

# Urine-Marking During Agonistic Encounters in the Bush Dog (*Speothos venaticus*)

Maxeen Biben

*Conservation and Research Center, National Zoological Park, Front Royal, Virginia*

During staged encounters, bush dogs of the same sex showed a high level of aggressive-defensive behaviors and a higher than normal frequency of urine-marking. Where dominance was established during encounters, dominant individuals marked more than subordinates. Where dominance was not clearly established, both participants remained aggressive and showed higher than normal levels of marking. Urine-marking appears to communicate aggressiveness and may be used to compensate for the otherwise relatively inconspicuous aggressive and dominance displays of this species.

**Key words:** bush dog, *Speothos*, scent-marking, agonistic behavior, aggression

## INTRODUCTION

The bush dog is a rare and threatened canid native to forested areas of northern South America. In captivity, bush dogs have been successfully maintained as heterosexual pairs or as family groups, which capture prey cooperatively and share all foods [Biben, 1982]. Same-sex pairs are more difficult to house together, as fighting often occurs. Aggression and dominance are displayed by a pilo-erected, tail-up, back-arched, stiff-legged posture which is not as visually conspicuous as the aggressive displays of most other canids because their stocky, uniformly dark bodies lack the contrasting white patches and large ears and tails featured in the displays of other canids [Fox, 1970]. The submissive or defensive behavior of subordinate bush dogs is made more noticeable by being very active and noisy, and includes rolling over, tail-wagging, flattened ears, whining, screaming, and "grinning" (gaping with lips retracted from teeth) [Kleiman, 1972]. An alternative to visual and vocal displays, scent-marking is used by many mammals to signal dominance, aggression, territoriality, or excitement [Ewer, 1968; Ralls, 1971]. This paper reports the prominent use of scent-marking by urination during agonistic encounters between bush dogs.

Received for publication July 7, 1982; accepted September 14, 1982.

Address reprint requests to Dr. Maxeen Biben, LDN, NICHD, Bldg. 36, Rm 2A21, National Institutes of Health, Bethesda, MD 20205.

## METHODS

The eight subjects were: four 9-month-old bush dogs from the same litter (three males: ♂1 (also used at 3½ years), ♂2, ♂3; one female: ♀1), their 2-year-old female full sibling (♀2), two 2-year-old females from another litter (♀3 and ♀4), and an unrelated male, several years old (♂a). Animal facilities included 2m × 4m × 2m indoor cages and 9m × 5m outdoor yards with natural vegetation. All participants in encounters (except ♀1 and ♀2) were housed adjacent to one another for at least one week prior to the encounters, and all showed some aggressive displaying at their common fences prior to encounters. ♂1 and ♂2 were housed together, adjacent to ♂3 and ♀1. ♀1 and ♀2 were housed in nonadjacent yards. Some of these animals had previously been housed together amicably, with no clear dominance relationships or serious aggression, but became aggressive after being separated for awhile: ♂1, ♂2, ♂3, and ♀1 were with their parents until 7 months of age, and ♀3 and ♀4 were together from birth to 2 years (first with littermates and parents, later with ♂a).

Encounters were staged by opening doors between cages or yards so that animals had equal and simultaneous access to both. The following urination behaviors were recorded: raised leg urination (RLU) by males and females, and squat and handstand (standing on forelegs with hindlegs supported against the target object) urinations by females only. Males also performed raised leg displays, or “dry” urinations, when marking at a high rate. Both sexes begin using RLU’s as early as 10 weeks of age, after which males, regardless of social status, no longer use the squat posture. Females’ use of the handstand posture usually does not begin until about the time of sexual maturity, and it was seen in all females reported here. Bush dogs do



Fig. 1. *Speothos venaticus*, collection of the National Zoo (M. Biben).

not mark by defecation. To determine normal (non-encounter) levels of urination behaviors, occurrences were recorded during observations made while animals were housed in their home areas. No baseline data were acquired for several days immediately before or after an encounter.

