

Scent Marking in the Red Brocket, *Mazama americana*

(Figure 1)

MALE ROE DEER have long been known to possess a specialized scent gland, containing both sudoriferous and sebaceous glands, on the forehead (Schumacher, 1936). They frequently mark with this gland during the rutting season by rubbing it against vegetation (Kurt, 1968). Recently, forehead-rubbing as a means of scent deposition was described for the first time in a New World cervid, the blacktailed deer, *Odocoileus hemionus columbianus* (Müller-Schwarze, 1971). This species does not possess a forehead scent-gland visible to the naked eye, but histological investigation revealed that the sudoriferous glands on the forehead are well developed (Quay and Müller-Schwarze, 1970).

We have observed forehead-rubbing in a second New World cervid, the red brocket, *Mazama americana*. One of us (N.V.) studied a captive group of four male and three female brockets at the New York Zoological Park (Bronx Zoo) for 15 hours. The deer were easily recognized individually on the basis of physical characteristics. They were observed in a 30 by 6 meter enclosure with a dirt substrate, small patches of grass scattered about, and a large tree in one corner.

Three of the four males displayed forehead-rubbing. The male which did not display had antlers in velvet during the period of observation (January to April, 1972). The males marked four objects: a root of the tree, a small branch lying on the ground, a branch of a tree sticking through the fence of the enclosure, and one spot on the fence itself. The male typically approached the object to be marked, sniffed it thoroughly, licked it several times, and then rubbed his forehead on it (Figure 1). This behavioral sequence was sometimes repeated two or three times. The deer then walked away and sometimes urinated nearby. Sometimes a male sniffed or stood close to one of the branches but did not rub on it. We never saw a female brocket forehead-rub, although female blacktailed deer do (Müller-Schwarze, 1971; 1972). Two females did sniff objects which males had forehead-rubbed.

In a group of four captive male blacktailed deer, the frequency of forehead-rubbing by individuals was positively correlated with the frequency with which they won agonistic encounters, and the behavior may be a means of agonistic interaction in addition to threatening, chasing, and fighting (Müller-Schwarze, 1972). We did not observe enough agonistic behavior in the brockets to judge whether or not dominant males did more forehead-rubbing. A correlation between a high frequency of scent marking and high social

rank and between marking and aggressive behavior patterns has been found in many other mammals (Ralls, 1971).

Forehead-rubbing may well be found to occur in many species of *Odocoileus* in addition to the roe deer, the blacktailed deer, and the red brocket. The forehead skin of the brocket has not been studied histologically, but probably contains sudoriferous glands similar to those of the blacktailed deer. Areas of well-developed sudoriferous or sebaceous glands are probably more common in mammals than generally recognized and may well be equally as important in their chemical communication systems as the better known macroscopically visible scent glands.

Both male and female brockets urinated frequently in small quantities in specific areas of the enclosure. They sniffed a urination area, lip-curved, and then urinated. Two hours after the deer had been let outside into the enclosure, the urination sites were easily visible as dark spots on the ground. The smell of brocket urine is pungent and quite noticeable to a human. On one occasion the deer urinated 56 times in a two-and-one-half-hour period. It is probable that chemical signals in the urine are important in the social life of brockets.

Red brockets have small or rudimentary tarsal glands (Frechkop, 1955) and were not seen to urinate on them while rubbing them together as do blacktailed deer (Müller-Schwarze, 1971).

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FIGURE 1. Male red brocket forehead-rubbing on a small branch lying on the ground.



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