also 30)..(5a) to (8b)

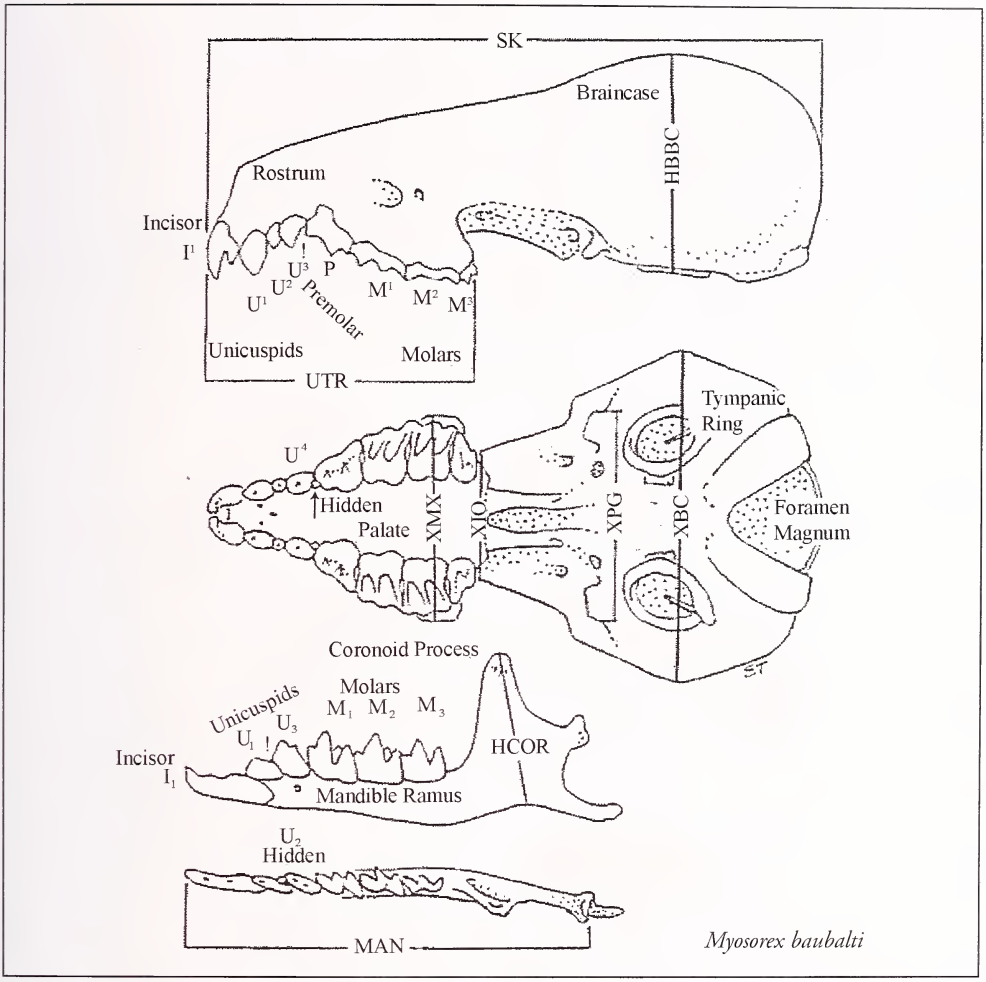

FIG. 50. Terms used for shrew skulls: HBBC – Height of Bulla and Braincase; HCOR – Height of mandibular Coronoid Process; I^1 – Upper Incisor; MAN – Length of Mandible; M^3 – Third Upper Molar; M_2 – Second Lower Molar; p^1 – Upper Premolar; SK – Greatest Length of Skull; U^1 – First lower Unicuspid; UTR – Upper Toothrow length; XMX – Greatest Maxillary width; XPG – Post-glenoid width; XM? - Width across upper Molar; XBC – Greatest width of braincase.

4b) Dark belly fur color blending with dark upperparts, scarcely paler ..... (9) to (29)

5a) T 68-90; > HB, flexes loosely around branches when climbing; HF 13,5-15; SK 17.0-18.5; UTR 7.3-7.6; 4 upper unicuspids ..... *Suncus megalura* Fig. 51G

5b) T = HB; 3 upper unicuspids ..... (6) to (10)

6a) T 59-72; without bristles; HF 14-15; belly pale gray; SK 20.5-21.7..... *C. roosevelti*

6b) T < 65; extensive bristles ..... (7) and (8)

7a) T 35-43; HF 12-14; SK 22.5-24.8; lateral width M^1 2.3-2.5 ..... *C. macarthuri*

7b) As above, but..... *C. voi butleri*

7c) T 50-65..... (8)

8a) HF 14-15; SK 22.6-24.8 (♂ big); lateral width M1 2.1-2.3; fur long, gray brown above,whitish below with blackish roots..... *Crocidura viaria*

8b) HF 15-17; SK 21.1-23.3; lateral width M1 1.8-2.1; fur rusty brown above, whitish below, with gray roots..... *Crocidura fulvastra*

9a) T without long bristles (except sometimes a few at extreme base) ..... (10) to (19b)

9b) T with conspicuous bristles on at least 50% of length... (20a) to (30c)

10a) Upper unicuspids 4 (but last ones sometimes very small).. (11) to (13)

10b) Upper Unicuspids 3..... (14) to (25)

11a) Upper Incisor tip pointed; lower incisor massive without notches; T 55-62; HF 16-17; SK 24.0-25.0 ..... *Ruwenzorisorex suncoides* Fig. 52B

FIG. 51. Chrysochloridae: A – *Chrysochloris stuhlmanni*. Tenrecidae: B – *Potamogale velox*. Erinaceidae: C – *Atelerix albiventris*. Soricidae: D – *Myosorex blarina*; E – *Crocidura nigrofusca*; F – *Crocidura parvipes*; G – *Suncus megalura*, modified after Vogel 1974; H – *Scutisorex somereni*.

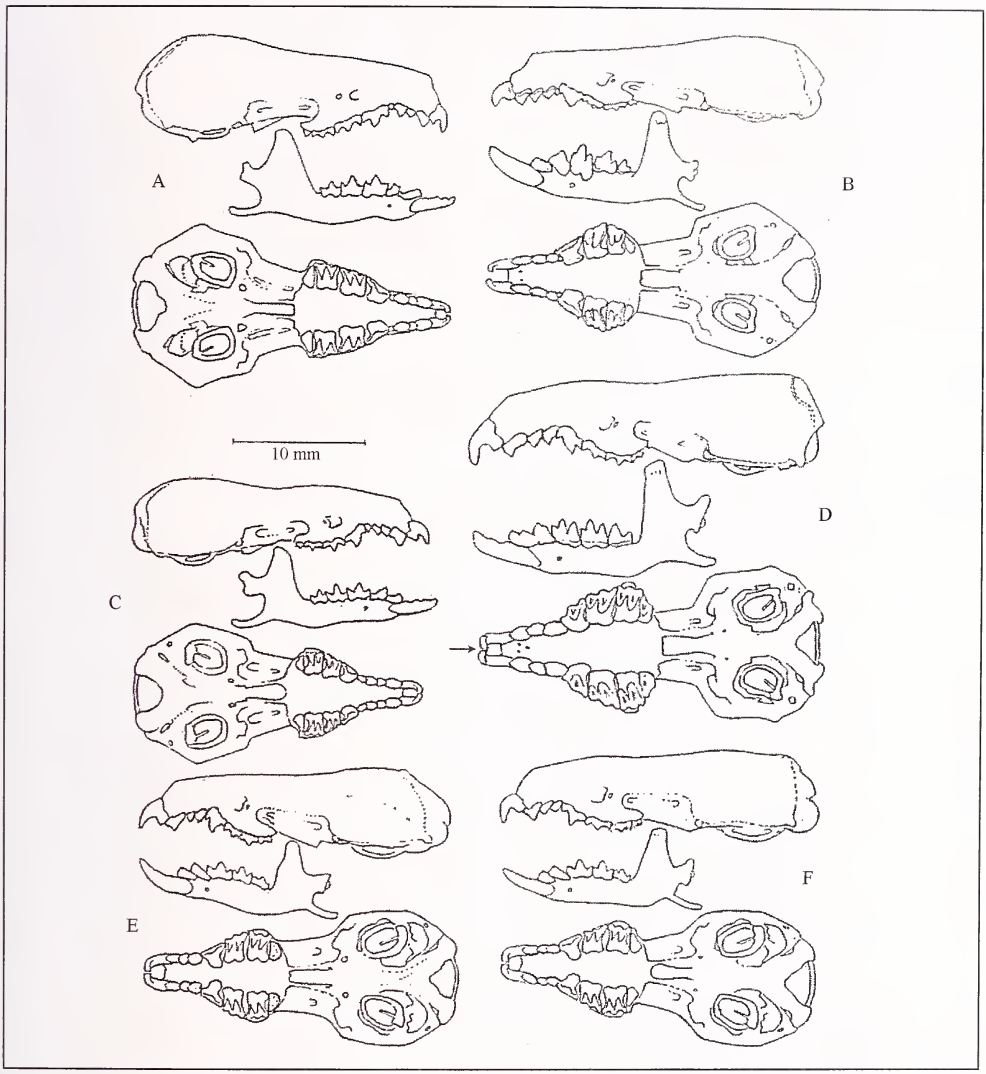

FIG. 52. Shrew skulls: A – *Myosorex blarina*; B – *Ruwenzorisorex suncoides*; C – *Sylvisorex lunaris*; D – *Paracrocidura maxima*; E – *Crocidura luna*; F – *Crocidura nigrofusca*.

11b) I^1 tip pointed, I1 fairly slender with 1 to 3 notches..... (12)
12a) T 48-58; without bristles; SK 22.0-23.0; U^2 notched ..... *Sylvisorex lunaris* Fig. 52C
12b) T 35-45; without bristles; SK 21.0-22.5..... (13)
13a) Tiny U^4, visible externally, separating U^3 from P^1.... *Myosorex blarina* Figs. 51D, 52A
13b) Tiny U^4 wedged internally where U^3 touches P^1..... *Myosorex babaulti*
14a) 3 upper unicuspids; SK > 20mm ..... (15) to (17)
14b) 3 upper unicuspids; SK < 20... (18)
15a) SK > 22.0; fur above and below generally dark..... (16)
15b) SK 20-22..... (17)
16a) SK 22.9-24.4; upper cranial profile almost straight; 3 upper Unicuspids

narrow oval, UTR 9.5-10.3; above blackish chocolate; below equally dark gray..... *Crocidura stenocephala* Fig. 53F

16b) SK 23.3-24.8; upper profile sinuous over bulging braincase; 3 upper unicuspids narrow ovals; UTR 9.7-10.7; grayish brown above shades to slightly paler below ..... *Crocidura littoralis*

17) SK 20.7-21.5; bulbous profile of braincase; the 3 upper unicuspids are narrow ovals; fur above and below blackish chocolate ..... *Crocidura maurisca*

18a) T 73-95; above dark grayish umber, slightly grayer below; HBBC 6.1; SK 18.5-20.0; XBC 8.1-8.6; XIO 3.9-4.3; XMX 5.5-5.8; UTR 7.6-

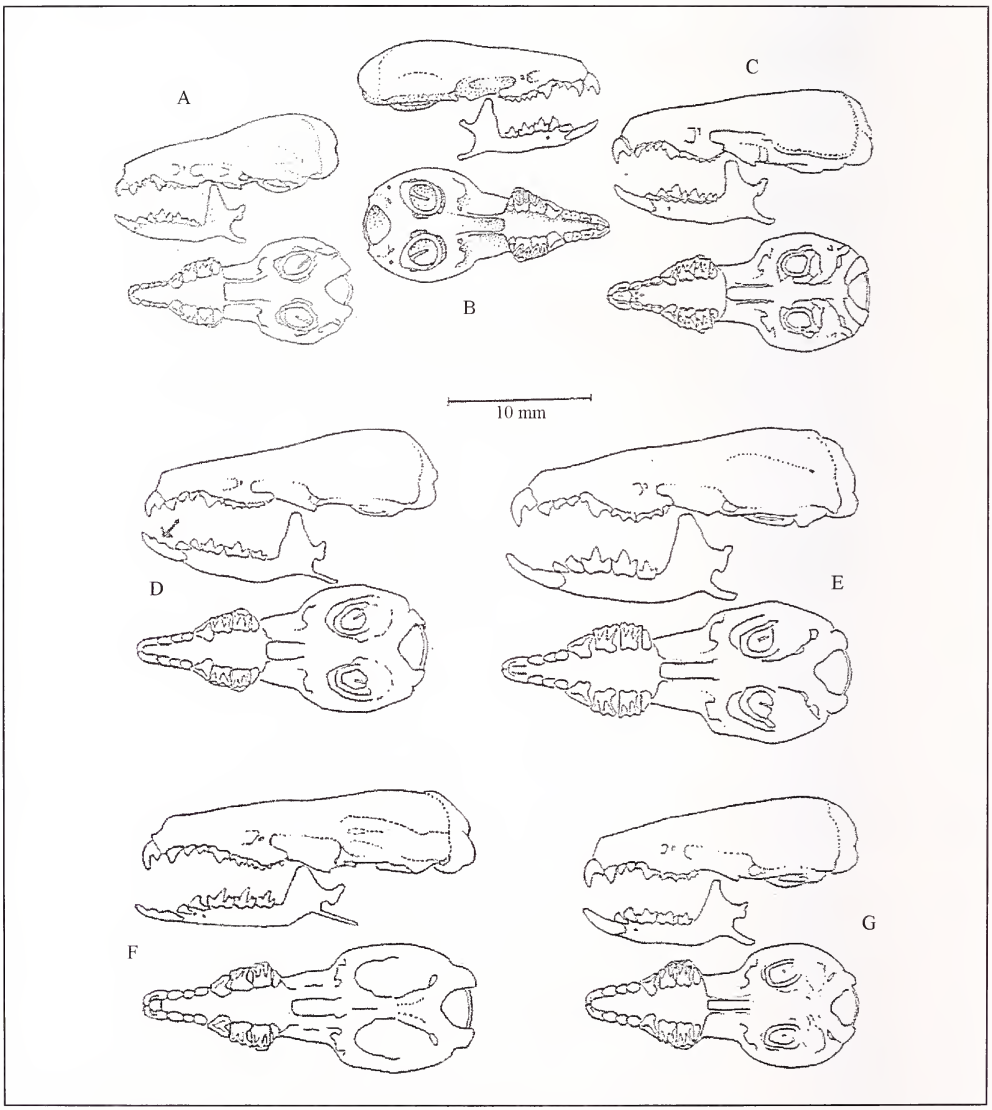

FIG. 53. Shrew skulls: A – *Sylvisorex vulcanorum*; B – *Crocidura allex*; C – *Crocidura ludia*; D – *Crocidura maurisca*; E – *Crocidura littoralis*; F – *Crocidura stenocephala*; G – *Crocidura niobe*.

8.6; U elongate oval; mandible ramus slender and bowed ..... *C. dolichura*

18b) T 58-70; nearly naked.....(19)

19a) XBC > 8.4; XMX > 5.6; U^2, U^3 round ovals; mandible ramus stout, nearly straight; above blackish gray, below chocolate.....*Crocidura niobe* Fig. 53G

19b) XBC > 8.4; XMX > 5.6; U^2, U^3 narrow ovals; ramus slender and bowed; fur above caramel, below slightly paler..... *Crocidura ludia* Fig. 53C

19c) T well bristled at least 50% of length, body dark above and below; 3 upper unicuspids..... (20)

20a) T 37-45; upper Incisor chisel-tipped: SK 25.0-27.0; 3 upper unicuspids; blackish brown above and below; HF 16-16,5 ..... *Paracrocidura maxima* Fig. 52D

20b) Upper incisor pointed; SK 21.0-25.0; 3 upper unicuspids ..... (22) to (24)

21) Incisors pointed; SK < 21.5 (check overlap)..... (25)

22a) T 48-58; SK 22-25; junction of occipital/sagittal crests usually swollen beyond general posterior contour of braincase; profile of upper back rim of foramen magnum usually overhangs occipital condyle; height $U^2 > U^3$; lower mandible profile fairly straight..... ..... *Crocidura nigrofusca* complex (*kempi, nilotica, tarella, zaodon*) Figs. 51E, 52F

22b) SK 21.0-23.5; junction of sagittal/occipital smooth within general rounded contour of back of braincase, upper rim of foramen magnum scarcely visible in sideview, $U^2 > U^3$; lower margin of slender mandible is sinuous; adults blackish brown, immatures sometimes conspicuously pure gray; T 55-64 bristly.....*Crocidura luna* complex ..... (23) to (24) Fig. 52E

23a) SK 21.0-22.4; XMX 6.4-6.9; T 59-64; fur long (7mm) blackish; HF 14.5-17; claws sometimes 3 mm long.....*Crocidura montis*

23b) Fur shorter, (< 5 mm); claws normally 1-1,5 mm..... (24)

24a) SK 22.8-23.5; XMX 7.1-7.5; HF 13-15..... *Crocidura selina*

24b) SK 21.2-23.2; XMX 6.7-7.1; HF 14-17..... *Crocidura luna*

25a) HF < 14; fur color distinctly much pale below..... (33b), (34)

25b) HF < 13,5; fur dark above blending to medium dark below ..... (26) to (33a)

26a) SK 19.3-21.3; XMX 5.8-6.8; 3 upper unicuspids..... (27)

26b) SK 14.4-18.0; all over dark..... (28)

27a) Back of braincase slopes roundly downwards; color usually without much brown tint; T 50-60; dry wooded country ..... *Crocidura jacksoni*

27b) Back of adult's braincase shows gently raised occipital/sagittal suture; fur color usually blackish chocolate; T 43-53; forests ..... *Crocidura denti*

28a) 4 upper unicuspids; dark all over .....(29)

28b) 3 upper unicuspids; dark all over .....(32)

29a) SK >15.5; HF >10; T 45-70...(30)

29b) SK < 15.5; HF < 10; T 23-33...(31)

30a) SK 16.7-17.2; HF 11-12,5; T 55-70; naked..... *Sylvisorex granti*

30b) SK 15.4-15.8; HF 12-13,5; T 45-60; naked ..... *Sylvisorex vulcanorum*

31a) SK 13.9-15.5; HF 8-10; T 23-30; naked..... *Sylvisorex johnstoni*

31b) SK 13.9-15.2; HF 8-10; T 23-30; bristles > 60% length; slightly pale on throat, ♂ flank glands white ..... *Suncus infinitessimes*

31c) SK 13.3-14.2; HF 7-9; T 28-33; entirely dark ..... *Suncus* sp. nov. (p. 138)

32) HF 8,5-10,5; T 28-40; variable bristle coverage (may rub off easily) 3 upper unicuspids (compare *Sylvisorex johnstoni*, etc.) .....*Crocidura bottegi*

33a) SK 18.5-20.5; HF 12-14; T 45-62; rich dark brown above graduating to medium gray below ..... *Crocidura hildegardeae*
33b) SK 16.5-18.0; UTR 6.8-7.5; mental foramen of mandible under U_2 HF 10-13; T 35-50; dark brown above, distinctly medium gray below... *Crocidura fuscomurina*
33c) SK 15.1-17.0; UTR 5.9-6.8; mental foramen under M_1; HF 9-10; T 30-45; color about as *fuscomurina* ..... *Crocidura elgonius*
34a) Whitish belly color distinctly separated from darker back and flank; HF 10-13,5; SK 19.5-21.5; 4 unicuspids ..... *Suncus lixa*
34b) Color as above; HF 10-13; SK 19.7-21.6; 3 unicuspids ..... *Crocidura parvipes*
34c) Color as above, T 30-40; bristles conspicuously white; HF 8-10; SK 14.0-15.5; XBC 6.4-7.0; 3 unicuspids..... *Crocidura nanilla*

Myosorex blarina, Figs. 51D, 52A
Myosorex blarina Thomas 1906, Ann. & Mag. Nat. Hist. 7 (18): 139; Ruwenzori, Mubuku Valley 3050 m, Uganda.
Range. The above description by Thomas (1906) was not only the first Uganda report, but the first bonafide *Myosorex* outside S Africa, ignoring ill-founded "*Myosorex preussi*" (see Hutterer 1993, p. 99) and *M. johnstoni* later placed in *Sylvisorex*. Today the genus is known in equatorial regions only on a few high mountain areas in bog situations; *M. blarina* seems confined to the massif of Ruwenzori, not extended to the Kivu area in D. R. Congo where *babaulti* and *schalleri* were once doubtfully included (Corbet & Hill 1980). Since it has not been discovered on Mt Elgon, we believe that even rarer specimens from Kilimanjaro and Uluguru Mts are also separate species. The name blarina was chosen by Thomas from resemblance to a thickset blackish-furred American shrew of that name. This species was listed in error for BINP by Kasangaki *et al.* (2003). Fig. 54 displays the Ugandan distribution.
Western. Mubuku Valley (BMNH 6.7.1.35 Type, Thomas 1906, Thomas & Wroughton 1910); Kyoha/Mubuku Rivers, 1890 m; John Mate Camp, 3370 m; Bujuku Hut, 3960 m (FMNH, Kerbis *et al.* 1996).
Measurements. (Ruwenzori, Type) HB 74; T 42; HF 14; E 7; SK 23.6; XBC 12.0; XIO 5.5; XMX 7.0; UTR 10.8; MHBC 7.5.

FIG. 54. Distribution of *Myosorex* (Soricidae): *Myosorex babaulti* (▲), *Myosorex blarina* (O). Shaded areas indicate lakes.

Myosorex babaulti
Myosorex babaulti Heim DeBalsac & Lamotte, 1956, Mammalia 20: 150; Kivu district, D. R. Congo.
Range. This form has sometimes been regarded as a subspecies of *M. blarina* (Misonne 1963, who reported some characteristics combined in a specimen from Kabare, D. R. Congo, just beyond Uganda's SW corner at 3100 m). The two are undoubtedly very close, but the present Uganda specimens first reported by Kingdon 1974, and Baranga 1992, seem to be *babaulti* not the Ruwenzori form. Fig. 54 displays the Ugandan distribution.
Southern. Bwindi NP (UFD, Kingdon map 1974, Baranga 1992, Monfort 1992); Omubiyanja Swamp 1850 m (FMNH, Kasangaki *et al.* 2003); Mts Mgahinga/Muhavura saddle 2980 m (FMNH).
Measurements. (Type series, Misonne 1963) HB 75-87; T 36-42; HF 14-14; E 7; SK 21.7; XBC 12.0; XMX 7.4; XIO 4.8; UTR 9.0. (Mgahinga) HB 83; T 38; HF 14; E 6; WTG 19; SK 21.4; XBC 12.1; XMX 6.6; XIO 5.1; UTR 8.9; MAND 13.6; LTR 8.4.

Suncus lixus aequatorius, Fig. 55C
Pachyura lixa aequatoria Heller 1912 Smiths. Misc. Coll. 60: 4 Mt Sagalla, Kenya 3°27'S 38°35'E.
Crocidura parvipes nisa (in part) DeBeaux 1926, Ann. Mus. Civ. Stor. Nat. Genova 52: 102. Not Hollister 1916 (op. cit.).
Range. This rather rare shrew has not been reported in Uganda before, perhaps in Kenya only as the Type, and a few times in Tanzania, the nearest being at Mwanza

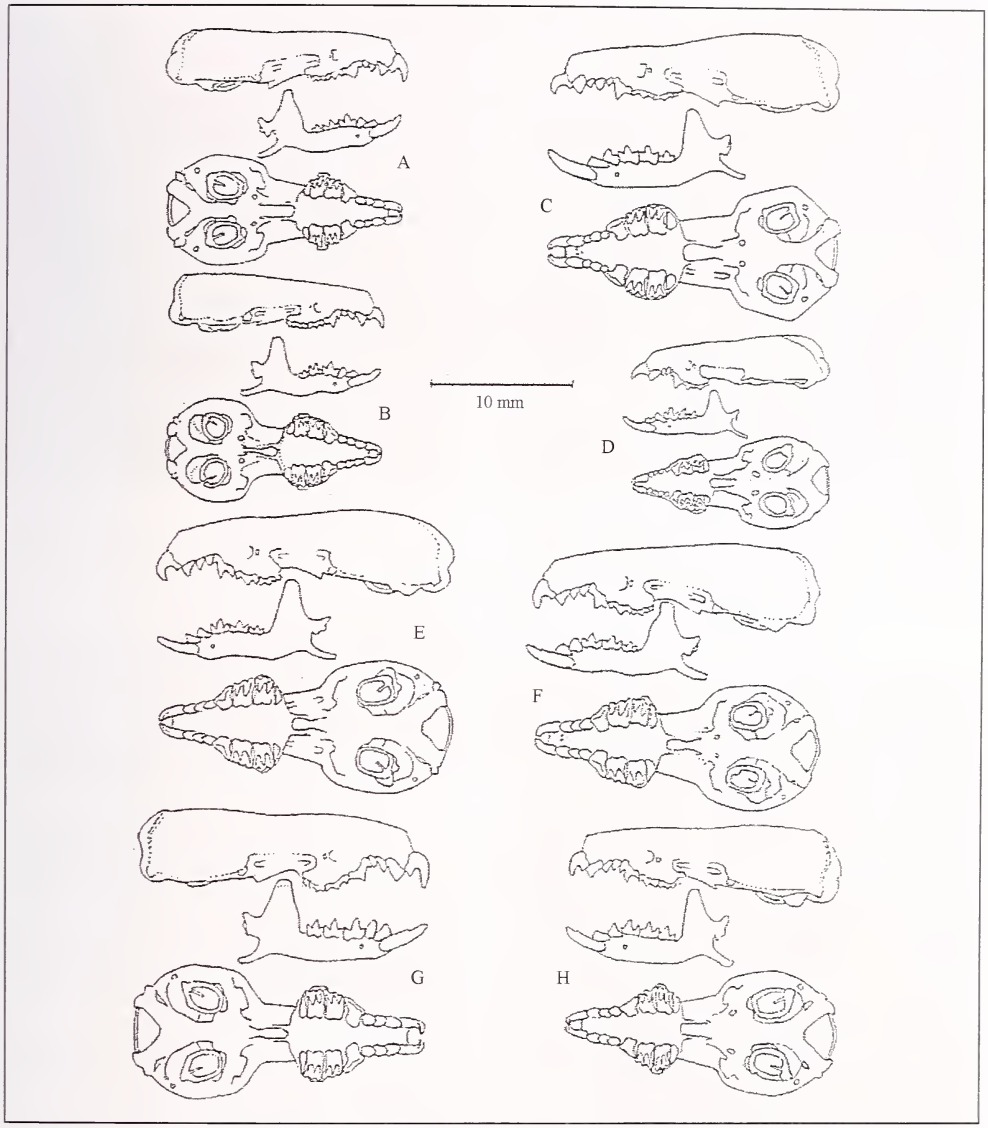

FIG. 55. Shrew skulls: A – *Crocidura fuscomurina*; B – *C. elgonius*; C – *Suncus lixus*; D – *Suncus* new species; E – *C. jacksoni*; F – *C. denti*; G – *C. parvipes*; H – *C. hildegardeae*.

(MCZ); it has been more often found in S and C Africa. Fig. 56 displays the Ugandan distribution.
N. Buganda. Bussu (MSNG 19632, DeBeaux 1926: 102).
Measurements. (Bussu) HB 70; T 37; HF 12; E 9; SK 21.3; XMX 7.0; XIO 4.4; XBC 9.1; UTR 8.9.

Suncus hututsi **spec. nov.**, see p. 141

Suncus megalura, Fig. 51G
Pachyura megalura Jentink 1888, Notes from Leyden Mus. 10: 48; Schieffelinsville (Liberia 6°19'N 10°44'W).
Myosorex sorella Thomas 1898, Proc. Zool. Soc. Lond. for 1897: 930; Masuku Plateau = Misuku (Malawi 9°38'S 33°38'E).

?*Sylvisorex granti* Festa 1909 Insettivori (*in*) "II Ruwenzori: Spedizione … Savoia, Risultati". Zool., 1: 87-89.
Sylvisorex gemmeus Heller 1910, Smiths. Misc. Coll. 56: 7; Rhino-Camp, Lado (= Uganda 2°59'N 31°24'E).
Sylvisorex gemmeus irene Thomas 1915 Ann. & Mag. Nat. Hist. 8 (16): 151 Kagenbah = Kagamba (Uganda 1°S 30°15'E).
Suncus megalura Ellerman *et al.* 1953 "Southern African Mammals.." 24; but generally regarded as *Sylvisorex megalura* until Querouil *et al.* 2001.
Suncus megalura Querouil *et al.* 2001, Molec. Phylogen. & Evol. 20: 189.
Range. Heller's above citation was the first published record from what became part of today's Uganda. A number of names from many savanna parts of equatorial and southern Africa were amalgamated in *Suncus megalura* by Ellerman *et al.* (1953) but most authors followed Meester (1953) to reinstate genus *Sylvisorex* of Thomas (1904). As now understood this is probably the most widespread species of shrew in Africa, reaching hills of S Sudan. It is somewhat

FIG. 56. Distribution of select Soricidae: *Paracrocidura maxima* (▲), *Suncus lixus* (■). Shaded areas indicate lakes.

specialized for climbing in bushes and trees (Vogel 1974, Hutterer 1985), likes swamps (Rahm & Christiaensen 1963), reaches at least 2980 m on Mgahinga (FMNH). Fig. 57 displays the Ugandan distribution.
Western. Budongo (LACM, FMNH).

FIG. 57. Distribution of select Soricidae: *Suncus megalura* (O), *Sylvisorex vulcanorum* (▲). Shaded areas indicate lakes.

Southern. Buhoma 1500 m (FMNH); Byumba 1540 m (FMNH); Echuya FR 2380 m (FMNH); Enkombe Sawmill, Kalinzu FR 1480 m (FMNH); 1 km SE of Bwentale Camp, Kigezi GR 1062 m (FMNH); Impenetrable Forest (ROM); Kagamba (BMNH 11.12.3.56 Type of *irene*); Kichwamba (BMNH, Delany 1964); Mgahinga Gorilla NP 2980; saddle bet. Mts Mgahinga & Mt Muhavura 2680 m (FMNH); Mubwindi Swamp 2070 m (FMNH); Ngoto Swamp 1500 m (FMNH); Ruhija, BINP 2285 m (LACM).
S Buganda. Bussu (MSNG, DeBeaux 1926).
N Buganda. Kasiba (Festa 1909) from published description we believe this was *S. megalura*, not "*S. granti.*"
Eastern. Mbale (UFD); Mulanda (BMNH); Nabumali (BMNH).
Nile. Rhino-Camp (USNM 164644 Type of *gemmeus* and cotype).
Measurements. (Rhino-Camp, Nabumali, Mulanda) HB 59-69; T 71-82; HF 12-15; E 7-8; WTG 4-5; SK 17.4-17.8; XMX 5.3-5.5; XIO 4.1-4.3; XBC 7.6-8.0; UTR 7.4-7.8; HBBC 5.3. (Kagamba, Kichwamba, Ruhiza) HB 58-70; T 68-80; HF 13-15; E 7-9; WTG 5; SK 17.2-18.5; XMX 5.2-5.4; XIO 4-4.2; XBC 7.7-8.0; UTR 7.3-8.0.

The measurements above are divided into paler reddish brown animals like *gemmeus* from N and E Uganda, and darker more chocolate examples as *irene* from southern regions. Delany (1964) noted it in tall elephant grass, another had been swallowed by a puff adder *Bitis arietans* (DeBeaux 1926).

Sylvisorex johnstoni

Myosorex johnstoni Dobson 1888, Proc. Zool. Soc. Lond. for 1887: 575; Rio del Rey (Cameroon 4°42'N 8°36'E).

Sylvisorex johnstoni Thomas 1904, Proc. Zool. Soc. Lond., p. 185.

Sylvisorex johnstoni dieterleni Hutterer 1986 Bonn. zool. Beitr. 37: 25; Usambirio (Tanzania 2°55'S 31°12'E). Mentions BMNH examples from Uganda.

Range. Hutterer's description above included the first Uganda record, from Mabira forest. *S. j. dieterleni* was supposed to be a small subspecies, but Hutterer & Schlitter (1996) doubted its validity. A few examples have been cited from Bioko, Gabon, P. R. Congo, NE D. R. Congo, and Burundi. Fig. 58 displays the Ugandan distribution.

Western. Budongo (FMNH 152191, 165095).

Southern. 8 km N of Bwambara, Kigezi GR, 1031 m (FMNH 154071).

S Buganda. Malabigambo (LACM 55118).

N Buganda. Mabira Forest (BMNH 4.12.28.1, Hutterer 1986).

Measurements. (Budongo, Mabira) HB 39-50; T 25-28; HF 8-10; SK 14.8-15; XMX 4.6-4.8; XIO 3.5-3.6; XBC 7.4; HBBC 4.5-4.6; UTR 6.1.

There is a possible specimen without skull from Entebbe in BMNH (see *Crocidura bottegi* in Rejected Species appendix).

Sylvisorex vulcanorum, Fig. 53A

Sylvisorex vulcanorum Hutterer & Verheyen 1985, Z. Säugetk. 50: 267; Karisoke (Rwanda 1°28'S 29°29'E).

Range. Described from Rwanda volcanoes and adjoining D. R. Congo. *Vulcanorum* was found in 1991 on both Uganda and D. R. Congo sides of Ruwenzori by FMNH. However it has since been found very common at several locations in S P. Fig. 57 displays the Ugandan distribution.

Western. Nyabitaba 2670 m (FMNH); confluence Kyoha/Mubuku R. 1890 m and Mubuku/Mahoma R. 2100 m (FMNH, Keris Peterhans *et al.* 1998).

Southern. Echuya 2380 m (FMNH); Impenetrable Forest (ROM); Mgahinga Gorilla NP (at 2680 m and at saddle between Mts Mgahinga and Mt Muhavura 2980 m; FMNH); Ruhija 2350 m (FMNH).

Measurements. (Type, and Ruwenzori) HB 47-51; T 47-59; HF 10-12; E 7; SK 15.4-15.8; XBC 7.7-7.9; XIO 3.9-4.0; XMX 4.9-5.3; UTR 6.5-6.8; HBBC 5.1. Population in at least two of the three Southern Province locations was amazingly high during February to April. Almost twice more ♂ than ♀ were captured.

FIG. 58. Distribution of select *Sylvisorex* (Soricidae): *Sylvisorex johnstoni* (O), *Sylvisorex granti granti* (▲), *Sylvisorex granti mundus* (■). Shaded areas indicate lakes.

Sylvisorex granti

Sylvisorex granti Thomas 1907 Ann. & Mag. Nat. Hist. 7 (19): 118 Mubuku Valley 10000 ft (Uganda 0°21'N 29°56'E).

Sylvisorex mundus Osgood 1910 Zool. Ser. Field Mus. Nat. Hist. 10: 18 Kijabe (Kenya 0°56'S 36°34'E).

Range. Thomas 1907, added this Uganda species to his own new genus *Sylvisorex* (Thomas 1904). It has since been described from mountainous parts of Kenya, Tanzania, E D. R. Congo, Rwanda, and S Cameroon, and seems generally far easier to catch than other species except *S. megalura* (but see also, locally *S. vulcanorum*). This species was listed in error for BINP by Kasangahi *et al.* (2003). Fig. 58 displays the Ugandan distribution.

Western. Lake Bujuku 3960-4000 m (BMNH, FMNH); confl. Mubuku/Kyoha R. 1920 m (FMNH); confl. Mahoma/Mubuku R. 2100 m (FMNH); Mahoma L. 2960 m (FMNH); John Mate Camp 3370 m (FMNH); Mihunga 1980 m (MCZ; Allen & Loveridge 1942); Mubuku Valley 3050 m (BMNH; Thomas 1907, Thomas & Wroughton 1910; FMNH); Nyabitaba 2670 m (FMNH); Nyamleju 3320 m (LACM).

