Ecological aspects of the distribution of *Epomophorus*-fruit bats (Mammal., Chiropt.) in Zimbabwe

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Synopsis

Epomophorus wahlbergi and *E. gambianus* (subspecies *crypturus* only), two very similar epauletted fruit bats, occur in Africa south of the equator. After an examination of specimens, extensive mist netting, and an analysis of tape recordings, the present assumption the ranges of the two species would overlap widely has to be altered. In Zimbabwe, *E. wahlbergi* is restricted to river valleys and eastern mountain slopes with a good water supply for the arboreal vegetation and a relatively even climate. In contrast to this, *E. g. crypturus* is able to inhabit also drier woodland with a long dry season.

Die beiden einander sehr ähnlichen Epaulettenflughunde *Epomophorus wahlbergi* und *E. gambianus* (hier nur die südliche Rasse *crypturus*) kommen in Afrika südlich des Äquators vor. Aufgrund einer kritischen Überprüfung von Museumsmaterial, eigener Netzfänge und der Analyse von Tonbandaufnahmen, ist die bisherige Auffassung einer breiten Überlappung der Verbreitungsgebiete zu revidieren. *E. wahlbergi* ist in Zimbabwe auf Flußtäler und ostexponierte Gebirgshänge mit guter Wasserversorgung für die Vegetation und relativ ausgeglichenem Klima beschränkt. *E. g. crypturus* ist dagegen in der Lage, auch die trockenere Baumsavanne mit einer langen Trockenzeit zu besiedeln.

Epomophorus gambianus crypturus, Epomophorus wahlbergi, Epauletten-Flughunde, Verbreitung, Stimmanalyse, Vegetationstypen, Simbabwe

Epomophorus gambianus crypturus, Epomophorus wahlbergi, epauletted fruit bats, distribution, voice analysis, vegetation types, Zimbabwe

1. Introduction

Epomophorus wahlbergi (SUNDEVALL) and the southern subspecies *E. g. crypturus* PETERS of *Epomophorus gambianus* (OGILBY) (after BERGMANS 1988) are both found in southern Africa. They are very similar taxa. To the human ear, their voices hardly sound different.

According to BERGMANS (1988), HUTTON (1986), SKINNER & SMITHERS (1990), and SMITHERS & WILSON (1977), the range of *E. wahlbergi* covers that of *E. g. crypturus* to a large extent (Fig. 1). Both species are recorded to occur in the same habitat.

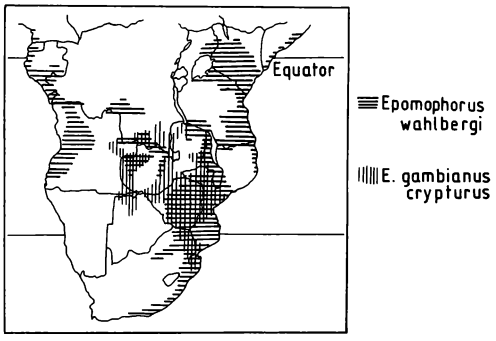


Fig. 1
Distribution of *E. wahlbergi* and *E. g. crypturus* as presently known from literature.

Abb. 1
Verbreitung von *E. wahlbergi* and *E. g. crypturus* nach bisherigem Kenntnisstand.

Recently, VOLPERS & KUMIRAI (in prep.) in a review of fruit bats from Zimbabwe could confirm only 26 out of 67 specimens of E. wahlbergi and found that ten had been misidentified.

2. Material and Methods

According to the review of Zimbabwean fruit bats, the old distribution maps were corrected. We also traced old records of *E. wahlbergi* from literature.

From 1989 to 1992 we captured several hundred fruit bats in mist nets in about twenty quarter degree squares all over Zimbabwe to gather additional information on the distribution areas.

Display calls of males were recorded with an Uher report 4000 L tape recorder in several places and examined in a sound spektrograph (FFH spectral analyzer, MEDAV, Erlangen).

