

Methods of communication exhibited by captive slender mongooses *Herpestes sanguineus*

C.M. Baker

Department of Biological Sciences, University of Natal, Durban 4001, Republic of South Africa

Received 22 October 1981; accepted 18 January 1982

Slender mongooses are solitary, diurnal viverrids. No detailed studies on communication in this species have been reported. Smithers (1971) and Taylor (1975) record the production of a distress call, and Taylor (1975) describes a hissing sound produced by alarmed mongooses. In the present study (348 h of observation) vocal and non-vocal displays of captive mongooses were examined.

Six pairs of mongooses were maintained in outdoor enclosures for up to 20 months (for details concerning housing, see Baker 1981). Vocalizations were recorded on a Uher 4200 L tape recorder at speeds of 9,5 or 4,7 cm/s using a Uher M517 microphone. The sounds were analysed using a Kay sonograph 7030A following Kiley (1972). A male and a female mongoose were asphyxiated and all large skin glands were located and dissected out. The method, frequency and site of glandular marking, micturition and defaecation were recorded.

Vocalizations

Five different vocalizations were identified.

1) *Spit*. This sound is loud and sharp. The duration varies from 0,2 to 0,4 s. Repetition within a 2-s interval is infrequent. The sound is produced with the mouth open. Sound energy is distributed over a wide range (Figure 1). The fundamental frequency varies from 2 kHz to 3 kHz and usually drops 1 kHz from start to finish. The amplitude of the sound is greater at the beginning of the vocalization, which corresponds to the initial burst of energy that is characteristic of spitting.

2) *Growl*. Sound energy is distributed over a wide range (up to 6 kHz). The growl is often repeated three times within a 2-s interval. The fundamental frequency occurs at 0,5 kHz, with overtones at 1,3 kHz, 2,7 kHz, 5,5 kHz and 6,0 kHz. The amplitude is usually greatest in the middle of the growl. When the sound is produced, the mouth is opened very slightly. Call duration varies from 1,05 s (Figure 2) to 6,30 s (Figure 3) with a mean of 2,55 s.

3) *Snarl*. No recording was made. This vocalization lasts for approximately 0,8 s (measured with a stopwatch) and is produced with the mouth slightly open and the upper lip retracted. Repetition within a 2-s interval is infrequent.

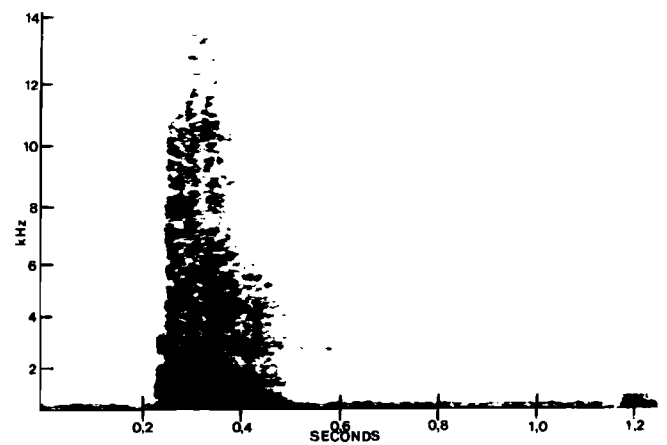


Figure 1 Sonograph (narrow band filter) of a spit.

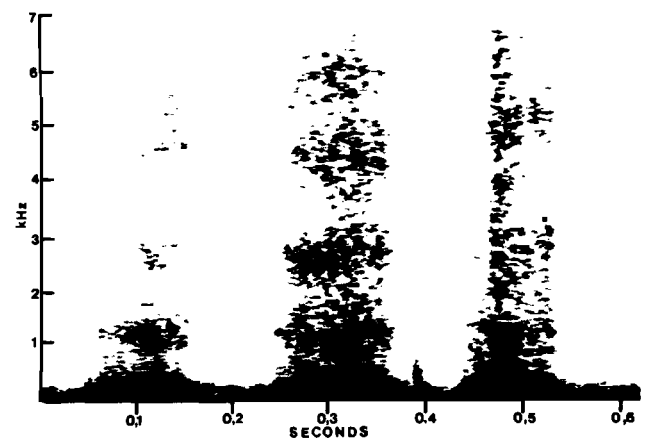


Figure 2 Sonograph (narrow band filter) of a growl.