Southern. Bufumbiro (Kingdon 1974); Impenetrable Forest (ROM); Ruhija 2285 m (LACM)

Eastern. Butandiga 2135 m (MCZ, Allen & Lawrence 1936); Kapchorwa (UFD).

Measurements. (Bujuku, Impenetrable, Mubuku) HB 48-64; T 52-70; HF 10-13; WTG 2-5; SK 16.8-17.0;

XMX 5.2-5.3; XIO 3.3-4.2; XBC 8.5-8.9; UTR 6.4-6.5; HBBC 5.8.

In addition to the altitude range 1890-3960 m indicated on Uganda specimens, there are several notes on reproduction at Ruwenzori: BM 77.228 at 3960m among *Senecio* and *Alchemilla* alpine grassland in March carried 1 embryo; MCZ 39307 from a banana plantation near a swamp at 1980 m in January fled from a nest, dragging 2 suckling young from her nipples (Allen & Loveridge 1942).

Sylvisorex lunaris, Fig. 52C

Sylvisorex lunaris Thomas 1906, Ann. & Mag. Nat. Hist. 7 (18): 139; Ruwenzori East (= Mubuku Valley 3810 m).

?*Sylvisorex ruandae* Lonnberg & Gyldenstolpe 1925, Arkiv. f. Zool. 178: 1; Mt Sabinio 2600 m (Rwanda 1°24'S 29°35'E).

Range. This new species named from W Uganda was followed by others from neighboring countries and from Cameroon, with speculation about their relationships (Osgood 1936, Balsac & Lamotte 1957). In recent years further species have been discovered with obvious similarity to *lunaris*, but, following Hutterer (1993) we tentatively include only *ruandae* from Virunga volcanoes and specimens from the Kivu mountains as conspecific with *lunaris* from D. R. Congo and Uganda sides of Ruwenzori massif (see below). Fig. 59 displays the Ugandan distribution.

Western. Buhunga 1829 m (BMNH); Mubuku Valley 3810 m (BMNH 6.7.1.38 Type, and 4 topotypes from sites 1890-3900 m); Nyabitaba 2670 m

FIG. 59. Distribution of select *Sylvisorex* (Soricidae): *Sylvisorex lunaris lunaris* (■), *Sylvisorex lunaris ruandae* (▲). Shaded areas indicate lakes.

FIG. 60. Distribution of select Soricidae: *Ruwenzorisorex suncoides* (O), *Scutisorex somereni* (▲). Shaded areas indicate lakes.

(LACM, FMNH); confl Kyoha/Mubuku R 1890 m (FMNH), confl Mahoma/Mubuku Rivers 2100 m (FMNH); Lake Mahoma 2960 m (FMNH); John Mate Camp 3370 m (FMNH, Kerbis *et al.* 1996).

Southern. Bwindi 2055-2070 m (LACM 55120, FMNH); Echuya 2380 m (FMNH); Mgahinga Gorilla NP 2680-2980 m (FMNH); Mubwindi Swamp 2070 m (FMNH); Omubiyanja Swamp 1850 m (FMNH); Ruhija 2350 m (FMNH). Sex ratio of recent captures (Feb. to Apr.) in SW Uganda was 14 ♂ to 11 ♀.

Measurements. (Buhunga, Mubuku, Nyabitaba) HB 77-91; T 51-56; HF 14-16; E 9-11; SK 22.1-23.1; XMX 5.9-6.5; XIO 4.4-4.7; XBC 9.5-10.0; UTR 9.4-9.9. (Bwindi) HB 81; T 48; HF 14; E 9; WTG 12; SK 22.3; XMX 6.6; XIO 4.9; XBC 10.4; UTR 10.2.

In several details some specimens from Southern Province closely resemble the Type of *ruandae* and differ from most Ruwenzori *lunaris*. Although overall length of the skull is similar, the upper toothrow is shorter and the maxillae wider, and as in *ruandae*; the pterygoid fossa is pinched in at the hamulars, the coronoid process anterior edge is sinuous and the upper profile of the braincase seems less inflated.

Ruwenzorisorex suncoides, Fig. 52D

Sylvisorex suncoides Osgood 1936, Zool. Ser. Field Mus. Nat. Hist. 20: 217; Kalongi 2134 m (D. R. Congo 0°20N 29°48'E).

Ruwenzorisorex suncoides (Osgood) Hutterer 1986, Z. Säugetk. 51: 260; new genus.

Range. Hutterer (1993) listed this species first from Uganda. Although originally described from the D. R. Congo side of Ruwenzori, it does not seem to occur on the Uganda slopes of the same massif and the only Uganda locality seems an extension of the species occurrence from about 2°S in D. R. Congo, through W Burundi and W Rwanda. Fig. 60 displays the Ugandan distribution.
Southern. Ruhija 2350 m (FMNH 157830).
Measurements. (Hutterer 1986) HB 92-95; T 55-62; HF 16-17; E 7; WTG 18; SK 24.5-25.0; XBC 11.1-11.6; XIO 4.8-5.1; XMX 7.4-7.5; UTR 10.7-11.3.
Querouil *et al.* (2001) found molecular affinity with *Suncus*. One of us (JKP) noted semi-aquatic behavior, apparently unique among African Soricidae; also see Vogel & Kopchen (1978). Stephan *et al.* (1991) studied its brain structure.

Crocidura littoralis, Fig. 53E
Crocidura littoralis Heller 1910, Smiths. Misc. Coll. 56: 5; Butiaba (Uganda 1°49'N 31°19'E).
Crocidura oritis Hollister 1916, Bul. Amer. Mus. Nat. Hist. 35: 666; Avakubi (D. R. Congo 1°18'N 27°35'E).
Range. This single shrew, discovered in W Uganda in 1910, and still the only Uganda example known, seems to be less rare in N E D. R. Congo (Hollister 1916, Balsac & Verschuren 1968, Dieterlen & Balsac 1979) and has been subsequently reported in wooded hills of S Sudan (Hutterer & Dieterlen 1981), Cameroon, Central African Republic, Angola, and W Kenya (Dippenaar 1980), but see below. Fig. 61 displays the Ugandan distribution.
Western. Butiaba (USNM 164642, Type, Dieterlen & Balsac 1979).
Measurements. (Butiaba) HB 96; T 67; HF 16; SK 24; XMX 6.4; XIO 4.9; XBC 9.9; UTR 10.0.

No less than 23 shrews closely resembling this species were taken by the USNM 1910 expedition at Kaimosi; they were identified as *maurisca* by Hollister (1916), who compared the skulls of 7 of them with his own slightly larger Type of *littoralis*. Dippenaar (1980) considered Kaimosi material (FMNH 43852?) as *littoralis*, but Balsac (1958), Butler *et al.* (1989), and McLellan (1994) assert that *littoralis* has 1 notch on the lower incisor, and *maurisca* has 2 notches. Some of the USNM series seem to show 2 notches, and a nearby specimen from Yala R. Kenya (NRMS A596315) clearly has 2 notches and agrees in dimensions with those from Kaimosi.

Crocidura maurisca, Fig. 53D
Crocidura maurisca Thomas 1904, Ann. & Mag. Nat. Hist. 7 (14): 239; Entebbe,Uganda (see also Balsac & Mein 1971, pp. 232-235).
Range. For 60 years no other Uganda specimen was noted. Hollister (1918) reported specimens from W Kenya which are still being debated. 2 specimens collected south of Kilimanjaro were identified by Thomas as *maurisca* for Stockholm Museum (Lonnberg 1910) but may have been *littoralis* (Dippenaar 1980) or *C. tansania* and could not be located recently. Another example was trapped in SW Uganda in 1961 (Delany 1964), followed by reports from N E D. R. Congo, Rwanda, W Kenya, Nairobi, and even Gabon and Cameroon. However the list by Hutterer (2005) was quite conservative, not even including his own (1981) Nairobi record. Fig. 61 displays the Ugandan distribution.
Southern. Echuya Swamp 2380 m (BMNH, Delany 1964; MCZ, FMNH); Mubwindi Swamp 2380 m (FMNH); Ngoto Swamp 1500 m (FMNH).
Central. Entebbe (BMNH 1.8.9.99 Type; Thomas 1904); "Kanyanya" or "Kayanja" (BMNH 19.11.3.1 collected by Van Someren 24/1/1919), the handwriting of the label and the catalog are uncertain; there is a hill 10 km north of Kampala called Kanyanya, and places called Kayanja near Masaka (?N Buganda) and 30 km E of Kampala (?Central), (Jenkins in litt. 1994).
Measurements. (Echuya, Entebbe, Kanyanya) HB 75-88; T 55-64; HF 14-16; E 7-10; SK 20.6-20.7; XMX 5.7-6.2; XIO 4.4-4.9; XBC 9.0-9.2; UTR 8.9-9.2.
As well as 3 Uganda specimens listed, the senior

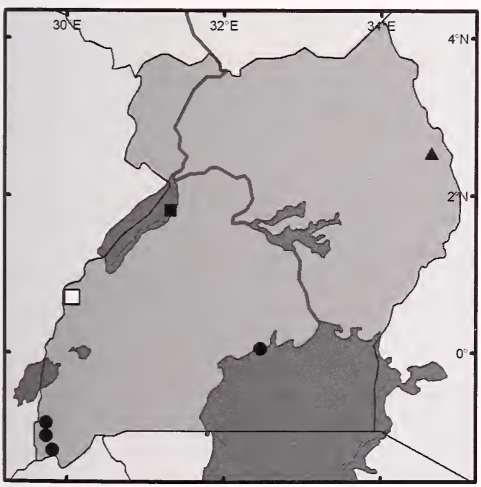

FIG. 61. Distribution of select *Crocidura* (Soricidae): *Crocidura macarthuri* (▲), *Crocidura maurisca* (●), *Crocidura littoralis* (■), *Crocidura ludia* (□). Shaded areas indicate lakes.

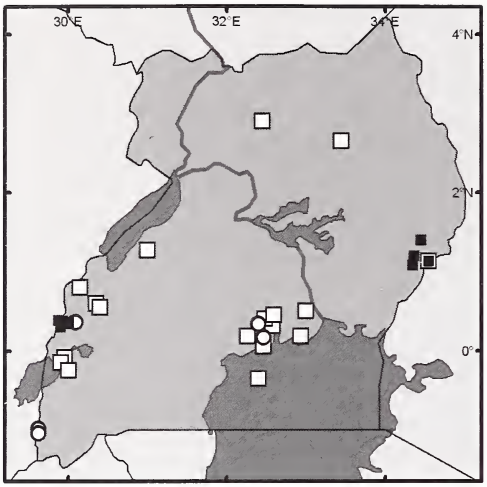

FIG. 62. Distribution of select *Crocidura* (Soricidae): *Crocidura dolichura* (O), *Crocidura luna* (□), *Crocidura montis* (■). Shaded areas indicate lakes.

author studied and accepted another from Yala R., W Kenya (NRMS A596315) in Stockholm, but search and enquiry (J. Englund, in litt.) for the Tanzanian specimens failed. It is probable that this species occurs in other untouched forests of Uganda, including the extreme east. However its potential for such refuges becomes daily less with expansion of settlement and logging.

Crocidura dolichura

Crocidura dolichura Peters 1876, Monatsber. K. Preuss. Akad. Wiss. Berlin, p. 475, pl. 2 (1); Bonjongo (Cameroon 4°6'N 9°8'E).

Range. Southern & Hook (1963) first captured and reported this species from Uganda (although it was at first labelled "*C. muricauda,*" a similar species but with a bristly tail from far W Africa); (Balsac & Meester 1977). This seems to be a forest species inhabiting central equatorial regions from Nigeria to Uganda. Fig. 62 displays the Ugandan distribution.

Southern. Buhoma 1575 m (FMNH); Nteko P. 1600 m (FMNH).

Western. Confl Kyoha/Mubuku Rivers RMNP 1890 m (FMNH).

Central. Mayanja (BMNH 69.549); Zika (BMNH 64.516; Southern & Hook 1963, Balsac & Meester 1977).

Measurements. (Hutterer & Happold 1983) HB 60-70; T 73-75; HF 12-13; HF 12-13; E 9-10; WTG 5-6. (Mayanja, Zika) SK 18.6-18.9; XMX 5.5-5.8; XIO 4.0-4.3; XBC 8.3; HBBC 5.5-5.6; UTR 7.6-7.8.

Crocidura ludia, Fig. 53C

Crocidura ludia Hollister 1916, Bul. Amer. Mus. Nat. Hist. 35: 668; Medje (D. R. Congo 2°26'N 27°17'E).

Range. This rare species is here reported from Uganda for the first time. Described from two nearby places in N E D. R. Congo, then found further S E and further W in D. R. Congo (Dieterlen & Balsac 1979, Colyn 1986, Hutterer & Dippenaar 1987); and a skull in a mongoose scat in Central African Republic (Hutterer & Ray 1997). Fig. 61 displays the Ugandan distribution.

Western. Bundibugyo (two specimens in FMNH, UFD field numbers T 02, T11)

Measurements. (Bundibugyo; Type AMNH 48566) HB 60; T 60; HF 14; SK 17.7-18.3; XBC 8.2; XIO 4.0; XMX 5.4; UTR 7.8; HBBC 5.3. (Bundibugyo) HB 65-74; T 59-63; HF 12-13; E 9.0; WTG 5; SK 18.0-18.5; XBC 8.2-8.4; XIO 4.0; XMX 5.6; UTR 7.9; HBBC 5.5; MAND 11.0.

The above identification was made with help from R. Hutterer. Brosset *et al.* (1965) suggested that *ludia* could be a synonym of *C. latona*, while Balsac & Meester (1977) named it "*C. dolichura ludia*" and believed that BM 64.516 from near Entebbe might be *ludia* (but we consider this specimen to be *C. dolichura* not *C. ludia*).

Crocidura stenocephala, Fig. 53F

Crocidura littoralis stenocephala Heim de Balsac 1979, Säugetk. Mitt. 27: 258; Kahuzi-Gebiet = PN Kahuzi-Biega (D. R. Congo 2°15'S 28°41'E).

Range. This is the first record in Uganda and the first beyond the Type region for *stenocephala*. The Field Museum expeditions of 1996/97 found 7 examples from 4 locations, extending the range 180 km NE. Fig. 63 displays the Ugandan distribution.

Southern. Echuya 2380 m (FMNH); Mubwindi Swamp 2070 m (FMNH); Ngoto Swamp 1500 m (FMNH); Ruhija 2350 m (FMNH).

Measurements. (Bwindi, Echuya, Ngoto) HB 90-95; T 66-69; HF 13-17; E 5-9; WTG 13-18; SK 22-25; XBC 9.8; XMX 6.1; XIO 4.7; UTR 9.5; LTR 9.0.

The Type material came from 3 neighboring *Cyperus latifolius* swamps at about 2300 m, also from another swamp and a place by a waterfall in the same region. MBwindi has 2 m high rush/sedge swamp vegetation with *Lobelia*, closely surrounded by steep forest-covered hills. Located at the periphery of BINP, Ngoto Swamp features *Cyperus papyrus* and is surrounded by degraded/secondary vegetation rather than mature montane forest (Drewes & Vindum 1994).

Crocidura niobe, Fig. 53G
Crocidura niobe Thomas 1906, Ann. & Mag. Nat. Hist. 7 (18): 138; Mubuku Valley 1830 m, Uganda.
?*Crocidura macowi* Dollman 1915, Ann. & Mag. Nat. Hist. 8 (16): 378; Mt Nyiro = Ol Doinyo Ngiro (Kenya 2°8'N 36°51'E).
Range. This Uganda species remains rare in collections, partly from its choice of alpine habitat. It may be restricted to Ruwenzori, adjoining volcanoes and Kivu Mountains, but very similar shrews have been noted from mountains in NW Kenya and SW Ethiopia. Fig. 63 displays the Ugandan distribution.

FIG. 63. Distribution of select *Crocidura* (Soricidae): *Crocidura stenocephala* (▲), *Crocidura roosevelti* (■), *Crocidura niobe* (O), *Crocidura jacksoni* (□). Shaded areas indicate lakes.

Western. Mubuku Valley 1830 m (BMNH 6.7.1.32 Type, two Topotypes); one at 2135 m; confl Kyoha/Mubuku Rivers RMNP 1890 m (FMNH).
Southern. Nteko P. 1600 (FMNH); Itama 1615 m (LACM); Mts Mgahinga/Muhavura 2980 (FMNH); Sabinio Volcano MGNP 2590 m (FMNH 26477).
Measurements. (Mubuku, Ibanda, Sabinio) HB 59-75; T 56-67; HF 13-14; E 9-10; WTG 6; SK 19.0-19.8; XMX 5.3-6.3; XIO 4.5; XBC 8.1-9.1; UTR 8.2-8.5; HBBC 5.6.

Crocidura roosevelti, Fig. 64C
Heliosorex roosevelti Heller 1910, Smiths. Misc. Coll. 56 (15): 6; Rhino Camp, Lado = Uganda.
Crocidura roosevelti Hollister 1918, Bul. U.S.Ntl. Mus. 99: 68.
Range. This rare shrew described from N Uganda as of a new genus, was not found again until 1963, when Hayman sought advice from Balsac, over such a specimen from Angola. Despite characteristic delicate dentition and extended braincase, Hollister (1918), Balsac & Verschuren (1968), and subsequent authors rejected its generic separation, although Hutterer (1993) retained it as a subgenus. Only 2 dozen specimens are known today (half of them from owl pellets), occurring from Cameroon and N Angola through eastern D. R. Congo, Rwanda, Tanzania, and Uganda. Fig. 63 displays the Ugandan distribution.
Southern. Crater track, Rwenzori NP (Lausanne Museum, Hutterer 1981); (KMB, 5 more, same locality out of 80 shrews taken, A. Hoffmann thesis, in litt. 1999).
Nile. Rhino-Camp (USNM 164643 Type; Hollister 1918, Hutterer 1981, Hutterer 1993).
Measurements. (Rhino-Camp) HB 85; T 66; HF 14; SK 21; XMX 5.9; XIO 4.6; XBC 8.4; UTR 8.6.

The Rwenzori NP specimens were found in *Imperata / Cymbopogon* grass and *Capparis / Euphorbia* bushland mosaic (Hoffmann, in litt. 1999).

Crocidura luna, Fig. 52E
Crocidura luna Dollman 1910, Ann. & Mag. Nat. Hist. 8 (5): 175; Bunkeya R. (D. R. Congo 10°22'S 27°1'E).
Range. There was probably no mention of *C. luna* in Uganda before the monograph of the *luna-fumosa* complex by Dippenaar & Meester (1989), zoologists having been accustomed to think of any similar Uganda shrew as a form of *C. fumosa* (Thomas 1906, Dollman 1915, Southern & Hook 1963). As now understood (Hutterer 1993) the species has extensive distribution from E Zimbabwe to the NE border of D. R. Congo and to Mt Kenya. The species was listed in error for BINP by Kasangaki *et al.* (2003). Fig. 62 displays the Ugandan distribution.
Western. Kanyawara (SMNS); Kibale (LACM); Mwela (LACM); Ntandi (LACM).
Southern. Rwenzori NP (BMNH, Dippenaar & Meester 1989); Crater/Main Tracks QENP (KMB, Hoffman 1999).
S Buganda. Bufumira I. (BMNH).
Central. Entebbe (BMNH); Kabanyolo (BMNH, Dippenaar & Meester 1989); Kampala (USNM); Mpanga (DAS).
N Buganda. Bussu (MSNG, DeBeaux 1926); Kisimbiri (USNM, Dippenaar & Meester 1989); Mabira (BMNH, Dippenaar & Meester 1989).
?Eastern. Juch (2000) records both *C. luna* and "*C. fumosa*" from Mt Elgon.

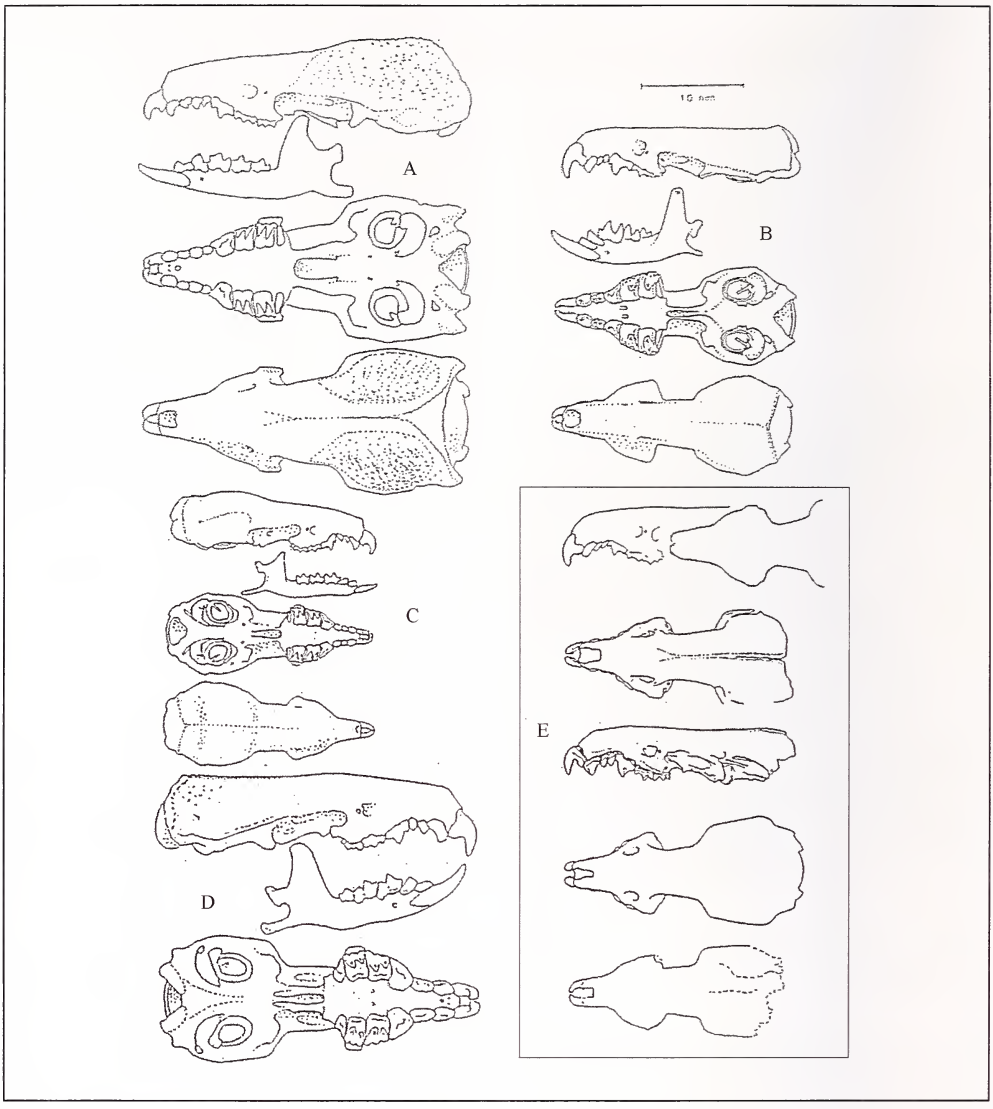

FIG. 64. Shrew skulls: A – *Scutisorex somereni*; B – *Crocidura macarthuri*; C – *C. roosevelti*; D – *C. olivieri*; E – *C. voi*, after Hutterer 1983, 1986, and type.

Northern. Awach (BMNH); Paicho (BMNH).
Measurements. (Dippenaar & Meester 1989) HB 64-101; T 31-63; HF 13-15; E 8-10; SK 20.0-23.4; XMX 6.3-7.6; XIO 4.2-5.3; XBC 9.3-10.5; UTR 8.7-10.4.

This seems to be a fairly common species of the southern and western parts of the country, avoiding closed parts of heavy forest. In wooded places in the north it may be the subspecies *garambae* Balsac & Verschuren (1968). Karyotypes of *luna* from neighboring Burundi showed the lowest number 2n = 36, FN = 56 among African Crocidura and were thought to show unexpected connection with *Sylvisorex lunaris* (Maddalena 1990). In Rwenzori NP, mostly in *Imperatus / Cymbopogon* grassland, it amounted to a third of all shrews found (Hoffmann thesis, in litt. 1999).

FIG. 65. Distribution of select *Crocidura* (Soricidae): *Crocidura elgonius* (O), *Crocidura selina* (■). Shaded areas indicate lakes.

Crocidura selina

Crocidura fumosa selina Dollman 1915 Ann. & Mag. Nat. Hist. 8 (16): 371; Mabira Forest (Uganda 0°30'N 33°E).

Crocidura luna selina McLellan 1994, 386 et seq. *in* Merritt *et al.* (eds) "Advances in the Biology of Shrews" Carnegie Mus. N. H. Spec. Publ. 18.

Range. In the monograph of Dippenaar & Meester (1989) which we mostly follow for this group, *selina* was regarded as a unique forest species found only in Uganda, and sometimes occurring with *luna*. In her analysis of morphological details, McLellan agreed in part with classification by Balsac & Meester (1977) placing *selina* as the subspecies of *luna* in this area. Contemporary versions seem to agree that *fumosa* is a distict form not in Uganda. Fig. 65 displays the Ugandan distribution.

Western. Kibanda (BMNH, Dippenaar & Meester 1989).

Central. Mbanga (BMNH, Dippenaar & Meester 1989); Zika (BMNH, Southern 1963).

N. Buganda. Mabira (BMNH 8.10.27.3 Type).

Measurements. (Dippenaar & Meester 1989) HB 79-88; T 55-62; HF 13-15; SK 22.8-23.5; XMX 7.1-7.3; XIO 4.7-5.0; XBC 10.3-10.9; UTR 10.2-10.6.

Crocidura montis

Crocidura fumosa montis Thomas 1906, Ann. & Mag. Nat. Hist. 7 (18): 138; Mubuku Valley 3810 m (Uganda 0°21'N 29°54'E).

Crocidura montis Dippenaar & Meester 1989, Ann. Transv. Mus. 35: 1-47.

Range. One of many characteristic montane small mammals to be recognized early from the BMNH expeditions to Ruwenzori. At first thought to be restricted to Ruwenzori, but currently reported from elevated locations in E and NE Uganda, S Sudan, SW Kenya, and Kilimanjaro foothills. This species was listed in error for BINP by Kasangaki *et al.* (2003). Fig. 62 displays the Ugandan distribution.

Western. Mubuku Valley 3810 m (BMNH 6.7.1.28 Type and 5 Cotypes; Thomas & Wroughton 1910, Dippenaar & Meester 1989); "Elinine 4610 m" = Lake Irene (Transvaal Museum); Lake Mahoma 2960 m (FMNH); John Mate Camp 3370 m (FMNH, Kerbis Peterhans *et al.* 1998); Nyamgesami L (BMNH).

Eastern. Butandiga, N Bugishu (BMNH); Mt Elgon W side (BMNH); Juch (2000) reported both *C. luna* and "*C. fumosa*" from Mt Elgon but without seeing the specimens we follow Dippenaar & Meester and presume them to be *C. luna* and *C. montis*; Kapchorwa (UFD); Kokanjiro Mts (BMNH, Dippenaar & Meester 1989).

We are inclined to doubt Balsac & Meester's (1977) inclusion in *montis* of specimens from Entebbe (elevation only 1200 m). This species has been found higher than any other shrew in Africa, at 4610 m (Dippenaar & Meester 1989) and on the western D. R. Congo side of Ruwenzori at 4450 m (Balsac 1968). One marvels at its ability to find invertebrate food through the year, and as with *Sorex tundrensis* in high arctic Canada we wonder how its life cycle can be achieved through long periods of below-freezing weather. On Ruwenzori the species is noted in *Arundinaria alpina* bamboo thickets (2960 m), among *Phillippia* and *Erica* heathers (Kerbis *et al.* 1996). On Mt Elgon it was found common and active all day in *Festuca pilgeri* alpine grassland 3300-4120 m (Clausnitzer *et al.* 2003).

Crocidura jacksoni, Fig. 55E

Crocidura jacksoni Thomas 1904, Ann. & Mag. Nat. Hist. 7 (14): 238; Ravine Station = Eldama (Kenya 0°1'N 35°43'E).

Range. Hutterer 1993 listed *C. jacksoni* from Uganda without detail; here we probably give the first specimen record. It occurs at least in hilly areas across N equatorial Kenya W to Karamoja and S to Mara region of Kenya (*amalae*). Balsac (1959) recognized its distinctness from "*C. jacksoni denti*," and we suspect that supposed records of "*jacksoni*" from NE D. R. Congo are small examples of *C. luna* or misinterpreted *C. denti* (Balsac & Meester 1977). Fig. 63 displays the Ugandan distribution.

Karamoja. Amudat (BMNH 63.663); Moroto (BMNH 63.657).
Measurements. (Amudat, Moroto, Ravine, Kenya) HB 72-81; T 46-54; HF 12-13; E 7; WTG 7-9; SK 20.5-21.1; XMX 5.8-6.6; XIO 4.2-4.5; XBC 8.3-9.6; UTR 9.0-9.4.

We believe this species to be a small member of the *C. luna-fumosa* complex unfortunately not discussed by Dippenaar & Meester (1989). Its first juvenile pelage is a pure medium gray, as with *C. luna*, and the pale flecks described by Thomas (1904) in the darker adult coat are probably juvenile hairs not yet moulted out. At Amudat it was trapped in dry tree savanna.

<u>*Crocidura denti*</u>, Fig. 55F
Crocidura jacksoni denti Dollman 1915, Ann. & Mag. Nat. Hist. 8 (16): 377; between Mawambi & Avakubi (D. R. Congo 1°14'N 28°4'E) (not *C. denti* St. Leger 1932 = *C. rudolfi* = *C. nanilla*).
Crocidura denti Balsac 1959, Bonn. zool. Beitr. 10: 216.
Range. Balsac & Meester (1977) included Ruwenzori area of Uganda in their account, together with records from the Congo basin and west to Cameroon. Although a forest shrew it is not found at high altitudes. Fig. 66 displays the Ugandan distribution.
Western. Budongo (LACM, ROM); Bugoma (BMNH); Bundibugyo (UFD); Bwamba (AMNH); Hoima (FMNH); Mwela (LACM); Ntandi (LACM).

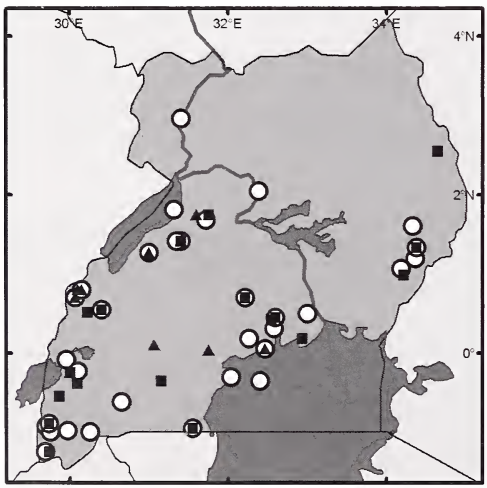

FIG. 66. Distribution of select *Crocidura* (Soricidae): *Crocidura denti* (▲), *Crocidura nigrofusca* (O), *Crocidura hildegardeae* (■). Shaded areas indicate lakes.

Southern. Rwenzori N P (BMNH).
S Buganda. 160 km W Entebbe (BMNH); 80 km W Entebbe (BMNH).
Central. Entebbe (BMNH).
Measurements. (Bundibugyo, Entebbe, Hoima) HB 60-65; T 45-46; HF 13-14; E 8; SK 20.3-20.6; XMX 5.8-6.7; XIO 4.2-4.5; XBC 8.6-9.3; UTR 8.5-9.0.

As indicated above, Dollman's (1915) inclusion of *denti* in *jacksoni* caused confusion until long after Allen's (1939) list. *C. denti* more resembles a small *C. nigrofusca*, rather than *C. jacksoni*, but its basic measurements are quite similar. At Mwela, end of Nov. ♀ with 2 embryos.

<u>*Crocidura nigrofusca*</u>, Fig. 52F
Crocidura nigrofusca Matschie 1895, "Die Säugethiere Deutsch Ost-Afrikas," p. 33; Wukalala (near Kinyawanga, D. R. Congo 0°29'N 29°32'E on W bank of Semliki R.).
Crocidura nigrofusca Matschie. Hutterer 2005 *in* Wilson & Reeder (eds) includes *nilotica*, *kempi*, ?*zaodon* from Uganda.
Crocidura turba tarella Dollman 1915, Ann. & Mag. Nat. Hist. 8 (16): 135; "Chaya near Rutshuru" (?D. R. Congo 1°11'S 29°27'E); maybe = Echuya, Uganda).
Crocidura tarella (Dollman). Hutterer 2005 *in* Wilson & Reeder (eds) separates species, Uganda, based on Dippenaar (1980, unpubl.).
Crocidura zaodon Osgood 1910, Publ. Zool. Field Mus. 10: 21 Nairobi, Kenya.
Crocidura turba zaodon (Osgood) Hollister 1918, Bul.U.S. Ntl. Mus. 99, pp. 52-55. Material from SW Uganda, omitted mention of *tarella*.
Crocidura zaodon tarella (Dollman). McLellan (1994), pp. 386-390 *in* Merritt *et al.* (eds) Carnegie Mus. Nat. Hist. Spec. Publ. 18; Uganda.
Crocidura nilotica Heller 1910, Smiths. Misc. Coll. 56: 3; Rhino-Camp, Lado = Uganda.
Crocidura nilotica Heller. McLellan 1994 *in* Merritt *et al.* (eds), Uganda.
Crocidura nigrofusca nilotica (Heller). Hutterer 2005 *in* Wilson & Reeder (eds), Uganda.
Crocidura turba kempi Dollman 1915, Ann. & Mag. Nat. Hist. 8 (16): 134; Kirui, Mt Elgon 1830 m (Kenya 0°50'N 34°40'E).
Crocidura nigrofusca kempi (Dollman) Hutterer 2005, *in* Wilson & Reeder (eds).
Range. Heller (1910) first described specimens as *nilotica* from Uganda, followed soon by Dollman (1915) and Hollister (1918). Both the latter had much experience with C African shrews, but the variance of their nomenclature for this group continues today

among experts. Still lacking concensus, we here treat all forms of this group as if they are subspecies of *C. nigrofusca*, but genetic studies and further morphological detail may give a different picture. We studied most of our material before McLellan's detailed analysis was available, and our classification is based largely on geographical isolations. The species group inhabits wooded savanna and open forest through much of Uganda and widely in E and C Africa. Setzer (1956) questioned the ability of *nilotica* to cross to both banks of the Nile in NW Uganda and Sudan; Hollister (1918) (ignoring *tarella*) thought the Victoria Nile a boundary between *nilotica* and *zaodon*, but reported S Sudan specimens called *zaodon* east of the White Nile. There seems a considerable gap between specimens from Kampala area (*tarella* / *zaodon*) and those near Mt Elgon (*kempi*). Fig. 66 displays the Ugandan distribution.

Western. Bundibugyo (AMNH); Butiaba (USNM, Hollister 1918); Hoima (USNM, FMNH); Kibale (LACM); Masindi (BMNH); Mwela (LACM); Ntandi (LACM); crater track Rwenzori N P (KMB, Hoffmann, in litt. 1999).

Southern. Byumba 1540 m (FMNH); Kagamba (BMNH, Dollman 1915); Kichwamba (BMNH); Kiduha (BMNH); Kigezi (BMNH); Mbarara (BMNH); Nalasanji (BMNH); Ngoto 1500 m (FMNH). S Buganda. Bufumira I. (FMNH); Bukakata (FMNH); Malabigambo (LACM).

Central. Entebbe (BMNH); Kabanyolo (BMNH); Kampala (DAS, USNM); Mpanga (DAS).

N Buganda. Mabira (BMNH); Kabula-Muliro (BMNH).

Eastern. Butandiga (MCZ); Greeki R. (MCZ); Mbale (UFD); Sipi (MCZ); the report of *C. turba* from Mt Elgon (Juch 2000) is likely *C. nigrofusca kempi*.

