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## BAT RECORDS FROM MALAWI (MAMMALIA, CHIROPTERA)

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### ABSTRACT

Five species of bats are recorded from Kasungu National Park, Malawi: *Eidolon helvum* (Kerr, 1792); *Epomophorus anurus* Heuglin, 1864; *Epomophorus minor* Dobson, 1880; *Epomops dobsonii* (Bocage, 1889); and *Scotoecus hindei* Thomas, 1901. Some other Malawian records of these species, based on literature and specimens in collections, have been included. *Epomophorus anurus*, *Epomops dobsonii* and *Scotoecus hindei* are recorded from Malawi for the first time.

### INTRODUCTION

During his stay in the Kasungu National Park, Malawi, from January to March 1982, the second author collected some Chiroptera. The bats were deposited at the Zoölogisch Museum in Amsterdam. The number of bat records from Malawi is limited and this new collection, although small, contains three species which have not previously been recorded from that country. Together with the others they are reported in this note. Earlier records of the species concerned, from other Malawian localities, have been included. Mention has also been made of

unpublished specimens of these species in other collections.

### MATERIAL AND METHODS

All 26 bats have been preserved in alcohol. Due to lack of technical assistance only a small number of skulls considered desirable for measuring have been extracted. This has not interfered with the aim of this paper. A more extended taxonomical analysis, especially of the *Epomophorus* species in the collection, should not be restricted to material from a

single small area and would go far beyond the present subject. All measurements have been taken by the first author from alcohol specimens and are given in mm. Geographical coordinates of localities mentioned can be found in the gazetteer at the end of the paper. Names of trees are those in use by the Park authorities.

Collections have been abbreviated as follows.-

AMNH - American Museum of Natural History, New York; BMNH - British Museum (Natural History), London; CMNH - Carnegie Museum of Natural History, Pittsburgh; HZM - Harrison Zoological Museum, Sevenoaks; MMB - Museum of Malawi, Blantyre; ZMA - Zoölogisch Museum, Amsterdam.

## RESULTS

The vegetation of the Kasungu National Park is composed predominantly of myombo woodlands (types 18 and 19 in Keay, 1959) which cover most of western Malawi (Knapp, 1973). In the Park two main subtypes can be distinguished. "Plateau areas" are covered with closed canopy *Brachystegia/Julbernardia* woodlands and "Valley areas" with open canopy *Terminalia/Combretum* woodlands. In both subtypes so-called dambos occur. In "Plateau areas" these dambos have deep sandy soils with low quality grass of medium height. In "Valley areas" dambos have relatively richer soils with grass of better quality. The bats have been collected at six different localities in the Park, which may be briefly described as follows.

*Brachystegia/Julbernardia* woodlands:

Lifupa: dambo, open land with short grass and few trees; mistnet between two *Julbernardia paniculata* (Benth.) trees; a small lake at a distance of about 40 m; bat species: *Epomophorus minor*, *Epomops dobsonii*.

Administration Camp: in transition zone between dambo and typical vegetation; bat species: *Epomophorus anurus*, *E. minor*, *Epomops dobsonii*, *Scotoecus hindel.*

Lisanthu: predominantly typical vegetation, long grass; mistnet over stream between two *Syzygium cordatum* Hochst. trees in fruit; bat species: *Eidolon helvum*, *Epomophorus anurus*, *E. minor*, *Epomops dobsonii*.

Vitanda: dambo, long grass; mistnet over stream between two *Syzygium cordatum* trees in fruit; bat species: *Epomophorus minor*.

Rocky outcrop: rock formation in otherwise plain land; typical vegetation, more fully developed than at the other localities; bat species: *Epomops dobsonii*.

*Terminalia/Combretum* woodlands:

House on slope of Lingadzi dambo, with *Terminalia sericea* Burch and other tree species;

long grass; bat species: *Epomophorus minor*.

On the species in the bat collection and their occurrence in Malawi the following comments can be made.

### 1. *Eidolon helvum helvum* (Kerr, 1792)

Material.-

1 immature ♂, Lisanthu, 20-III-1982 (ZMA 21.694).

Remarks.-

The specimen has a forearm length of 105.7. Earlier Malawian records of *Eidolon helvum* are from Zomba (Thomas, 1896), Mount Malosa (Thomas, 1897), Ruo River in Mlanje Mountains (Lawrence & Loveridge, 1953), and Zoa Estate (Morris, 1964). Two additional localities are Misuku (material in HZM collection) and Blantyre (material in MMB collection and identified by P. Hanney; Dr. W.F.H. Ansell, in lit., 9-X-1982).