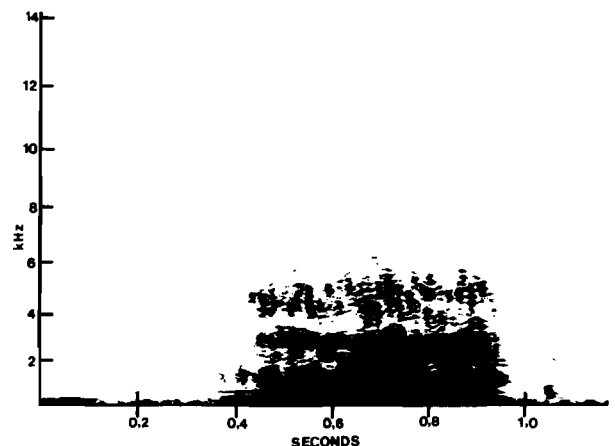


Figure 3 Sonograph (narrow band filter) of a growl.

4) *Buzz*. No recording was made of this soft call. It is not repeated within a 2-s interval.

These four vocalizations are used in agonistic encounters. Growling and spitting were produced when threatening a conspecific or warding off potential attackers. Snarling was used only when two animals approached each other in attack. Growling, spitting and snarling were produced equally by both male and female mongooses. A female mongoose buzzed when she intercepted her mate

during peak activity periods (06h45 to 09h00 and 15h00 to 17h15).

5) '*Huh-nwe*' call. One distress call (onomatopoeically termed the '*huh-nwe*' call) was heard. It is a soft vocalization produced with the mouth closed. It lasts for 0,05 s and may be repeated once or twice within a 2-s interval. The fundamental frequency is 1 kHz at the beginning of the call and drops to 0,9 kHz. Harmonics occur at 1,7 kHz and 2,7 kHz (Figure 4).

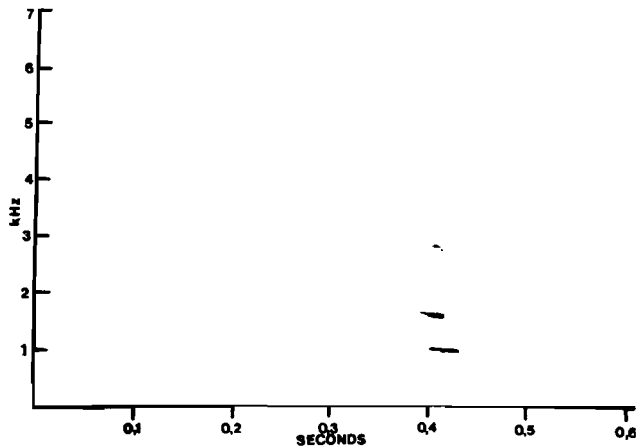


Figure 4 Sonograph (narrow band filter) of the '*huh-nwe*' call.

The '*huh-nwe*' call was heard only in the late afternoon and was produced when one mongoose (either male or female) was out in the enclosure (the partner remained in the nestbox). The animal appeared agitated and moved constantly from one place to another.

A second distress call was reported by J. Venter (pers. comm.). It was produced when one of a pair of mongooses was run over by a motorcycle. The animal was severely injured and the partner was heard to produce a clicking or rattling vocalization.

Marking

Dissections of a male and a female mongoose showed that enlarged glands are restricted to the anal pouch and the sub-otic regions. Externally the anal gland opens into

a small pouch, situated ventrally at the base of the tail. The lining of the pouch is naked. Around the rim, a dense mass of short hair occurs which occludes the pouch when the rim sphincter muscle is contracted. The anus opens into the centre of this pouch and the glandular anal sacs open via small apertures on either side of the anus (Figure 5). Situated immediately behind the anus is a hemispherical groove, which may lead into a third anal sac, but probably serves as a storage area for anal secretions.