Northern. Kidirangi-Lango (BMNH).

Nile. Rhino-Camp (USNM 164638, Type and series; Hollister 1918; FMNH).

Measurements. (Butiaba, Hoima, Kibale, Kichwamba, Kiduha, Malabigambo) HB 76-101; T 51-60; HF 15-16; E 9-10; WTG 11-19; SK 22.5-24.6; XMX 7.0-7.5; XIO 4.4-4.9; XBC 9.6-10.0; UTR 9.9. (Rhino-Camp) HB 88-102; T 48-52; HF 14-16; SK 21.9-23.8; XMX 6.6-7.5; XIO 4.5-4.8; XBC 9.3-10.3; UTR 9.4-10.6. (Kirui, Kenya, Mbale, Sipi) HB 78-100; T 48-60; HF 13-15; SK 22.3-23.4; XMX 7.1-7.2; XIO 4.7-4.9; XBC 9.5-9.7; UTR 9.8-10.4.

The measurements have been grouped from presumed ranges respectively of *tarella* /*zaodon*, *nilotica*, and *kempi*, but only a large series from each locality, carefully sorted by age, would be likely to show fine distictions due to two sympatric species. McLellan (1994) found 11 anatomical details to distinguish *tarella* from *nilotica*, out of 42 characteristics analysed, and only 5 to distinguish *tarella* from *zaodon*. Along the northern border of Uganda in Northern and Karamoja there will probably be found more *nilotica*. A series named "*tephra*" Setzer (1956) was described from hill forest in S Sudan; but Hutterer (1983) found that it included *C. nilotica*, and *C. viaria*; the Type was since identified as *C. foxi* (Hutterer 1993). In Rwenzori NP, it was scarce, in *Imperata* /*Cymbopogon* grassland, *Capparis* /*Euphorbia* bush (Hoffmann). Kasangaki *et al.* (2003) listed two synonyms of this taxon (*C. tarella* and *C. turba*), without explanation, in their listing of rodents and shrews from BINP.

Crocidura olivieri, Fig. 64D

Sorex olivieri Lesson 1827, Manuel de Mammologie, 121; Sakkara (Egypt 29°51'N 31°13'E) (embalmed material) see Corbet 1978.

Pachyura occidentalis Pucheran 1855, Rev. et Mag. de Zool. 2: 154; Gabon. Type (MNHN 1854-1285). Considered the valid name by Chitaukali *et al.* 2001, p. 420; *in* Denys *et al.* (eds) "African Small Mammals,"

Crocidura nyansae Neumann 1900, Zool. Jahrb. Syst. 6, p. 544; Lubwa's = Bugembe (Uganda 0°28'N 33°15'E).

Crocidura mutesae Heller 1910, Smiths. Misc. Coll. 56: 3; Kampala (Uganda).

Crocidura turba mutesae (Heller) Dollman 1915, Ann. & Mag. Nat. Hist. 8 (16): 136 (also as in Balsac & Verschuren 1968).

Crocidura hirta mutesae (Heller) Osgood 1936 Zool. Ser. Field Mus. 20: 224.

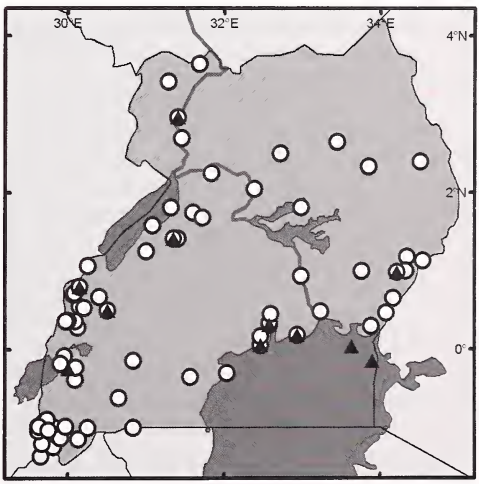

FIG. 67. Distribution of select *Crocidura* (Soricidae): *Crocidura olivieri* (O), *Crocidura fuscomurina* (▲). Shaded areas indicate lakes.

Crocidura flavescens kivu Osgood 1910, Ann. & Mag. Nat. Hist. 8 (5): 370;. Lake Kivu (eastern D. R. Congo).
Crocidura sururae Heller 1910, Smiths. Misc. Coll. 56: 2; Rhino-Camp (Uganda).
Crocidura daphnia Hollister 1916, Smiths. Misc. Coll. 66 (8): 1; Gondokoro, "Uganda" (Sudan 4°54'N 31°40'E). Hollister (1918), included BMNH specimen from Wadelai, Uganda, after Dollman (1915).
Range. This is the most common shrew in collections generally, from north of the Zambesi to about 15°N latitude, and in the east into Egypt. Neumann's was the first record from Uganda. Thomas (1902) referred Uganda specimens to *hedenborgiana* and *doriana* (now subspecies from Sudan). At one time the species was believed conspecific with *C. flavescens* of S Africa (Balsac & Barloy 1966). Later the equatorial form *C. occidentalis* seemed to be the next earliest name, until genetic work (deHondt 1974, Meylan 1967, Maddelena 1990) showed Egyptian, W, and E African forms to be conspecific. Recently the validity of this somewhat sketchy embalmed material from early Egypt is in question.The problem of small *mutesae*, and similar *simiolus* from W Kenya (Hollister 1916), and perhaps *zaphiri* from S Ethiopia (Dollman 1915) has had considerable exposure (Osgood 1936, Balsac & Verschuren 1968, Hutterer 1980, Thorn, in prep.) With a collection of about 50 shrews to study in the *olivieri / mutesae* complex from the Type locality Kampala, we have concluded that *mutesae* is within the extreme variation of *C. olivieri nyansae*. Our analysis of numerous skull measurements and proportions has shown an unbreakable series from small adult ♀ (as in Types of *mutesae* and *simiolus*) to large individuals (usually ♂) in the same population. Fig. 67 displays the Ugandan distribution.
Western. Budongo (LACM); Bugoma (BMNH); Bugoye (MCZ); Bundibugyo (UFD, AMNH); Bundimesemba (LACM); Butanuka (BMNH); Butiaba (USNM); Hoima (USNM); Kasindi (NHRS); Kiangami (BMNH); confl. Kyoha/Mubuku Rivers, RMNP 1890 m (FMNH); confl. Mahoma/Mubuku Rivers RMNP 2100 m (FMNH, Kerbis Peterhans *et al.* 1998); Masindi (BMNH); 32 km W Masindi (BMNH); Mubuku Valley 2590 m (BMNH, Thomas & Wroughton 1910); Murchison Falls NP (Williams 1967); Mweya (BMNH, SMNS); Ntandi (LACM); Nyabitaba 2670 m (FMNH); Rwansenge (LACM); Rwenzori NP crater trail (BMNH, Delany 1964); (KMB, Hoffmann 1999); Toro (Festa 1909); Tonia (BMNH).
Southern. Buhoma 1575 m (FMNH); Burumba (BMNH); Bwindi 2060 m (LACM); Byumba 1540 m (FMNH); Echuya (BMNH, Delany 1964); Enkombe Sawmill, Kalinzu FR 1480 m (FMNH); Ingezi (BMNH); Itama 1615 m (LACM); Kagamba (BMNH); Kakoba (BMNH); Kayonza (BMNH); Kibandama (BMNH); Kichwamba (BMNH); Kumba (BMNH); Lutoba (NHRS); Mbarara (BMNH); Mgahinga 2680 m (FMNH); Lake Mutanda (BMNH, Dollman 1915); Nyalusanje (BMNH); Ngoto Swamp 1500 m (FMNH); Nteko P. 1600 m (FMNH); Omubiyanja 1850 m (FMNH); Rugangi (BMNH); Ruhija 2350 m (FMNH).
S Buganda. Kaboyo (NHRS); Bukakata (FMNH).
Central. Entebbe (BMNH); Kabanyola (Delany 1964); Kampala (BMNH, DAS, NMK, USNM 164636 Type *mutesae*); Kamwokya (FMNH); Zika (Southern & Hook 1963).
N Buganda. Bussu (MSNG, DeBeaux 1926).
Busoga. Bugembe (ZMB A5485 Type *nyansae*; Neumann 1900); Lwangosia (AMNH); Nakavugo (MSNG, DeBeaux 1926).
Eastern. Budadiri (AMNH); Bugishu (AMNH); Busia (MSNG); Mt Elgon (Juch 2000); Nabumali (BMNH); Sukulu (NHRS); Terinyi (FMNH).
Karamoja. Lotome (BMNH, Watson 1951); Lorengikipi (BMNH).
Northern. Awach (BMNH); Awere (FMNH); Kidilande (BMNH); Kwera, Lango 1030 m (FMNH).
Nile. 2 miles W of Moyo (FMNH); Rhino-Camp (USNM, Hollister 1918; FMNH); Lomunga (BMNH); Wadelai (BMNH).
Measurements. (Bundibugyo, Ntandi, Ruhiza, Ruwenzori E) HB 103-122; T 70-85; HF 18-21; E 10; WTG 20-38; SK 27.5-31.0; XMX 9.1-10.1; XIO 5.1-5.5; XBC 11.0-12.6; UTR 11.5-14.3. (Bugembe, Entebbe, Kampala) HB 96-140; T 62-90; HF 17-22; E 10-13; WTG 18-45; SK ♀ 25.3-30.5, ♂ 27.1-31.3; XMX ♀ 8.0-9.8, ♂ 8.6-10.0; XBC ♀ 10.2-12.7, ♂ 10.8-12.7; UTR ♀ 11.3-13.7, ♂ 12.3-13.8. (Bugishu, Sukulu, Terinyi) HB 97-113; T 61-73; HF 16-20; E 12; SK 28.2-29.9; XMX 9.0; XBC 11.2-12.3; UTR 12.3-12.8. (Rhino-Camp, Wadelai) HB 99-129; T 53-70; HF 15-18; SK 25.6-30.0; XMX 8.4-9.8; XIO 5.0-6.0; XBC 10.6-12.3; UTR 11.6-13.3.

The above measurements are separated approximately into regions, which may represent subspecies: dark *kivu*, brown *nyansae*, ? *kijabe*, and pale *sururae*. Measurements of *mutesae* (Type) and *simiolus* (Type) although very small individuals, can be matched within the very numerous specimens from around Kampala. Reported color differences are partly obscured by strong fading and reddening of fur on the living animal, continued undoubtedly even in dark fumigated museum cases. Rich new dark fur seemed apparent in some Entebbe and Kampala specimens of Jan. and Aug. and most faded in some Jun. examples. Allen & Lawrence (1936) describe the moult in Dec. on NW Mt Elgon. Of 54 taken near Kampala (all months trapped except August), 33 were ♂, 9 of ♀

had 2 to 5 embryos (av. 3.4) and 1 ♀ lactating; breeding took place every month trapped (except Apr., Jun., Jul.) and 2 breeding records in Oct. Long rains are Mar. to June; short rains Nov. Dec., but no months dry (breeding data courtesy D. A. Smith). Near Jinja a juvenile was taken in May. Delany (1964) reported 6 pregnant ♀ (each 2-4 embryos) in Ruwenzori NP in Jul., Aug. DeBeaux (1926) noted 2 litters of 3 on Bussi I. A small subad ♀ trapped near Kampala in Sep. was already pregnant, her SK 27.1 with basioccipital suture still open.

Crocidura hildegardeae, Fig. 55H

Crocidura hildegardeae Thomas 1904, Ann. & Mag. Nat. Hist. 7 (14): 240; Fort Hall = Muranga (Kenya 0°43'S 37°10'E).

Crocidura maanjae Heller 1910, Smiths. Misc. Coll. 56 (14): 4; Kabulamuliro (Uganda 0°41'N 32°8'E).

Crocidura hildegardeae rubecula Dollman 1915, Ann. & Mag. Nat. Hist. 8 (16): 509; Kigezi (Uganda 1°16'S 29°45'E or surrounding district).

Range. Heller's (1910) description was the first record of the species in Uganda Hollister (1918) first rejected *gracilipes* as a possible prior name for *C. hildegardeae*, but the idea returned to Balsac (1957), Balsac & Meester (1977). Honacki *et al.* (1982), and Hutterer (1993) all rejected this proposed synonymy. Few zoologists accepted the sweeping inclusion of *hildegardeae* in *C. russula* of Ellerman *et al.* (1953). Common in Kenya, Tanzania, and parts of D. R. Congo and Sudan adjacent to Uganda, apparently extending to Nigeria. Fig. 66 displays the Ugandan distribution.

Western. Bukwe (BMNH); 5 km E of Hoima (FMNH); Kibale (LACM); Kyabombo (BMNH).

Southern. 1 km SE of Bwentale Camp 1062 m Kigezi GR (FMNH); Enkombe Sawmill, Kalinzu FR 1480 m (FMNH); Kigezi (BMNH 11.12.3.54 Type *rubecula*); Ngoto Swamp 1500 m (FMNH); Ruanda-Oweru (BMNH); Rwenzori NP = Queen Elizabeth NP (BMNH, Delany 1964; KMB, Hoffmann 1999, Lloyd & Zwick 1997).

S Buganda. Kabula (BMNH); Malabigambo (NMK).

Central. Kabanyolo (BMNH); Katalemwa (DAS).

N Buganda. Bussu (MSNG, DeBeaux 1926); Kabalamuliro (USNM 164639 Type *maanjae*).

Eastern. Nabumali (BMNH); Sipi (MCZ, Allen & Lawrence 1936).

Karamoja. Moroto (DAS).

Measurements. (Bussu, Kabulamuliro, Kibale, Kigezi) HB 65-82; T 43-52; HF 13-14; E 8-10; SK 19.0-19.5; XMX 5.7-6.3; XIO 4.1-4.5; XBC 8.1-8.7; UTR 8.0-8.5.

Although no specimens have been found in the far north of Uganda it is likely that a form of this species occurs, perhaps subspecies *phaios* (Setzer 1956). Reported in *Imperata* /*Cymbopogon* grass (Hoffmann 1999), dense grassland, scrub and palm forest (Delany 1964). A year's trapping series near Kampala (minus August) yielded 13 ♂ but only 1 ♀, WTG 7-11 (D. A. Smith). We are unable to account for variation of the lachrymal foramen shape which occurs in Uganda and Rwanda; also Balsac (1959) remarked that all eastern D. R. Congo specimens had thin tails, but many in Uganda and Kenya have thick tails.

Crocidura fuscomurina, Fig. 55A

Sorex fusco-murinus Heuglin 1865, Nov. Act. Acad. Caes. Leop. Car. 32: 36; Meschra el Req (Sudan 8°25'N 29°16'E).

Crocidura bicolor Bocage 1889 J. Sci. Math. Phys. Nat. Lisboa. 1, p. 29; Gambos (Angola 15°45'E 14°5'E).

Crocidura cuninghamei Thomas 1904, Ann. & Mag. Nat. Hist. 7 (14): 240; Vumba I. (Uganda 0°3'N 33°42'E).

Crocidura planiceps Heller 1910, Smiths. Misc. Coll. 56: 5; Rhino-Camp, Lado (Uganda 2°59'N 31°24'E).

Crocidura suaveolens (in part) Ellerman *et al.* 1953 "Mammals of Southern Africa", p. 25. Not of Pallas 1811.

Range. Thomas' (1904) *cuninghamei* was the first recognition of this shrew in Uganda. The systematic revision by Hutterer (1983) located the earliest Type, allocated a number of local forms, and drew attention to the persistent question of whether *planiceps* and *elgonius* are included (see also Balsac & Verschuren 1968). But there may be some evidence that *planiceps* and *fuscomurina* are closer than *cuninghamei*. Fig. 67 displays the Ugandan distribution.

Western. Hoima (USNM); Ntandi (LACM); Toro (Festa 1909).

Southern. Rwenzori NP = QENP (BMNH, Delany 1964; KMB, Hoffmann1999).

Central. Entebbe (MCZ, Allen & Loveridge 1933; BMNH); Kampala (BMNH, Dollman 1916; DAS).

N Buganda. Bussu (MSNG, DeBeaux 1926).

Busoga. Vumba I. (BMNH 2.7.5.6 Type *cuninghamei*, Moreau *et al.* 1946); Kama I. (BMNH).

Eastern. Nabumali (BMNH).

Nile. Rhino-Camp (USNM), and ?(USNM 164641 Type *planiceps*).

Measurements. (all Uganda except Type *planiceps*) HB 55-71; T 38-52; HF 9-12; E 9-10; WTG 4-5; SK 16.8-17.6; XBC 7.0-7.6; XIO 3.5-3.8; XMX 4.9-5.6; HBBC 4.0-4.9; UTR 7.0-7.4.

(Type *planiceps*, Rhino-Camp) HB 71; T 53; HF 12.3; SK 18.3; XBC 7.7; XIO 3.6; XMX 5.1; HBBC 4.7; UTR 7.8.

There is not very much Uganda material in any one museum to make adequate comparisons, but there

seems to be clear differences between Types of *cuninghamei* and *elgonius* (see keys). By error, Hutterer (1983, p. 225) referred to *planiceps* as "a small variant of *C. fuscomurina*", meaning a large variant. Alone, the Type of *planiceps* has considerably longer SK than any Uganda specimen of the complex. It is approximated in S Sudan by *fuscomurina* Type (SK 17.9, Hutterer 1983), also by one from N Nigeria (SK 18.0, Hutterer & Happold 1983). Hollister noted smaller U^3 in *planiceps* Type; our limited measurements suggest that HBBC is relatively lower in southern *cuninghamei* (3.8-4.2) than in more northern examples (4.5-5.0) from Rhino-Camp and Mt Elgon and in Type of *fuscomurina*.

The only two series known from Uganda (DAS near Kampala, USNM Rhino-Camp) are both predominantly ♂. The species reached at least 3 small Uganda islands, perhaps hitch-hiking in canoes. An infant, perhaps the present species was taken in Oct. at Masindi. A possible example BMNH 13.10.18.23 from Kitgum is discussed under *C. allex* (Hypothetical).

Crocidura elgonius, Fig. 55B

Crocidura bicolor elgonius Osgood 1910, Ann. & Mag. Nat. Hist. 8, Kirui, Mt Elgon (Kenya 0°50'N 34°40'E).
?Crocidura nanilla Balsac & Verschuren 1968 (Garamba, northeastern D. R. Congo). Not Thomas 1909.
Crocidura elgonius (Osgood) Balsac & Meester 1977 Soricidae *in* Setzer & Meester (eds) "African Mammals: Identification Manual".

Range. Apparently no-one has previously recorded *C. elgonius* from Uganda, although some specimens (BMNH) referred to by Delany (1964) as *bicolor* (= *fuscomurina*) appear to be the present species. Hutterer identified 12 (of 80 shrews) from Rwenzori NP as *elgonius* (Hoffmann 1999) and 1 as *nanilla*, but found no *fuscomurina*. Fig. 65 displays the Ugandan distribution.

Western. Butiaba (MCZ; Allen & Loveridge 1942); Masindi (DAS).
Southern. Ruwenzori NP (BMNH; Delany 1964; KMB; Hoffmann 1999).
S Buganda. Bukakata (FMNH); Bukasa I. (FMNH).
Central. Kampala (DAS).
N Buganda. Bussu (MSNG, DeBeaux 1926).
Eastern. Butandiga (MCZ; Allen & Loveridge 1942).
Northern. Kitgum-Chua (BMNH).

Measurements. HB 49-67; T 39-42; HF 9-10; SK 15.7-16.7; XMX 4.8-5.0; XIO 3.5; XBC 6.8-7.2; UTR 6.6-6.8.

Uganda material of the *fuscomurina/elgonius/planiceps* complex is little differentiated in exterior measurements, but seems to vary too much over SK lengths for a single species, and at least the Type of *elgonius* and a few others differ in skull details from typical *fuscomurina cuninghamei*.

Crocidura macarthuri, Fig. 64B

Crocidura macarthuri St. Leger 1934, Ann. & Mag. Nat. Hist. 10 (13): 559; Merifano (Kenya 2°19'S 40°8'E).

Range. This is the first record of *macarthuri* from Uganda. Previously it has been identified in dry terrain of northern Kenya and southern Somalia. Its identity was studied by Hutterer (1986a) who included "*C. smithi*" (Balsac 1966) from Somalia, and attributed it to a new genus called *Afrosorex*. Fig. 61 displays the Ugandan distribution.

Karamoja. Moroto; adult ♀, Uganda Forest Dept. collection 4052; 17 May 1993.

Measurements. (Merifano, Type BMNH 33.10.6.1, Moroto) HB 81; T 36-38; HF 12-13; E 6; WTG 11; SKCI 22.7-23.9; XBC 9.2-9.3; XIO 4.2-4.5; XMX 7.4-7.7; UTR 10.2; HBBC 5.0-5.4; MAND 13.5; LTR 9.5; HCOR 5.9.

Hutterer (1986a) compared this form to obviously larger *C. fischeri*; and his only comparison with *C. voi*, which has a skull averaging the same measurements as *C. macarthuri* is in the shape of the braincase from above. Our example from Moroto. Variations in shape of upper Incisors attributed to examples of *C. voi* are shown here. Hutterer Fig. 64E (1986, p. 30) referred to color variation in *C. voi*, and this probably applies also to *C. macarthuri*; USNM *voi* 164047 Ulukania, Kenya, 27 Nov, is obviously moulting with anterior two-thirds of dorsal fur in short new brown condition, rear third retains long pale faded fur. Swynnerton (1959) wrote "colour of fur subject to changes brought about by long storage. The Type of *macarthuri* St. Leger is a classic example of such a change" (BMNH 33.10.6.1). We would not be entirely surprised if in the future *macarthuri* should be united with *voi*. On the basis of size particularly we considered a report of "*Crocidura butleri percivali*" (Harrison & Bates 1986) to represent *C. parvipes*.

Crocidura parvipes, Fig. 55G

Crocidura parvipes Osgood 1910, Field Mus. Zool. Ser. 10: 19; Voi (Kenya 3°23'S 38°34'E).
Crocidura lutrella Heller 1910, Smiths. Misc. Coll. 56 (15): 4; Rhino-Camp, Lado = Uganda.
Crocidura parvipes nisa Hollister 1916, Smiths. Misc. Coll. 66 (8): 2; Kibabe = Kibabet = Kaibibich (Kenya

FIG. 68. Distribution of select *Crocidura* (Soricidae): *Crocidura nanilla* (▲), *Crocidura parvipes* (O). Shaded areas indicate lakes.

1°11'N 35°15'E) (not very close to Kisumu, as often quoted, see Hollister 1918, p. 20).
Crocidura hirta Watson 1951, Uganda J. 15, p. 95; Bere 1962 "Wild Mammals of Uganda", p. 10 (Not as Peters 1852).
Crocidura katharina Kingdon 1974, "East African Mammals" (not as in Kershaw 1922).
Crocidura cyanea lutrella, *C. c. nisa*, *C. c. parvipes*, Balsac & Meester 1977, Soricidae *in* Meester & Setzer (eds) Mammals of Africa: Identification Manual (Not of Duvernoy 1838).
Crocidura butleri percivali (in part) Harrison & Bates 1986, Ann. Naturh. Mus. Wien. 88/89 B, pp. 205-211 (not of Thomas 1911).
Range. Heller (1910) described *lutrella* as the first form of the present species from Uganda. We follow Hutterer (1986) to include *lutrella* and *nisa* in *parvipes* rather than in *cyanea* (as in Balsac & Meester 1977).
"*C. hirta*" came from an old tentative BMNH identification (also in Kityo *et al.* 1994), and the same material was later called *butleri percivali*; we agree with Harrison & Bates (1986) that *percivali* seems very like some specimens from Karamoja, but cannot accept them as conspecific with larger *butleri*.
C. parvipes is considered by Hutterer (2005) to occur in dry savannas from S Sudan and S Ethiopia to Zambia and Angola. Fig. 68 displays the Ugandan distribution.

Northern. Kabalega NP (BMNH).
Western. Masindi (BMNH, Kingdon 1974).
Southern. Rwenzori NP (BMNH, Delany 1964).
Eastern. Ajeluk (BMNH, Watson 1951, Harrison & Bates 1986).
Karamoja. Kidepo NP (BMNH, Hutterer 1986; DAS).
Nile. Rhino-Camp (FMNH, USNM 164640, Type *lutrella*).
Measurements. (Kidepo, Rhino-Camp) HB 71-88; T 34-42; HF 11-13; SK 20.9-21.6; XMX 6.3-7.2; XIO 4.0; XBC 8.8-9.3; UTR 8.5-9.4.

In shape of the pterygoid fossa, some specimens from Kidepo resemble *lutrella* more than the Type of *nisa*. Fur of the belly may be short, or may be longer and bicolored; such differences may be due to age or to locality. Hutterer (1986) placed *parvipes* in a subgenus *Afrosorex*, with *fischeri*, *voi* (including *butleri* and *percivali*) and several other species, all with massive molars M^1, M^2, yet slender M^3, and crowded U^1, U^2, U^3.

Crocidura nanilla
Crocidura nanilla Thomas 1909, Ann. & Mag. Nat. Hist. 8 (4): 99; "Uganda, probably Entebbe, collected by Herr Simon, number 856."
Crocidura denti (Not of Dollman 1915) St. Leger 1932, Ann. & Mag. Nat. Hist 10 (9): 240-242. "Koliokwell R. near L. Rudolf, Uganda" (= W Kenya 3°30'N 35°50'E).
Crocidura rudolfi (name replacement for above, preoccupied) St. Leger 1932, Ann. & Mag. Nat. Hist. 10 (9): 487.
Range. Probably the first valid record actually from Uganda of today was Hutterer's determination from Ruwenzori NP in Hoffman 1999. This species seems often to have been confused with comparably small *C. elgonius*. Recent distribution accounts suggest dry savanna country from Kenya to Mauretania, but its relationships with *C. pasha* and *C. lusitania* do not seem to be quite clear. "*C. nanilla*" from Albert NP Eastern D. R. Congo (Frechkop 1938) has been re-identified as *Sylvisorex vulcanorum* (Hutterer *et al.* 1985). However a specimen we located NRS A587320 from Kabare, D. R. Congo, on the southern shore of Lake Edward seems to be *C. nanilla*, quite close to Ruwenzori NP, Uganda.

True *nanilla* is to be expected also in Uganda's Karamoja, Nile, and Northern Provinces; specimens from Torit, S Sudan have been identified by Hutterer in FMNH.

There is a hint of mystery about this species. Its clearcut whitish underparts and bristly whitish tail, seem characteristic (in Africa) of a dry country shrew and improbable in the lush environment of Entebbe in the early 1900s. The Germanic form of the collector's name led the senior author to unsuccessful searches of Zoological Record for the decade, and Zoologischer Jahresbericht (ed. P. Mayer; Friedlander & Sohn, Berlin 1900-1910). A chance perusal of C. Pitman's "Guide to the Snakes of Uganda" (edition 2, 1974, p. 25) explains this enigma.

"….. *Naja nigricollis pallida* .. Uganda. BM 1909 ... collector Simone; *pallida* (does) not occur present day Uganda, but found (in) Uganda's Eastern Province (extending to Naivasha) prior 1902. Simone family lived on Kinangop (Kenya); as far as I am aware never collected in Uganda of today .... specimen purchased from dealer Rosenberg" (Rosenberg dealt with Berlin Museum). We propose that the Type Locality of *Crocidura nanilla* be ammended to "Rift Valley of central Kenya, probably near Kinangop, approximately 0°45'S 36°30'E." Fig. 68 displays the Ugandan distribution.

Southern. Queen Elizabeth NP (Hoffman 1999).

Measurements. (Type *nanilla* BM 9.7.14.1, Type *rudolfi* BM 32.2.19.5, NRS A587320 Kabare) HB 40-53; T 30-39; HF 8-10; SK 14.5-16.0; XBC 6.5-7.0; XIO 3.0-3.4; XMX 4.3-4.6; UTR 5.8- 6.5; HBBC 3.2-4.3.

In the Type, as noted by Thomas (1909), there is a poorly formed supernumerary upper unicuspid.

Paracrocidura maxima, Fig. 52D

Paracrocidura schoutedeni maxima Balsac 1959, Rev. Zool. Bot. Afr. 59, p. 26; Tshibati (D. R. Congo 2°10'S 28°46'E).

Paracrocidura maxima (Balsac), Hutterer 1986, Bonn. zool. Beitr. 37, p. 79.

Range. Hutterer (1993) and Kityo *et al.* (1994) listed this species for Uganda without detail, a gap that the present records fill. Balsac's (1956) new genus *Paracrocidura* with unique upper incisors lent new interest to African shrew study. Fig. 56 displays the Ugandan distribution.

Western. Kilembe Mine (MUZM).

Southern. Itama 1615 m (LACM); Mgahinga Gorilla NP 2680 m (FMNH); Nteko P. 1600 m (FMNH); Ruhija 2350 m (FMNH).

Measurements. (Itama, Kalongi, D. R. Congo, W Ruwenzori) HB 94-95; T 43-44; HF 15-15; E 6; WTG 21; SK 26.0; XMX 9.5-9.6; XIO 5.0; XBC 11.0; UTR 13.1.

Scutisorex somereni, Figs. 51H, 64A

Sylvisorex somereni Thomas 1910, Ann. & Mag. Nat. Hist. 8 (6), 113; Kyetume (Uganda 0°28'N 32°37'E).

Scutisorex gen. nov., Type *S. somereni* Thomas 1913, Ann. & Mag. Nat. Hist. 8 (11): 321.

Scutisorex congicus Thomas 1915, Ann. & Mag. Nat. Hist. 8 (16): 470; Medje (D. R. Congo 2°26'N 27°17'E).

Range. W Uganda and adjacent Rwanda, Burundi, Congo basin. Thomas (1910, 1913, 1915) did not realize at first the uniqueness of his new species, which was revealed only when carcases were studied and the incredible ramification of the spinal column was discovered (Allen 1917, Schulte 1917). Querouil *et al.* (2001) with molecular analysis showed it surprisingly close to *Sylvisorex ollula*. Fig. 60 displays the Ugandan distribution.

Western. Near Budongo (Kingdon map); Bwamba (Kingdon 1974).

Southern. Buhoma 1500 m (FMNH); Bwindi NP (Baranga 1992); Byumba 1540 m (FMNH); Kalinzu (BMNH, Delany 1964); Nteko P. 1600 m (FMNH).

Central. Kyetume (BMNH 10.5.21.1 Type); Mayanja (Kingdon 1974).

Measurements. (Kalinzu, Kyetume) HB 119-124; T 68-81; HF 20-23; E 12-13; WTG 30; SK 31.2-33.7; XMX 9.2-10.1; XIO 7.7-8.1; XBC 13.7-14.2; UTR 15.0-15.2.

Kingdon (1974) has written an interesting account of the animal and his lively sketches show the humpbacked normal posture of this remarkable shrew for the first time. On the anatomy and mechanics of *Scutisorex*, see also Cullinane *et al.* (1998), and Cullinane & Aleper (1998).

REJECTED SPECIES REPORTS AND POSSIBLE ADDITION

The above descriptions include 32 species of shrews from Uganda, all from known records. Several other species have been listed from Uganda but without substantiationas far as we could learn. There are some further species from just beyond the country's borders which can be expected to be collected in Uganda in the future.

Crocidura allex Juch (2000) is the first report of this species in Uganda (Fig. 53B). While not unexpected, we have not seen the material. As well as the Type locality Naivasha, Kenya, *C. allex* has been found sparsely through SW Kenya and adjacent Tanzania, specially in mountain areas up to 4176 m, and two

subspecies (*alpina* and *zinki*) were described so its presence on Mt Elgon would not be very surprising. However no skull measurements are yet available (Kityo in litt.), so we list it as hypothetical. Also BMNH 13.10.18.23 with broken skull from Kittigom Chua (= Kitgum) was provisionally labelled *?allex*, but seems dubious. XBC 7.5; XIO 3.3; XMX 4.0; HBBC? 5.2; UTR 6.5; the XBC too high, the UTR too small, and the color rather dark.

Crocidura bottegi Thomas 1898 Ann. Mus. Stor. Nat. Genova 38: 677. A minute blackish-chocolate forest shrew HB 44-57; T 41-45 with or without bristles (perhaps easily shed, see Hutterer & Yalden 1990); SK 15.0-15.3 with domed braincase; records in S Ethiopia, N Kenya, Cameroon, to Guinea. Balsac 1958 referred to a BMNH skin without skull from Uganda; this is probably BMNH 34.11.6.4 from Entebbe. It looks right but could equally be *Sylvisorex johnstoni*.

Crocidura butleri Thomas 1911 described from C Sudan (and not unlike the more western *C. foxi*). Harrison & Bates (1986) identified specimens from Karamoja as *C. butleri percivali* which we call *C. parvipes*. Both *butleri* and *percivali* were made forms of *C. voi* by Hutterer (1986). *C. voi* is very close to *C. macarthuri* already collected in Uganda.

Crocidura cyanea Duvernoy 1842. Balsac & Meester (1977) regarded this as the species in which *lutrella* belonged; here called *C. parvipes lutrella*.

Crocidura foxi Dollman 1915 known by the Type from N Nigeria, and by Hutterer (1993) considered to include the Type of *C. turba tephra* Setzer (1956) from Torit S Sudan; the "*tephra*" series were regarded as two species *suahelae* and *turba nilotica* by Balsac & Verschuren (1968). One of the series was identified as *C. viaria* by Hutterer (1984); another specimen (perhaps *foxi*) was reported as the very similar "*C. lamottei*" at Jieh, SE Sudan (Hutterer & Dieterlen 1981).

Crocidura fulvastra Sundevall 1843 described along with sympatric *sericea* (synonym fide Hutterer 1984) from C Sudan, now considered widespread over sub-Saharan Africa into Kenya; specimens known from each side of Kenya-Sudan border within 40 km of Kidepo NP, and likely in Uganda.

Crocidura fumosa Thomas 1904. Formerly regarded as the species name for *montis*, *selina*, and *luna* in Uganda. Now restricted to Mt Kenya area (Dippenaar & Meester 1989).

Crocidura gracilipes (Peters 1870). Formerly Balsac & Meester (1977) regarded it as prior name for *C. hildegardeae* Thomas 1904.

Crocidura pasha Dollman 1916, Ann. & Mag. Nat. Hist. 8 (17): 195. Atbara R. (Sudan 17°40'N 34°E). SK 14.2-14.4. Setzer (1956) referred damaged BMNH specimens from Torit, S Sudan, to *pasha* but similar FMNH Torit examples were re-identified more recently by Hutterer as *nanilla*.

Crocidura viaria Geoffroy 1834. Described from Senegal, but after rediscovery of the Type and assignment of synonyms, Hutterer (1984) showed it throughout sub-Saharan savannas to S Ethiopia and Kenya where it includes *hindei*. In S Sudan it has been taken at Juba, and at Torit (where it was associated with *C. foxi tephra*).

Crocidura voi. Osgood 1910. The only connection with Uganda was due (Fig. 64E) to specimens from Karamoja listed by us as *C. parvipes*, but by Harrison & Bates (1986) as *C. butleri percivali* (both latter names considered forms of *C. voi* by Hutterer (1986). However see also new record of *C. macarthuri*, (above) a very similar species.

ERINACEIDAE

Much debate over the anatomy, embryology, and genetic relationships of hedgehogs (Old World only) seems to have resolved their place in a newly named order Eulipotyphla, founded on molecular studies, and including also shrews of the world, and moles of Eurasia and the Americas (Douady *et al.* 2002). Fossils tell us that hedgehogs have existed for at least 70 million years.

Atelerix albiventris, Fig. 51C

Erinaceus albiventris Wagner 1841, p. 22 *in* Schreber "Säugethiere" Suppl. 2. "Type locality Senegambia" (Anderson 1895, Proc. Zool. Soc. 420).

Erinaceus (Atelerix) Pomel 1848, Arch. Sci. Phys. & Nat. Geneve 9, p. 251.

