

# Observations on mating behaviour in the common slit-faced bat *Nycteris thebaica*

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## 1. INTRODUCCION

Mating behaviour in bats, although typically mammalian, varies considerably between taxa, with regard to both the mating system and copulatory behaviour. In general, pair formation, courtship and copulation are brief events, with unique features in every species described (reviewed by Carter, 1970; Hill & Smith, 1984).

Males generally mount females from the rear, with the female attached to a solid surface and the male attached to the female (Carter, 1970; Fenton, 1983). Only one species, a megachiropteran, is known to copulate venter to venter (Nelson, 1965).

*Nycteris thebaica* is a seasonally migrating, non-hibernating species associated with man-made structures, and occurs often in half-light conditions (Bernard, 1982; Rautenbach, 1982; Wingate, 1983). This paper describes the precopulatory and copulatory stages of mating behaviour in the species.

## 2. METHODS

A small colony (7 individuals) of common slit-faced bats was routinely observed in a house in Okaukuejo, Etosha National park, SWA/Namibia, from January to March 1984. Observations coincided with the active nocturnal cycle of the bats and generally commenced at 21h00, lasting until 24h00. Bats had free access to the building and were not interfered with in any way. Weak light sources of 40 watts were generally activated prior to the arrival of the first bat. Observations were recorded on magnetic tape.

## 3. RESULTS

The colony of *N. thebaica* roosted in the roof of the house (between ceiling and corrugated iron) during the day and intermittent vocalisations confirmed their presence from dawn to well after dusk. Bats emerged from 20h00 and foraged in the immediate vicinity of

## ABSTRACT

Precopulatory and copulatory sequences of mating behaviour are described in a microchiropteran bat. After a brief period of courtship, copulation occurs in flight with both bats hovering. Copulation is of short duration and is repeated up to three times.

## SAMEVATTING

Prekopulatoriese en kopulatoriese fases van paringsgedrag van 'n insekvretende vlermuis word beskryf. Na 'n kort hofmakery vind paring plaas in vlug terwyl beide vlermuise op een plek fladder. Kopulasie is van korte duur en word tot drie kere herhaal.

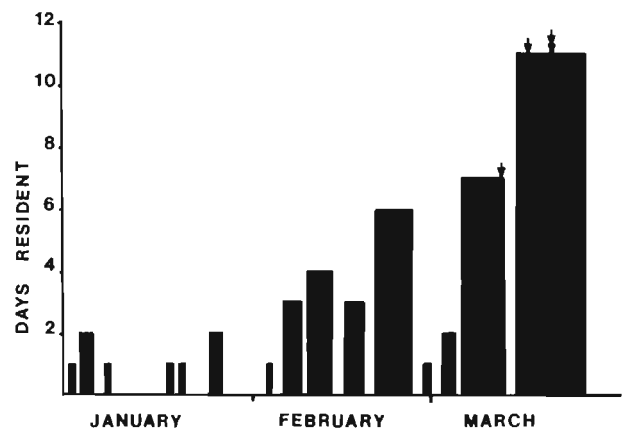


FIGURE 1: Periods of occupancy of a house in the Etosha National Park in 1984 by a small colony of the common slit-faced bat *N. thebaica*. (Arrows indicate occurrences of intensive vocalisation and flying, the double arrow indicates mating).

the house. Both dark and brightly lit rooms were frequently entered without apparent preferences for particular light conditions.

Prior to January 1984, sporadic occurrences of bats were noted, but from January to February progressively longer periods of residence with shorter intervals of absence occurred. Occupancy of the building by bats is illustrated in Fig. 1.

Group size remained constant throughout the study period and all seven individuals appeared to be adult. Males and females could not be distinguished from one another. Food supply was regarded as constantly over-abundant, owing to the multitude of flying insects attracted to electric lights in the surrounding area at that time of the year in Etosha. Foraging inside the building in brightly lit rooms was observed twice and moths were caught in flight. Bats utilised the inside and outside of the house as feeding sites, with

prey items being consumed whilst the bats were hanging from their hind legs. Smoothly plastered surface apparently presented no problems for attachment in this species.

Unusual excitement among the bats was noticed on three occasions in March when all seven individuals displayed increased intensities of vocalisations and "frenzied" flying. Such activity was of short duration, usually < 5 min., on the 12th and 16th of March but two individuals were observed in active pursuit of two others on the 19th of March and one pair was observed mating.