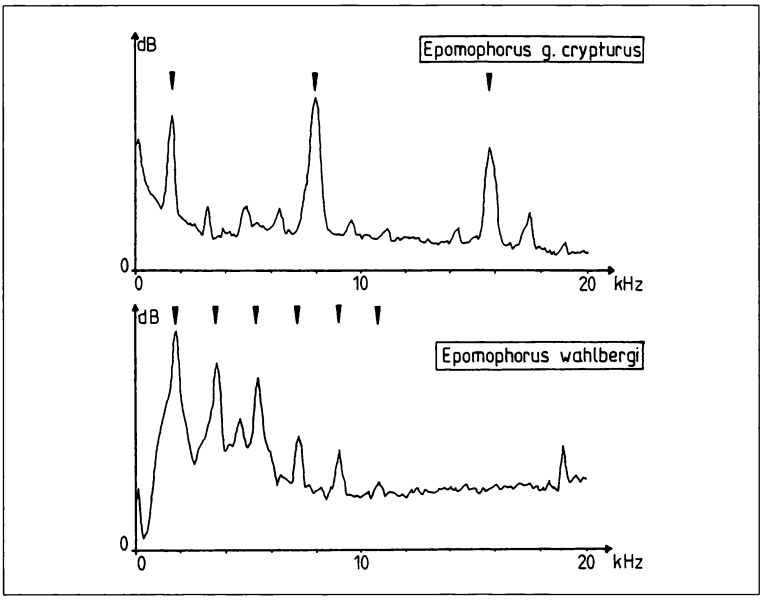


Fig. 2
Typical sonagrams of »pink«-calls of one male of each species.

Abb. 2
Typische Sonagramme von »pink«-Rufen jeweils eines balzenden Männchens jeder Art.

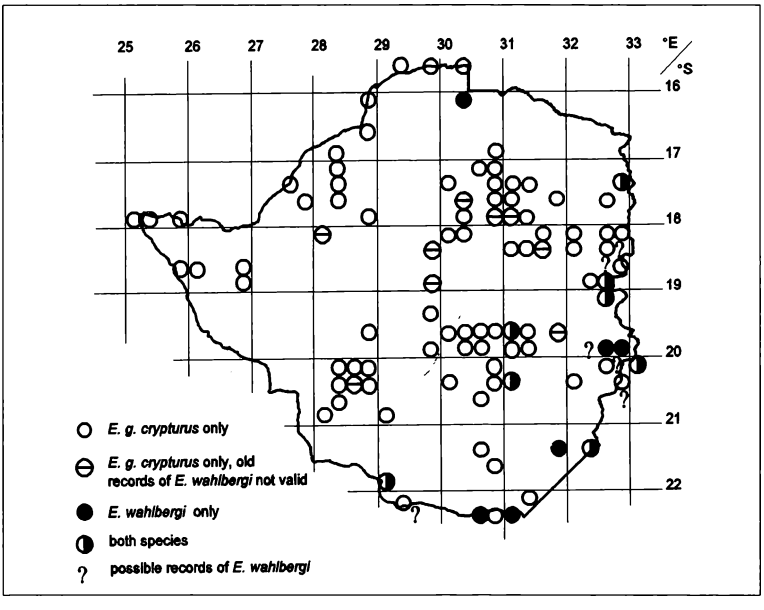


Fig. 3
New distibution map of *Epomophorus* bats in Zimbabwe.

Abb. 3
Neue Verbreitungskarte der Epaulettenflughunde in Zimbabwe.

Informations on altitude and annual rainfall are drawn from the Tabex Encyclopedia Zimbabwe (1987) and from official maps of the Surveyor General of Zimbabwe.

3. Results

3.1 Voice

At certain times of the year, males of both species utter monotonous series of »pink«–calls on end. To the human ear in the field, the calls of the two species are undistinguishable. Sonagrams of the calls reveal that there are clear differences (Fig. 2). *E. wahlbergi* calls ideally have their greatest intensity around 1.4–1.8 kHz. The higher harmonics fall off continuously. In contrast, the calls of *E. g. crypturus* show three maxima of intensity at around 8, 1.6, and 16 (19) kHz. The other harmonics are much fainter.

With the aid of sound recordings, *E. g. crypturus* were found in two additional quarter degree squares.

3.2 Actual Distribution in Zimbabwe

Compared to previous data (see Fig. 1), the distribution pattern of *E. wahlbergi* has changed. Now the patterns for the two species in Zimbabwe differ considerably from each other (Fig. 3).

E. g. crypturus is widespread and occurs all over the country. The gaps on the distribution map seem to be due mainly to different intensity of collecting activity. There may be also a few patches where this species is rare or in fact absent.