Anal marking or '*dragging*' occurred throughout the year (Table 1). When performing the anal drag the anal pouch was opened and everted so that its entire surface was pressed down onto the object being marked. The distance over which the drag occurred was approximately 20 mm to 150 mm. Drags lasted for 1 to 5 s. Anal drags were performed on a variety of large objects in the enclosures, such as rocks, food bowls and pieces of large bark. Mate-marking was observed once when a male dragged his whole body over that of the female, while depressing the anal region.

The sub-otic glands are enlarged sebaceous glands, situated below and anterior to the pinnae. They are not marked externally but a slight musky odour reveals their presence. Cheek-rubbing (Table 1), which probably stimulated the release of the secretion, occurred on the sides of the nestbox.

Table 1 Occurrence of communication patterns in 107 observation periods

Communication pattern	Occurrence	
	No. of observation periods in which pattern was observed	% of observation periods
Agonistic vocalization	9	8,4
Neck- and shoulder-orientated threat-gape	12	11,2
Mutual open-mouth display	5	4,6
Submissive grin	4	3,7
Urination	79	73,8
Defaecation	43	40,1
Anal drag	38	35,5
Cheek rubbing	12	11,2
Grooming solicitation	18	16,8

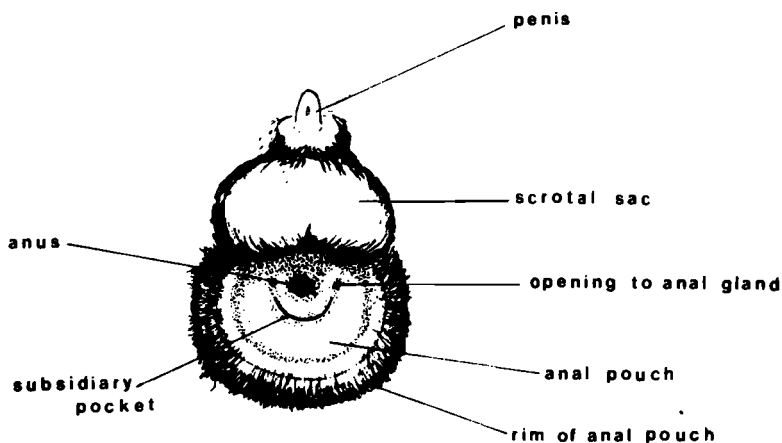


Figure 5 External appearance of the anal pouch showing gland openings.

One or two areas in each cage were selected for defaecation and were re-used even after the cages had been thoroughly cleaned out. In the majority of cases most of the faeces were deposited on a focal point, such as a stone. No attempt was made to hide the faeces. Urination also occurred in one or two selected areas, as well as on the pathways that the mongooses used during peak activity periods. Defaecation occurred approximately twice a day and micturition frequency varied from one to eight times per hour, and averaging three while the mongooses were active. Only a few drops of urine were released at a time (Table 1).

The glandular secretions and elimination products of each mongoose were always sniffed by the cage mate and often elicited reciprocal marking. Tests using urine from a female water mongoose (*Atilax paludinosus*) and a human elicited slight responses from the slender mongooses. Little attention was paid to the human urine, but whenever water mongoose urine was present, the slender mongooses sniffed the urine-soaked pads and immediately withdrew into the nestboxes. Only after those pads had dried, did the mongooses urinate or defaecate on them. If the pads were left in the enclosures for a week or more they became regular elimination sites.

Visual signals

The slender mongoose has a long tail with a conspicuous black tip. When moving around rapidly the tail was always held low, almost parallel to the ground, with only the black tip turned up. When moving slowly or when in an alert standing posture, the tail was held in a similar position. When a mongoose changed an alert or a relaxed posture into an escape reaction, there was an initial upward and then downward flick of the tail.

Slender mongooses have pink noses and lips. When their mouths are opened during a yawn these features are particularly noticeable. In aggressive interactions the mouths of both mongooses were often held open (Baker 1981) thus displaying the pink interior, and accentuating either a threat or submissive posture.

Threat and submissive postures are ritualized (Baker 1981) and were used in agonistic encounters as a means of communication (Table 1). For example, during neck- and shoulder-orientated threat gapes and mutual open-mouth threat displays (Baker 1981), the mongooses never touched one another and always used the same set of movements. Similarly, during submission both neck exposure and submissive 'grinning' were frequently used.