E. albiventris Wagner 1841 (designated Type, Thomas 1918, Ann. & Mag. Nat. Hist. 9 (1): 195. But *Atelerix* based (indirectly) on *E. pruneri* Wagner (23 ibid) fide J. Allen 1922, p. 13; Sennaar (Sudan). See also G. Allen 1936, pp. 62-64.

Range. The first specific mention of hedgehogs in Uganda was by Thomas (1902). J. Allen (1922) was wrong to quote "Uganda" from Anderson (1895), the original citation was "Ukamba." Copely's (1950) reference to a "long-eared hedgehog" in Uganda different from *A. pruneri* of Kenya was certainly a misconception. Present concensus places *pruneri* and many forms from countries surrounding Uganda as

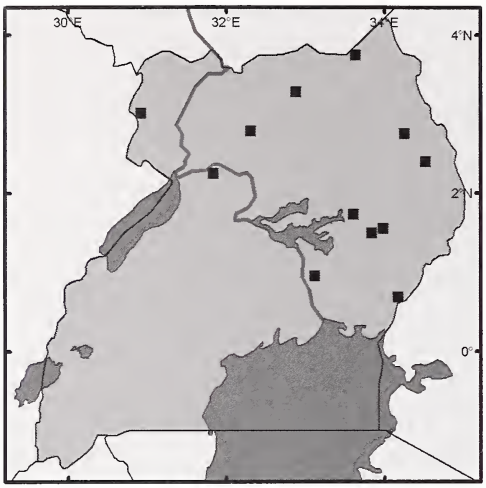

FIG. 69. Distribution of Erinaceidae: *Atelerix albiventris* (■). Shaded areas indicate lakes.

synonyms of *albiventris* (see *faradjius*, *hindei*, *langi*, *oweni*, *sotikae*), with much doubt even of subspecific validity (Corbet 1988, Hutterer 1993). Fig. 69 displays the Ugandan distribution.

Western. Murchison NP (Williams 1967).

Busoga. Kingdon (1974) mapped the vicinity of Kamuli.

Eastern. Ajeluk (BMNH, Watson 1951; AMNH); Ongino (BMNH); Soroti, and Tororo (Kingdon, 1974 map).

Karamoja. Karamoja (BMNH, Watson 1951); Latome (AMNH); Kingdon (1974) shows many locations including Kidepo.

Northern. Following Corbet (1988) we rely on Kingdon's (1974) map which shows many locations including Kitgum and Gulu areas.

Nile. Arua district and many other places (Kingdon 1974).

Measurements. (Teso, Ongino, Torit, Sudan) HB 191; T 24; HF 28-32; E 29; SK 40.0-44.4; XZ 24.5-27.2; UTR 19.1-21.6; M^2M^2 16.1-16.7.

Additional to the above Provincial records in dry regions, Kingdon (1974) maps several sightings in S Buganda and Western. These are probably not part of the natural potential range; hedgehogs are very susceptible to be moved by humans as pets or as ritual objects (Maberly 1960, Watson 1951). Also they swim well (Copley 1950) and occur on some islands at least in southern Lake Victoria (Allen & Loveridge 1933). Kingdon (1974) summarised their known biology in E Africa; Baylis (1935) described nematodes from a Uganda specimen. A juvenile taken at Lotome in Feb. had SK 35; HF 23.

4. AFROSORICIDA, a newly named Order

In the last few years the emerging field of molecular systematics has made possible an overview of the relationships of enigmatic families which centuries of anatomy and palaeontology, and decades of karyotyping, have left still puzzling. Surprises have resulted, few more unexpected than Afrotheria, a major group of orders comprising not only tenrecs and golden-moles (Afrosoricida), but also elephant-shrews (Macroscelidea), aardvark, hyraxes, elephants, and manatees. These animals are known first by fossils of Miocene age in Africa/Madagascar from which the Afrosoricida never left. Long before then, there cannot have been any connection with insectivores (now called Eulipotyphla).

CHRYSOCHLORIDAE

African golden-moles are very distinctive small stout mammals with large heavy-clawed front feet, no tail, no ear-pavilions, vestigial eyes, and in our species dark velvet-like fur glossed with green or purple sheen. They spend most of their time digging long shallow tunnels to forage for invertebrates, or resting alone in underground chambers. Their classification has always been controversial but new molecular techniques have moved them away from moles and shrews, into a newly conceived order Afrosoricida (Murphy 2001, and others) where they are aligned with tenrecs.

FIG. 70. Distribution of Chrysochloridae: *Chrysochloris stuhlmanni* (▲), *Chrysochloris fosteri* (■). Shaded areas indicate lakes.

Chrysochloris stuhlmanni, Fig. 51A

Chrysochloris stuhlmanni Matschie 1894, Sitzber. Ges. Naturf. Freunde 123; Karevia (D. R. Congo 0°20'N 29°46'E).

Chlorotalpa Roberts 1951 "Mammals of S. Africa" p. 107 Ruwenzori

Chlorotalpa (Kilimatalpa) stuhlmanni Lundholm 1955, Ann. Transv. Mus. 22, p. 288.

Carpitalpa stuhlmanni Simonetta 1968, Mon. Zool. Ital. Suppl. 2, p. 40.

Range. Thomas & Wroughton (1910) found this species in the British Ruwenzori collections from Uganda. It has been taken at least along the eastern highlands of D. R. Congo from L. Kivu to L. Albert, and in adjoining forests of Uganda; but authorities differ whether to include outlying forms *fosteri* (350 km distant), *vermiculus* (500 km), *tropicalis* (1000 km), or *balsaci* (2000 km). Fig. 70 displays the Ugandan distribution.

Western. Bujuku RMNP 3960 m (NMK, Jarvis 1974); Kabamba Rock Shelter 3505 m (Jarvis 1974); Kibale (Baranga in litt.); Kitandara 4020 m (ROM, Jarvis 1974); Mubuku Valley 2135-3050 m (BMNH, Thomas & Wroughton 1910); Nyamleju 3290 m (Jarvis 1974); Stuhlmann Pass 4330 m (AMNH, Struhsaker 1975).

Southern. Byumba 1540 m (FMNH); Bwindi 2135 m (UFM, LACM; Baranga 1992); Ekombe Sawmill, Kigezi GR 1480 m (AMNH); Impenetrable Forest (Williams 1967); Itama 1615 m (LACM); Kanaba 2000 m (AMNH); Kayonza Forest 1524 m (FMNH, ROM; Williams 1967); Kigezi high areas (Hopkins 1949); Mgahinga (Baranga in litt.); Ruhija 2073 m, 2290 m (LACM, MUZM; Baranga in litt.).

Measurements. (Kanaba, Kayonza, Kitandara) HB 109-133; HF 11-16; SK ♀ 22.2-25.3, ♂ 26.0-27.1; XBC 16.8; UTR 10.8; HBBC 11.7; WTG ♀ 43-55, ♂ 60-90.

Hopkins 1947, Jarvis 1974, and Kingdon 1974 gave some details of its biology in Uganda, but no positive breeding has been recorded here.

Chrysochloris fosteri

Chlorotalpa fosteri St. Leger 1931, Ann. & Mag. Nat. Hist. 10 (8): 605; Mt Elgon (Uganda side, 2835 m).

Chrysochloris stuhlmanni fosteri Meester 1974, *in* Meester & Setzer (eds) "Identification Manual for African Mammals" (Smithsonian, Washington).

Range. St. Leger's description was the first record, but the range has since been found to include localities

in the Cherengani Range of adjacent W Kenya. With caution due to its considerable distance from *C. stuhlmanni* of Ruwenzori, and small differences noted by St. Leger (1931) we tentatively list *C. fosteri* as a separate species. Fig. 70 displays the Ugandan distribution.
Eastern. Mt Elgon Uganda side 2835 m (BMNH 31.11.1.3 Type; St. Leger 1931).
Measurements. (Mt Elgon, Kaibibich, Kenya) HB 110-131; HF 12; WTG 48-60; SK 25.6-27.0; XZ 17.1-17.2; UTR 10.5-11.1; HBBC 12.4.

Other than a few comments by the first collector (St. Leger 1931, Hopkins 1947), nothing seems to have been observed within Uganda, but Duncan & Wrangham (1971) studied its biology in adjacent Kenya, and found breeding ♂, pregnant ♀ in July. Clausnitzer (in litt. 1999) never saw evidence of it during 13 months trapping in the Afroalpine of W Mt Elgon (base camp 3700 m) although the burrowing rodent *Tachyoryctes* was there; a dead *Chrysochloris fosteri* was found on Koitoboss trail over the Kenya side at nearly 4000 m (in KMB).

TENRECIDAE (POTAMOGALINAE)

Otter-tenrecs are only found in equatorial Africa, although all other tenrecs (including another aquatic form), occur on Madagascar. They were until recently included enigmatically in the orders Insectivora, or in Deltatheridia, or in Lipotyphla, from which they and golden-moles have now been moved to the order Afrosoricida, based on their molecular systematics (Douady *et al.* 2002, and others).

The otter-tenrecs show obvious design for aquatic life, with a long vertically flattened tail in the present most widespread species, and webbed toes in another species likely to be found near Uganda.

Potamogale velox, Fig. 51B
Cynogale velox DuChaillu 1860, Proc. Boston Soc. Nat. Hist. 7: 361; Ogowe R., Gabon.
Potamogale velox DuChaillu 1860 ibid., p. 363.
Range. The large, otter-like *P. velox* appears not to have been listed for Uganda until Williams (1967). Its discovery in W Kenya (Aggundey 1977) suggests possible wider range in Uganda than presently evidenced. Elsewhere it ranges from Angola and N Zambia to Cameroon and northeastern D. R. Congo.
Western. Reported from Bwamba Forest by Williams (1967); also from Dura R. (maybe in S Kibale Forest) by Kingdon (1974), and by Aggundey (1977).
Southern. Reported from Kalinzu Forest and Rwenzori NP by Williams (1967); Kingdon (1974), and Aggundey (1977) both list it from Kashasha R. which might be the same as Kayonza Forest (Williams 1967).
Measurements. (Medje, northeast D. R. Congo) HB 280-339; T 230-290; HF 40-46; E 20-23; SK 62-67; XMST 31; XMX 27; UTR 30.5-32.5; M M 21.5.

Adults have 20 upper and 20 lower teeth (as adult *Micropotamogale ruwenzorii*) but young *P. velox* with SK < 50 have only 16 upper and 16 lower teeth. Toes are not webbed in *P. velox*.

There are no specimens from any of these Uganda locations in MUZM or NMK; to the best of our knowledge no Uganda specimens are in European or N American museums. *Potamogale* distribution is closely tied to watersheds (Schouteden 1945, p. 153). In northeastern D. R. Congo it seems likely that it passed from the Ituri / Aruwimi branch of the Congo system into nearby streams feeding L. Albert, southward (upstream) into the Semliki-Rutshuru-Kashasha, and also in central Uganda up the Victoria Nile to Lake Victoria, finally ascending the Nzoia into Kenya. It would not be entirely surprising if there might still be small populations in streams running into the Victoria Nile. The species occurs from 1800 m to near sea-level, is nocturnal, and feeds on mollusks, crustaceans, fish, and amphibians. Many existing specimens were drowned in fishermen's nets or traps.

RUMORED SPECIES

Micropotamogale ruwenzorii. Up to the present there is no vouchered specimen of this species in Uganda. All known specimen records are from watersheds on the west side of Ruwenzori or beyond. Kingdon (1974) states that he found evidence (presumably scat) of the species in the Dungilia River, near Kyarumba in the southern spur of the Ruwenzories at about 1220 m p. 12. Only this comment, repeated in Hutterer (1993) and Kityo (1994) suggests its occurrence in Uganda, and we have been unable to obtain any more information from these writers.

MACROSCELIDIDAE

The distinctive mammal family Macroscelididae is unique to Africa. Following anatomical studies (Butler 1956), the elephant-shrew family was removed from the longstanding Order Insectivora and installed in Macroscelidea. Now, recent molecular and other ana-

lyses show Macroscelidea to belong in a new larger grouping called Afrotheria, with not only golden-moles and tenrecs (Afrosoricida), but aardvark, hyraxes, elephants, and manatees; but which excludes shrews and hedgehogs (formerly also in Insectivora) (Murphy *et al.* 2001, and other papers).

Only about fifteen species in four genera of elephant-shrews are known today, and only four species occur in Uganda. With an animal in hand (they are very inoffensive), identification should be possible from external appearance alone. Skulls present some difficulties because of the confusing development of upper milk teeth, with only two incisors, no canine, two premolars, being replaced by three permanent upper incisors, a canine, three premolars, and two molars. Although already full-grown before adult teeth have pushed out all milk teeth, final adult dentition is immediately followed by sealing the basi-occipital suture (Thomas 1890, Allen 1922, Hill 1938). Elephant-shrew newborn, single or twins, are almost immediately active, with large open eyes, and probably begin to feed on ants, termites, and other insects long before they are weaned. Like their prey, elephant-shrews seem to be mostly diurnal, and some species indulge in sun-bathing, but run (not hop) extremely fast to shelter if danger threatens. More-or-less faithful couples maintain a series of cleared little trails in their territory for foraging and for rapid escape. *Rhynchocyon* and to a lesser extent *E. brachyrhynchus* prefer forest or woods, while *E. rufescens* and *fuscipes* occur in more open savanna or grassland (Rathbun 1992, Leirs *et al.* 1995).

Key to Uganda Macroscelididae

1a) Rabbit-sized, with long snout and long tail, conspicuous grid of large dark squares over back, hindfoot 70-78, in forest ..... *Rhynchocyon cirnei stuhlmanni*

1b) Rat-sized, with fairly uniform fur color; hindfoot 28-38 with five hind toes.....2)

2a) conspicuous white eyering, a dark mark behind eye, a gland surrounded with pure white fur on center ofchest ..... *Elephantulus rufescens*

2b) only slight white marks around eye and buff patches behind eye, behind ear..... 3)

3a) fairly dark brown above with gray legs, gland on center of chest..... *E. fuscipes*

3b) paler and grayer above, whitish legs, no gland on center of chest... *E. brachyrhynchus*

Rhynchocyon cirnei stuhlmanni

Rhynchocyon cirnei Peters 1847, Berl. Verhandl. Königl. Preuss. Akad. Wiss. 37, p. 4; Quelimane (Mozambique 17°52'S 36°53'E).

Rhynchocyon stuhlmanni Matschie, 1893, Sitzber. Gesellsch. Naturf. Freunde Berlin, p. 66; Bundundi (D. R. Congo O°40'N 29°40'E; Moreau *et al.* 1946).

Range. This large checkerboard-patterned forest form was listed for Uganda by Thomas (1902) without locality. This dark strongly spotted subspecies *stuhlmanni* exists in mixed forest from northwestern D. R. Congo to W of Lake Kivu and C. Uganda. Other less striking subspecies of *R. cirnei* occur along Lakes Tanganyika and Nyasa to S Tanzania and N Mocambique. Fig. 71 displays the Ugandan distribution.

Western. Budongo (AMNH, BMNH, FMNH, ROM; Allen 1922, Brown 1964, Corbet & Hanks 1968). Bugoma (BMNH, Corbet & Hanks 1968). Bwamba (ROM; Corbet & Hanks 1968, Kingdon 1974).

N Buganda. Mabira (BMNH; Pitman 1942, Hopkins & Rothschild 1956).

Measurements. (Budongo, Bugoma, Bwamba, Mabira) HB 251-275; T 215-240; HF 70-77; E 25-31; *WTG 400; SK 61.5-67.8; XZ 29.4-35; XMST 24; XIO 19.5-22.2; XSO 21.5-25.6; UTR 23.0-28.2; M^2M^2 17.8-20.5; HBBC 22.2; MAN 48-52; LTR 30-33. *(from Haltenorth & Diller 1977).

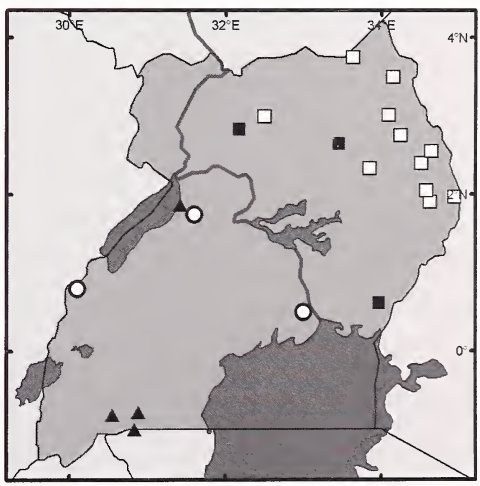

FIG. 71. Distribution of Macroscelididae: *Rhynchocyon cirnei* (O), *Elephantulus fuscipes* (■), *Elephantulus brachyrhynchus* (▲), *Elephantulus rufescens* (□). Shaded areas indicate lakes.

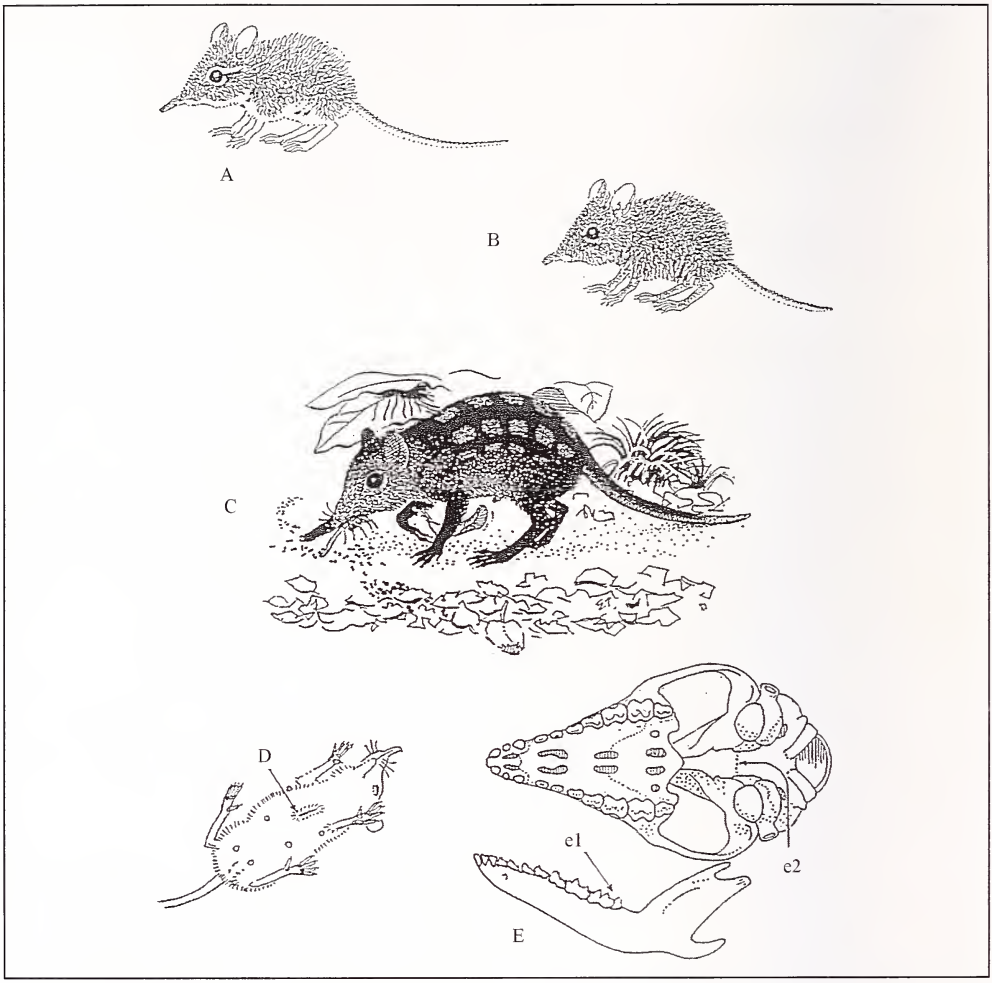

FIG. 72. Macroscelididae: A – *Elephantulus rufescens*; B – *E. fuscipes*; C – *Rhynchocyon cirnei*; D – chest gland; E – *E. brachyrhynchus*; e^1 – 11 teeth in lower row; e^2 – baso-occipital suture.

Separation of the western and central (Mabira) populations probably reflects *Rhynchocyon*'s dependance on specialized forest habitats that have long been eliminated in the intervening landscapes. Some natural history of the species in Uganda is found in Pitman (1942), Brown (1964), Kingdon (1974). Several specimen labels indicate diurnal activity. Hopkins & Rothschild (1956) described a flea species from Mabira on this elephant-shrew.

Elephantulus rufescens dundasi, Fig. 72A, Pl. 6
Macroscelides rufescens Peters 1878, Monatsber. Kaiserl. Preuss. Akad. Wissensch. 198, p. 1; Ndi (Kenya 3°14'S 38°30'E).
Macroscelides pulcher Thomas 1894, Ann. & Mag. Nat. Hist. 6 (13): 69; Usambiro (Tanzania 3°0'S 32°34'E).
Elephantulus dundasi Dollman 1910, Ann. & Mag. Nat. Hist. 8 (5): 95; "Harich near Lake Baringo" (Kenya, probably Marich Pass 1°32'N 35°27'E).
Elephantulus rufescens hoogstraali Setzer 1956, Proc. U.S. Ntl. Mus. 106, p. 456; Ikoto (Sudan 4°5'N 33°4'E).
Range. First published report of this species in Uganda was Thomas (1902) without locality. Although somewhat like *E. fuscipes* and *E. brachyrhynchus*, *Elephantulus rufescens* is paler and grayer brown above than these, with a conspicuous dark mark behind the

Plate 6. Above: *Elephantulus fuscipes*. Below left: *E. rufescens*. Right: *E. brachyrhynchus*.

eye and a complete white eyering; the underside of the snout is covered with short hairs unlike the other two with a naked patch there. *E. rufescens* also has a large chest gland as in *fuscipes*, but unlike *brachyrhynchus*. Contrary to Ellerman *et al.* (1953, p. 8), *E. rufescens* is not conspecific with *E. rozeti* of north Africa.
The present species occurs in dry woods and grasslands through much of Tanzania, Kenya, Ethiopia, and Somalia. Fig. 71 displays the Ugandan distribution.
Karamoja. Amudat (BMNH); Kaabong (Brown 1964); Kakomongole (BMNH); Karamoja (Watson 1951, Bere 1960, Delany 1964); Kidepo (Williams 1967); Kotido (AMNH); Lorengikipi (BMNH); Lotome (AMNH, BMNH); Moroto (BMNH, LACM); Nabilitak (BMNH).
Northern. Acholi (Brown 1964).
Measurements. (Moroto) HB 125-140; T 111-141; HF 32-35; E 21-26; WTG 69-89; SK 35.1-37.1; XZ 20.2-21.1; XMST 17.8-18.9; XIO 5.8-6.1; UTR 17.4-18.1; M^2M^2 11.8-12.5; HBBC 14.7-16.0; MAN 26.6-28.0; LTR 15.9-17.

Brief accounts of this animal's biology in Uganda are in Watson (1951), Kingdon (1974), and Brown (1964) who noted no pregnancies in December and January. A museum label states one was trapped inside a termite mound. It is likely that the species will be found (*? E. r. hoogstraali*) in places along the northern border of Uganda.
Special Literature. Koontz & Roeper (1983).

Elephantulus brachyrhynchus, Fig. 73E, Pl. 6
Macroscelides brachyrhynchus Smith 1836, Report. Exped. Exploring Centr. Afr. 42; "between L. Latukoo and the Tropic" (either SW Botswana or N Cape Prov. S Afr.).
Macroscelides delamerei Thomas 1901, Ann. & Mag. Nat. Hist. 7 (8): 155; Athi River (Kenya 1°27'S 36°59'E).
Nasilio brachyrhyncha Thomas and Schwann 1906, Proc. Zool. Soc. Lond., abstr. 33, p. 10, also 578. New genus.
Elephantulus (Nasilio) brachyrhynchus Ellerman *et al.* 1953, "Southern African Mammals" (BMNH, London) pp. 8, 9. *Nasilio* as subgenus.
Range. This species was taken in SW Uganda by the Tanganyika-Uganda boundary survey (Thomas & Schwann 1904). In Africa generally it is the widest-ranging species of the Family, occurring from northern S Africa and Angola to N Kenya. It is very like dark, plain *E. fuscipes* but *brachyrhynchus* lacks a chest gland in its dusky underparts, which both sexes of *fuscipes* have, as do eye-patterned *rufescens*.

In mature dentition of *brachyrhynchus* and *fuscipes* the mandible bears 11 teeth, the mark of sub-genus Nasilio (not 10 as in *E. rufescens*). Fig. 71 displays the Ugandan distribution.
Western. Near Lake Albert 290 m (BMNH, Corbet & Hanks 1968, map. 99; Rothschild & Hopkins 1956).
Southern. Burumba (BMNH, Thomas & Schwann 1904); Demba (BMNH, Thomas & Schwann 1904); Lake Nakivali (BMNH, Ruxton 1926, Friant 1935).
Measurements. (Burumba, Demba, Nakivali) HB 105-112; T 83-102; HF27-28; E 19-20; WTG 43; SK 31.0-33.0; XZ 16.5; XMST 14.1-16.6; XIO 5.5-5.9; UTR 18; M^3M^3 11.5; HBBC 13.1; MAN 24-27; LTR 14.2.

Hopkins & Rothschild (1956) identified several fleas on a Uganda example. Another elephant-shrew species, not reported from Uganda, but occuring in Kagera (NE Rwanda), would possibly co-exist with *E. brachyrhynchus*; it is *Petrodomus tetradactylus*, a bigger species with a larger dark mark behind the eye than in *E. rufescens* with relatively much longer thinner legs but only four hind toes.

Elephantulus fuscipes, Fig. 72B, Pl. 6
Macroscelides fuscipes Thomas 1894, Ann. & Mag. Nat. Hist. 6 (13): 68; Doruma (D. R. Congo 4°42'N 5°6'E).
Nasilio fuscipes J. Allen 1922, Bul. Amer. Mus. Nat. Hist. 47, pp. 37-38.
Range. First publication of this species in Uganda was Corbet & Hanks (1968), although Fain (1953) described it from adjacent D. R. Congo. Total known range is limited to savannas from S Sudan and northeastern D. R. Congo to N and SE Uganda. It is dark brown above with only a few whitish spots around the eye, a short bicolor tail; medium gray feet, extensive blackish roots and sparse white tips below give a generally dark belly tone, inside the external ear is a spherical lobe unique to *fuscipes*. Fig. 71 displays the Ugandan distribution.
Eastern. Nyimera (BMNH, Corbet & Hanks 1968).
Northern. Awach (BMNH); Lamogi (BMNH).
Measurements. (Awach, Lamogi, Nyimera, Obbo, Sudan). HB 115-120; T 80-90; HF 25-28; E 20-22; SK 33.2-35.5; XZ 17-18; XMST 15.1-17.6; XIO 5.7-6.2; UTR 18.3-19.0; M^3M^3 12; HBBC 13.2-14.2; MAN 24.5-27; LTR 17.2-18.2.

The Nyimera female (BMNH 22.12.13.4, taken in 1922, SW of Mt Elgon) lies far from other examples. It was identified by Corbet & Hanks (1968) and it has an 18 mm long pectoral gland. One wonders if further collections today will show *fuscipes* in intermediate locations. It is quite likely to be found also near Uganda's northern boundary, as a number of examples come from nearby parts of Sudan.

5. LAGOMORPHA

LEPORIDAE

I appreciate several correspondents who contributed specially to this chapter, John Flux of Lower Hutt, New Zealand, graciously sent me data from his east African researches. The late Allan C. Brooks of Miracle Beach, B. C. Canada, shared his personal leporid observations from Uganda, and provided items from his library. Viola Clausnitzer (Marburg), Anke Hoffman (Braunschweig, Germany), John Binderna-gel (Courtenay B. C.) and Terry Robinson (Stellenbosch, S. Africa) kindly shared their observations at Mt Elgon, Rwenzori NP, and Masindi respectively.

Hares and rabbit: these long-eared herbivores are quite well known in many parts of Africa, and are locally in folklore (Wright 1960, Pitman 1974), but they seem to avoid much notice in Uganda. In open places where larger game is available human hunters tend to overlook them, and in some more forested regions only a shy cryptic species occurs. Hares and their

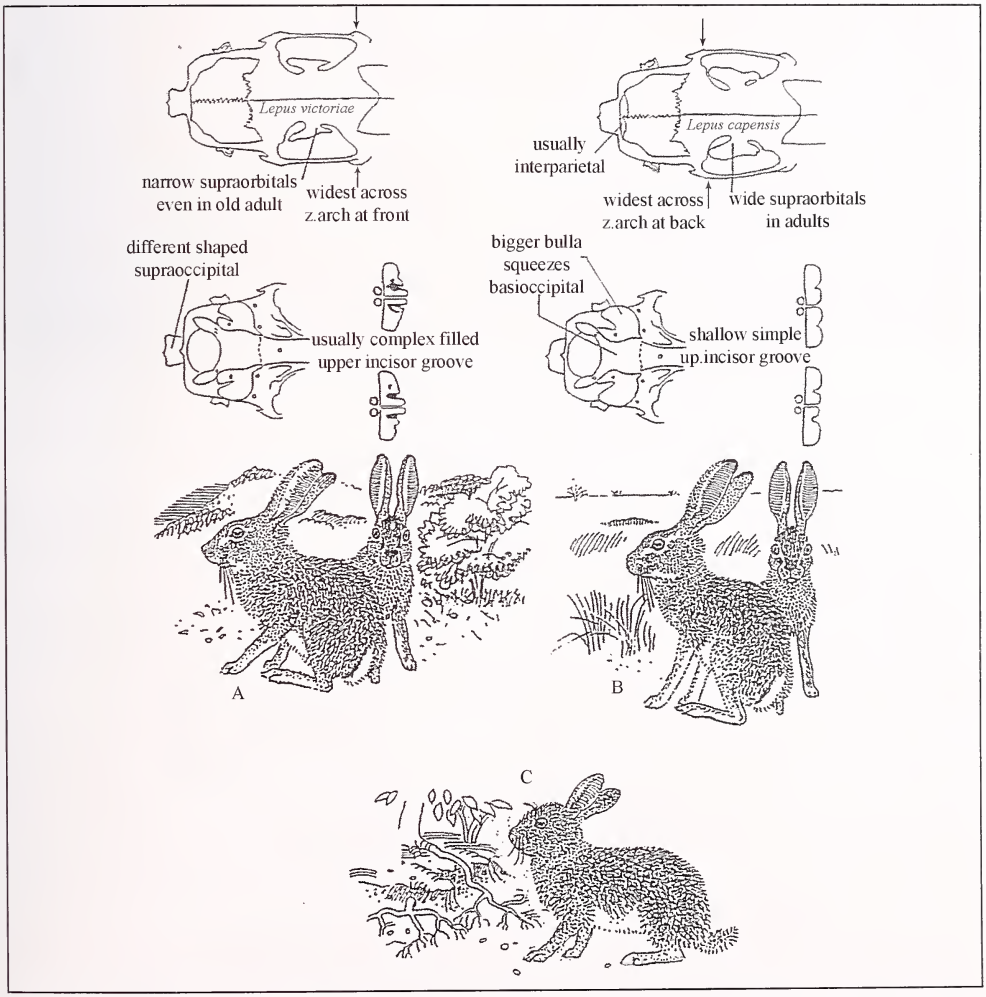

FIG. 73. Leporidae: A – *Lepus victoriae* ssp. (?); B – *L. capensis*; C – *Poelagus marjorita*.

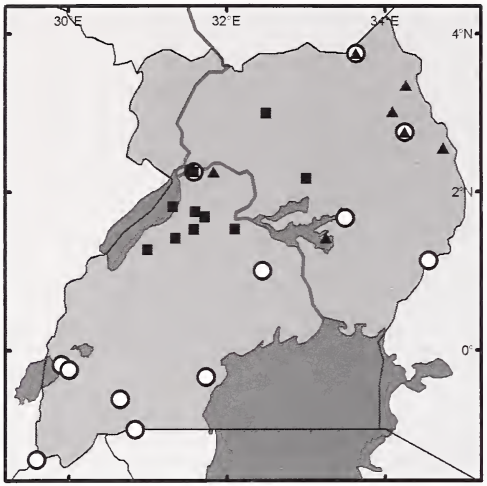

FIG. 74. Distribution of Leporidae: *Poelagus marjorita* (■), *Lepus capensis* (▲), *Lepus victoriae* (O). Shaded areas indicate lakes.

relatives are now long classified in the Order Lagomorpha, at one time regarded as aberrant rodents because of their conspicuous incisors and nibbling habits. However these front teeth include a pair of tiny incisors behind the main pair, and thereby differ from all rodents. In Africa not only fairly long ears, but also a short furry tail (always white and dark in Uganda), with long hind legs for hopping and dodging and running at great speed, all make Leporidae instantly recognizable.

Hare systematics present great difficulty; collections from any single locality usually show much homogeneity, while examples from a neighbouring population are different, but again all alike. All *Lepus* have the same karyotype and several quite different species can hybridize. Very few features supposed to define *Lepus* species are entirely reliable over numerous widespread samples.

The term "rabbit" originated for a North African/European species now found in domestication even in E Africa. Newborn rabbits are blind and feeble, develop for 4 weeks in an underground nest, unlike precocious young hares which begin to forage away from the above-ground birthplace at one week. In Uganda, *Poelagus marjorita* breeds more as the European rabbit and so is often given that name.

Special Literature. Flux & Angermann (1990), Duthie & Robinson (1990).

Key to Uganda Leporidae

1a) Ears shorter than hindfoot ..... *Poelagus marjorita*

1b) Ears longer than hindfoot ..... *Lepus* 2)

2a) supraorbitals narrow, upper front incisor groove complex and filled ..... *L. victoriae*

2b) supraorbitals wide, incisor groove shallow and simple..... *L. capensis*

Lepus victoriae ssp?, Fig. 73A, Pl. 7

Lepus victoriae Thomas 1893, Ann. & Mag. Nat. Hist. 6 (12): 268; Nassa (Tanzania 2°24'S 33°33'E). Type not actually designated and skull missing, but see Major 1899, Trans. Linn. Soc. Lond. Zool 2: 468; and St. Leger 1932, Proc. Zool. Soc. Lond., p. 120.

Lepus kakumegae Heller 1912, Smiths. Misc. Coll. 59 (16): 19; Lukosa R. (= Yala R., Kenya 0°12'N 34°50'E). Complete Type.

?Lepus whytei Thomas 1894, Proc. Zool. Soc. Lond., p. 142; Palombi R. (Malawi 15°35'S 35°35'E). Back of skull broken, unusual proportions of palate; discussed by Angermann (1966), Petter (1971), Robinson & Dippenaar (1983), Azzaroli (1987), Angermann & Feiler (1988); sometimes used as name for Uganda hares.

?Lepus crawshayi DeWinton 1899, Proc. Zool. Soc. Lond., p. 416, pl. 24; Neugia = Ngiini near Kitui (Kenya 1°21'S 38°2'E). Complete Type, but definitive details ambiguous (Corbet & Yalden 1972, Robinson & Dippenaar 1983, Angermann & Feiler 1988). Might be young *capensis*.

Lepus victoriae microtis Setzer 1956 Proc. U.S. Ntl. Mus. 106, p. 477. Not of Heuglin 1865. From its Type locality in marshy Sudan grassland, *microtis* seems unlikely to be *victoriae*.

The brief description, obviously of an infant Lagomorph, does not clearly connect with known species, and the Type is apparently lost. Hatt (1940, p. 555) even suggested it could be *Poelagus*.

Leche (1888) attached to *microtis* pale yellowish and black specimens from two degrees southward and across the Nile; Hollister (1919) and Setzer (1956) extended it further southeast to include rich brown forms of wooded hills bordering Uganda, which I agree likely belong with *victoriae*, but not to *microtis*. The latter, unidentifiable, may refer to *L. capensis hawkeri*.