### 2. *Epomophorus anurus* Heuglin, 1864

Material.-

1 subadult ♂, Administration Camp, 24-I-1982 (ZMA 21.693a); 1 adult ♂, skull extracted, Lisanthu, 19-III-1982 (ZMA 21.693b).

Remarks.-

The adult ♂ has a forearm length of 77.1 and a greatest skull length of 47.1. The subadult ♂ has a forearm length of 77.4. Forearm lengths indicate that in Malawi *anurus* may approach *Epomophorus crypturus* Peters, 1852, in body size range. Koopman (1966) suggested that *anurus* may be conspecific with the larger *crypturus* and that the solution of this problem should be looked for in northeastern Zambia and southeastern Zaire.

Earlier Malawian specimens of this group have all been assigned to *crypturus*. Thomas (1894) recorded an adult ♀ with a forearm length of 78 from Zomba, which Andersen (1912) apparently considered as immature but also as *crypturus*. Other specimens from Malawi which Andersen could study were two immature ♀♀ from the same locality (Andersen, 1912). Koopman

(1966) mentions one adult ♀ skull from Likabula which he states to agree with the diagnosis of *crypturus* by Andersen (1912). The first author studied this specimen (AMNH 161852) some years ago; it was collected on 26-VI-1946 by H.E. Anthony, has a dry forearm length of 78.6 and a greatest skull length of 46.6. In the MMB collection there are *Epomophorus* specimens identified as *crypturus* by P. Hanney, from Blantyre, Chikwawa, Karonga and Liwonde (Dr. W.F.H. Ansell, in lit., 9-X-1982).

The measurements of our *anurus* (see also Table 1) are quite large for the species, but not beyond its size range (Bergmans, unpublished notes on East African specimens). The measurements of the Malawian specimens ascribed to *crypturus*, as quoted above, fall within the lower ranges of that species' dimensions.

*Epomophorus anurus* has not been recorded from Malawi before.

### 3. *Epomophorus minor* Dobson, 1880

#### Material.-

4 immature ♂♂ and 1 immature ♀, Lifupa, 8- (2 specimens), 19-, 20- (♀), and 22-I-1982 (ZMA 21.671-21.674, and ♀ ZMA 21.687); 1 immature and 2 adult ♂♂, Administration Camp, 24-, 25-, and 29-I-1982 (ZMA 21.675-21.677); 1 adult ♂, house, 20-II-1982 (skull extracted; ZMA 21.678); 1 immature ♂, Vitanda, 4-III-1982 (ZMA 21.679); 5 adult and 2 immature ♂♂, Lisanthu, 6- (2 specimens), 8-, 9-, 10- and 13- (2 specimens) III-1982 (skulls of 2 adults extracted; ZMA 21.680-21.686).

#### Remarks.-

Earlier Malawian specimens have been recorded from Kautsi (as Kausi; Lawrence & Loveridge, 1953), Karonga (Harrison, 1959), and Nkhotakota (as Kotakota; Koopman, 1966). Over the last few years the first author could study the mentioned specimens of the latter two authors and specimens from some other Malawian localities: 2 ♂♂ and 5 ♀♀ from Cape Maclear, 30- and 31-V-1975, collector L.W. Robbins (2 ♀♀ in alcohol, others: skins and skulls; CMNH 409758-409764); 2 ♂♂ and 4 ♀♀ from Karonga, 1956-1957, collector R.H. Oram (skins and skulls; HZM 9.1926, 12.2198, 13.2204, 20.2621, 21.2638, 22.2639); 1 ♂ and 1 ♀ from Karonga (BMNH); 4 ♀♀ from Nkhotakota, 11- and 14-VIII-1946, collector

H.E. Anthony (skins and skulls; AMNH 161853 and 161856-161858); specimens from Livingstonia and Livingstonia District (BMNH). In the MMB collection there are specimens identified as *minor* by P. Hanney, from Monkey Bay (Dr. W.F.H. Ansell, in lit., 9-X-1982).

Measurements of adult ZMA specimens are given in Table 1. These are all ♂♂. Two adult ♂♂ from Karonga have a forearm lengths of 64.9 and 65.0, one of them a greatest skull length of 39.3; 3 adult ♀♀ from Karonga have forearm lengths of 59.9, 60.8 and 61.9, 2 of them greatest skull lengths of 35.3 and 36.0; 1 ♀ from Cape Maclear has a forearm length of 62.9 and a greatest skull length of 35.0. The 4 ♀♀ from Nkhotakota have forearm lengths of 59.9-62.8 and greatest skull lengths of 35.0-35.9.

In dimensions the Malawian specimens agree with known examples from Zambia and Tanzania. The ♂♂ are generally larger than ♂♂ from more northern localities. A sexual dimorphism in size seems obvious.