Grooming was solicited from a conspecific by nuzzling it in the chest region. This signal invariably initiated allogrooming of the head and neck areas.

The use of elimination products as communication markers has been recorded amongst carnivores (Ewer 1968; Brinck, Gerell & Odham 1978). Rasa (1973) has shown that sociable dwarf mongooses (*Helogale undulata rufula*) are able to obtain information concerning the identity of the marking mongoose, and also time of marking, from both glandular secretions and elimination products. Thus uncovered faeces and glandular deposits produced by slender mongooses may provide other conspecifics with information regarding the marker. The response to water mongoose urine and not to human urine suggests that the slender mongooses also receive

messages from some extraspecific elimination products. The frequency of urine marking on pathways habitually used by captive slender mongooses indicates that this may be a territorial activity.

N. Jacobsen (pers. comm.) reports that his tame slender mongooses squirted a pungent-smelling fluid from their anal glands in stressful situations. This was not observed during the present study.

Pelage markings are often used in communication (Fox 1969; Ewer 1973). The black-tipped tail of the slender mongoose is very noticeable and accentuates tail movements. It seems likely that it is an alarm signal.

Because slender mongooses are solitary, many social encounters are aggressive and therefore it is not surprising to find that many vocalizations are agonistic. Buzzing may be interpreted as a warning produced during threat situations.

Smithers (1971) and Taylor (1975) report that the 'huh-nwe' call is produced by young slender mongooses. They assumed that the sound was either an attention or a distress call, directed towards adults. It was produced by adults in this study and may have a similar function, perhaps indicating a negative response to captivity.

Many of the ritualized postures such as the mutual threat-gape and the neck- and shoulder-orientated threat-gape are concerned with maintaining an individual distance. The contrasting pink interior of the mouth acts as a signal, and serves to accentuate those postures where the mouth is held open i.e. mutual open-mouth threat, neck- and shoulder-orientated threat and submissive 'grinning' (Baker 1981).

It may be significant that aggression is communicated by vocalizations, ritualized postures and colouration. The fact that there is more than one communication method expressing the same message for a particular agonistic behaviour pattern, may indicate the importance of this behaviour amongst the mongooses.

Communication patterns are usually well-developed in sociable animals where a need exists for constant communication for the maintenance of the social structure. Even though the slender mongoose is a solitary animal, communication is an essential part of the behavioural repertoire which enables two animals to remain compatibly together for periods long enough to produce and rear their offspring. During this time communication must be almost as extensive as that in sociable viverrids. Amongst the wide variety of communication patterns in slender mongooses the emphasis on aggressive messages is great, and it is perhaps this factor which helps to maintain the solitariness of the species.

Acknowledgements

Thanks are due to Professor J. Meester for supervising this project, and for commenting on the manuscript. Financial assistance from the C.S.I.R. and the University of Natal Research Fund is gratefully acknowledged.

References

- BAKER, C.M. 1981. Agonistic behaviour patterns of the slender mongoose, *Herpestes sanguineus*. *S. Afr. J. Zool.* 16: 263–265.
BRINCK, C., GERELL, R. & ODHAM, G. 1978. Anal pouch secretion in mink *Mustela vison*: Chemical communication in Mustelidae. *Oikos* 30: 68–75.

- EWER, R.F. 1968. Ethology of mammals. Paul Elek, London.
- EWER, R.F. 1973. The carnivores. Weidenfeld & Nicolson, London.
- FOX, M.W. 1969. The anatomy of aggression and its ritualization in Canidae: a developmental and comparative study. *Behaviour* 35: 242 – 258.
- KILEY, M. 1972. The vocalizations of ungulates, their causation and function. *Z. Tierpsychol.* 31: 171 – 222.
- RASA, O.A.E. 1973. Marking behaviour and its social significance in the African dwarf mongoose, *Helogale undulata rufula*. *Z. Tierpsychol.* 32: 293 – 318.
- SMITHERS, R.H.N. 1971. Mammals of Botswana. *Nat. Mus. Rhodesia, Museum Memoir* 4: 1 – 340.
- TAYLOR, M.E. 1975. *Herpestes sanguineus*. *Am. Soc. Mammal.* Nov. 1975.