Range. In accord with our earlier caution about hare systematics, we provisionally follow R. Hoffmann (1993), although Petter (1971) considered *victoriae*

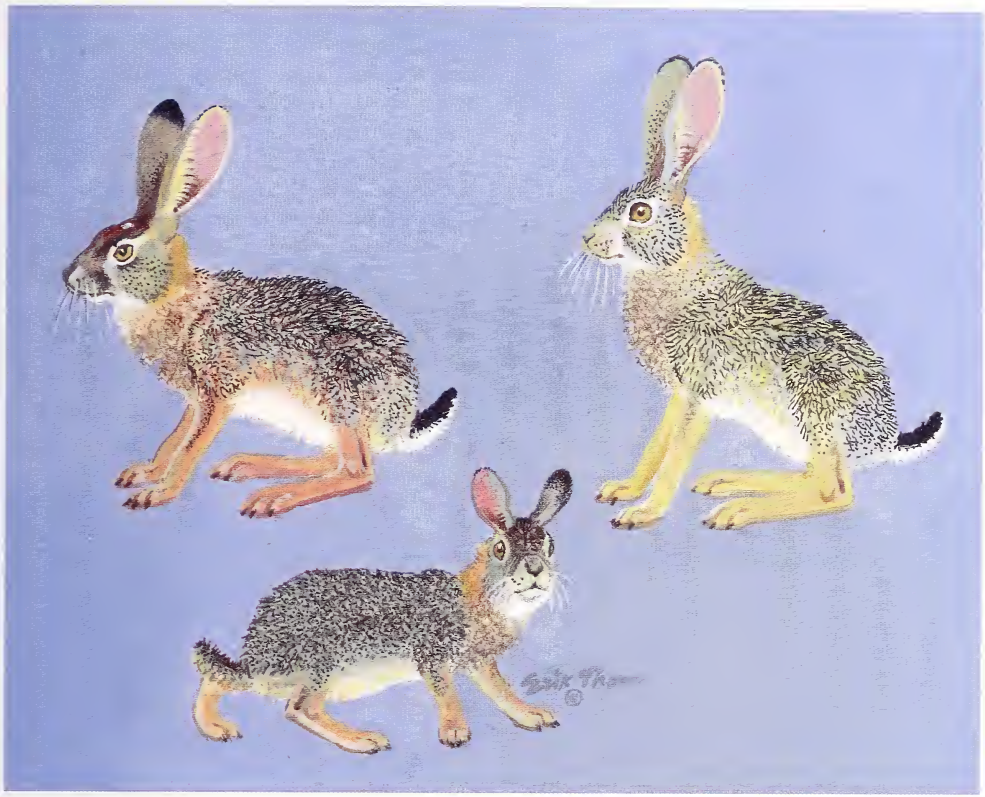

Plate 7. Above left: *Lepus victoriae*. Above right: *Lepus capensis*. Below: *Poelagus marjorita*.

a nomen dubium and called it *crawshayi*. Hares seen from SW Uganda, Rwanda, eastern D. R. Congo and S Sudan are rich red brown, often with a white spot on the forehead, and there seems no valid scientific name for the subspecies. The inner edge of the upper leading incisors is raised; the filled central groove along the front of the incisor usually spreads irregularly or has side channels, but may be simple. Flux & Flux (1983) gave nine characteristics to distinguish this species from *L. capensis* which shares much of Kenya with it. Coarser fur, ear top with a large blackish smudge, smaller supraorbitals and bullae, and smaller heart, characterize *victoriae*. Johnston (1902, p. 423) was prophetic when he wrote, with Thomas (ibid "hares of perhaps three species are common throughout Uganda" (then including W Kenya), but no specimens have yet been identified. Fig. 74 displays the Ugandan distribution.

Western. Mweya (BMNH, Eltringham & Flux 1971).
Southern. Burumba (BMNH, Thomas & Schwann 1904); Mbarara (BMNH, Petter 1959, Flux & Flux 1983); Rwenzori NP (Flux collection Wellington, New Zealand; Rowell 1966, Williams 1967, Agnew & Flux 1970, Ogen-Odoi & Dilworth 1985, Suchentrunk & Flux 1996, A. Hoffmann in litt. 1999); Sabinio Volcano MGNP 2438 m (FMNH 26427).
S Buganda. "possibly Masaka" (Bere 1962).
N Buganda. Nakasongola-Bombo Rd. (roadkill examined by J. Flux).
Eastern. Mt Elgon 3700 m, 4200 m (Clausnitzer, in litt. 1999); "widespread in Teso & Karamoja, richly coloured sometimes with white frontal spot" (Watson 1952).
Karamoja. "Karamoja" (Watson 1952 see above, sp?); Kidepo (sp? Williams 1967; sight record A. Brooks pers, comm. 1981).

Northern. Kabalega N. P. (Williams 1967) (extralimital Nimule S. Sudan; FMNH).
Measurements. (Rwenzori NP, Nimule, and Nagichot, S Sudan) HB 417-450; T 72-90; HF 99-113; E 86; 110; WTG 2.25 kg; SK 87.0-88.9; XZ 39.8-40.0; XIO 13.5; XMST 32.5; UMOL 16; HBBC 30.

A number of biology studies have been made in Rwenzori NP (= Queen Elizabeth NP); Eltringham & Flux (1971) found it common when grass was short, but inhibited by the presence of other animals; Rowell (1966) witnessed baboons as successful predators on hares; Ogen-Odoi & Dilworth (1984) investigated effect of grass-fires and predatory birds on hare population; the same authors (1985) studied hitch-hiking weed-seeds on hare fur, as did Agnew & Flux (1970). Flux (1970) and Suchentrunk & Flux (1996) analyzed tooth variation. A. Hoffmann (in litt.) seldom saw hares there during 2 years of biological work. Neal (1971) witnessed a hare's narrow escape from a serval. Flux (1969) described continuous breeding of equatorial hares. On Mt Elgon, Clausnitzer (in litt.) sometimes saw hares (sp?) in afroalpine grassland of *Festuca pilgeri* from her base camp at 3700 m up to 4200 m; poachers there sometimes hunted hares if they missed larger game. At high elevation these hares often have a simple incisor groove (Flux, pers. comm. 1986). On the Kenya side of Mt Elgon, Granvik (1924) collected the species up to 3048 m.

Lepus capensis, Fig. 73B, Pl. 7
Lepus capensis Linnaeus 1758, Syst. Nat. (ed.10) 1, p. 58; Cape of Good Hope. Type probably lost.
Range. We can record only a few specimens of this species known for certain from Uganda (Karamoja), although suitable habitat probably exists widely through NE and and N Uganda. The name "*capensis*" was used indiscriminately for any Uganda hare until recent decades (Watson 1952, Bere 1962, etc.). Although this name is used for the common plains hare of Kenya (R. Hoffmann 1993) problems remain with the systematics. Maps in Flux & Angermann (1990), and Alden *et al.* (1995) show two separate populations, isolated from S Tanzania to the Zambesi R. Whether the present Uganda form is really conspecific with the southern African *capensis*, and with outlying relatives such as *habessinicus*, remains in question. Possibly the earliest northern name was *Lepus aegyptius* Demarest 1822. Flux & Flux (1983) gave distinctive characters for East African *L. capensis*: often the color is pale and grayer or yellower mixture (without strong orange or deep brown) and with merely a rim of black at the ear tip; the fur tends to be softer (than in *victoriae*). In life *capensis* appears longer- limbed with a blunt muzzle and rounded forehead profile (adults lack a white spot). Adult *capensis* skulls have large supraorbitals which prevent an inverted skull from rolling over, the zygomatic breadth is greater at the rear, the jugular process is narrow, and the groove along the front of the leading incisors is shallow and straight. Fig. 74 displays the Ugandan distribution.
Eastern. "Arapoo" (= Hare). (Landscape) "good for hunting owing to its wide open character" (Watson 1952), probably refers to *L. capensis*.
Karamoja. Loyoro (NMK 5386); near Kotido (map Flux & Flux 1983; J. Flux was unable to find his record of this individual, which might be the same as the Loyoro specimen); ?Kidepo (both Williams (1967) and A. Brooks (in litt.) reported hares (?sp); hares found in "dry thorn-scrub country of southeast Karamoja" (Watson 1952) again probably this species; near Mt Moroto 1219 m (LACM).
Measurements. (Type *L. raineyi* USNM 181808, Longaya, Kenya, AMNH 179121, Ol Donyo Nyiro, Kenya) HB 460-480; T 65-95; HF 105-118; E 114; SK 84-87; XZ 39-42; XIO 15-17; XBC 28.7-29.0; UTR 15; NAS 36.7; X19.4.

This species is little studied in Uganda, although some general notes by Watson (1952) and Kingdon (1974) probably apply to *capensis*. Robson (1961) attempted to rear unidentified baby hares (probably near Gulu) but they were taken by predators.

Poelagus marjorita, Fig. 73C, Pl. 7
"European rabbit" Carpenter 1925, Nature 116: 677; Masindi, Uganda. Misidentification copied by Thompson & Worden (1956); see Hayman (1957).
Lepus marjorita St. Leger 1929, Ann. & Mag. Nat. Hist. 10 (4): 292; near Masindi, 1220 m (Uganda near 1°41'N 31°43'E).
Poelagus marjorita St. Leger 1932, Proc. Zool. Soc. Lond., p. 119, Figs; New genus. Initial comparisons with *Pronolagus*, and *Caprolagus* (Asia).
Poelagus marjorita oweni Setzer 1956, Proc. U.S. Ntl. Mus. 106: 472; Lotti Forest (Sudan 4°2'N 32°33'E).
Range. This has been the last genus of *Leporidae* to be discovered in Africa. Aside from earlier confusion with *Oryctolagus* (above), it was considered a subgenus of *Pronolagus* (Ellerman & Morrison-Scott 1953) but this was refuted by Angermann (1966); Corbet (1983) reviewed the genus and found some skull

similarities to both *Pronolagus* (of S and E Africa) and *Sylvilagus* (N and S America). St. Leger (1935) described a second subspecies from SW Sudan; Schouteden (1946) named one in Rwanda; Hatt (1940) recognized it from Garamba (northeastern D. R. Congo). Subsequent finds extend to S Tchad, but still further extension (to Angola, Petter 1971) has now been relegated to *Pronolagus* (pers. comm. with Petter and J. C. Cabral 1999). Of possible relevance to N Uganda, Setzer (1956) described a form *oweni* from SE Sudan. Fig. 74 displays the Ugandan distribution.
Western. Budongo (ROM, LACM; Williams 1967); Butiaba (1967 observation Flux in litt.); 32 km and 37 km NW of Hoima (1968 observations Flux in litt.); Mt Kajula (DAS 1967 observation, J. Bindernagel pers. comm.); Masindi (BMNH, DAS; Pitman 1958); Mwela (LACM); Nakitoma (AMNH, BMNH).
Northern. Acholi Province (Bere 1962, probably referred to Kabalega NP records); Buligi Circuit (1968 observation Flux in litt.); Kabalega NP (BMNH; not uncommon Bere 1962, Williams 1967); Lango (Bere 1962, southeastern part of Northern Province); Paraa (observation Flux ibid, also 2 taxidermy specimens of local young in Park Museum); young in Park Museum.
Measurements. (Masindi, Lotti, S Sudan) HB 495-510; T 45-52; HF 90-103; E 55-85; WTG 2720; SK 85.0-87.1; XZ 40.0-41.2; XBC 30.6; NAS 29.5-31.5; X 17.5; UMOL 15.8.

Occurrence in extreme southern Sudan (Imela, Imurok, Katire, Lotti, Torit, etc.) makes it very probable that it will be found in wooded hills on the northern Uganda border. Pitman (1958), Bere (1962), Williams (1967), and Kingdon (1974), have all given a few details of the biology of this shy species. A. Brooks (pers. comm.) found it sheltering under edges of laterite crust where opened by erosion etc. on Kajula hills; young were taken there in March, also in May and August (Kingdon 1974). Notwithstanding these records of the 1960s, T. Robinson (pers. comm.) recently was unable to find any *Poelagus* or people who knew them around Masindi or Kabalega NP; we wonder if this is due to disturbance, disease, or other factors. Also biologist Vernon Reynolds (1965) had lived in the center of *Poelagus* Uganda range without seeing them. But birdwatchers recently reported two by the road near Murchison Falls (surfbirds.com 2002).

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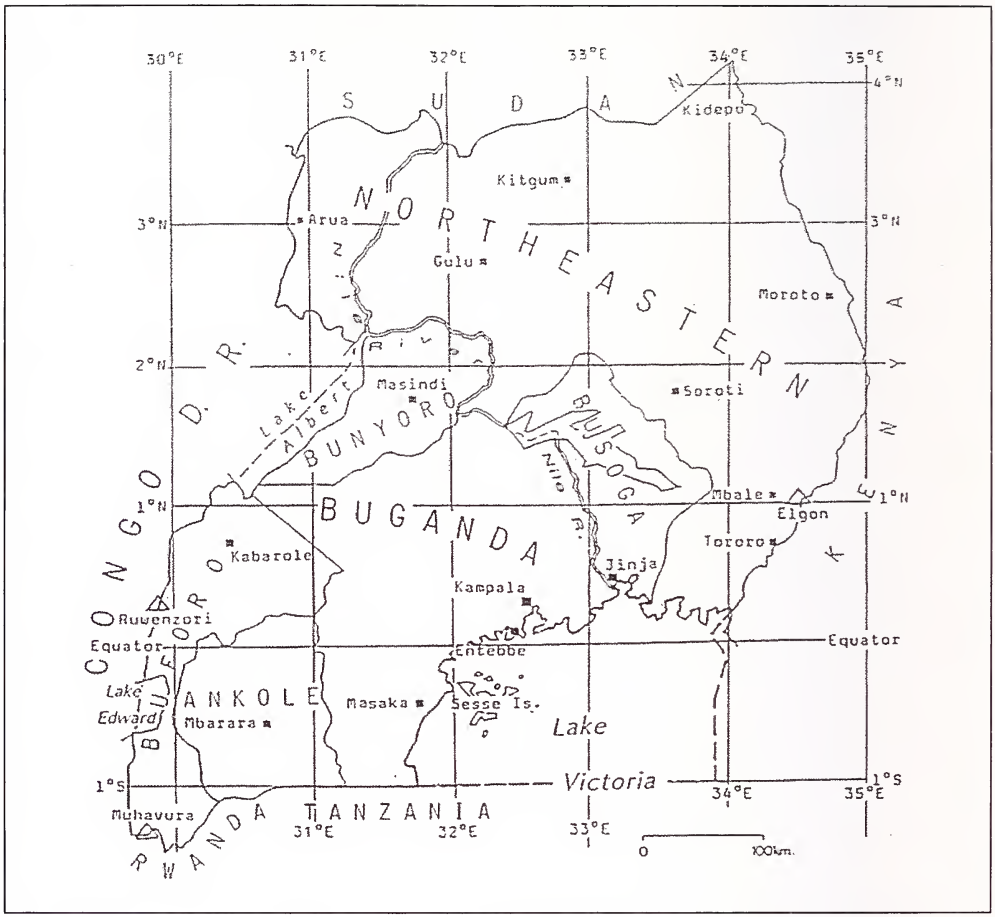
7. APPENDIX 1

Uganda with its official post-1996 provinces.



Localities of specimens studied.

8. APPENDIX 2

ORDER CHIROPTERA
Key to the Families
(adopted from Hayman and Hill, 1971)

1a) First and second digits both terminating in a claw
Tail membrane greatly reduced
Tail absent or much reduced
Cheek teeth simple without 'W' cusp pattern
Tragus always absent ..... MEGACHIROPTERA ..... (Pteropodidae p. 12)
1b) First digit only with a claw
Tail membrane well developed
Tail usually well developed (absent in one family)
Cheek teeth with 'W' well developed cusp pattern
Tragus often present ..... MICROCHIROPTERA

MICROCHIROPTERA
2a) Tail visible ..... (3)
2b) No visible tail (although posterior membrane may be extensive)
Ears 30-45
No upper incisors ..... Megadermatidae (p. 34)
3a) Tail not completely included within tail membrane ..... (4)
3b) Tail completely included within tail membrane ..... (6)
4a) Free terminal portion of tail emerges above the middle of the tail membrane and rests on the surface of tail membrane (basal part of tail included within tail membrane)
Ears not fused nor closely positioned in the midline
One upper incisor on each side
Slender post-orbital process .... Emballonuridae (p. 39)
4b) Free terminal portion of tail projects well beyond the rear margin of tail membrane and is much longer than the tail membrane ..... (5)
5a) Free portion of tail very slender and long, much longer than tail membrane
Pair of discrete nasal swellings above and to the side of nasal opening ..... Rhinopomatidae (p. 37)
5b) Free portion of tail stout and short, not much longer than tail membrane
Ears mostly united in the midline or at least closely positioned
One upper incisor on each side
One or two lower incisors on each side .... Molossidae (p. 64)
6a) Nose without fleshy superstructures and appendages or slits
Tragus present ..... Vespertilionidae (p. 41)
6b) Nose region with fleshy superstructures or appendages or slits
Tragus absent or present ..... (7)
7a) Mid facial sagittal slit surrounded by fleshy structures
Ears meet in midline
Tragus present
Tail ends in a Y or T shape
Frontal region of skull concave/hollowed out ... Nycteridae (p. 35)
7b) Mid facial slit absent
Nose leafs with either erect tip, trident, or low and rounded horseshoe-like structure
Ears not fused in midline
Tragus absent
Tail does not end in a Y or T shape
Nasal region inflated ..... Hipposideridae (p. 24)
7c) The top of the rhinarium "horsehoe" usually a rounded or squarish lobe (in a few species this bears a central and two side tall fleshy projections). The four outer toes have only two phalanges ..... Hipposideridea
7d) The top of the rhinarium surmounted by a large triangular lobe. The four outer toes have three phalanges ..... Rhinolophidea (p. 30)

9. APPENDIX 3

NEW ADDITIONS AND NOTEWORTHY RECORDS TO THE BAT (MAMMALIA: CHIROPTERA) FAUNA OF UGANDA, RWANDA, AND THE DEMOCRATIC REPUBLIC OF CONGO

R. M. Kityo, J. C. Kerbis Peterhans, M. H. Huhndorf & R. Hutterer

Abstract. New records are reported for five species of bats from Central Africa. Two genera (*Laephotis* and *Casinycteris*) and a large member of *Kerivoula* (*? cuprosa*) are recorded from Uganda for the first time but the specific identification of the later taxon is problematic. *Nycteris grandis* and *Kerivoula c.f. cuprosa* are reported from Rwanda for the first time. The number of known specimens of the rare Afrotropical bat, *Casinycteris argynnis* is nearly tripled. The second and third records of *Taphozous perforatus* confirm its presence in Uganda.

Key words: *Bats*, *Chiroptera*, *Uganda*, *Rwanda*, *DR Congo*, Casinycteris, Laephotis, Kerivoula, *new records.*

Introduction

Bats constitute an important proportion of the mammalian biodiversity of Uganda and the world at large. Kityo & Kerbis (1996) put the chiropteran fauna at 24% of the mammalian fauna of the country while Wilson & Reeder (1993, 2005) put them at 19.9% and 20.6% respectively of the world's mammalian diversity. As for many groups of mammals, certain species have distributions that can be quite patchy; further collecting and documentation is important in documenting their range and habitat requirements.

This paper reports on five taxa of bats (*Casinycteris argynnis*, *Taphozous perforatus haedinus*, *Laephotis wintoni*, *Nycteris grandis*, and *Kerivoula ? cuprosa*) collected on recent surveys in Uganda and Rwanda. We also re-identify historical cranial material for the rare fruit bat, *Casinycteris argynnis*, in the collections at the Royal Museum for Central Africa (RMCA), Tervuren, Belgium. Three of the aforementioned taxa are new records for Uganda, two are new records for Rwanda, while a fourth is documented for Uganda for only the second time.

Methods

Abbreviations for museums, countries, and collectors:

AMNH	American Museum of Natural History, New York, U.S.A.
BMNH	British Museum (Natural History), London, U.K.
CAM	Cameroon
DRC	Democratic Republic of Congo (formerly 'Zaire')
HZM	Harrison Zoological Museum, Sevenoaks, U.K.
JFD	Jack F Degner Field Notes, MUZM collection
KRM	Robert M. Kityo Field Notes, MUZM collection (uncatalogued)
MHH	Michael H. Huhndorf Field Notes, MUZM collection
MHNG	Museum d'Histoire Naturelle de Geneve, Geneva, Switzerland
MUMZ	Makerere University Museum of Zoology, Kampala, Uganda
RMCA	Royal Museum for Central Africa, Tervuren, Belgium
SA	South Africa
SMF	Senckenberg Museum, Frankfurt am Main, Germany
TANZ	Tanzania
ZFMK	Zoologisches Forschungsmuseum Alexander Koenig, Bonn, Germany
ZMUM	Zoological Museum of Moscow State University, Moscow, Russia

Abbreviations for cranial and external body measurements used in the text; mostly from Stanley & Kock (2004) but see also Hill (1974).

Ant.for.w	Width across anteorbital foramina
Bcd	Braincase depth, from basioccipital bone to top of braincase
Bcd (bull)	Braincase depth, including bullae
Bcw	Brain case width
C-C	Greatest breadth across crowns of upper canines
Cdl	Condylobasal length, from antero-most point of the premaxillary bone to occipital condyle

Cdl (C)	Condylocanine length, from anterior face of canines to occipital condyle
Cdl (inc)	Condylo-incisive length, from anteromost point of I^1 to occipital condyle
C-M^3	Crown length of upper maxillary row, canine to M^3
Crn	Greatest length of skull, from anteromost point of premaxillary bone to most posterior point of occiput
Crn (inc)	Greatest length of skull, from anteromost point of I^1 to most posterior point of occiput
Ear	Ear length
Fal	Forearm length
Hfl	Hind foot length
Ior	Interorbital breadth, width across rostrum dorsally between orbits
Lacr	Lacrimal breadth, width across rostrum dorsally at protuberances near lacrimal canals
Lmesop-ham	Length from anterior edge of mesopterygoid fossa to tip of pterygoid hamulars
LM^3-ham	Length from line across posterior faces of M^3-M^3 to tip of pterygoid hamulars
LM^3-mesop	Length from line across posterior faces of M^3-M^3 to anterior edge of mesopterygoid fossa
Lpp-mesop	Length from rear of pre-palatal emargination to anterior edge of mesopterygoid fossa
Lpp-M^3	Length from rear of pre-palatal emargination to line across posterior faces of M^3-M^3
Ltrl	Lower toothrow length measured from
M^3-M^3	Greatest breadth across upper tooth rows
Mand	Mandible length, from alveola of I_1 to midpoint of condyle
Mast	Mastoid width
Mw	Maxillary width
Pal	Palatal length, anterior border of premaxilla to posterior border of hard palate
Palw	Palatal width at the junction of M^2 and M^3
M^2-M^3	
Por	Least postorbital breadth, dorsal width at most constricted part of skull
Pow	Post orbital width
Tbl	Total body length
Tl	Tail length
Trg	Tragus length
Wgt	Body mass (in grams)
Zyg	Zygomatic breadth

Ten specimens of *Casinycteris argynnis* from Uganda were collected in Mabira Forest Reserve, central Uganda, using 36 mm mesh mist nets set in both primary and secondary forest. Seven of these specimens are preserved as skins with skeletons while the remaining three are preserved in 70 % ethanol with skulls removed. All presently reside at the MUMZ and remain with their original field numbers. Additional materials of *Casinycteris argynnis* from DR Congo were examined by the senior author in the collections of the RMCA.

The single male specimen of *Laephotis wintoni* (KRM 2947) was netted in Nakiloro, approximately 12 km northwest of Moroto, Karamoja, northeastern Uganda on 20th January, 2004. The mist netted specimen is preserved as a skin with skull and skeleton at the MUMZ.

Specimens of *Taphozous perforatus haedinus* were collected from cave roosts in the Sukulu Hills, Tororo region, eastern Uganda, using a mist net stretched across cave openings. The caves were visited twice by the senior author. On 9 September 1993, a total of 160 individuals were counted in the roost; 12 specimens (MUZM 1547 & 1548, 1550–1553 and 1566–1571: 3 ♀, 9 ♂) were collected. On March 3 1995, a total of 30 bats were counted as they flew out of the cave. An additional 10 specimens (Sukulu 34–43; 6 ♀ and 4 ♂) were collected at this time. On both occasions it was not possible to establish the total size of this colony of bats. This is the same locality discussed by Kock (1974).

Eleven individuals of *Taphozous perforatus haedinus* from the Alekilek area, Karamoja, northeastern Uganda were retained from a cave that is located on a rocky volcanic plug. These specimens (KRM 2960, 2962–2971) were obtained on the 19 March 2004. This represents the second known locality for this taxon in Uganda.

The single specimen of *Nycteris grandis* was collected from a tree near Gashora, Rwanda. The specimen (ZFMK 2001.162) represents the first record from the country.

The unique series of *Kerivoula c.f. cuprosa* from Kibale (Uganda) was collected by the senior author over a 12-day period in mid-elevation tropical forest using a homemade HARP trap. Kibale Forest National Park in Kabarole District, western Uganda, lies south east of the town of Fort Portal from 0°13′ to 0°41′N and 30°19′ to 30°32′E. The vouchered records of *Kerivoula ? cuprosa* from Rwanda are from Kamiranzovu and Uwinka, Nyungwe NP (Rwanda)

and were collected by the senior author from mist-nets. Anabat recordings 'captured' vocalizations at the latter site.

Cranial measurements of *Casinycteris argynnis* were rounded to the nearest 0.1 mm using a Mitutoyo dial caliper, while those of *Taphozous perforatus* were recorded to the nearest 0.1 mm using ordinary slide calipers. Cranial dimensions recorded are similar to those used by Kock (1967), Hill (1974), Bergmans (1989), Stanley *et al.* (1996) and Kock *et al.* (1998). The senior author measured all external body dimensions of the Ugandan material. JCKP measured FA and cranial measurements of *Kerivoula ? cuprosa* in the confines of the MUMZ.

Species accounts

Casinycteris argynnis Thomas, 1910

New material. 10 specimens from Uganda captured in Mabira Forest Reserve, ca 45 km east of Kampala; 7 collected in July, 2000 (JFD 094, JFD 152, MHH 350, KRM 2658, KRM 2677, KRM 2687, KRM 2696) and 3 collected in August, 2003 (KRM 2826, KRM 2831, KRM 2849). All specimens are currently housed in the MUMZ.

Re-identified material. 55. These include 44 newly recognized crania from DR Congo discovered in the RMCA collection (93-79-M-92 to 93-79-M-101, 93-79-M-103, 93-79-M-106 to 93-79-M-125, 93-79-M-243 to 93-79-M-244 and 93-79-M-246 to 93-79-M-256) all collected in January and February 1988 at different localities in the Reserve Forestiere de Masako, Kisangani (DRC). Additionally, we recognize 11 alcohol-preserved specimens from DRC in the RMCA collection (Boteka; 85-30-M-1, Wafanya; 92-79-M-72 to 92-79-M-75 and 91-76-M-79 to 91-76-M-80, Reserve Forestiere de Masako; 93-79-M-323 to 93-79-M-326).

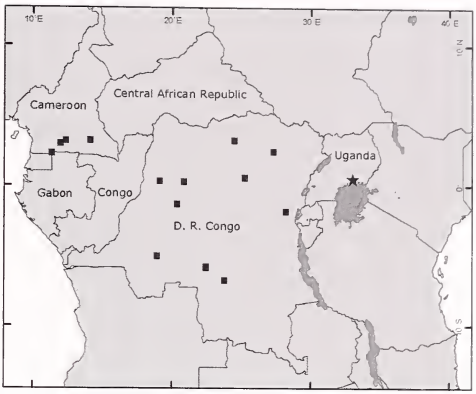


FIG. 1. Distribution of *Casinycteris argynnis* (■) including the new Ugandan record from Mabiry Forest (★).

Distribution remarks. Meirte (1983) noted that *Casinycteris argynnis* was known from 11 localities in southern Cameroon and the DRC and was restricted to the central African forest block. According to Hayman & Hill (1971), Irangi west of Lake Kivu was the most easterly locality yet recorded. Hayman *et al.* (1966) dismissed the record from Beni (Schouteden 1948) as a mis-identified *Scotonycteris zenkeri*. Bergmans later (1990) produced a distribution map documenting all 12 known localities. More recently, Van Cakenberghe *et al.* (1999) documented the most southerly records. Occurring above and below the Congo River, the species had ranged from Meyo

TABLE 1. External measurements of *Casinycteris argynnis*.

Casinycteris argynnis	Sex	N	Tbl	Hfl	Fal	Ear	Wgt	Wing Span	Digit V M/ carpal	Digit V Total length	Digit III Phalanges M/ carpal	Digit III Phalanges 1st Phal	Digit III Phalanges 2nd Phal	Wing tip
Uganda	All	10	86.7 ±5.8	14.0 ±2.8	57.4 ±1.5	20.4 ±1.7	24.8 ±3.9	411.3 ±15.0	40.4 ±1.5	77.6 ±2.0	41.1 ±1.8	27.8 ±1.4	35.7 ±2.6	104.6 ±5.35
Uganda	F	9	86.7 ±5.8	14.0 ±2.9	57.7 ±1.3	20.6 ±1.7	25.1 ±4.0	420.0 ±1.4	41.05 ±1.3	78.8 ±0.3	42.0 ±1.4	28.6 ±0.3	37.1 ±1.4	107.7 ±0.3
Uganda	M	1			54.65	19.15	22.5	394	39	75.3	39.3	26.25	32.85	98.4
DR Congo	F	11			58.7 ±1.5		28 ±3.9		41.6 ±1.3	9.3 ±3.5	42.6 ±1.5	28.1 ±1.0	36.5 ±2.0	107.1 ±3.9
Type	F	1	95		60	20								

TABLE 2. Mean values for a variety of cranial measurements on *Casinycteris argynnis* and *Scotonycteris zenkeri*. Note: Some of the specimens are not sexed but have been included in the sample for computing mean values. Measurements for *Scotonycteris zenkeri* are included for comparison. Other Cameroon materials are presented separate from the type specimen data.

Casinycteris argynnis	Sex	n	Crn	Cdl(C)	C-M³	M³-M³	Pw M²-M³	Por	Zyg	Mw	Bcd	pow	ltrl-M³	Bcw
DR Congo	F	19	25.1±1.53	23.1 ±2.96	8.25 ±.7	9.7 ±.65	7.55 ±.85	5.1 ±.53	18.5 ±1.1	11.0 ±.5	9.7 ±.40	6.94 ±.37	9.85±.60	12.33 ±.41
	M	30	24.9 ±1.3	23.2 ±1.45	8.1 ±0.5	9.6 ±0.6	7.5 ±0.8	5.1 ±0.5	18.2 ±1.45	11.0 ±0.55	9.8 ±0.4	6.97 ±0.51	9.90±0.57	12.26 ±0.47
	All	55	25.1 ±1.4	23.1 ±2.7	8.2 ±.6	9.7 ±.6	7.5 ±.8	5.1 ±.5	18.3 ±1.45	11.0 ±.5	9.7 ±.4	6.93 ±.47	9.91±.57	12.31 ±.47
Type	F	1	28.3	25				5.2	20					13.6
Cameroon	F	2	27.05 ±0.1	26.1 ±0.2	9.0 ±0.1	10.6 ±.3		5.4 ±0.1	20.1 ±0.95	11.6 0.1	9.7 ±0.5	7.17 ±0.89		10.92 ±0.04
	M	1	24.8	23.2	8	10.1		5.5	18.75	11.7	10.6	7.8		12.95
	All	4	25.9 ±1.3	25.2 ±1.7	8.5 ±0.6	10.3 ±0.3		5.35 ±0.15	19.5 ±0.9	11.45 ±0.4		7.41 ±0.6		13.01 ±0.15
Uganda	F	6	25.5 ±0.9	23.7 ±0.9	8.4 ±0.3	10.2 ±.45	7.8 ±0.6	5.3 ±0.35	19.0 ±1.1	11.3 ±0.1	9.6 ±0.4	7.58 ±0.23	9.49 ±0.46	12.55 ±0.25
	M	1	24.2	22.1	7.5	9.3	7.35	4.9	18.1	11.3	9.5	7.36	9.15	12.42
	All	7	25.3 ±0.9	23.4 ±1.1	8.2 ±0.4	10.1 ±0.55	7.7 ±0.6	5.2 ±0.4	18.8 ±1.0	11.3 ±0.2	9.5 ±0.4	7.56 ±0.22	9.38 ±0.52	12.53 ±0.23
Scotonycteris zenkeri	M	1	26	24.2	8.3	8.5	7	4.9	17.1	10.4	8.55	6	10.2	11.2

Nkoulou, Cameroon in the west to Irangi in the east. Our new record from Mabira Forest Reserve, Uganda, extends its range approximately 500 km to the east. Fig. 1 depicts the currently documented distribution.

Known specimens. We include here a detailed list of all currently known records. Until now this species was only known by 38 specimens from 13 localities from Congo basin forests in Cameroon and DRC. We increase the total number of recorded localities to 17 (Fig. 1), including the first records from east Africa, and nearly triple the number of recognized specimens to 103.

CAMEROON. Type: Bitye, Ja River 1 ♀ (BMNH 11.5.5.1, Thomas 1910); Mang 2 ♂ (RMCA 75-56-M-81, -98, Meirte 1983); Mefo 1 ♀ (MHNG 913/54, Perret & Aellen 1956); Meyo-Nkoulou, 2 ♀ (RMCA 73-18-M-93, -188, Meirte 1983).

DEMOCRATIC REPUBLIC OF CONGO. Bena-Bala 2 ♀ (RMCA 84-35-M-1, 84-35-M-2, Bergmans 1990); Boende 1 ♂, 1 ♀ (RMCA 38652, 38653, Meirte 1983); Boteka 1 ♀ (RMCA 85-30-M-1, present study; Irangi 1 ♀ (RMCA (RG) 27430, Hayman *et al.* 1966) 9 ♂, 5 ♀, 1 imm. ♀ (SMF 64988-65000, SMF 65052, Bergmans 1990); Irangi? 1 ♀ (SMF 69400, Bergmans 1990); Koloka 1 ♂ (SMF 6367, Schwarz 1920); Lukonga 1 ♀ (RMCA 80-13-M-3, Meirte 1983); Luluabuorg [= Kananga] 2 ♂ (RMCA (RG) 33347, 33348, Meirte 1983) 2 ♀ (RMCA (RG) 33411, 33412); Mbwambala, Kikwit 2 ♀ (1312, 1342, Van Cakenberghe *et al.* 1999); Masako Forest Reserve 44 (sex indet.) +4 ♀ (RMCA 93-79-M-92 to 93-79-M-101, 93-79-M-103, 93-79-M-106 to 93-79-M-125, 93-79-M-243 to 93-79-M-244 and 93-79-M-246 to 93-79-M-256, 93-79-M-323 to 93-79-M-326, present study); Medje 1 ♀ (AMNH 48751, Allen *et al.* 1917); Stanleyville [= Kisangani] 1 imm. ♂ (RG 16211, Schouteden 1948); Wafanya 6 ♀ (RMCA 92-79-M-72 to 92-79-M-75 and 91-76-M-79,-80, present study); DR Congo, no specific locality 1 ♀ (RMCA 84-35-M-3, Bergmans 1990).

UGANDA. Mabira Forest Reserve 9 ♀ 1 ♂. Mabira Forest Reserve, 7 in July 2000 (JFD 094, JFD 152, MHH 350, KRM 2658, KRM 2677, KRM 2687, KRM 2696, present study) and 3 in August 2003

(KRM 2826, KRM 2831, KRM 2849; present study).