In the collecting area the species was very abundant. The total number of bats captured was 72; of these, 46 were released: probably all *Epomophorus minor*. Of the remaining 26, another 17 represent the same species.

### 4. *Epomops dobsonii* (Bocage, 1889)

#### Material.-

1 immature ♀, Lifupa, 9-I-1982, about 5 a.m. (ZMA 21.688); 1 adult ♂, Administration Camp, 24-I-1982 (skull extracted; ZMA 21.689); 1 adult ♀ and 1 subadult ♀, rocky outcrop, 21- and 22-II-1982, 2.40 and 2.00-5.00 a.m. (ZMA 21.690-21.691); 1 subadult ♀, Lisanthu, 7-III-1982 (skull extracted; ZMA 21.692).

#### Remarks.-

Another Malawian specimen is in the BMNH alcohol collection as no. 34.6.4.1. It is an adult ♂ from Livingstonia with a forearm length of 93.5, which is larger than in other known ♂♂ (range: 85.0-90.5; see Bergmans, 1979). The adult ZMA specimens fall within the known size range (see Table 1). *Epomops dobsonii* has not been recorded from Malawi before. Its occurrence there was to be expected as it was known from Angola, Botswana, Zambia and southeast Zaire in the west and from Tanzania and Rwanda

in the (north)east (Bergmans, 1979)

5. *Scotoecus hindei* Thomas, 1901

Material.-

1 adult ♀, Administration Camp, 25-I-1982 (skull extracted; ZMA 21.695).

Remarks.-

Hill (1974) has revised the genus *Scotoecus*

Thomas, 1901. The specific identity of our specimen offers no problem. In measurements (see Table 1) it agrees mostly with the typical subspecies as defined by that author. Its collecting locality is quite near some Zambian localities of the subspecies *albigula* Thomas, 1909, as mapped by Hill (1974).

*Scotoecus hindei* has not been recorded from Malawi before.

GAZETTEER

Locality	Latitude	Longitude
Administration Camp	13°00'S	33°09'E
Blantyre	15°41'S	35°00'E
Cape Maclear	14°01'S	34°55'E
Chikwawa	16°01'S	34°48'E
house	13°00'S	33°09'E
Karonga	09°56'S	33°56'E
Kautsi	14°40'S	35°08'E
Lifupa	13°03'S	33°09'E
Likabula	15°56'S	35°30'E
Lisanthu	13°00'S	33°10'E
Livingstonia	10°36'S	34°07'E
Liwonde	15°04'S	35°13'E
Misuku	09°40'S	33°30'E
Mlanje Mountain (with Ruo River)	16°00'S	35°37'E
Monkey Bay	14°05'S	34°55'E
Mount Malosa	15°15'S	35°18'E
Nkhotakota	12°55'S	34°18'E
rocky outcrop	12°53'S	33°03'E
Vitanda	12°57'S	33°10'E
Zoa Estate	16°14'S	35°12'E
Zomba	15°23'S	35°19'E

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Table 1. Measurements of adult specimens of bats from Kasungu National Park, Malawi, in the Zoölogisch Museum, Amsterdam.

Species, sex	<i>Epomophorus anurus</i> , ♂		<i>Epomophorus minor</i> , ♂♂		<i>Epomops dobsonii</i> , ♂ ♀		<i>Scotoecus hindai</i> , ♀	
	21.693b	n	21.677-78 & -80-84	m	21.689	21.690	21.695	
Forearm length	77.1	7	63.8	7	89.9	88.3	33.9	
Greatest skull length (or occipito-basal length)	47.1	4	38.7	4	53.55		14.4	
Condylobasal length	46.9	4	38.0	4	53.7		14.0	
Rostrum length	19.8	4	15.4	4	25.1		3.3	
Palatal length	29.8	4	23.8	4	30.1			
Mandibulum length	36.6	4	30.0	4	42.9		11.65	
Cranium width	15.7	4	14.2	4	17.6		8.2	
Width across anteorbital foramina							5.5	
Interorbital width	7.3	4	6.6	4	7.0		4.6	
Postorbital width	9.7	4	8.7	4	10.5			
Zygomatic width	23.6	4	20.6	4	26.4			
Width over C-C (crowns)	8.7	4	7.4	4	10.2			
Upper tooth row (crowns)	16.3	4	13.1	4	16.1		5.35	
Width over last upper molars (crowns)	12.2	4	10.9	4	14.8		5.8	
Lower tooth row (crowns)	17.5	4	14.1	4	17.65		7.6	
			14.0-14.4				6.15	