With two exceptions, confirmed records of *E. wahlbergi* are restricted to the eastern, southern, and northeastern boundaries of the country. In the south, *E. wahlbergi* occurs in the valleys of the Limpopo and Shashe Rivers and Runde and Save Rivers below 600 m a.s.l. There is one record of an adult male from the lower Angwa River, a tributary to the Zambezi River in the north. The records along the eastern boundary cover the eastern slopes of the mountains from very low to medium altitudes (from 500 to 1200 m a.s.l.). 31 indeterminate »*E. wahlbergi*« (VOLPERS & KUMIRAI in prep.) all come from areas where this species has been confirmed anyway.

Most records from the inner parts of the country have to be cancelled. In particular, this is true for the following quarter degree squares: 1730 C2, 1730 D4, 1731 C3, 1828 A1, 1829 B4, 1829 D4, 1831 B3, 1931 D2 and 2028 B3. The records in 2031 A3 and 1931 C1 represent single females, each one collected in the middle of the dry season (June, July) about three months before and after the reproduction season. The latter was the only *E. wahlbergi* among more than 500 *E. g. crypturus* captured in three years in that region. Both specimens come from river systems which are connected to the Runde or Save River.

4. Discussion

The different distribution patterns of the two species probably correspond to their different ecological niches (see Tab. 1).

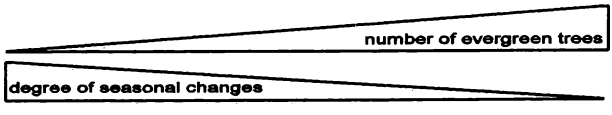
Vegetation type 29c in WHITE (1981, 1983) stands for undifferentiated woodland, occurring in Zimbabwe in regions with less than 700 mm annual precipitation and clear seasonal temperature changes. *E. wahlbergi* does not inhabit this woodland.

No. 26 is drier Zambesian miombo woodland, dominated by *Brachystegia* and *Julbernardia (Fabaceae).* More than half of the records of *E. g. crypturus* combine with this vegetation type. It is characterised by a long dry season and an annual rainfall of 600 to 1200 mm. *E. g. crypturus* is able to feed on only a few tree species (e.g. *Parinari curatellifolia, Chrysobalanaceae)* for several consecutive months (own observations) which might be considered as a specialization. There are only two single records of *E. wahlbergi* from this vegetation type.

Dry deciduous forest and dry *Colophospermum mopane* woodland are marked as 22a and 28. Fruit bats, especially *E. wahlbergi,* are confined to the close surroundings of rivers in these vegetation types. These linear structures are not mapped by WHITE. The trees along the rivers have access to a relatively high ground water table throughout the year and thus the effects of the cool–dry season are less pronounced. A high proportion of evergreen species exists there and a good fruit supply all year round.

No. 16 and 19 are the East African coastal mosaic and undifferentiated montane vegetation. In Zimbabwe, they receive more than 1200 mm rainfall per year and are dominated at lower altitudes by evergreen vegetation. Both species live in these areas

Vegetation type no. (WHITE 1983)	29	26	28 22a	19 16
E. g. crypturus (n=91 squares)	13 %	56 %	26 %	4 %
E. wahlbergi (n=14 squares)	–	14 %	57 %	28%



Tab. 1: **Dominating vegetation types in quarter degree squares with records of fruit bats. See text for explanations.**
Tab. 1: **Dominierende Vegetationstypen in 1/4 Grad-Quadranten mit Flughundnachweisen. Erläuterungen im Text.**

with less intense seasonal changes, but it seems to be more important for *E. wahlbergi*, and this species might be more competitive here.

On a larger scale (see Fig. 1), it is conspicious that the range of *E. g. crypturus* is almost congruent with the »Zambesian regional centre of endemism« (WHITE 1983). Only the records east of Lake Malawi are an exception. The range of *E. wahlbergi* generally coincides with vegetation types characteristic for more humid conditions and extends into the regions along the west and south-eastern coasts, and towards Tanzania and Kenya. There are a few *E. wahlbergi* localities which do not fit well into this pattern, for example, in the Witwatersrand and further to the west (Republic of South Africa).

The south-west of Africa (Kalahari, Namibia, Karroo) is too dry for either fruit bat with the exception of the Okavango delta. Although the conditions in the delta are similar to those of the lowveld rivers in Zimbabwe, *E. g. crypturus* thrives there without competitors. This area might be too far away from the range of *E. wahlbergi*.

Comparative studies of these two epauletted fruit bat species could help to understand their habitat use and competitive relation.

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