Pelage remarks. Thomas (1910b) described the bat as follows "The astonishing <superficial> resemblance of the type species to *Scotonycteris* is also noticeable. Probably both bats bear a protective resemblance to the leaves, fresh or dry, of some local tree." The color of these bats on all membranous body parts (ears and wings) has a greenish/yellowish tinge, while the joints of phalanges have a pronounced yellow pigmentation. The coat on the dorsum is fairly thick and uniformly brownish in coloration. Individual hairs are tri-colored, brownish apically (about 10% of the length), whitish for most of the midsection (about 75% of the length), and with a greyish base (about 15% of the total length). The coat on the venter is not as thick as on the dorsum, with a general brownish coloration and a broad whitish patch down the mid-body. In all specimens, a white spot exists above each eye with another white patch/spot between the eyes on top of the nose. Both cheeks have a whitish patch that extends backwards along the lips and a little beyond. The chin is more sparsely covered in whitish hairs, not concealing the skin, as is the case elsewhere on the venter.

Taxonomic remarks. This rare fruit bat has been described as having a superficial resemblance to *Scotonycteris zenkeri* (Hayman & Hill 1971, Nowak 1991). *Casinycteris argynnis* is distinguished by total absence of the post-dental bony palate (Thomas 1910), and was thought by Hayman & Hill (1971) to have a larger forearm than *Scotonycteris zenkeri* (60 mm vs. 45–55). However, Bergmans (1990) argues against the latter character as he lists forearm length as 49.8-63.5 in *Casinycteris argynnis*. The cranial dimensions of *Scotonycteris zenkeri* (Table 2) also mostly fall in the range of *C. argynnis*. The best cranial character is the absence of the post-dental palate. The palate is comprised exclusively of the maxilla, a unique condition among the Megachiroptera (Bergmans 1990).

At RMCA, all newly identified cranial specimens of *Casinycteris* were catalogued as either *Epomops franqueti* or *Megaloglossus woermanni*. There may well be others misidentified in the alcohol collection, which the senior author was unable to review. Cranial metric data is presented in Table 2 for 7 of these (6 ♀ and 1 ♂) newly acquired specimens. The Ugandan specimens are generally smaller than the type specimen, based on the few metric dimensions given for the type specimen, but appear to be similar in size to the specimens from the DRC.

Ecological remarks. Using White's (1983) vegetation schemes, Bergmans (1990) confirmed that this species was confined to Guineo-Congolian lowland rain forest. Specific localities include Swamp, Transitional, Mosaic (with secondary grassland), and both Wet and Dry rain forest types. Mabira Forest Reserve is located 20 km north of the Lake Victoria shoreline. It is considered to be predominantly secondary forest, in which the distinctive vegetation types represent subclimax communities, heavily influenced by man over prolonged periods of time (Howard 1991). Mabira Forest Reserve consists of vegetation broadly categorized into four forest types (Ibid.): 1) The colonizing tree *Maesopsis eminii* in association with *Albizia* spp., *Markhamia platycalyx*, *Sapium elipticum*, and *Celtis*

TABLE 3. Mean values for different external dimensions (in mm) of *Taphozous perforatus* from Sukulu Hills, Tororo and Alekilek, Karamoja in Uganda

	Sex	n	Tbl	Tl	Hfl	Ear	Fal	Wgt
Sukulu Hills		9	96.91	25.18	12.5	18.6	63.4	16.8
	M		±4.3	±2.8	±.5	±1.65	±1.7	±2.6
		3	93.5	23.2	13	18.2	63.9	16.7
	F		±3.3	±1.0	±1	±0.4	±0.81	±4.04
		12	96.05	24.7	12.6	18.5	63.52	16.75
	all		±4.2	±2.6	±.6	±1.4	±1.5	±2.8
Alekilek		3	104.75	28.8	12.7	22.4	63.9	17
	M		±.5	±3.1	±.6	±3.1	±1.8	±.4
		5	105.6	30.8	12.5	21.9	64.0	17.4
	F		±1.5	±3.3	±.5	±2.2	±1.3	±1.1
		8	105.6	30.8	12.5	21.9	64.0	17.4
	all		±1.5	±3.31	±.5	±2.2	±1.3	±1.1

TABLE 4. Mean values for different cranial dimensions of *Taphozous perforatus* from Sukulu Hills, Tororo and Alekilek, Karamoja in Uganda.

	Sex	N	Crn	Cdl	Zyg	Bcw	Bcd	Ior	Mand	C-M^3
Sukulu Hills		9	21.1	19.6	12.1	9.7	7.7	6.2	15.4	8.8
	M		±0.3	±0.4	±0.4	±0.4	±0.2	±0.3	±0.35	±0.25
		3	20.4	19.2	11.6	9.6	7.5	5.6	15.3	8.6
	F		±0.38	±0.4	±0.2	±0.05	±0.1	±0.23	±0.29	±0.2
		12	20.9	19.5	12.0	9.7	7.65	6.1	15.4	8.7
	All		±0.4	±0.4	±0.4	±0.3	±0.0	±0.4	±0.3	±0.2
Alekilek		3	20.88	19.57	12.10	9.95	7.45	6.31	16.31	8.75
	M		±0.05	±0.27	±0.15	±0.38	±0.09	±0.06	±0.41	±0.17
		5	20.72	19.38	11.98	9.69	7.42	6.25	15.70	8.68
	F		±0.25	±0.24	±0.17	±0.34	±0.05	±0.06	±0.18	±0.15
		8	20.75	19.46	12.01	9.76	7.42	6.27	15.90	8.73
	All		±0.22	±0.25	±0.17	±0.38	±0.09	±0.06	±0.41	±0.17

spp., 2) Communities of mixed forest, 3) *Celtis-Holoptelea* forest and 4) the poor mixed forest of the wet valley bottoms dominated by *Baikiaea insignis*. The forest covers an area of 360 km^2 with an altitudinal range of 1070–1350 m. Overall the vegetation of Mabira Forest can be broadly described as a medium altitude, semi-deciduous forest. It is considered to be a relict from once more continuous Congolean forests. The documentation of *Casinycteris argynnis* is supportive.

Taphozous perforatus haedinus Thomas, 1915

Distribution remarks. Kock (1974) was the first to document this taxon in Uganda. He reported on two female specimens from the Sukulu Hills in Uganda that he examined at the National Museums of Kenya. Subsequently, Davies & Van den Berghe (1994) omitted this species for Uganda, perhaps due to Kock's publication in a journal with limited distribution. The rediscovery of the roost of *Taphozous perforatus* confirms its occurrence in Uganda. It joins four other Emballonurid bats in Uganda: *Taphozous mauritianus* (E. Geoffroy 1818), *T. nudiventris* (Cretzschmar 1830), *T. peli* (Temminck 1853), and *Coleura afra* (Peters 1852). The species is widely known in arid portions of Kenya and Tanzania, as well as along the Nile Valley in Sudan (Koopman 1975). Its presence in an arid region of Uganda is, therefore, not surprising. It has a widespread but patchy distribution in many areas of Africa as well as in southwestern Asia.

Taxonomic remarks. The skull has a deep frontal depression as well as deep basisphenoid pits. Various external and skull measurements for 12 of the Sukulu Hills specimens and 8 of the Alekilek specimens are presented in Tables 3 and 4. In a number of respects the males from both populations are a little larger than the females. Since these specimens are referable to the dark-winged *T. p. haedinus* variety, we cannot address the status of the *sudani* form, originally described as a distinct taxon (Thomas 1915).

Pelage remarks. In general appearance, the dorsal coat color of these bats is Vandyke Brown. Individual hairs are bi-colored. Approximately 40% of the hairs (distal portion) are Vandyke Brown while the basal portion (60%) is white. The color of the venter is similar to the dorsal surface but passes into a lighter paler coloration on the lower abdomen in older specimens. Individual hairs of the lower abdomen are tri-colored with the tip (about 10% of the total length) off-white, the middle portion (about 30% of the length) brown, while the base (60% of the length) is white. Kingdon (1974) describes the color of these bats as drab. All the adult males posses a patch of brick red hairs on the chin. The lower surface of the plagiopatagium along the forearm is lined with short off-white to grey hairs. The angle between the forearm and the 5th metacarpal is covered with a flap of skin creating a small pocket.

Ecological remarks. The Sukulu Hills are found in eastern Uganda about 6.5 km south of Tororo. They bear rich deposits of limestone and phosphate minerals; the latter playing an important role in the economy of the local people. The surrounding communities mainly consist of agriculturalists growing sub-

TABLE 5. External measurements of *Laephotis wintoni* (KRM 2947) from Nakiloro, Karamoja in Uganda compared with other east African records for which data are available.

Number	Sex	Wgt	Tbl	Tl	Hfl	Ear	Trg	Fal
KRM 2947	M	6.5	89.3	44.4	7.2	24.3	8.55	37.4
FMNH 171300	F	6.8	96	42	8	23	10	39
BM 1.5.6.5	M				7.7	21	6.3	37.2
HZM 2.3020	M							36.6
ROM 36368	M		95	41	6.0	21		36.8
ROM 66245	F		89	37	7.0	21		37.8
BM 72.4397	F					21.4		40.7
BM 72.4398	F					21.1		40.2
BM 72.4399	F					21.5		40.2

sistence crops. The vegetation of the Sukulu Hills and the surrounding areas is mostly grassland savannah, with very sparse stands of trees.

The Alekilek/Akisim area is located near the interface of the Karamoja and Teso regions, in northeastern Uganda. It lies in an area composed largely of *Combretum-Terminalia* savannah. Alekilek has several other networks of caves that have not been investigated as yet, but might also contain bats of this or other species. Unlike the Nakiloro area described above, and despite having a uni-modal pattern of rainfall, it is more suitable for agriculture and settlement. These features contribute to a rapid rate of tree removal for charcoal, fuel and construction.

Laephotis wintoni Thomas, 1901

Referred materials. ETHIOPIA. Beletta Forest, 38 km SW of Jimma (ZMUM S165956-957 ♂, (Lavrenchenko *et al.* 2004). Koka, Shoa Province: BMNH 72.4397-4399, 3 ♀, (Hill 1974). KENYA. Kitui: *Type* ♂ BMNH (Thomas 1901). Nyeri: HZM, (Harrison 1961). Namanga: ROM 36368 ♂, (Peterson 1971). Nanyuki, 23 mi w of Mt Kenya: ROM 66245 ♀ (Peterson 1973). TANZANIA. Mazumbai Forest Reserve, West Usambara Mts, Lushoto Dist., Tanga Region, SMF 66961 ♂ (Kock & Howell 1988). Kibebe Farms, 6 km e Iringa, Iringa Dist, Iringa Region, FMNH 171300 ♀ (Stanley & Kock 2004). UGANDA. Nakiloro, 12 km ne of Moroto, Karamoja Prov., MUZM, KRM 2947 ♂ (present study).

Pelage remarks. Both the dorsal and ventral coat hairs are bicolored. The bat itself is bicolored darker above and paler below. The dorsum is a uniform soft loam brown, with individual hairs having the basal 60% blackish while the apical proximal 40% is a uniform loam brown. With the hairs not ruffled, the basal blackish portions of the hairs are not visible. The venter has varying shades of a pale brown coloration, darker below the chin to the mid breast, and then paler towards the vent. Individual hairs have a

TABLE 6. Selected cranial measurements of *Laephotis wintoni* from Nakiloro, Karamoja in Uganda compared with other published records from eastern Africa.

Number	Crn (inc)	Crn	Cdl (inc)	Cdl	Cdl (C)	Zyg	Ant. for.w	Lacr	Ior	Por	Mast	Bcw	Bcd bull	Bcd
KRM 2947	16.45	16.2	15.9	15.2	15.2	8.85	4.8	5.5	5.1	3.7	8.25	7.6	6.15	4.75
FMNH 171300	16.2	15.7	15.6	15.3	14.9	9.5	4.7	5.3	4.8	3.9	8.2	7.6	7.1	5.0
BMNH 1.5.6.5		15.8		15.2	14.9		4.5	5.2		3.7	8.5	7.4		4.8
HZM 2.3020		15.8		15.2	14.9		4.6	5.4		3.7	8.0	7.3		4.8
ROM 36368		16.1		15.4		9.1				3.9	8.1			5.0
ROM 66245		16.0		15.4		8.4				3.8	8.0			4.8
BMNH 72.4397		16.3		15.6	15.4	8.9	4.4	5.5		3.7	8.3	7.4		4.8
BMNH 72.4398		16.3		15.5	15.4	9.4	4.7	5.4		3.9	8.5	7.5		4.7
BMNH 72.4399		16.2		15.8	15.6	9.1	4.6	5.3		3.7	8.5	7.6		4.8

TABLE 7. Selected dental, palatal, and mandibular measurements of *Laephotis wintoni* from Nakiloro, Karamoja Uganda compared with other east African records of the taxon.

Number	M^3-M^3	C-M^3	Mand	C-C	Pal	Lpp-mesop	Lpp-M^3	LM^3-mesop	Lmesop-ham	LM^3-ham
KRM 2947	5.85	5.2	11.25	4.5	7.55					
FMNH 171300	5.9	5.2	10.5	4.5	8.0	6.5	4.2	2.2	1.9	4.1
BMNH 1.5.6.5	5.5	5.0	10.6	4.3	7.9	6.5	4.4	2.1	1.9	4.0
HZM 2.2030	5.7	5.0	10.5	4.5						
ROM 36368	5.9	5.1		4.7						
ROM 66245	5.5	4.9		4.3						
BMNH 72.4397	5.6	5.2	10.8	4.5	8.1	6.8	4.4	2.4	1.8	4.2
BMNH 72.4398	5.9	5.2	10.7	4.6	8.2	6.4	4.2	2.2	2.0	4.2
BMNH 72.4399	5.5	5.0		4.5	8.5	6.8	4.3	2.5	1.9	4.4

brownish tip varying in intensity as described for the venter. The flanks are covered in a unicolored pale offwhitish. The wings and tail membrane are translucent and fairly broad in outline.

Distribution remarks. This rarely collected species has a patchy distribution throughout the eastern third of sub Saharan Africa. Originally described from central Kenya (Thomas 1901), subsequent records have extended into Ethiopia (Hill 1974, Lavrenchenko *et al.* 2004) and central Tanzania (Stanley & Kock 2004). The single adult male of this species discussed here is the first record for this species in Uganda. It was netted in Nakiloro, Karamoja on the 11 January 2004 by the senior author. This brings the total confirmed number of east African specimens to 12.

Recent materials from Lesotho and South Africa (n = 9) have been tentatively referred to this taxon but may represent a new taxon. With some caution, Rautenbach & Nel (1978) extended the range of the nominate taxon to the Cape Province, South Africa. Although this view was upheld by Koopman (1993), Kearney and Seamark (2005) show that this question is unresolved. These records from southern Africa are not included in our distribution map (Fig. 2).

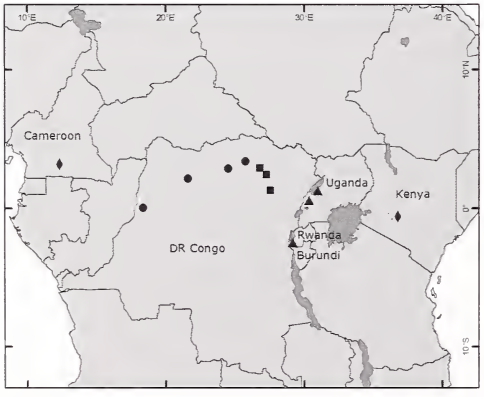


FIG. 2. Distribution of *Kerivoula ?cuprosa* (▲), *Kerivoula smithii* (■), *Kerivoula cuprosa* (♦), *Kerivoula* sp. indet. (●).

Taxonomic remarks. In the first comprehensive review, *Laephotis wintoni* was reported to occur in Kenya, southern Congo, Zambia, Angola and northwestern Botswana (Hayman & Hill 1971). By synonymizing Monard's *angolensis* (1935), these authors considered *Laephotis* a monotypic genus. That same year however, Setzer (1971) named two new species, *botswanae* and *namibensis*, and recognized all four named taxa as distinct. Hill (1974) re-reviewed the group and followed Setzer's lead. The metric data presented in Tables 5–7 suggests only slight variation in size for all the known specimens from eastern Africa.

Although South African chiropterologists united their specimens with the nominate race, they did so with hesitation, relying on the current definition of the taxon. Additional specimens and genetic and karyotypic analyses will be important in defining the breadth of *wintoni*. The remaining disjunct distribution implies that the South African form is a local endemic, or, alternatively, that the currently patchy distribution will continue to be filled with additional records. Recent genic analyses presented by Trujillo *et al.* (2004) favor the former alternative.

Ecological remarks. Kingdon (1974) observed that this long-eared bat roosted under tree bark. The same author suggested that the species may be widely distributed in savanna and woodland. In Tanzania, Stanley & Kock (2004) recorded this species in a dry

TABLE 8. External measurements of *Kerivoula cuprosa* and *? cuprosa*.

Museum	Number	Locale	Sex	Wgt	Cond	Fal	Tbl	Tl	Hfl	Ear	Trg
BMNH	type	Cameroon	M	?	?	32	90	45	?	13.5	5.5?
HZM		Kenya	F	?	?	34.6	84	38	7	13	8
KRM	2885	Kibale	M	5.5	Alc	32.4	84	42.15	6.6	13	6.65
KRM	2886	Kibale	F	5.6	Ssk	33.1	90	45.1	?	?	8.1
KRM	2887	Kibale	M	4.5	Alc	32.65	80	39.7	6	12.2	6.9
KRM	2888	Kibale	F	5.2	Alc	33.4	89	42.8	6	11	6.62
KRM	2890	Kibale	M	5.5	Alc	32.55	86	41.65	7.6	11.3	8.76
KRM	2891	Kibale	F	?	Alc	33.85	93	46.2	6.21	11.7	8.24
KRM	2894	Kibale	M	5	Alc	33.75	82	40.92	5.1	11.7	9.44
KRM	2896	Kibale	F	5.6	Alc	34.9	92	43.2	6.5	12.7	6.83
KRM	2897	Kibale	M	5	Alc	33.1	91	47.05	6.2	11.4	6.21
KRM	2899	Kibale	M	7.5	Alc	33.8	87	41.62	6.6	12.2	8.2
KRM	2904	Nyungwe	M	4.8	Alc	35.2	?	39.45	7.15	14	8.65
KRM	2934	Nyungwe	F	5.4	Ssk	36.35	?	47.42	7.6	17.7	6.1

woodland habitat. The Nakiloro area of the Karamoja region is located in northeastern Uganda, a semi- arid region. This area is mostly savannah composed of *Commiphora* spp., *Acacia* spp., *Ficus sycomorus*, *F. ingens* and *Sansevieria* spp. The Nakiloro River flows from Mt. Moroto through this area and is the only permanent water source. In the dry season, its volume decreases to a small flow. The presence of this river has created riparian habitats along its course in contrast with the semi-arid habitats elsewhere in the area. Owing to the scrubby nature of the vegetation, the area remains largely unsettled and largely used by pastoralists. Settlements and cultivated areas are limited to higher elevations on Mt Moroto. The single specimen was netted in a stand of *Acacia* spp. along the Nakiloro River.

Kerivoula cuprosa Thomas, 1912

New material. 10 specimens (KRM 2885-2888, KRM 2890-2891, KRM 2894, KRM 2896-2897, KRM 2899: 6 ♂, 4 ♀) collected near Kanyawara Research Station, Kibale Forest National Park, western Uganda, October 6-17, 2003. Two specimens (KRM 2904, 1 ♂ and KRM 2934, 1 ♀) collected at Kamiranzovu and Uwinka, Nyungwe National Park, Rwanda on the 19 and 22 November, 2004, respectively.

Referred material. Cameroon. Bitye, Ja River: 2000': Type ♂ BMNH (Thomas 1912) G.L. Bates #564. Kenya. Fort Warwick, eastern slope of Aberdare Mountains, 9000'.

Distribution remarks. The genus *Kerivoula* has been very infrequently collected. *Kerivoula cuprosa* (Thomas 1912) is one of the rarest of African bats despite the widely disjunct records. It was previously known with certainty only by the type from Bitye, Cameroun. The same locality also yielded *K. smithii* and *K. muscilla* (Thomas 1912). Only one other specimen (Harrison 1957), from the Aberdare Mountains at 9000' in Kenya, has been generally recognized. The distinction of *K. cuprosa* from *K. smithii* has been, and continues to be, problematic despite Thomas' descriptions of each (1880, 1912) and his direct comparisons therein (1912). Other specimens referred to *K. cuprosa* by Allen *et al.* (1917) from northern DR Congo (Akenge, Medje) have been re-identified by Koopman (1965) as *Kerivoula smithii*. Likewise, the record by Dollman (1914) from Avakubi (DR Congo) was re-identified by Thomas as *smithii* (Hayman *et al.* 1966). Specimens referred to this taxon by Schouteden (1944) from DR Congo (Eala, Lisala, Koteli, Bambesa) have not been seen by us nor specifically re-evaluated by others. We are perplexed that Hayman *et al.* (1966) did not discuss these Schouteden specimens in their review of DR Congo bats. However, in their compendium of African bats, Hayman & Hill (1971) state, "some of those listed by Schouteden (1944) from the Congo (K.), also as *cuprosa*, are *smithii*" (p.52). At this point then, we are unable to verify any records from DR Congo. Given that the two confirmed records of this taxon are separated by some 4000 km, it is not surprising to find the intervening records of a large *Kerivoula* that we report on here. Figure 3 documents the currently known distribution.

Taxonomic remarks. Among described taxa, *Kerivoula ? cuprosa* can only be confused with *K. smithii*. Both

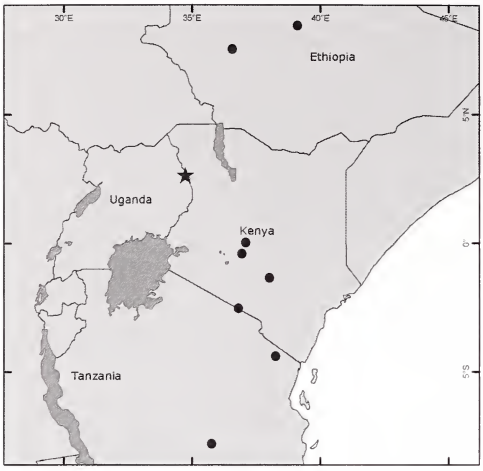


FIG. 3. Distribution of *Laephotis wintoni* (sensu strictu).

are unique in the genus in their large size (FAL 32-34) and their grizzled dorsal pelage. They both lack a comb-like fringe of hairs on the rear of the uropatagium (Hayman & Hill 1977); instead they bear a few scattered inconspicuous hairs. Our series (Table 8) expands the FAL to 36 mm (Nyungwe specimen). As currently defined, they are distinguished from each other by their upper and lower incisors (Thomas 1912, Harrison 1957). *K. cuprosa* has a trifid lower outer incisor and short upper incisors while *K. smithii* has a large and projecting unicuspid lower outer incisor (see Harrison 1963, Fig. 1) and long upper incisors. These characters of *K. cuprosa* are confirmed with our specimens. However, Fahr believes (in litt.) that these specimens represent *K. smithii*. Until the definition of this taxon is re-stated, we must retain them here as *Kerivoula ? cuprosa*. In all of these new records, the tragus is long, pointed and without hairs. In the Kibale series, the tragus in 5 of the specimens (KRM 2885, 2890, 2891, 2894 & 2899) has a dark colored region at its terminus.

Pelage remarks. Pelage in the disjunct populations of *K. cuprosa* appears to be variable; the Kibale series consists of uniformly golden brown grizzled individuals. The grizzled appearance is created by the variably bicolored nature of the fur. The basal half in the Kibale series is dark brown with gold/yellow tips. The basal belly fur is dark brown with yellowish or whitish tips. Orange hairs are located along the tibia. The Nyungwe specimens (KRM 2904 & 2934) are distinct in that the dorsal fur is deep chocolate brown with golden tips. At the junction of the uropatagium, the tips are orange, forming a horizontal orange line. The belly fur is dark brown at the base with a whitish frosting to the tips.

Ecological remarks. Kibale Forest National Park in Kabarole District, western Uganda lies south east of Fort Portal town from 0°13′ to 0°41′N and 30°19′ to 30°32′E. It covers an area of 560 km² of mixed medium altitude moist evergreen forest in the north, medium altitude moist semi deciduous forest at lower altitudes in the south, as well as grassland and swamp communities, and an altitudinal range of 1110–1590 m. The more prominent tree species in the forest park are *Olea welwitschii*, *Aningeria altissima*, *Strombosia scheffleri*, *Newtonia buchanani*, *Chrysophyllum* spp., *Celtis* spp., *Diospyros abyssinica* and *Markhamia platycalyx*. All the bats were captured in compartment K30 a section of Kibale Forest National Park that has never been commercially logged, within 2 km from Kanyawara (about 0°34'N 30°22'E).

The large Kibale series derive from several localities within a few hundreds of meters of one another suggesting that this species can be locally abundant and that its rarity may be a function of collecting technique. There is some evidence that male and female

TABLE 9. Cranial measurements of *Kerivoula ? cuprosa*. The Max measurements include the incisors to m^3.

Museum	Number	Crn	Max	Ior	Bcw	Bcd	C-M^3	Mand
BMNH	type	?	?	?	?	?	5.1	?
HZM		13.0	?	?	6.2	?	5.2	10.1
KRM	2885	13.45	6.05	3.1	6.45	5.26	5.4	9.9
KRM	2886	13.65	5.8	3.05	6.3	5.5	5.5	10.1
KRM	2896	13.4	6.1	3.05	6.6	5.05	5.34	10.0
KRM	2897	13.32	5.86	2.95	5.95	4.7	5.82	9.95
KRM	2904	13.25	6.3	3.05	6.2	5.05	5.4	9.85
KRM	2934	13.9	5.6	3.15	6.56	5.4	5.55	10.3

pairs travel together: an adult male and female were caught together on three occasions (October 6, when a second male was also captured; Oct 13; Oct 16). All males captured had large scrotal testes (n = 6). Three of the four females had large, lactating teats.

Nyungwe Forest is 980 km^2 of tropical montane forest, contiguous with the Kibira National Park in Burundi. Combined, these two protected areas form the largest block of forest in east Africa between 1,500 and 2,300 m in altitude. The forest is important for its population of a number endemic species and a high diversity of primates, with 13 recorded species. Nyungwe also contains a variety of habitats including montane forest, bamboo, grasslands, swamps and bogs, and is very mountainous (http://albertine-rift.org/arift-home/arift-protectedareas/Nyungwe). Specimens from Nyungwe Forest NP were netted in montane forest in the areas around Kamiranzovu Swamp and Uwinka.

Nycteris grandis Peters, 1865

New material. 1 adult ♀ (ZFMK 2001.162) collected in 1985 from a flower of *Kigelia africana* at Gashora, near Lake Kilimbi, southeastern Rwanda. The specimen is preserved in spirit.

External measurements. Tbl 130 mm, Tl 70 mm, Hfl 16.7 mm, Ear 27.4 mm, Fal 60 mm, Wgt 28 g.

Distribution remarks. The Large slit-faced bat is known from Senegal to DR Congo and from Uganda, Kenya, Tanzania and south to Zimbabwe, Malawi, and Mozambique (Hickey & Dunlop 2000); also the offshore islands Zanzibar and Pemba are inhabited by this bat. It was not found in Rwanda before.

Taxonomical remarks. The external measurements fall well into the known size range of the species (Hickey & Dunlop 2000). No geographical variation has been observed so far.

Ecological remarks. The specimen was captured from a flower of *Kigelia africana* but is not known to take pollen or nectar. Probably it was gleaning for arthropods associated with the flowers. *N. grandis* is a forest bat but is also found in swampy areas (Hickey & Dunlop 2000). Such areas are common in the vicinities of Lake Kilimbi and other lakes in eastern Rwanda.

Discussion

The present paper provides additional DR Congo records of *Casinycteris*, the second known Ugandan locality for *Taphozous perforatus*, adds three species (with two new genera) to the bat fauna of Uganda (*Casinycteris argynnis*, *Laephotis wintoni* and *Kerivoula ? cuprosa*) and documents two new bat species for Rwanda (*Kerivoula ? cuprosa*, *Nycteris grandis*).

The record of *C. argynnis* in Uganda extends its known range eastwards ca. 500 km. from its most easterly documented DR Congo locality. It exhibits a disjointed distribution given that it has not been recorded in the intervening forests of western Uganda (e.g. Budongo FR, Kasyoha-Kitomi FR, Bwindi-Impenetrable NP) that are much closer to the Congo forest block.

Forested habitats likely contain much more undiscovered biodiversity (e.g. *Casinycteris argynnis*, *Kerivoula ? cuprosa*) owing to their closed and three-dimensional nature. However, deficiencies in surveys and data gathering efforts limit our attempts to provide accurate species lists. Even the primate-rich Kibale Forest National Park has never been surveyed for its small mammal diversity.

The records presented here also illustrate that Uganda's poorly investigated open habitats contain considerable levels of unknown biodiversity. The three areas from which *Laephotis wintoni* and *Taphozous perforatus haedinus* (Nakiloro, Alekilek, and Sukulu Hills respectively) have been documented, are in parts of the country that are ordinarily not covered in biodiversity surveys. As previously described, they lie in areas of dry savannah, now heavily impacted by humans either though agriculture and settlement or pastoralism. Other Ugandan areas with similar undiscovered potential include Kidepo NP in the NE and West Nile and Madi Districts to the NW, areas affected by civil unrest.

Surveys, such as those mentioned here, may result in the documentation of species new to science. A new species of mouse (Van der Straeten & Kerbis Peterhans 2001) and shrew (Kerbis Peterhans & Hutterer, this volume) have been described from the Ruhija area of Uganda's Bwindi-Impenetrable NP, one of Uganda's most studied protected areas. Typically, such surveys extend the ranges of known species. A full understanding of species' ranges is essential for credible conservation management programs that are based on rigorous scientific detail. These results further indicate that Uganda represents a unique reservoir of African biodiversity as it lies at the interface of distinct biotic realms. Here we have documented new additions to the bat fauna in tropical wet forests (with relatives to the west) and in dry savannah (with relatives to the north, south and east). Mabira Forest Reserve houses unique and remarkable Congo basin

TABLE 10. Gazetteer.

Locality	Locality 2°	Country	Latitude	Longitude	Elev.
Akenge		DRC	2° 54' N	26° 49' E	654
Akisim, Mt	Alekilek, nr	Uganda	2° 7' N	34° 12' E	1140
Avakubi		DRC	1° 18' N	27° 35' E	549
Bambesa		DRC	3° 23' N	25° 47' E	615
Beletta Forest	38 kms SW Jimma	Ethiopia	7° 32' N	36° 33' E	2050
Bena-Bala		DRC	6° 47' S	23° 46' E	710
Bitye		CAM	3° 10' N	12° 20' E	620
Boende		DRC	0° 14' N	20° 50' E	400
Boteka		DRC	0° 19' S	19° 7' E	340
Eala		DRC	0° 2' N	18° 22' E	300
Fort Warwick	east Aberdares NP	Kenya	0° 36' S	36° 46' E	2740
Garissa		Kenya	0° 28' S	39° 38' E	150
Gashora		Rwanda	2° 11' S	30° 14' E	1320
Gumba		DRC	2° 58' N	21° 28' E	413
Irangi		DRC	1° 54' S	28° 27' E	900
Kamiranzovu	Nyungwe NP	Rwanda	2° 30' S	29° 9' E	1950
Kananga	Luluabourg	DRC	5° 53' S	22° 26' E	610
Kanyawara	Kibale Forest	Uganda	0° 36' N	30° 21' E	1500
Kibebe Farms	6 kms E of Iringa	TANZ	7° 48' S	35° 45' E	1550
Kikwit	Mbwambala	DRC	5° 13' S	18° 49' E	438
Kisangani	Stanleyville	DRC	0° 33' N	25° 14' E	450
Kitui		Kenya	1° 22' S	38° 1' E	1150
Koka		Ethiopia	8° 27' N	39° 6' E	1700
Koloka	S of Angu	DRC	3° 12' N	24° 28' E	550
Koteli		DRC	2° 51'N	24° 34' E	430
Lisala		DRC	2° 8' N	21° 37' E	410
Lukonga		DRC	5° 48' S	22° 27' E	630
Mabira	Forest Reserve	Uganda	0° 30' N	33° 0' E	1160
Mang		CAM	3° 12' N	14° 5' E	600
Masako	Forest Reserve	DRC	0° 36' N	25° 13' E	500
Mazumbai	Forest Reserve	TANZ	4° 25' S	38° 15' E	1500
Mbwambala	nr Kikwit	DRC	5° 13' S	18° 49' E	440
Medje		DRC	2° 25' N	27° 18' E	800
Mefo		CAM	2° 58' N	11° 58' E	550
Meyo-Nkoulou	15 kms S Ambam	CAM	2° 16' N	11° 20' E	365
Mwela	Bugoma FR	Uganda	1° 16' N	31° 0' E	1158
Nakiloro	12 kms NE Moroto	Uganda	2° 37' N	34° 44' E	1570
Namanga		Kenya	2° 33' S	36° 48' E	1360
Nanyuki	'Nanguki'	Kenya	0° 1' N	37° 5' E	1990
Nyeri		Kenya	0° 25' S	36° 56' E	1770
Old Calabar		Nigeria	4° 57' N	8° 20' E	
Sukulu Hills	Tororo Region	Uganda	0° 39' N	34° 8' E	1220
Uwinka	Nyungwe NP	Rwanda	2° 29' S	29° 12' E	2450
Wafanya		DRC	1° 21' S	20° 19' E	400

endemics, now including *Casinycteris argynnis*. Our data further argues for its continued protection and its consideration for a status upgrade.

The records of bats reported in this paper underscore several important aspects in biodiversity studies:

i. The importance of continued surveys of fauna even in areas that may be considered fairly well known,

ii. The value of museum specimens in acting as a database of information on species distribution and also as a basis for future verification of species identifications and

iii. The current base of knowledge in the distribution of species may still have immense gaps for a number of species which could/might range further than currently documented.

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10. APPENDIX 4

THE DESCRIPTION OF A NEW SPECIES OF *SUNCUS* (SORICIDAE, MAMMALIA) FROM CENTRAL AFRICA

J. C. Kerbis Peterhans & R. Hutterer

Abstract. Although small African *Suncus* (Soricidae, Soricomorpha) are quite rare in collections, their frequencies are starting to increase with the use of pitfall trapping regimes. Here we report on a new species of Afrotropical *Suncus* first documented in Burundi, subsequently in Uganda, and now possibly in the Democratic Republic of Congo.

Key words: *Shrews, Soricomorpha*, Suncus hututsi **sp. nov**, *endemic species, Albertine Rift, Burundi, Uganda, Democratic Republic of Congo.*

Introduction

African species of small-sized *Suncus* are rare in collections; consequently identifications are difficult. Their small size (defined here as condylo-incisive length less than 15 mm) renders them difficult to collect with traditional traps. With the exception of owl pellet faunas (Meester & Lambrechts 1971, Hutterer & Joger 1982), series are nonexistent. The most recent revision of African *Suncus* only included South Africa records (Meester & Lambrechts 1971). Currently, three taxa of small *Suncus* are recognized (Heim de Balsac & Meester 1971; Hutterer 1993, 2005). One of these, the commensal *Suncus etruscus* (Savi 1822), is readily distinguished by its displaced unicuspid P4 and flat dorsal profile. A second, *Suncus remyi* Brosset, Dubost & Heim de Balsac, 1965, is the only described tropical forest *Suncus*, and known from the type locality in Makokou and Belinga, Gabon (Brosset *et al.* 1965); Monts Doudou, Gabon (Goodman & Hutterer 2004); Minkébé Forest, NE Gabon (Goodman *et al.* 2001); Odzala National Park, Republic of Congo, (Hutterer *et al.* 2001); and the Dzanga-Sangha Forest Reserve, Central African Republic (Ray & Hutterer 1995). The third and most problematic is *Suncus infinitesimus* (Heller 1912). The nominate race is represented by the type specimen from Rumuruti, Laikipia Plateau, Kenya. The form *chriseos* (Kershaw 1921) from southern Africa (reviewed by Meester & Lambrechts 1971) and *ubanguiensis* Petter & Chippaux, 1962 described from and represented by two specimens from the Central African Republic are also included within *infinitesimus* (Meester & Lambrechts 1971; Heim de Balsac & Meester 1971; Hutterer 1993, 2005). Other published records of *infinitesimus* outside of southern Africa include Hutterer & Joger (1982) for Cameroon, 20 km N of Banyo. Recently acquired specimens have enabled us to review these latter groups of taxa.

