Emopomphorus wahlbergii. By Lalita Acharya

Published 5 June 1992 by The American Society of Mammalogists

Emopomphorus wahlbergii (Sundevall, 1846)
Wahlberg's Epauletted Fruit Bat

Pteropus wahlbergii Sundevall, 1846:118. Type locality "Prope Port-Natal et in Caffraria interiore occesiis" (Durban, Natal, South Africa).

Pteropus haldemani Hallowell, 1846:52. Type locality "Western Africa."


Emopomphorus zenkeri Matschie, 1899:46. No type originally designated. Type locality restricted to "Chinchcho, Cabinda" (Angola) by Anderson (1912:524).

Emopomphorus neumannii Matschie, 1899:50. No type originally designated. Type locality restricted to "Mombasa, British East Africa" (=Kenya) by Andersen (1912:524).

Emopomphorus haldemani Matschie, 1899:50. No type originally designated. Type locality restricted to "Vikindo, Usaramo, German East Africa" (=Tanzania) by Andersen (1912:527).

CONTEXT AND CONTENT. Order Chiroptera, Suborder Megachiroptera, Family Pteropodidae, Subfamily Pteropodinae. Genus Emopomphorus. Six species are recognized (Bergmans, 1988); a key is presented in Boulard and Robbins (1989). Andersen (1912) recognized two subspecies of E. wahlbergii:

E. w. haldemani Hallowell, 1846:52, see above (zenkeri Matschie and Matschie are synonyms).

E. w. wahlbergii Sundevall, 1846:118, see above (stuhlmanni Matschie is a synonym).

The two subspecies differ in size; this difference is most evident in the skulls of males (skulls of male E. w. haldemani range from 47 to 51 mm in length; those of E. w. wahlbergii range from 52 to 56 mm; Andersen, 1912). There is considerable overlap in characters and it is possible that E. w. haldemani is not distinct from E. w. wahlbergii (Bergmans, 1988; Hayman and Hill, 1971). Intermediates have been found over a large part of the range of the species (particularly in eastern Africa) and size differences actually may represent clinal variation (Bergmans, 1979).

DIAGNOSIS. Emopomphorus is distinguished from other members of the Pteropodinae by the presence of white epaulettes of fur in males; no white nose and eye patches; three upper cheekteeth; six prominent palatal ridges, one or two being post-dental, which are not different from interdental ridges. The post-dental palate is strongly concave posteriorly (Hayman and Hill, 1971).

In the field, E. wahlbergii (Fig. 1) closely resembles E. gambianus crypturus. The two can be distinguished by post-dental palatal ridges; E. g. crypturus has two palatal ridges behind the last molar, whereas E. wahlbergii has only one (Smithers, 1983). The presence of one post-dental palatal ridge distinguishes E. wahlbergii from all other Emopomphorus.

GENERAL CHARACTERISTICS. Emopomphorus wahlbergii is buff to brown in color with distinctive white tufts at the front and back bases of the ears. Yellowish individuals are females, whereas the darkest animals are males. Hair tufts at the ear bases are white in the darker animals and sometimes yellow in the light-brown individuals (Wickler and Seibt, 1976).

Ranges of measurements (in g or mm; males and females, respectively) for external characters are: body mass, 60–124, 54–125; length of forearm, 72–95, 68–88; wingspan, 510–600, 456–540; length of ear, 22–26, 21–25; length of hind foot (including claw), 21–26, 18–24 (Bergmans, 1988; Happend et al., 1987). Apart from the size difference, there are two other differences between sexes: males possess a small, central-pharyngeal sac, and adult males have shoulder pouches and erectable epaulette-like hair tufts (Andersen, 1912).

Ranges of measurements (in mm; males and females, respectively) for cranial characters are: greatest length of skull, 44–57, 41–49; condylobasal length, 44–57, 41–49; rostrum length, 19–23, 16–20; zygomastic width, 25–29, 23–27; length between first canine and first molar, 16–19, 14–17 (Fig. 2; Bergmans, 1988).

DISTRIBUTION. Epauletted bats are found only in Africa (Wickler and Seibt, 1976). E. wahlbergii occurs in eastern and southeastern Africa (Fig. 3). The species ranges from Somalia and Uganda to South Africa and Angola and along the southern edges of the Congo basin forests at least to Gabon (Bergmans, 1988), and it has been reported from southwestern Cameroon (Aellen, 1952).