Amidst high intensities of shrieks, the two bats that could be observed at a distance of < 2 m followed erratic flight paths, with the leading individual clearly attempting to avoid the pursuer. The sequence of events and the duration and repetition of each phase are presented in Fig. 2. The pursuing bat frequently

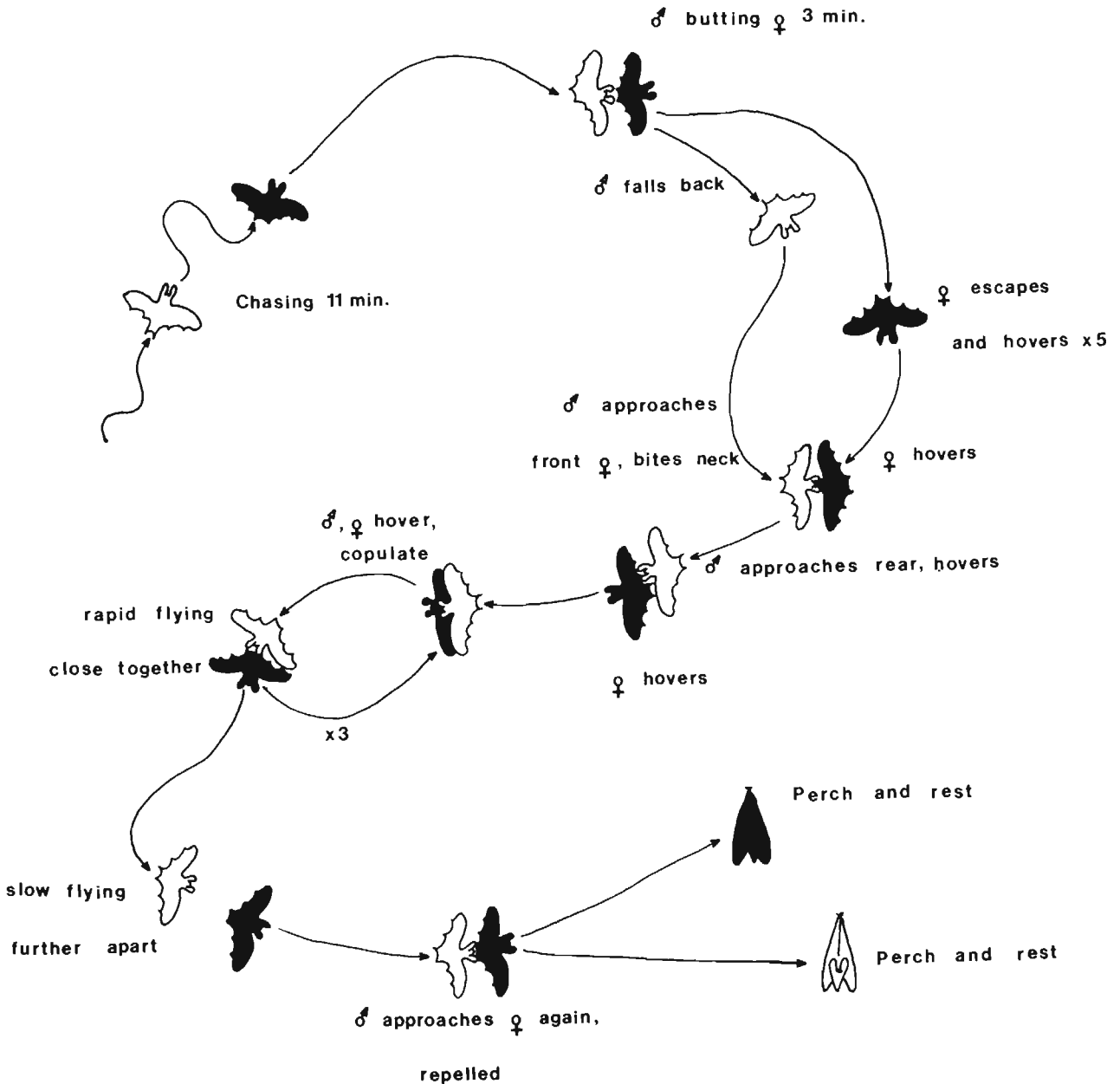


FIGURE 2: Diagram of precopulatory and copulatory sequences and duration and repetitions of each phase.