Members of the new species of *Suncus* were first recognized in collections from Kibira NP, Burundi. The tiny landlocked country of Burundi, with a population density of 193 humans per km^2, is second to neighboring Rwanda as the most densely populated country in Africa. Forest currently occupies approximately 1.5 % (360-413 km^2) of Burundi's 25,650 km^2 (Vedder *et al.* 1992). Despite the environmental degradation effected by such population pressures, the small mammal fauna of Burundi has never been comprehensively described. Over a three year period (1991–1993), the I.N.E.C.N. (Institut National pour l'Environment et la Conservacion de la Nature) and the Peace Corps/U.S.A.I.D. (United States Agency for International Development) Biodiversity Project, joined with the Field Museum of Natural History (Chicago) to document, for the first time, the small mammal and bird fauna of Kibira National Park. Unfortunately, civil unrest caused the termination of the program.

Within Burundi, Kibira National Park is composed of a thin strip of montane forest (1600– 2300 m) straddling the Zaire/Nile Crest. With the exception of tiny Bururi Forest (16 km^2) in the south, Kibira (379 km^2) is the last montane forest remaining in the country. Its width rarely exceeds 10 km and the park has been severed in the middle. The northern sector of the park is continuous with the much larger Nyungwe Forest (Rwanda), the small mammal fauna of which has been studied (Elbl *et al.* 1966, Hutterer *et al.* 1987). Socio-political conflict over the past 16 years continues to stress Kibira NP.

Specimens referable to the new taxon have subsequently been collected in Uganda and possibly also in Bururi Forest, Burundi and in the Democratic

Republic of Congo. We predict that it will also be found in Nyungwe NP (Rwanda) and surveys targeting such small mammals will be initiated there this year. In Uganda, it was first recognized from Bwindi-Impenetrable NP during the course of the 1997 African Tropical Biodiversity Program (ATBP), in an area previously thought to have been thoroughly surveyed (i.e., Ruhizha) .

Materials and Methods

The new species of *Suncus* was collected in unbaited pitfall traps (see Voss & Emmons 1996, Fig. 7). These consisted of ca. 20 m linear drift fences, with small 2 liter buckets spaced at 2 m intervals (Burundi) and a 50 m linear drift fence, with 4 liter buckets spaced at 5 m intervals at Bwindi-Impenetrable NP (Uganda). In order to quantify pitfall efforts, every bucket counted as 1 pitfall trapnight (PFN). For example, a 20 m drift fence set out for 3 days (11 buckets x 3) was equivalent to 33 pitfall trapnights. All traplines and pitfalls were checked twice daily (ca. 7:00 hrs, 17:00 hrs).

Kibira NP specimens were prepared as skeletons (n = 2), or were preserved in 10 % formalin after removal of the cranium (n = 3). After fixing in formalin for ca. 1 week, fluid-preserved specimens were transferred to 70 % ethanol. Uganda specimens were prepared as fluid-preserved carcasses with skulls removed (n = 4), skulls only (n = 4) and two skins with skeletons from Bwindi-Impenetrable NP. Embryos and a sample of stomachs were retained in ethanol. Specimens have been deposited at the Field Museum of Natural History, Chicago, IL USA; Makerere University Zoology Museum, Kampala, Uganda; and a paratype at Zoologisches Forschungsmuseum Alexander Koenig, Bonn. One record was identified in the collections of the AMNH.

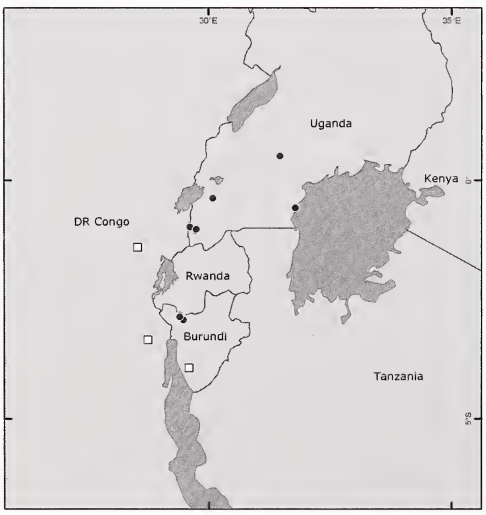

FIG. 1. Distribution of *Suncus hututsi* (●), *Suncus ?hututsi* (□)

Standard mammal external measurements were taken in the field and include ear (E) and weight in grams (WT). Hind foot length (HF) includes the claw. Head and body lengths (HB) were derived by subtracting tail length (TL) from Total Length (TO). The percentage of the tail covered by long bristle hairs is referred to as tail pilosity (TP%) and was determined in museum settings. Type specimens of *Suncus i. infinitesimus* (BMNH) and *S. i. ubanguiensis* (MNHN) were measured by the senior author in their respective institutions. Lengths are given in millimeters (mm) and mass in grams (g). Adult status was determined by the fusion of the basisphenoid-occipital suture. Soricid cranial measurements follow Dippenaar (1977): CI (condyloincisive length), BW (bimaxillary width), LIW (least interorbital width), GW (greatest width of braincase), PMH (posterior median height), UTRL (upper tooth row length), M+I (mandible and incisor length), LTR (lower tooth row). Additional measuring points include PGL (postglenoid width), RO (rostrum breadth at the level of the first unicuspid), MH (mandibular height at the coronoid), and U-C (length of anterior teeth from first incisor to last unicuspid, i.e., canine). NOS = Nature of specimen codes: asr = alcoholic carcass with skull removed, ssk = skin, skull and skeleton, sko = skeleton and skull only.

Reference material examined includes specimens from AMNH (American Museum of Natural History, New York), BMNH (British Museum of Natural History, London), FMNH (Field Museum of Natural History, Chicago), LACM (Los Angeles County Museum, Los Angeles), MNHN (Muséum National d'Histoire Naturelle, Paris), MCZ (Museum of Comparative Zoology, Harvard University, Cambridge, MA), MUZM (Makerere University Zoology Museum, Kampala, Uganda), UFD (Uganda Forest Department, currently housed at FMNH), BJH (Bruce J. Hayward, specimens at FMNH), ZFMK (Zoologisches Forschungsmuseum Alexander Koenig, Bonn). Other abbreviations include BINP (Bwindi-Impenetrable National Park), FR (Forest Reserve),

TABLE 1. External measurements of *Suncus hututsi*.

museum	number	country	taxon	locality	NOS	WT	TO	HB	TL	TP%	HF	E
FMNH	148272	Burundi	hututsi	Kibira NP	asr	2.3	84	55	29	51	8.5	5
FMNH	148273	Burundi	hututsi	Kibira NP	asr	2.3	73	45	28	45	8.35	5
FMNH	148274	Burundi	hututsi	Kibira NP	sko	2.4	83	51	32	na	9	6
FMNH	148942	Burundi	hututsi	Kibira NP	asr	2.4	83	50	33	62	8.3	6
FMNH	148943	Burundi	hututsi	Kibira NP	sko	2.3	90	58	32	na	7.5	6.5
FMNH	157831	Uganda	hututsi	BINP	asr	2	87	57	30	47	9	7
FMNH	160183	Uganda	hututsi	BINP	ssk	1.7	82	49	33	47	8	4
FMNH	160184	Uganda	hututsi	BINP	ssk	1.8	84	54	30	48	8	5
FMNH	160185	Uganda	hututsi	BINP	asr	2.1	87	55	32	57	8.5	6
AMNH	269677	Uganda	hututsi	Kalinzu FR	asr	1.5	84	54	30	50	8	4
MUMZ	3300	Uganda	hututsi	Mujuzi FR	asr				28	48	8	
FMNH	155925	Burundi	?hututsi	Bururi F	asr	2.5	83	56	27	59	8.9	5
FMNH	203735	DRC	?hututsi	Itombwe F	asr	2.6	85	56	29	63	8	7
FMNH	mwwf 45	DRC	?hututsi	Nakaponda	asr	2.4	80	50	30	57	9	5

TABLE 2. Cranio-dental measurements of *Suncus hututsi*.

museum	number	CI	BW	LIW	GW	PGL	PMH	UTRL	M+I	LTR	MH
FMNH	148272	13.56	3.97	3.08	6.24	4.4	3.31	5.35	7.91	5.05	2.9
FMNH	148273	13.84	4.17	3.12	6.41	4.33	3.17	5.53	7.81	5.22	3
FMNH	148274	13.79	3.98	3.21	6.42	4.31	3.32	5.55	7.91	5.12	3.08
FMNH	148942		3.83	2.95	6.13	4.48	3.1		8.21	5.19	3.11
FMNH	148943	13.33	4.16	3.23	6.25	4.51	3.41	5.44	7.97	5.28	3.03
FMNH	157831	13.9	4.11	2.98	6.18	4.07	3.25	5.65	8.14	5.16	2.97
FMNH	160183		4.02	3.1		4.4		5.3	7.76	4.7	2.85
FMNH	160184				6.05	4.1	3.36	5.2	7.67	4.8	2.92
FMNH	160185	13.88	4.19	3.21	6.41	4.6	3.14	5.55	8.1	5.2	3.12
AMNH	269677	13.5	3.97	3.19	6.03	4.3	3.31	5.5	7.81	5.11	3.0
MUMZ	3278	13.49	4.04	2.89	6.2	4.29	3.28	5.62	7.79	5.16	2.91
MUMZ	3300		4.11		6.6	4.49		5.55	8.14	5.06	3.18
MUMZ	3401		3.91	3.19	6.25	4		5.57			3.11
MUMZ	3402	14	3.86	3.19				5.5	8.1	4.96	3.04
MUMZ	3404	14.17	4.14	3.22	6.25	4.56	3.28	5.7	8.16	5.09	3.19
FMNH	155925	14.32	4.07	3.19	6.49	4.46	3.27	5.87	8.6	5.25	3.15
FMNH	203735	14.24	4.11	3.08	6.24	4.27	3.39	5.81	8.39	5.32	3.08
FMNH	mwwf45	14.13	4.2	3.2	6.42	4.32	3.17	5.73	8.37	5.27	3.2

TABLE 3. Diagnostic metrical differences among small Afrotropical *Suncus*.

	TL	TP%	MH	CI	UTRL
S. hututsi	27-33	45-65%	2.9-3.2	13.3-14.3	5.2-5.9
S. i. infinitesimus	24-26	90-100%	3.2-3.9	14.4-14.5	5.9-6.1
S. i. ubanguiensis	26	63-75%	3.5-3.6	14.1-14.4	6.0-6.3
S. remyi	17-21	36%	3.3-3.6	13.1-13.7	5.7-6.2

DRC (Democratic Republic of Congo, Kinshasa). Authors and years of description of names of shrews not given in the text can be found in Allen (1939) and Hutterer (1993, 2005).

Results

***Suncus hututsi* n. sp.** Kerbis Peterhans & Hutterer

Holotype. FMNH 148272, carcass in alcohol, skull extracted, adult female in good condition. Specimen collected on 23 October, 1991, Burundi, Bubanza Province, Kubutare Colline, Kibira National Park, Ruhondo Forest Block (02°56'S, 29°29'E, 2040 m), by L. Davenport; original number 161; deposited in the Field Museum of Natural History, Chicago. Depicted in Figs. 2-6.

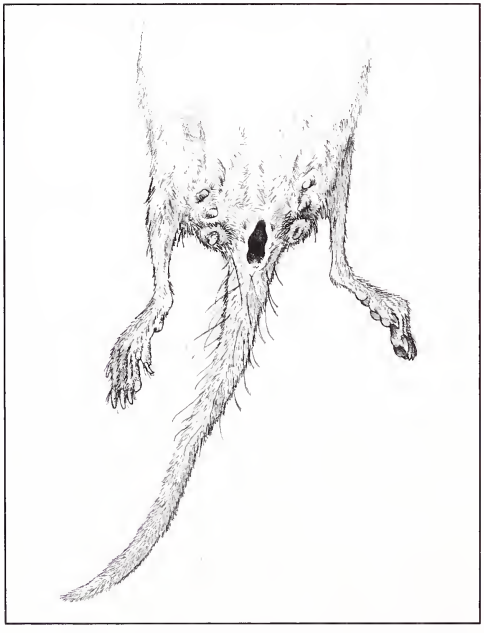

FIG. 2. Abdomen and tail of *Suncus hututsi* (type, FMNH 148272).

Paratypes. Four further specimens from Kibira NP, Burundi (2 alcoholic carcasses, and 2 complete skeletons, all with skulls): FMNH 148273 ♂ (LD 45), same locality and collector; FMNH 148274 ♂ (LD 806), Cibitoke Province, Kibira National Park, Ndora Forest Block, Kwogofe Hill, 13 April 1992; FMNH 148942 ♀ (JCK 2601) and 148943 ♂ (JCK 2624), Cibitoke Province, Kibira National Park, Ndora Forest Block, Giserama Hill, collected by J. C. Kerbis Peterhans on 1 August 1991.

Referred Specimens. Uganda (4 alcoholic carcasses with skulls extracted, 2 complete skins with skulls and skeletons and 4 skulls only); Bwindi-Impenetrable National Park: FMNH 160183 ♂, 160184 ♀ (BJH 9949, BJH 9951), Ruhizha, 11 & 12 February, 1997; AMNH 269677 (collector D.P. Lunde 337) Enkombe Sawmill (1480 m), ca. 20 km N of Ishaka, Kalinzu Forest Reserve, 09 July, 1996; UFD 3278, UFD 3300, Mujuzi Forest Reserve, 7 Sept, 1993, collector D. Mijumbi; UFD 3401, UFD 3402, UFD 3404, Kasana-Kasambya Forest Reserve 15 Nov. 1993, collector D. Mijumbi.

Referred specimens (with reservation, *Suncus ?hututsi*). Burundi (alcoholic carcass with skull extracted): Ruhinga Hill, 2170 m, Bururi Forest (collector J.L. Udelhoven 45), 13 March 1993, FMNH 155925 ♂; DR Congo (alcoholic carcass with skulls extracted), Lusasa, Itombwe Forest (collector T.C. Demos 2405 ♂) 29 July 2008, FMNH 203735; Bushema-Lutunguru Forest, Nakaponda-Katunguru (collector B. Ndara Ruziga) 03 March 2008, MWWF 45 ♂.

Diagnosis. A dark forest species smaller than *Suncus infinitesimus* and slightly larger than *Suncus remyi*. Dorsal color blackish gray, barely lighter below. Tail long, with bristle-hairs scattered around ca. 50 % of its length. Lateral glands of male marked by circles of dark hair. Height of coronoid process very reduced. Very short upper tooth row. Maxilla broad. M^3 very large and well-developed. Second upper unicuspid large, sub-equal to third in size.

FIG. 3. Pes and manus of *Suncus hututsi* (type, FMNH 148272).

Description. Tail long (28–33 mm), dark brown above and below and covered with long bristle hairs between 45–65 % of its length (Fig. 2). Tail densely haired to tip. Color above is gray-black with dark brown tips, bases grayish. Belly more gray, the colors of back and belly blending gradually at the flanks. Chin is the same color as venter. Pes with six plantar tubercles (Fig. 3). The proximal 25 % of the feet are furred, to the level of the last plantar tubercle. Dorso-medial aspect of pes more light in color due to being less densely haired. Forepaws light (sparsely haired), especially sparsely haired at wrist. Manus with 6 palmar tubercles (Fig. 3). Female with three evenly spaced inguinal teats per side (Fig. 2). Last pair lightly circled with ring of hair. Lateral glands in male imperceptibly marked by small patch of dark (i.e. densely haired) brown hairs. Feet dark due to dense hair; forepaws lighter due to less dense hair. Head dorsoventrally compressed with vibrissae up to 11 mm in length (Fig. 4). External measurements are presented in Table 1.

Lower incisor without notches. Coronoid process of mandible low. M3 large and well developed, approaching 'N-shape' (stage 4 of Freeman 1981; C66 p.16). Maxilla broad. Upper tooth row short. Second unicuspid large, sub equal to the third in size. Fourth upper unicuspid reduced but still 1/3 the size of third. Braincase of moderate breadth. Upper tooth row of moderate length. Parastyle of P4 not projecting anteriorly, not obscuring 4th unicuspid in lateral view. Cranio-dental measurements are presented in Table 2.

Variation. With hesitation, we tentatively refer larger specimens including one from Burundi and two from DR Congo to the new taxon. The large specimen from Bururi Forest (FMNH 155925; depicted in Fig. 5 and Fig. 6), southern Burundi, is light brownish above and below, in contrast to all specimens discussed herein. In similarity with *S. infinitesimus*, it displays a sinuous maxillary profile (Fig. 5) as well as a larger 4th unicuspid and a projecting parastyle on the P4 (Fig. 6). The specimens from the DR Congo (FMNH 203735, MWWF 45) are larger in most cranio-dental dimensions but combine a larger 3rd unicuspid with a smaller 4th. MWWF 45 has a projecting parastyle on the P4 while FMNH 203735 has a longer (thicker) M3 and a much larger basisphenoid fenestra (Gasc 1963). Additional material will be required to determine if their variations are taxonomically significant.

Comparisons

Suncus remyi

Suncus hututsi has a much longer tail (28-33 mm vs. 17-21 mm) with proportionately more bristle-hairs (45-65 % vs. 36 %) compared to *S. remyi* (Table 3). *Suncus hututsi* from Burundi is similar to *S. remyi* in condylo-incisive length and in its short and broad rostrum (Fig. 5). In both taxa, the maxilla is swollen, yielding a straight line from its widest point to the

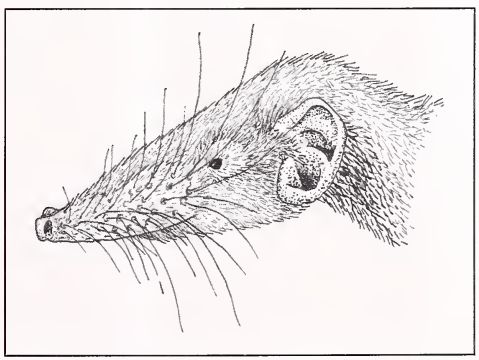

FIG. 4. Head of *Suncus hututsi* (type, FMNH 148272).

TABLE 4. Communities of shrews and golden moles associated with captures of *Suncus hututsi*.

Species	Mubwindi (Uganda)	Ruhija (Uganda)	Buhoma (Uganda)	Ruhondo (Burundi)	Ruvyirame (Burundi)	Ndora (Burundi)
Chrysochloris stuhlmanni					1	
Crocidura dolichura			1	7 (2)		2 (1)
Crocidura lanosa						2
Crocidura maurisca	1 (1)					
Crocidura niobe						1
Crocidura olivieri ssp.		2	8	3	9 (3)	19 (1)
Crocidura stenocephala	1 (1)	1*				
Myosorex babaulti					2	
Paracrocidura maxima		2				
Ruwenzorisorex suncoides		1*				1
Scutisorex somereni			1			1
Suncus hututsi	1 (1)	2 (2)	1 (1)	2 (2) T	2 (2)	1 (1)
Suncus megalura	1 (1)				1	
Sylvisorex johnstoni					8 (6)	4
Sylvisorex lunaris ruandae	2 (2)	9		2	7 (3)	2
Sylvisorex vulcanorum		25		10 (3)	9 (2)	13 (2)

3 (2) = Three (3) specimens collected at that general collecting camp with two (2) coming from the same trapline and habitat.

* captured while based at same camp but trapline located in a separate wet valley bottom

T includes type specimen

tip of the rostrum (Brosset *et al.* 1965, Fig 13A). However, in *S. hututsi*, the upper tooth rows are shorter (5.2–5.9 mm vs. 5.7–6.2 mm) and the coronoid height is much lower (2.9–3.2 mm vs. 3.3–3.6 mm, Table 2 & Table 3). The braincase is less circular and more elongate in *S. hututsi* (Fig. 5). In *S. hututsi*, the second unicuspid is less reduced compared to the third, the two being sub-equal in size whereas in *S.*

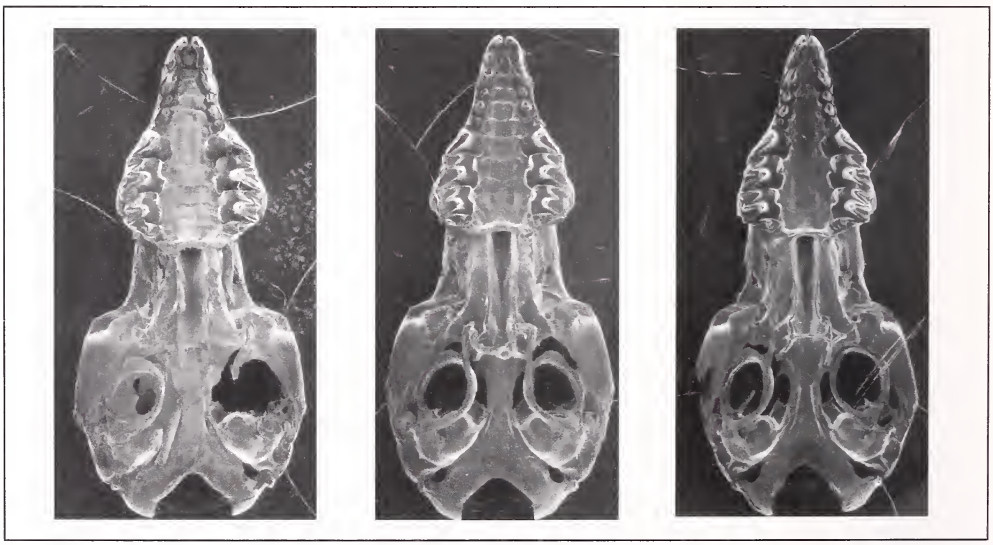

FIG. 5. Skulls of *Suncus remyi* (left, R22036), *Suncus hututsi* (center, type FMNH 148272), *Suncus ?hututsi* (right, FMNH 155925).

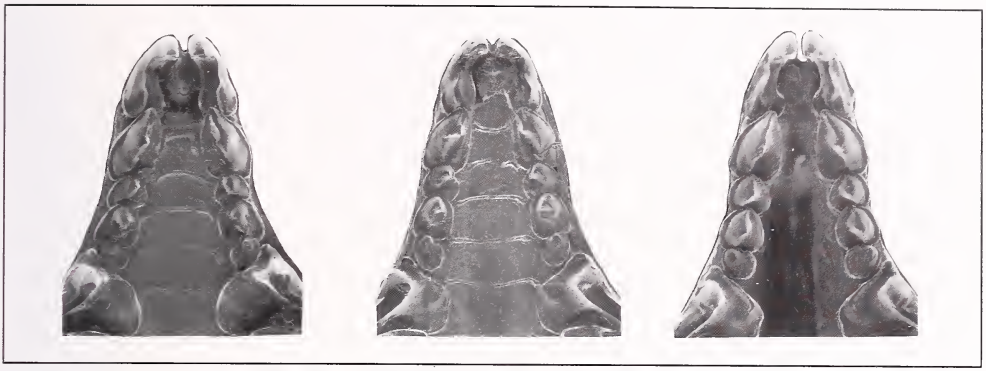

FIG. 6. Anterior maxillary dentition of *Suncus remyi* (left, R22036), *Suncus hututsi* (center, type FMNH 148272), *Suncus ?hututsi* (right, FMNH 155925).

remyi the third is 2–3 times larger (Fig. 6; see also Brosset *et al.* 1965, p.173). The 4 unicuspid is larger in *S. hututsi* and not deflected medially as in *S. remyi* (Fig. 6). M^3 very narrow from front to back in *S. hututsi* vs. more broad in *S. remyi*. Diagnostic differences with small Afrotropical *Suncus*, including *Suncus remyi*, are presented in Table 3.

Suncus infinitesimus

Suncus hututsi is distinguished from *S. infinitesimus* by its dark gray/black dorsum that contrasts the latters' broccoli brown pelage. Its belly is dark and devoid of the white-tipped slate hairs of *Suncus infinitesimus*. Tail longer (28–33 mm, avg 31 mm, n = 5 vs. 24–26 mm; Table 3). Tail covered with long bristle hairs for 45–65 % of its length, instead of 90–100 % in *S. infinitesimus*. Hands and feet darker in color due to being more densely haired. Lateral glands are dark brown not white as in *infinitesimus*. Braincase more hexagonal in *S. hututsi* vs the more elongate and rectangular outline of *S. infinitesimus*. These braincase proportions are reflected in the following ratio: greatest width/condylo-incisive length proportionately broader in *S. hututsi* compared to *S. infinitesimus* (0.44–0.48 vs 0.42–0.435).The outline of the maxilla is more broad and straight in *S. hututsi* vs. the more 'sinuous' profile of *S. infinitesimus* (Brosset *et al.* 1965, p 172). Upper tooth row shorter in *S. hututsi* (5.3–5.9 mm) vs. *S. infinitesimus* (5.9–6.4 mm) especially due to shorter incisor through canine (4^{th} unicuspid). Proportions of the second unicuspid similar to *S. infinitesimus*. First maxillary incisor is more lightly built and more procumbent (due to a more concave rostrum) than in *S. infinitesimus*.

TABLE 5. Gazetteer.

Locality	Country	Latitude	Longitude	Elev (m)
Ndora, Kibira NP	Burundi	2° 50' S	29° 25' E	2220
Ruhondo, Kibira NP	Burundi	2° 56' S	29° 29' E	2040
Ruvyirame, Kibira NP	Burundi	2° 52' S	29° 24' E	2100
Ruhinga Hill, Bururi FR	Burundi	3° 56' S	29° 36' E	2220
Lusasa, Itombwe Forest	DR Congo	3° 20' S	28° 45' E	2050
Nakaponda, Lutunguru-Katunguru	DR Congo	1° 25' S	28° 32' E	1185
Buhoma, BINP	Uganda	0° 59' S	29° 37' E	1500
Enkombe Sawmill, Kalinzu FR	Uganda	0° 23' S	30° 5' E	1480
Kasana Kasambya FR	Uganda	0° 30' N	31° 28' E	1250
Mubwindi Swamp, BINP	Uganda	1° 4' S	29° 44' E	2070
Mujuzi FR	Uganda	0° 35' S	31° 47' E	1170
Ruhija, BINP	Uganda	1° 2' S	29° 45' E	2350

Height of the mandibular coronoid process (Table 3) much lower in *S. hututsi* (2.9–3.2 mm) than in *S. infinitesimus* (3.2–3.9 mm).

Distribution. Currently known from the Albertine Rift including the mountain tops of Kibira National Park, NW Burundi (2100–2220 m), Bwindi-Impenetrable National Park (1500 m–2350 m) and mid elevation forests in Uganda (Kalinzu FR, Mujuzi FR and Kasana Kasambya FR, 1170–1480 m). Additional records possibly include Bururi Forest, Burundi (2220 m), Itombwe Forest, DR Congo (2050 m), and Nakaponda, Lutungulu-Katungulu, DR Congo (1185 m).

Etymology. Named for the major ethnic groups in the central African country of Burundi in which it was first discovered. The epithet is taken as a noun in apposition.

Ecological remarks. *Suncus hututsi* is only the second species of forest-dwelling *Suncus* known in Africa (along with *S. remyi*). Activity is generally nocturnal as most Burundi records (5/6) were collected during morning rounds (ca. 7:30 am). The documented exception was FMNH 148943 that was collected in the late afternoon rounds. All specimens were collected from pitfall buckets with varying lengths of barriers. At BINP, Uganda a male and female were collected on consecutive days from the same pitfall line. In Burundi, a male and female were collected from the same pitfall line on the same day, the female being collected in the morning and the male in the afternoon. One adult female collected on February 12 near Ruhiza (Bwindi-Impenetrable NP) had large teats; no embryos were recorded.

Burundi habitats. Specimens of *Suncus hututsi* from Burundi were collected at three locations in the northern sector of Kibira National Park, Burundi. The first collecting site (August, 1991) was within 1 km of the Ruvyirame Gite maintained for hikers by the INECN. The Gite was used by the survey team as a base camp and is located on the forest edge. Two specimens of *Suncus hututsi* were collected (FMNH 148942-148943) in well-drained closed-canopy montane forest at an elevation of 2100 m. This pitfall line consisted of 24 buckets placed 1 m apart. One specimen of *Sylvisorex johnstoni* was collected in the same bucket as *Suncus hututsi*. The next two specimens from Burundi (FMNH 148272 and 148273) were collected in the Ruhondo sector with one coming from closed forest (15 buckets, 1 m apart) and the second from a pitfall line (20 buckets x 1 m) adjacent and parallel to Irabiro Creek, with moderate to heavy canopy. The final Burundi specimen (FMNH 148274), from the Ndora zone, was recovered from upland bamboo (*Arundinaria alpina*) with mixed hardwoods (*Macaranga neomildbraediana*, *Symphonia globulifera*, and *Tabernaemontana johnstonii*) and forbs, sedges, grasses, *Begonia* sp. and *Chlorophylum* sp. An additional specimen, that may be referable to *S. hututsi*, was collected in southern Burundi in the Bururi Forest Reserve in secondary forest at 2220 m.

Uganda habitats. At BINP (Uganda), two specimens (FMNH 160183 & 160184) were collected amidst *Dombeya joatizen* along a well-drained forested slope below the Institute of Tropical Forest Conservation research station in Ruhija. Another was collected on the periphery of Mubwindi Swamp at 2070 m under a thick canopy of *Loconia* sp. (FMNH 157831), while the fourth was collected near Buhoma (FMNH 160185) at 1500 m on a dry slope under 2 m tall ferns and shrubs (*Loconia* sp.). AMNH 269677 was collected in dense forest undergrowth in Kalinzu FR. Referred specimens include UFD 3278 and UFD 3300 from Mujuzi, a Forest Reserve adjacent to Lake Victoria bisected by the Mujuzi River. In Kasana Kasambya, a small forest (51 km^2) along the Mubende-Mityana Rd, three additional specimens were collected (UFD 3401, 3402, 3404). This is generally dry country forest on the upland slopes, with only 29/135 tree and shrub species being forest dependent (Kityo, personal comm.), but there are more closed forest habitats in gallery contexts.

DR Congo habitats. One specimen collected by T.C. Demos in primary montane forest in a pitfall trap, adjacent to giant ferns. The ground was damp with sparse ground cover (< 50 %) and a thin layer of leaf litter. The second (MWWF 45) was collected in Bushema-Lutunguru Forest, Nakaponda, Lutungulu/Katungulu at an elevation of 1185 m.

Ectoparasites (B. O'Connor, in litt.):

FMNH 157831. Ixodidae larva: on face (1); posterior ventral (1); Laelapidae in wrap wash (1) that could possible be a contaminant; Trombiculidae on tail (1); Glycyphagidae dn's numerous at bases of hairs, on face, and anterior dorsal.

FMNH 148942. Laelapidae in fur dorsally (3); Trombiculidae scattered over dorsum (a few), ear pinna surface (1); Glycyphagidae dn's on hairs anterior to mid dorsal.

FMNH 148272, 148273, 160185: Examined but no parasites found.

Summary and Discussion

A new species of *Suncus*, easily diagnosed from its congeners, is described from mid elevation and highland forests of central Africa. Its discovery highlights several important aspects in the documentation and conservation of biodiversity. It can be added to the long list of taxa endemic to the Albertine Rift forests (Kerbis Peterhans *et al.* 1998, Kityo *et al.* 2003). A mouse (*Praomys degraaffi*) was recently described with a similar distribution (Van der Straeten & Kerbis Peterhans 1999). The known range of *Suncus hututsi* is extremely small, in forest pockets that extend 400 km east/west by 500 km north/south. *Suncus hututsi* was first discovered in Kibira NP (Burundi), a biodiversity hotspot as reflected in its Soricid diversity. Six additional genera of shrews have been documented in this tiny and threatened park (Table 4). Five of these genera are associated with *Suncus hututsi* while a sixth genus (*Paracrocidura*, species = *maxima*) was collected at a separate locality in Kibira NP (Gitenge River Swamp, 2°57'S, 29°30'E, 2200 m). No other protected area in the world has yielded 7 genera of Soricidae.

Clearly the socio-economic problems of the region must be resolved in order for conservation efforts to have a chance. Kibira NP has been overrun with 'rebels' who burn fuel wood, mine for minerals and harvest forest products. Kibira NP is extremely vulnerable as it is composed of a very narrow strip of the Zaire/Nile crest. It has already been severed in the middle through human activities. That such a distinct taxon remained undiscovered is a function of this shrews' small size and the fact that pitfall trapping is a relatively recent technique in the survey of very small mammals. Previously, the Ruhiza area of BINP had been extensively surveyed but never with pitfall trapping; Kibira NP had never been systematically surveyed prior to these efforts. These results show that many mammalian taxa probably remain to be discovered, a situation that can only be changed with comprehensive and wide-ranging surveys.