FORM AND FUNCTION. The lungs of E. wahlbergii are relatively large (lung volume per unit body weight is 0.043 cm³/g). They have an extensive alveolar surface area (surface area of tissue barrier per unit of body mass is 138 cm²/g), a thin blood-gas barrier (0.267–0.349 μm), and a high capacity for diffusion per unit of body mass (0.02 ml O₂ min⁻¹ mm Hg⁻¹ g⁻¹; Maina, 1982; Maina et al., 1982). Although the overall appearance and structure of the lung is similar to that of a non-vegetal mammal, these adaptations allow the lung to provide the large amount of oxygen necessary for flight (Maina, 1985). The left lung of E. wahlbergii is unlobed and the right lung has two incompletely separated lobes and an accessory lobe. To accommodate their large lungs, the thoracic cavity is large and the abdominal cavity is compressed towards the narrow pelvic

![Figure 1. Emopomphorus wahlbergii photographed in Zimbabwe. Photograph courtesy of M.B. Fenton.](image-url)
OBTENGY AND REPRODUCTION. *Epomophorus wahlbergi* has a seasonally polyestrous reproductive cycle with two birth periods per year (Anciaux de Faveaux, 1972, 1983). In Kenya (Andersen, 1912; O'Shea and Vaughan, 1980) and the Congo (Bergmans, 1979), the first birth period occurs in February and March, and the second from October to December. Varying parturition dates may reflect differently timed reproductive cycles in different parts of the range (Bergmans, 1979). One young and occasionally two are born (Anciaux de Faveaux, 1972).

In Kenya, the first lactation period of *E. wahlbergi* coincides with the peak of fruit availability during the rainy season, but the second lactation period occurs 6 months later during the dry season. It has been speculated that pteropodids (including *E. wahlbergi*) are capable of timing one lactation period to ensure a maximal supply of food, but are unable to optimally time the second because of a relatively rigid 5–6 month gestation period (Thomas and Marshall, 1984). Individuals may be full-grown at the age of about 15 months. Females can take part in the second reproduction cycle after their own birth and males in the third. Females may be ahead of males in reaching sexual maturity; shoulder tufts in males seem to develop only after the bats have reached adult size (Bergmans, 1979).

At birth, the teeth of *E. wahlbergi* are lightly enamelled, small, and sharp. The dental formula of a neonate is i2/2, c1/1, m1/1, total 16. During weeks 2 and 3 of life, the second milk teeth premolars appear in the upper and lower jaws giving a total of 20 teeth. The adult dental formula is i2/2, c1/1, p2/3, m1/2, total 26. The permanent teeth are heavily enamelled. Premolars and molars are conspicuously cusped. The age at which all permanent teeth are present is 81–150 days; mean, 106 days (Sowler, 1980).

ECOLOGY. *Epomophorus wahlbergi* is a savanna, woodland, and forest-margin species not found at altitudes >2,000 m (Kingdon, 1974). The species occurs in areas with a mean annual rainfall of 700 mm and in drier areas of river valleys containing evergreen forests with a minimum annual rainfall of 250 mm (Smithers, 1983).
The diet of E. wahlbergi consists mainly of figs such as Ficus sycomorus. It also eats the fruits of Diospyrus and Psidium guajava (Pienaar et al., 1985; Wickler and Seibt, 1976). E. wahlbergi eats the leaves of two species of Balanites. The leaves of this plant contain two steroidal components, dioxigenin and yamogenin (Wickler and Seibt, 1976). The species visits flowers of Anadromus in Kenya, acting as a pollination agent (Kock, 1972). Remnants of beetles and other insects have been found in the stomach contents of a few individuals, suggesting that E. wahlbergi is partially insectivorous (Pienaar et al., 1980, 1987). Fruit is carried from the source to a perch some distance away where the juice is eaten and the skin and seeds are spat out. Food is not carried back to the day roost (Fenton et al., 1985; Wickler and Seibt, 1976).