came into contact with the leading one, approaching it from the rear and slightly below and butting it forcefully with its head. These bouts of butting increased gradually until the pursuer fell back abruptly, whereupon the leading bat immediately started to hover for short periods (< 20 s) and at regular intervals. After five such hoverings, the pursuer approached the leading bat from the front and after biting it briefly on the head and neck regions, approached it from the rear and slightly above and copulated. Three copulations were observed interspersed with short bouts of flying in close formation.

Copulations were performed without clasping by the male, and pelvic thrusts could not be clearly distinguished, as both individuals were hovering while copulating. In both individuals hovering was performed with a marked arching of the body, the posterior and anterior parts being directed downwards. Whilst hovering during copulation, the body of the male was at a slight angle to that of the female and only the posterior parts of each were in contact.

A short period of slower and less frenzied flying followed the third copulation, after which the presumed male again approached the presumed female who had now stopped hovering. The "male" was attacked by the "female" and both bats settled on opposite sides of the room. They shifted their positions frequently, flying short loops and settling a short distance away from the previous point. Vocalisation decreased until both were completely silent.

After twenty minutes of resting, three other bats entered the room, one of which immediately approached the roosting female and butted her from the front whilst she was still suspended. Immediately all the other bats engaged in frenzied flying and the butting individual was lost in the mêlée. No further attempts to approach the female were observed and the three latecomers left shortly afterwards, soon followed by the "male" that had mated. The female remained suspended for a further 90 min. and then left the building.

The same colony was observed on consecutive evenings but no further attempt at mating was observed. The colony vacated the roof of the building six days later and did not return.

#### 4. DISCUSSION

The general sequence of events resulting in copulation in *N. thebaica* is typically mammalian, where the active pursuit of the female by the male bat can be equated to the courtship phase, with the butting phase inducing the female bat to hover and allowing the male to copulate. The significance of the male allowing the female to escape as a stimulus for her to start

hovering is unknown, but this response appeared to be the result of the male's behaviour. Once the female has started to hover intermittently, it appears that the initiative has been transferred to the female and can be compared to the female-initiated invitation to mating known in other mammals. Females of *Hypsignathus monstrosus* also hover in front of selected males before copulation (Bradbury, 1977).

The brief frontal approach and head-neck biting by the male could be a relict of some incomplete behavioural sequence, as the female had already presented herself by hovering prior to the frontal approach by the male bat. In other species (Hill & Smith, 1984) the male has to restrain the female by head-neck biting and clasping before copulation.

It appears that the above observation is the first recorded instance of in-flight mating by a microchiropteran bat, and may well be a special attribute of *N. thebaica*, in terms of this species' ability to catch ground-living prey (Felten, 1956), where hovering could conceivably be useful.

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#### 6 REFERENCES

- BERNARD, R.T.F.  
1982: Female reproductive cycle of *Nycteris thebaica* (Microchiroptera) from Natal, South Africa. *Z. Säugetierk* 47:12-18.
- BRADBURY, J.W.  
1977: Lek mating behaviour in the Hammer-headed bat. *Z. Tierpsych* 45:225-255
- CARTER, D.C.  
1970: Chiropteran reproduction. In: *About bats*, eds. Slaughter, B.H. & Walton, D.W. Southern Methodist University Press, Dallas.
- FELTEN, H.  
1956: Fledermause fressen Skorpione. *Natur Volk* 86:53-57.
- FENTON, M.B.  
1983: *Just bats*. University of Toronto Press, Toronto.
- HILL, J.E. AND SMITH, J.D.  
1984: *Bats, a natural history*. University of Texas Press, Austin.
- NELSON, J.E.  
1965: Movements of Australian flying foxes (Pteropodidae; Megachiroptera). *Austral. J. Zool.* 13:53-73.
- RAUTENBACH, I.L.  
1982: Mammals of the Transvaal. *Ecoplan Mongr.* 1:1-211.
- WINGATE, L.R.  
1983: Population dynamics of five species of cave-dwelling microchiroptera in natal. Unpublished M.Sc. thesis, University of Natal, Durban.