During the encounters, fighting often broke out (Table 1) and animals were separated if wounding occurred. In most cases, however, combat was brief, with losers retreating quickly. Winners explored losers' home areas, using the aggressive or dominant postures, while losers avoided them or took refuge in a nestbox. In encounters 1 and 2, all males fought, with ♂3 the winner. Further fighting occurred in encounter 3, with ♂1 emerging as the winner. ♂1 maintained his dominant position during encounters 4–6. ♀1 did not participate in her brothers' aggressive interactions, although she was present. ♂1 was also used 2.5 years later in encounters 14–17 with ♂a. Serious fighting occurred in encounters 14, 16, and 17. In encounter 15, ♂a quickly took refuge in his nestbox and did not emerge. ♂1 showed dominance behaviors.

In female-female encounter 7, ♀2 entered ♀1's yard, resulting in intermittent aggression, including biting. In encounters 8 and 9, ♀2 made only brief entries into ♀1's yard, retreating or gaping defensively when approached by the resident ♀1. No dominance relationship was established between the females. In encounters 10–13, between ♀3 and ♀4, aggression was more serious but again no dominance relationship was established. Females used all three types of urination postures, although handstands appeared to be preferred when marking at very high rates. The

**TABLE 1. Urination behaviors occurring during agonistic encounters between bush dogs.\***

	♂a	♂1	♂2	♂3	♀1	♀2	♀3	♀4
Nonencounter rate per 30 min, for 250 min observation per individual	0.1	2.0 <sup>a</sup> 1.2 <sup>b</sup>	1.4	3.9	0.0	No data	0.3	0.5
Encounters—scores for 30-min encounters								
Animals involved	Encounter no.							
(♂1, ♂2, ♂3, ♀1)								
(♀1, ♀2)								
(♀3, ♀4)								
(♂a, ♂1)								

<sup>a</sup>At age 9 months (encounters with ♂2, ♂3, ♀1).

<sup>b</sup>At age 3.5 years (encounters with ♂a).

<sup>c</sup>Encounters terminated within first several minutes because of serious fight.

\*Scores for dominant individuals are given in boldface.

elevation of marking rates that occurred during female-female encounters has also been noted in female bush dogs encountering strange males [Kleiman, 1972].

## RESULTS AND DISCUSSION

1. Urination behaviors increased in frequency over nonencounter levels for at least one participant in all encounters where data could be obtained (those not terminated early by fighting). Twelve instances of such increases occurred in 12 encounters ( $p < 0.001$ , sign test).
2. Where dominance was established, the dominant individual (as identified by display postures and avoidance by animals showing submissive behavior) had a higher rate of scent-marking than the subordinate(s).
3. Where dominance was not clearly established, both individuals showed aggression and higher rates of marking than normal.

In the social situations reported here, scent-marking by urination appears to communicate aggressiveness and a willingness to fight. The RLU and handstand are obvious visual as well as olfactory displays; their prominent use in agonistic situations may compensate for the fact that the stocky, uniformly dark bodies of bush dogs do not present a conspicuous visual display.

## ACKNOWLEDGMENTS

I thank Devra Kleiman for providing advice and facilities, and Melissa Ditton for assistance in data collection.

## REFERENCES

- Biben, M. Ontogeny of social behavior related to feeding in the crab-eating fox (*Cerdocyon thous*) and the bush dog (*Speothos venaticus*). *JOURNAL OF ZOOLOGY, LONDON* 196:207-216, 1982.
- Ewer, R.F. *ETHOLOGY OF MAMMALS*. New York, Plenum Press, 1968.
- Fox, M.W. A comparative study of the development of facial expression in canids: wolf, coyote, and foxes. *BEHAVIOUR* 35:49-73, 1970.
- Kleiman, D.G. Social behavior of the maned wolf and bush dog: A study in contrast. *JOURNAL OF MAMMALOGY* 53:791-806, 1972.
- Ralls, K. Mammalian scent-marking. *SCIENCE* 171:443-449, 1971.