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11. APPENDIX 5

GAZETTEER

Specific 1	Supplement*	Province	Country	Lat°	Lat"	N/S	long'	long	E/W	Elev.	Ref.
Acholi	former District	Northern	Uganda	3	0	N	32	30	E		1
Ajeruk	Ajeluk, Ajeruku	Eastern	Uganda	1	30	N	33	50	E	1095	2
Ajumani	Adjumani	Nile	Uganda	3	22	N	31	47	E	761	1
Akisim, Mt	Alekilek, nr	Eastern	Uganda	2	7	N	34	12	E	1140	1
Albert, Lake	east of	Western	Uganda	1	52	N	31	25	E	650	4
Amiel		Northern	Uganda	2	58	N	33	27	E	1137	1
Amudat		Karamoja	Uganda	1	58	N	34	57	E	1223	2
Amuria		Eastern	Uganda	2	1	N	33	38	E	1155	1
Apoka	Opoka	Karamoja	Uganda	3	44	N	33	46	E	1243	2
Arapoo		Eastern	Uganda	1	25	N	33	15	E	1025	1
Arua	Arua District	Nile	Uganda	3	1	N	30	55	E	1195	1
Avakubi			DR Congo	1	18	N	27	35	E	900	5
Awack	Awach	Northern	Uganda	2	39	N	33	27	E	998	2
Awere		Northern	Uganda	2	30	N	32	43	E	1052	1
Bafwabaka			DR Congo	2	10	N	27	39	E	600	5
Balegi	see Kabalega (Ka Balegi)		Uganda								
Biso	Bisu	Western	Uganda	1	45	N	31	25	E	969	2
Bokora		Karamoja	Uganda	2	25	N	34	25	E	1190	2
Bombo	20 kms N Kampala	North Buganda	Uganda	0	35	N	32	32	E	1151	1
Bubeke, Island		South Buganda	Uganda	0	20	S	32	40	E	1131	2
Budadiri	Budadira, Budadin Camp (MENP)	Eastern	Uganda	1	11	N	34	21	E	1355	2
Buddu	former county	South Buganda	Uganda	0	25	S	31	40	E		1,22
Budo		Central	Uganda	0	15	N	32	29	E	1217	1
Budongo Forest	Budongo FR	Western	Uganda	1	45	N	31	36	E	1265	2
Bufamira Island	Bufumira	South Buganda	Uganda	0	21	S	32	24	E	1132	2
Bufumbiro Mts	Bufumbira, Mfumbiro (MGNP)	Southern	Uganda	1	22	S	29	39	E		2
Bugabo	Nabugabo, Lake	South Buganda	Uganda	0	22	S	31	53	E	1210	2
Bugabo	SE of Entebbe	Central	Uganda	0	5	N	32	34	E	1140	9
Bugaia Island	Ugaya	North Buganda	Uganda	0	3	N	33	16	E	1186	1
Bugala Island		South Buganda	Uganda	0	24	S	32	10	E	1196	2
Bugembe		Busoga	Uganda	0	29	N	33	14	E	1328	1
Bugishu Dist	Bugisu	Eastern	Uganda	1	0	N	34	20	E		1
Bugoma FR		Western	Uganda	1	15	N	31	0	E	1065	2
Bugoma	North end of Bugala I	South Buganda	Uganda	0	17	S	32	5	E		34
Bugoye		Western	Uganda	0	17	N	30	7	E	1460	2
Buhivu		Eastern	Uganda	1	8	N	34	33	E	3850	6
Buhoma	(BINP)	Southern	Uganda	0	59	S	29	37	E	1575	3
Buhunga	Mihunga (RMNP)	Western	Uganda	0	22	N	30	3	E	1829	2
Buhuru, Mt Elgon	Buhugu?	Eastern	Uganda	1	12	N	34	18	E		21
Bujongolo	Bujongo (RMNP)	Western	Uganda	0	21	N	29	55	E	3810	12
Bujuku Hut	(RMNP)	Western	Uganda	0	23	N	29	53	E	3960	3
Bukakata		South Buganda	Uganda	0	18	S	32	2	E	1132	1
Bukalasa		North Buganda	Uganda	0	43	N	32	30	E	1109	1
Bukasa Island		South Buganda	Uganda	0	23	S	32	31	E	1188	2
Bukwe		Western	Uganda	1	45	N	31	45	E		2
Bulago		Eastern	Uganda	1	15	N	34	21	E	1640	1
Bulamagi		North Buganda	Uganda	0	26	N	33	7	E	1183	1
Buligi Circuit	(MFNP)	Northern	Uganda	2	16	N	31	32	E	690	1
Buloba		Central	Uganda	0	20	N	32	29	E	1218	1

Specific 1	Supplement*	Province	Country	Lat°	Lat"	N/S	long'	long	E/W	Elev.	Ref.
Buluganya	Bulugeni?										
	Bugisu Dist	Eastern	Uganda	1	13	N	34	23	E	1845	1,21
Bumasifwa		Eastern	Uganda	1	11	N	34	21	E	1388	1
Bundibugyo	Bundibujio	Western	Uganda	0	42	N	30	4	E	1088	2
Bundimusaba	Bundimusembe										
	(Bwamba FR)	Western	Uganda	0	43	N	30	5	E	914	7
Bunyoni, Lake		Southern	Uganda	1	17	S	29	55	E	1649	1
Bunyoro	former District	Western	Uganda	1	40	N	31	30	E	1223	1
Burumba		Southern	Uganda	1	0	S	30	50	E	1579	2
Bushenyi		Southern	Uganda	0	32	S	30	11	E	1569	1
Busia		Eastern	Uganda	0	28	N	34	5	E	1218	2
Busingiro		Western	Uganda	1	44	N	31	28	E	1065	2
Busoga	Busuga										
Forest-South	(S Busoga FR)	Busoga	Uganda	0	14	N	33	32	E	1138	8
Busu	Bussu, 4 kms NW										
	of Namukuma	North Buganda	Uganda	0	11	N	32	56	E		33
Bussi I	Busi I	Central	Uganda	0	2	N	32	20	E	1167	1
Butandiga	Butandika	Eastern	Uganda	1	12	N	34	22	E	1743	1
Butanuka		Western	Uganda	0	32	N	30	12	E		20
Butiaba		Western	Uganda	1	49	N	31	19	E	617	2
Butiti	Butili	Western	Uganda	0	39	N	30	32	E	1374	2
Buvuma Island	Buvumu	North Buganda	Uganda	0	14	N	33	18	E	1150	1
Bwamba Forest	(Bwamba FR)	Western	Uganda	0	48	N	30	6	E	1000	2
Bwambara,											
8 kms n	(Kigezi GR)	Southern	Uganda	0	33	S	29	52	E	1031	16b
Bwentale Camp,											
1 km se	(Kigezi GR)	Southern	Uganda	0	33	S	29	52	E	1062	16b
Bwindi Forest	Impentrable,										
	Kayonza (BINP)	Southern	Uganda	1	2	S	29	49	E		2
Byumba	(BINP)	Southern	Uganda	0	56	S	29	42	E	1540	3
Calamari	Chalamari,										
	30 mi E Torit		Sudan								19
Chagwe	see Mabira		Uganda								
Crater Track	(QENP)	Western	Uganda	0	5	S	29	57	E	850	25
Debasien Mts	Kadam	Karamoja	Uganda	1	45	N	34	42	E	2041	1
Demba		Southern	Uganda	0	49	S	30	33	E		4
Dufile		Nile	Uganda	3	34	N	31	56	E	627	1
Dungilia River	near Kyarumba,										
	Dungulilia	Western	Uganda	0	7	N	29	57	E	1220	1
Dura River	(KFNP)	Western	Uganda	0	8	N	30	17	E	1250	10
Dwaji Island	Lwaji	North Buganda	Uganda	0	0	N	32	55	E	1132	1
Echuya Forest	Chuya (Echuya FR)	Southern	Uganda	1	15	S	29	49	E	2380	3
Edward, Lake	Rutanzige	Southern	Uganda	0	26	S	29	47	E	913	est
Elgon, Mount	(MENP)	Eastern	Uganda	1	8	N	34	33	E		1
Enkombe	Kalinzu FR,										
Saw Mill	20 km N Ishaka	Southern	Uganda	0	23	S	30	5.2	E	1480	16c
Entebbe	Port Alice	Central	Uganda	0	3	N	32	28	E	1132	2
Entebbe,	(ca. outskirts										
60 mi w	of Kyabi?)	Central	Uganda	0	3	N	31	34	E	1130	1
Fort Portal	Kabarole	Western	Uganda	0	40	N	30	18	E	1524	2
Fort Portal,											
40 kms ese	(KFNP)	Western	Uganda	0	29	N	30	37	E		11
George, Lake											
(northeast of)		Western	Uganda	0	15	N	30	15	E	1206	11
Gitenge River	(Kibira NP)		Burundi	3	0	S	29	31	E	2200	3
Gondokoro	"Uganda"		Sudan	4	54	N	31	40	E		5
Greeki R.	Greek	Eastern	Uganda	1	36	N	34	20	E	1218	2
Gulu		Northern	Uganda	2	47	N	32	18	E	1083	2

Specific 1	Supplement*	Province	Country	Lat°	Lat"	N/S	long'	long	E/W	Elev.	Ref.
Hakibale	? Harubale	Western	Uganda	0	46	N	30	24	E	1492	1
Hakitengya		Western	Uganda	0	45	N	30	5	E	830	2
Harugale	Harugali?	Western	Uganda	0	41	N	30	4	E	877	1
Hoima		Western	Uganda	1	25	N	31	21	E	1124	2
Hoima, 32 kms nw	ca. outskirts of Bwijanga?	Western	Uganda	1	32	N	31	35	E	1180	1
Hoima, 5 kms e		Western	Uganda	1	25	N	31	24	E		11
Humia	Humia R?, Humya (Bwamba FR)	Western	Uganda	0	46	N	30	2	E	701	2
Ibanda		Southern	Uganda	0	8	S	30	29	E	1535	1
Ibanda Rockshelter	(RMNP)	Western	Uganda	0	17	N	29	53	E	3600	12
Iganga	Igang	Busoga	Uganda	0	37	N	33	29	E	1143	1
Impenetrable Forest	Bwindi, Kayonza (BINP)	Southern	Uganda	1	5	S	29	49	E		2
Ingezi		Southern	Uganda	1	0	S	29	50	E		2
Irangi			DR Congo	1	54	S	28	27	E	900	5
Irene Lake	Elnine (RMNP)	Western	Uganda	0	23	N	29	52	E	4500	12,13
Iriri		Eastern	Uganda	2	6	N	34	12	E	1178	2
Ishasha River	Kashasha (BINP)	Southern	Uganda	0	28	S	29	39	E		1
Ishasha Rd, 0.5 km S Ishasha River @	Kigezi GR	Southern	Uganda	0	30	S	29	46	E	1000	16
Hihizu R.	Sassa R (BINP)	Southern	Uganda	0	56	S	29	44	E		14
Ishasha, 5 kms ne	(Kigezi GR)	Southern	Uganda	0	41	S	29	40	E	1062	16b
Itama Mine	Ithama, Itame (BINP)	Southern	Uganda	0	57	S	29	42	E	1615	7
Itwara Forest	(Itwara FR)	Western	Uganda	0	48	N	30	28	E		1
Jinja		Busoga	Uganda	0	27	N	33	12	E	1200	2
John Mate Camp	(RMNP)	Western	Uganda	0	23	N	29	56	E	3370	3
Jubiya		South Buganda	Uganda	0	15	S	31	58	E		1
Ka balegi	see Kabalega=MFNP	Western	Uganda	2	15	N	31	50	E		1
Kaabong		Karamoja	Uganda	3	30	N	34	9	E	1488	2
Kabale		Southern	Uganda	1	15	S	29	59	E	2175	1
Kabalega Falls N.P.	Paraa, Balegi (MFNP)	Northern	Uganda	2	15	N	31	35	E	691	2
Kabamba Rock Shelter	(RMNP)	Western	Uganda	0	21	N	29	55	E	3505	12
Kabanda	near Tonia	Western	Uganda	1	31	N	30	58	E	617	36
Kabanyolo	Kabanyola, Kabanyiro?	Central	Uganda	0	27	N	32	36	E	1132	2
Kabarole	Fort Portal	Western	Uganda	0	40	N	30	18	E	1523	2
Kabatoro	Kabatora	Western	Uganda	0	8	S	29	55	E	845	1
Kabei Cave		Eastern	Uganda	1	19	N	34	43	E	2000	14
Kabeti	Kabiti	Southern	Uganda	0	16	S	29	45	E		9
Kaboyo		South Buganda	Uganda	0	21	S	31	34	E	1229	1
Kabula		South Buganda	Uganda	0	22	S	31	10	E	1426	2
Kabulamuliro	Kabulamulero	North Buganda	Uganda	0	42	N	32	13	E	1144	2
Kabwangasi		Eastern	Uganda	1	8	N	34	7	E	1166	1
Kaganbah	Kagambah	Southern	Uganda	1	0	S	30	15	E	1600	2
Kahunge		Western	Uganda	0	20	N	30	27	E	1308	1
Kaina Mine	nr Mbarara	Southern	Uganda	0	51	S	30	10	E		15
Kajansi		Central	Uganda	0	12	N	32	33	E	1176	2
Kajula, Mt.	Kajuia?,hill just S of Hoima	Western	Uganda	1	25	N	31	21	E		14
Kakindu		Busoga	Uganda	0	56	N	32	59	E	1057	1
Kakoba	Kikoba, 'Ankole'	Southern	Uganda	0	33	S	30	9	E		34
Kakomongole	Kakumongole, Nakomogoli	Karamoja	Uganda	1	54	N	34	38	E		1
Kakumiro		Western	Uganda	0	47	N	31	19	E	1338	1

Specific 1	Supplement*	Province	Country	Lat°	Lat"	N/S	long'	long	E/W	Elev.	Ref.
Kalinzu Forest	(Kalinzu FR)	Southern	Uganda	0	22	S	30	7	E	1517	2
Kalongi			DR Congo	0	20	N	29	49	E	2134	17
Kama Island	Kaina	Busoga	Uganda	0	9	S	33	54	E	1132	2
Kamamboga	see Kyambogo	Central	Uganda	0	23	N	32	35	E		9, 14
Kampala		Central	Uganda	0	19	N	32	35	E	1197	2
Kamuli		Busoga	Uganda	0	57	N	33	7	E	1115	1
Kamwokya		Central	Uganda	0	20	N	32	35	E		16a
Kanaba		Southern	Uganda	1	14	S	29	46	E	2002	2
Kanungu		Southern	Uganda	0	54	S	29	47	E	1743	1
Kanyanya?	Kayanja?		Uganda								?
Kanyawara	Kibale Forest Station (KFNP)	Western	Uganda	0	36	N	30	21	E	1500	10
Kapchorwa	Sabei camp, Savi, Save	Eastern	Uganda	1	24	N	34	27	E	2419	1
Karamoja	Karamoja, central	Karamoja	Uganda	2	45	N	34	15	E		1
Karongo		Western	Uganda	1	41	N	31	30	E	1265	1
Kartoushi			DR Congo	0	44	N	29	34	E	1000	5
Kasana-Kasambya F.R.		North Buganda	Uganda	0	30	N	31	24	E	1250	35
Kasenyi		North Buganda	Uganda	0	33	N	31	26	E	1270	36
Kasese		Western	Uganda	0	10	N	30	5	E	1734	1
Kashasha River	Ishasha (BINP)	Southern	Uganda	1	2	S	29	36	E		1
Kashoya-Kitomi FR	Kasyoha-Kitomi FR	Southern	Uganda	0	15	S	30	15	E	1281	1
Kasiba		North Buganda	Uganda	0	40	N	31	28	E		9, 37
Kasindi	see Masindi?	Western	Uganda								
Kasokero Cave		South Buganda	Uganda	0	21	S	31	58	E	1133	1
Katahuleko Creek			DR Congo	0	20	N	29	48	E	2134	3
Katalemwa	Katalmura, 12 mi N Kampala	Central	Uganda	0	30	N	32	35	E		14, 34
Katera	Katere? (Sango Bay FR)	South Buganda	Uganda	0	55	S	31	39	E	1218	1
Katwe	(QENP)	Western	Uganda	0	8	S	29	52	E	770	1
Kawanda Agricultural Station		Central	Uganda	0	25	N	32	32	E		18
Kayanja		South Buganda	Uganda	0	18	S	31	53	E		39
Kayonza Forest	northern sector (BINP)	Southern	Uganda	0	56	S	29	42	E	1525	1
Kayunga, nr		North Buganda	Uganda	0	41	N	32	55	E		17
Kazinga Forest and hill		Southern	Uganda	0	13	S	29	53	E	920	1
Kei, Mt	(Mt Kei FR)	Nile	Uganda	3	35	N	31	5	E	1336	1
Kenya, nw			Uganda	4	45	N	35	36	E		19
Kiangami	8 mi E of Fort Portal	Western	Uganda	0	40	N	30	24	E		9, 37
Kibale Forest	Mpanga, Kabala (KFNP)	Western	Uganda	0	33	N	30	24	E	1400	2
Kibandana	Kibandama	Southern	Uganda	1	6	S	29	52	E		9
Kibande Forest	20 mi N of Hoima	Western	Uganda	1	44	N	31	21	E		32
Kichwamba	(BMNH)	Southern	Uganda	0	14	S	30	6	E	1210	2
Kichwamba	(AMNH)	Western	Uganda	0	43	N	30	12	E		20
Kidepo NP		Karamoja	Uganda	3	45	N	33	38	E		8
Kidirandi-Lunga	Kidilande, Lango?	Northern	Uganda	2	3	N	32	23	E	1037	1
Kiduha		Southern	Uganda	1	15	S	29	41	E	2000	2
Kigezi		Southern	Uganda	1	0	S	29	45	E		1
Kigezi Game Reserve	(Kigezi GR)	Southern	Uganda	0	30	S	29	50	E		1

Specific 1	Supplement*	Province	Country	Lat°	Lat"	N/S	long'	long	E/W	Elev.	Ref.
Kigezi High Areas		Southern	Uganda								
Kigumba		Western	Uganda	1	49	N	32	0	E	1066	1
Kijura, nr	Kidura	Western	Uganda	0	49	N	30	25	E	1449	1
Kikorongo		Western	Uganda	0	0	N	30	0	E	927	1
Kikorongo, Lake	Kikarongo (QENP)	Western	Uganda	0	1	S	30	1	E	930	1
Kilembe Mine, above	(RMNP)	Western	Uganda	0	12	N	30	0	E		1
Kilyama, DRC	"Kiriamo, Semilki Valley "Uganda"	DR Congo	Uganda	0	59	N	30	3	E		20
Kinyala		Nile	Uganda	3	38	N	31	43	E		1
Kinyala Estate	14 mi w Masindi (BMNH)	Western	Uganda	1	41	N	31	32	E	1262	21
Kiriamo	"Uganda", see Kilyama"		DR Congo								
Kiriba	"Uganda"	Sudan	Uganda	4	52	N	31	40	E		19
Kisanga			DR Congo	0	15	N	29	43	E	1100	5
Kisimbiri		North Buganda	Uganda	0	24	N	32	29	E	1204	2
Kisoro	Kisolo, Gisoro	Southern	Uganda	1	17	S	29	41	E	1995	1
Kisubi		Central	Uganda	0	7	N	32	32	E	1141	1
Kitahulira	"Kita Melira"	Southern	Uganda	0	59	S	29	41	E	1585	1, 21
Kitandara Lakes	(RMNP)	Western	Uganda	0	21	N	29	53	E	4115	3
Kitgum		Northern	Uganda	3	17	N	32	53	E	889	2
Kitoba		Western	Uganda	1	31	N	31	21	E	1106	1
Kitobo Island		South Buganda	Uganda	0	15	S	32	26	E	1132	1
Kiuulu	?Kiumu	Central	Uganda	0	10	N	32	26	E		1
Kiuulu	?Kiyoolu, ?Kiulwe Point	Central	Uganda	0	6	N	32	35	E	1134	1
Koba (in error), 14	Lake Albert, see Kitoba	Western	Uganda	1	31	N	31	21	E	1106	1,27
Kokanjiro Mt	Nkokonjeru, Kokannjero	Eastern	Uganda	1	5	N	34	21	E		2
Kome Island		North Buganda	Uganda	0	6	S	32	45	E	1132	2
Kotido		Karamoja	Uganda	3	1	N	34	6	E	1215	2
Kumba		Southern	Uganda	1	8	S	29	54	E	1818	2
Kwania Lake		Northern	Uganda	1	45	N	32	45	E		2
Kwapur Cave, nr Binyin	Kwapa, Sebei Dist	Eastern	Uganda	1	25	N	34	32	E		1,21
Kwera	Ekwera	Northern	Uganda	1	49	N	32	59	E	1030	1
Kyabasala	Kyabazala, Kyazabala	Western	Uganda	1	4	N	30	59	E	1074	1
Kyabombo	? Kyombya, Toro	Western	Uganda	0	31	N	30	13	E		2
Kyagwe, island off of	Buvuma I?	North Buganda	Uganda	0	14	N	33	18	E		1
Kyambura Game Reserve	(Chambura GR)	Southern	Uganda	0	7	S	30	4	E		1
Kyema Cave		Eastern	Uganda	1	23	N	34	23	E		1
Kyambogo	Kyembogo Farm, 'near Kampala'	Central	Uganda	0	19	N	32	35	E	1201	21
Kyetume	nr Kampala'	Central	Uganda	0	37	N	32	40	E		1
Kyoga, Lake			Uganda	1	30	N	33	0	E	1030	1
Kyoha/Mubuku R., confl. of	(RMNP)	Western	Uganda	0	22	N	30	2	E	1890	3
Lamogi		Northern	Uganda	2	50	N	32	10	E	1078	1
Lango	former District	Northern	Uganda	2	10	N	33	0	E		1
Limaiba Island	Maiba, Limaiba	South Buganda	Uganda	0	19	S	32	28	E	1132	1
Lira		Northern	Uganda	2	15	N	32	54	E	1072	1
Lodwar			Kenya	3	7	N	35	36	E	477	5
Lokomarinyang			Sudan	5	2	N	35	35	E		19

Specific 1	Supplement*	Province	Country	Lat°	Lat"	N/S	long'	long	E/W	Elev.	Ref.
Lolui Island		Busoga	Uganda	0	7	S	33	42	E	1200	1
Lomunga		Nile	Uganda	3	25	N	31	17	E	911	1
Lonyili Mt	Longili	Karamoja	Uganda	3	43	N	33	36	E	2200	2
Lopodet	Lopedot?	Karamoja	Uganda	2	8	N	34	48	E		1
Lorengikipi		Karamoja	Uganda	2	20	N	33	51	E		2
Lotome	Lotomu, Latoma	Karamoja	Uganda	2	24	N	34	31	E	1231	2
Loyoro		Karamoja	Uganda	3	21	N	34	16	E	1472	1
Lubwa's	ca 17 kms. E of Jinja	Busoga	Uganda	0	22	N	33	23	E	1132	22,23
Lugala		Busoga	Uganda	0	12	N	33	54	E	1132	1
Luhiza	Luhizha, Ruhija (BINP)	Southern	Uganda	1	2	S	29	46	E	2360	1
Lunyo	Entebbe penninsula forest	Central	Uganda	0	8	N	32	32	E	1170	24
Lutoba	Lutobo?	Southern	Uganda	1	9	S	30	8	E	1846	1
Lwangosia		Busoga	Uganda	0	18	N	33	53	E	1211	1
Lwankima	Mabira Forest Station (Mabira FR)	North Buganda	Uganda	0	30	N	33	0	E		2
Lwiro Falls, nr			DR Congo	2	14	S	28	49	E	2103	20
Mabira	Chagwe, Kyugwe (Mabira FR)	North Buganda	Uganda	0	30	N	33	0	E	1161	2
Madi, West		Nile	Uganda	3	30	N	31	35	E		1
Magamoto	Sempaya Hot Springs?	Western	Uganda	0	51	N	30	11	E	1185	15
Mahoma, Lake	(RMNP)	Western	Uganda	0	21	N	29	58	E	2960	3
Mahoma/Mubuku R., confl. of	(RMNP)	Western	Uganda	0	22	N	29	60	E	2100	3
Maiba Island	Limaiba	South Buganda	Uganda	0	19	S	32	28	E	1134	1
Main Track	(QENP)	Western	Uganda	0	9	S	29	54	E	975	25
Makerere	University	Central	Uganda	0	20	N	32	34	E		1
Malabigambo FR	Tero, (Sango Bay FR)	South Buganda	Uganda	0	57	S	31	33	E	1229	2
Malukhu, nr Mbale	Bugishu Dist	Eastern	Uganda	1	5	N	34	10	E		1,21
Maramagambo Forest, South	(QENP)	Southern	Uganda	0	30	S	29	55	E	1092	16b
Maramagambo FR	(QENP)	Southern	Uganda	0	33	S	29	53	E	1065	1
Masaka		South Buganda	Uganda	0	20	S	31	44	E	1287	2
Masindi		Western	Uganda	1	41	N	31	43	E	1222	2
Mayanja	(Mayanja FR)	Central	Uganda	0	20	N	32	24	E	1230	2
Mbale		Eastern	Uganda	1	4	N	34	11	E	1155	2
Mbanga Forest	Mpanga, 17 mi NW Entebbe (Mbanga FR)	Central	Uganda	0	11	N	32	16	E	1181	2
Mbarara		Southern	Uganda	0	37	S	30	39	E	1372	2
Mburo Lake	(Lake Mburo NP)	Southern	Uganda	0	40	S	30	56	E	1287	1
Mbwindi	Bwindi (BINP)	Southern	Uganda	1	2	S	29	45	E		3
Medje			DR Congo	2	25	N	27	18	E	800	5
Mengo	old Kampala	Central	Uganda	0	17	N	32	35	E		2
Metu		Nile	Uganda	3	38	N	31	48	E	948	1
Mgahinga, Mt	Gahinga (MGNP)	Southern	Uganda	1	24	S	29	38	E		2
Mgahinga/Muhavura Mts	Gahinga (MGNP)	Southern	Uganda	1	23	S	29	39	E	2980	3
Mihunga	Bihunga (RMNP)	Western	Uganda	0	22	N	30	3	E	2042	2
Mitiana	Mityana, Mitiyana	North Buganda	Uganda	0	24	N	32	3	E	1217	1
Mobuto Sese Seko, Lake	Albert, Lake	Western	Uganda							619	
Moffat's Island	nr Entebbe'	Central	Uganda								?
Mokia	Muhokya R	Western	Uganda	0	6	N	30	4	E	1036	2
Mongiro		Western	Uganda	0	50	N	30	10	E	1098	1

Specific 1	Supplement*	Province	Country	Lat°	Lat"	N/S	long'	long	E/W	Elev.	Ref.
Moroto	(Moroto FR)	Karamoja	Uganda	2	33	N	34	39	E	1364	2
Moroto, Mt	(Moroto FR)	Karamoja	Uganda	2	33	N	34	44	E	1120-3084	2
Moruita		Karamoja	Uganda	1	54	N	34	45	E	1410	1
Moyo		Nile	Uganda	3	39	N	31	42	E	922	2
Moyo, 2 kms W		Nile	Uganda	3	39	N	31	41	E		11
Moyo, 10 mi se		Nile	Uganda								11
Moyo, 16 kms east	vicinity, Otzi Forest	Nile	Uganda								11
Mpanga Forest	Mbanga (Mpanga FR)	Central	Uganda	0	11	N	32	16	E		2
Mubende		North Buganda	Uganda	0	35	N	31	23	E	1323	2
Mubuku Valley	(RMNP)	Western	Uganda							2135-3053	2
Mubuku Valley	Mihunga (RMNP)	Western	Uganda	0	22	N	30	0	E	1524	26
Mubwindi	see Bwindi (BINP)										
Mubwindi Swamp	(BINP)	Southern	Uganda	1	4	S	29	44	E	2070	3
Muhavura, Mt	(MGNP)	Southern	Uganda	1	22	S	29	39	E	2680	3
Mujuzi FR		South Buganda	Uganda	0	35	S	31	47	E		1
Mulanda	Mulande	Eastern	Uganda	0	42	N	34	0	E	1133	1
Mulema		Southern	Uganda	0	56	S	30	56	E	1650	20
Munteme		Western	Uganda	1	19	N	31	10	E	1080	1
Murchison Falls NP	Kabalega, hdqrtrs	Western	Uganda	2	15	N	31	50	E		1
Mutanda, Lake		Southern	Uganda	1	12	S	29	40	E		2
Mwana Island		South Buganda	Uganda	0	44	S	32	16	E		1
Mwela	(Bugoma FR)	Western	Uganda	1	16	N	31	0	E	1158	7
Mweya	(QENP)	Western	Uganda	0	11	S	29	54	E	803	2
Nabeya	see Nyabyeya		Uganda						E		
Nabilatuk	Nabilituk	Karamoja	Uganda	2	3	N	34	35	E	1176	2
Naboa	Nabea	Eastern	Uganda	1	3	N	34	1	E	1098	1
Nabugabo, Lake		South Buganda	Uganda	0	22	S	31	53	E	1200	2
Nabumali		Eastern	Uganda	0	59	N	34	13	E	1268	2
Nagongera	Ngongera	Eastern	Uganda	0	46	N	34	2	E	1071	21
Naitakwai	Navtakwai	Karamoja	Uganda	2	33	N	34	38	E	1320	1
Nakasajja		North Buganda	Uganda	0	29	N	32	41	E	1109	1
Nakasongola-Bombo Rd		North Buganda	Uganda	1	0	N	32	27	E	1079	11
Nakavuggo	Nakabugo?, Nakabugu?	Busoga	Uganda	0	56	N	32	59	E	1137	1,27
Nakiloro		Karamoja	Uganda	2	37	N	34	44	E	1574	2
Nakitoma		North Buganda	Uganda	1	32	N	32	6	E	1063	1
Nakivali, Lake		Southern	Uganda	0	47	S	30	53	E	1310	2
Namagunga		North Buganda	Uganda	0	23	N	32	53	E	1193	1
Namaiba		North Buganda	Uganda	0	18	N	32	47	E		1
Namalala FR	Namalala (Sango Bay FR)	South Buganda	Uganda	0	53	S	31	40	E		1
Namalere, 8 mi n Kampala	see Namulere	Central	Uganda	0	26	N	32	35	E		1,21
Namasagali	Namagasali	Busoga	Uganda	1	1	N	32	57	E	1040	1
Namirembe		Central	Uganda	0	19	N	32	34	E		1
Namulere, 8 mi n Kampala	Namalere	Central	Uganda	0	26	N	32	35	E		1
Namulusi Island		Central	Uganda	0	10	N	32	38	E		28
Nandi	"Uganda"		Kenya	0	11	S	35	28	E		5
Navtakwai	see Naitakwe		Uganda							1320	
Ndeke		Southern	Uganda	0	17	S	30	6	E	1401	1
Nebbi		Nile	Uganda	2	30	N	31	6	E	1029	2
Ngamba Island		North Buganda	Uganda	0	6	S	32	39	E	1132	1

Specific 1	Supplement*	Province	Country	Lat °	Lat"	N/S	long'	long	E/W	Elev.	Ref.
Ngogo	(KFNP)	Western	Uganda	0	31	N	30	25	E	1350	10
Ngongera, 14 mi W Tororo	Nagongera, Ngongere	Eastern	Uganda	0	46	N	34	2	E	1071	21
Ngora rest house	Teso	Eastern	Uganda	1	30	N	33	45	E	1077	2
Ngoto Swamp	(BINP)	Southern	Uganda	0	54	S	29	44	E	1500	3
Nile	Province	Nile	Uganda	3	0	N	31	30	E		
Nkozi Hospital		Central	Uganda	0	2	N	32	3	E		39
Nsadzi Island		North Buganda	Uganda	0	5	S	32	36	E	1217	1
Ntandi	(Bwamba FR)	Western	Uganda	0	48	N	30	9	E	701	1
Nteko Parish	(BINP)	Southern	Uganda	1	2	S	29	37	E	1600	3
Ntoroko, 15 miles S of		Western	Uganda	0	49	N	30	33	E	548	1,11
Nyabirongo		Western	Uganda	0	4	N	29	53	E	1205	1
Nyabitaba	(RMNP)	Western	Uganda	0	22	N	29	58	E	2670	3
Nyabyeya Forestry School	Nabeya, Nabea? (Budongo FR)	Western	Uganda	1	41	N	31	32	E	1100	1
Nyalasanji	Nyalushanje, Nalasangi, Nyalusanje	Southern	Uganda	0	59	S	29	58	E	1670	1
Nyamagasami R	Nyamugasani, Nyamagasani (RMNP)	Western	Uganda	0	18	N	29	53	E	3960	12
Nyamileju Rock Shelter	Nyamleju (RMNP)	Western	Uganda	0	23	N	29	57	E	3292	12
Nyemera	Nyimera	Eastern	Uganda	0	37	N	33	58	E	1101	1
Omubiyanja Swamp	Two Pond Swamp (BINP)	Southern	Uganda	0	59	S	29	38	E	1850	3
Ongino		Eastern	Uganda	1	33	N	33	59	E	1090	2
Opoka	see Apoka		Uganda								
Otze, Mt.	(Otzi FR)	Nile	Uganda	3	37	N	31	51	E	1500	1
Pader	Palwo	Northern	Uganda	2	49	N	33	7	E	1037	1
Paicho		Northern	Uganda	2	54	N	32	27	E	1000	1
Pajule	Fadjulli	Northern	Uganda	2	58	N	32	56	E	999	1
Paraa	(MFNP)	Northern	Uganda	2	18	N	31	35	E	689	1
Piswa		Eastern	Uganda	1	19	N	34	30	E		29
Port Alice	Entebbe	Central	Uganda	0	3	N	32	28	E	1132	12
Queen Elizabeth N.P.	Rwenzori NP (QENP)	Southern	Uganda	0	15	S	30	0	E	850	1
Rhino Camp		Nile	Uganda	2	58	N	31	24	E	607	2
Rongai			Kenya	0	10	S	35	52	E	1911	5
Ruanda-oweru		Southern	Uganda	1	15	S	29	44	E		9
Rugangi		Southern	Uganda	0	9	S	30	50	E		1
Ruhija	Luhiza, Ruhiza (BINP)	Southern	Uganda	1	2	S	29	45	E	2350	3
Rumuruti			Kenya	0	16	N	36	32	E	1890	5
Ruwenzori FR	(RMNP)	Western	Uganda	0	25	N	30	0	E		1
Ruwenzori NP	see QENP	Western	Uganda	0	15	S	30	0	E		1
Ruwenzori, East	Mubuku Camp (RMNP)	Western	Uganda	0	22	N	30	1	E	1525	2
Ruwenzori, Southeast	Mokia, Muhokya River	Western	Uganda	0	6	N	30	4	E	1040	2
Rwanasenge	(Bwamba FR)	Western	Uganda	1	4	N	30	15	E	671	7
Sabei	Sebei, Save, Kapchorwa	Eastern	Uganda	1	24	N	34	27	E	1895?	1
Sabinio Volcano	(MGNP)	Southern	Uganda	1	23	S	29	35	E		1
Sabinio/ Mgahinga	Gahinga (MGNP)	Southern	Uganda	1	23	S	29	37	E	2591	3
Sambiye R		Western	Uganda	2	3	N	31	45	E		1
Sango Bay Forest	Namalala, Tero (Malabigambo FR)	South Buganda	Uganda	0	53	S	31	40	E	1134	1

Specific 1	Supplement*	Province	Country	Lat°	Lat"	N/S	long'	long	E/W	Elev.	Ref.
Sebei	Save, Savi, Kapchorwa	Eastern	Uganda	1	24	N	34	27	E	1895?	1
Semliki Flats	Semliki Valley (Semliki FR)	Western	Uganda	0	49	N	30	4	E	700	1
Sempaya		Western	Uganda	0	51	N	30	11	E	1185	1
Semuganja Island		South Buganda	Uganda	0	19	S	32	22	E		1
Serere		Eastern	Uganda	1	31	N	33	26	E	1066	2
Sese Islands	Sesse	South Buganda	Uganda	0	20	S	32	20	E	1132	1
Shanwa	Shandwa		Tanzania	3	10	S	33	46	E	1352	30
Sipi		Eastern	Uganda	1	20	n	34	19	E	1822	34
Sonso R.		Western	Uganda	1	53	N	31	24	E	1253	1
Sore	5 miles from Kapchorwa	Eastern	Uganda	1	24	N	34	27	E		24
Soroti		Eastern	Uganda	1	44	N	33	36	E	1179	2
Soweh Island	Sowe	Central	Uganda	0	10	N	32	39	E	1129	1
Ssio Bay	Sio	Eastern	Uganda	0	14	N	34	1	E	1140	1
Stuhlmann Pass, N and above	(RMNP)	Western	Uganda	0	24	N	29	53	E	4330	12
Sukulu	Sakula	Eastern	Uganda	0	40	N	34	10	E	1217	1
Terinyi Camp	Bukedi Dist former District	Eastern	Uganda	1	0	N	33	46	E	1084	1
Teso		Eastern	Uganda	1	40	N	33	30	E		1
Thoro	Toro?	Western	Uganda	0	30	N	30	30	E		1
Tonia	Tonya	Western	Uganda	1	35	N	31	5	E	647	1
Torit			Sudan	4	27	N	32	31	E	829	5
Toro Dist		Western	Uganda	0	30	N	30	30	E		1
Toro Game Reserve	(Toro GR)	Western	Uganda	1	5	N	30	25	E		1
Tororo		Eastern	Uganda	0	41	N	34	10	E	1182	2
Tororo, 64 kms sw		Busoga	Uganda								11
Ugaya Island	see Bugaya	North Buganda	Uganda								
Victoria Nile R	Jinja to Lake Kyoga to Lake Albert		Uganda								
Vumba Island		Busoga	Uganda	0	2	N	33	38	E	1134	1
Wadelai		Nile	Uganda	2	42	N	31	27	E	615	2
Wasa River	Dorwa (KFNP)	Western	Uganda	0	50	N	30	18	E	1046	31
Wati, Mt.	Watti	Nile	Uganda	3	13	N	31	2	E		1
Yumbe		Nile	Uganda	3	28	N	31	15	E	917	2
Zika Forest	(Zika FR)	Central	Uganda	0	10	N	32	28	E		2
Zoka F.R.		Nile	Uganda	3	14	N	31	35	E		1

* 'Supplement' column refers to alternate spelling or as a modifier.
Elevations (Elev.) mostly from References.

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12. INDEX.

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