In daylight hours, E. wahlbergi roosts in groups of 3–100 individuals. Wickler and Seibt (1976) reported that the species roosts in the open and does not occur in caves. However, Fenton et al. (1983) found some animals roosting in dense-riparian forest and others in shelter caves. Kingdon (1974) stated that groups of E. wahlbergi move around according to the regional ripening of fruits and do not remain linked to a roost for long periods of time. Conversely, Wickler and Seibt (1976) suggested that E. wahlbergi has long-term site attachment to a given roost in a suitable area. Fenton et al. (1985) radio-tracked E. wahlbergi roosting in trees with dense canopies in Kruger National Park, South Africa. All of the E. wahlbergi tracked switched day roosts, but there was no evidence of the bats selecting roosts that were close to the food supply. Switching of day roosts may reduce the risk of predation. At dusk, females usually made longer moves (up to 4 km) between their day roosts and feeding areas, while males tended to make shorter moves (<500 m) to feeding areas; males made longer moves later in the night.

Epomophorus wahlbergi sometimes associates with E. labiatus, roosting in separate groups, but in the same tree. At night, the two species will sometimes roost as if they were from the same tree (Kingdon, 1974). E. wahlbergi also associates with E. gambianus (Smithers, 1983).

A malarial parasite (Hepaticystis) infects E. wahlbergi (and other African fruit bats). Exoerythrocytic schizonts (immature parasites) are found in the liver of infected individuals (Gartharn, 1950). A virus isolated from the brain of E. wahlbergi is indistinguishable from that of rhesus by fluorescent-antibody tests. The virus, called Lagos bat virus because it was first isolated from Eidolon helvum on Lagos Island, Nigeria, causes a fatal rhabdomyolysis in these Megachiroptera (Meredith and Standing, 1981).

**Behavior.** As in most Megachiroptera, flight in E. wahlbergi is mainly used for travelling from roosts to feeding areas. The wings of E. wahlbergi are relatively broad and relatively slow. The animals rarely rise above the canopy, and during flight, individuals sometimes hang into obstacles and conspecifics. Take-off in the evenings usually is preceded by intensive 0.5 h-grooming sessions (Wickler and Seibt, 1976). Flight occurs throughout the night, but after approximately 2000 h, flight declines to almost one-half of peak level (Fenton et al., 1985).

Little social interaction has been witnessed in E. wahlbergi. Group cohesion is seen only during roosting time. The only other type of social interaction that has been observed is mother-young relationships (Fenton et al., 1985; Wickler and Seibt, 1976).

Males of the closely related genera Epomops, Epomophorus, Micropoteropus, and Hypsignathus produce loud frog-like calls. Male E. wahlbergi begin calling after leaving the day roost. Usually, a calling male hangs from a branch at least 2–3 m above the ground. Calling usually occurs from 15 min to 1 h before a male moves to another tree. While calling, the normally conical epaulettes can be everted and displayed. Skin muscles control this tuft erection. Males call an average of 575 times/min and occasionally the rate is increased to 100–120 calls/min (Wickler and Seibt, 1976). Periods of accelerated calling are brief (<60 s in length) and relatively rare (Fenton et al., 1985). Calls contain a few relatively pure frequencies with a slight click at the beginning. The fundamental frequency is at approximately 175 Hz and three more frequencies occur at 3,500, 5,200, and 7,000 Hz. In Kenya, males call mainly during the dry season, males call at about 50–60 min intervals. In other epomorphines, calling attracts females, and the behavior also may serve this purpose in E. wahlbergi (Wickler and Seibt, 1976).

**Genetics.** Epomophorus wahlbergi has a diploid number of 36 chromosomes and a fundamental number of 68 (Dulic and Mutere, 1973; Peterson and Nagorsen, 1975). The karyotypically stained karyotype is identical to that of E. gambianus with six metacentrics, eight submetacentrics, and four subtelocentrics. The X chromosome appears to be submetacentric and the Y chromosome acrocentric (Dulic and Mutere, 1973).

**Remarks.** References to species of Epomophorus in this account follow Bergmans (1988). Andersen (1912) described the range of E. w. haldemani as "essentially western (Cameroon to Benue), but extends through the Congo Valley east to British and northern German East Africa" and that of E. w. wahlbergi as "southwestern British East Africa to eastern Cape Colony." Bergmans (1988) noted that the two subspecific ranges given by Andersen cross each other. Bergmans concluded that the geographical variation in size within E. wahlbergi is clinal and subspecific divisions on the basis of size differences are untenable.

**Literature Cited**


Editors of this account were TROY L. BEST and KARL F. KOOPMAN. Managing editor was CRAIG S. HOOD.

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