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2. SOME NOTES ON THE BREEDING SEASON OF RUFOUSTAILED HARE (*LEPUS NIGRICOLLIS RUFICAUDATUS*)

It appears that the breeding season of rufous-tailed hare has not been recorded precisely. Sabnis (1981) reports that the young may be found throughout the year, while Humayun Abdulali (pers. communication, quoted by Sabnis) has records of seeing pregnant females during December to March. Prater (1965) has not recorded any particular breeding season for rufoustailed hare.

In Keoladeo National Park, Bharatpur it appears the breeding season is mainly January to February, closer to the observation of Humayun Abdulali. Altogether four litters were

seen, one each on 16 and 21 January, and 9 and 12 February 1987. No young was seen during the rest of the year.

Litter size of rufoustailed hare has been recorded as one to two (Prater 1965). One out of the four litters recorded at Bharatpur had three young, but the very next day of my observation (10 February) I found one young was missing, possibly preyed on as fur was seen scattered on the ground.

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3. DERMAL SHIELDS OF HIMALAYAN TAHR (*HEMITRAGUS JEMLAHICUS*)

(With a text-figure)

INTRODUCTION

Recent field work on ungulate behavior and social organization has shown that competing males may injure their opponents in fights which establish dominance and determine access to females for breeding (e.g. Geist 1964, Clutton-Brock *et al.* 1982, Berger 1986). Many of these studies have also shown that such injuries may have long term effects on the competitive ability of males. Males should be expected, therefore, to possess effective defensive mechanisms as well as offensive ones. Defensive behavior is readily evident in the fighting behavior of many species. For instance, the head-low posture of South African oryx (*Oryx gazella*, Walther 1980), the scarcity of physical contact in mountain goats (*Oreamnos americanus*, Geist 1964), and the spinning around of Nilgiri tahr (*Hemitragus hylocrius*, Rice 1984), are all methods of minimizing the damage that can be inflicted by the opponent. Horns also have a defensive function, as is shown most clearly by South African oryx (Walther 1980). Dermal shields are another defensive mechanism which protect the body against injury from the horns or antlers of an opponent. Geist (1971) has shown how the thickness of the skin in several caprids is greatest in areas most likely to receive horn blows. The area of thickening is dependent on the method of fighting em-

ployed by a particular species (Geist 1971: 149). In addition, Jarman (1972) and Sokolov and Danilkin (1979) have shown how dermal shields are absent in hornless and antlerless females and poorly developed in young males of impala (*Aepyceros malampus*) and roe deer (*Capreolus capreolus*) respectively. This paper describes the dermal shields of Himalayan tahr (*Hemitragus jemlahicus*) and suggests how they are related to the methods of fighting employed by this species.

MATERIAL AND METHODS

On 23 November 1986 a 5 year old male in the collection of Himalayan tahr at the New York Zoological Park lost a dominance fight with a previously subordinate male. The fight was not observed but the keeper in charge of the tahr had reported other fights during the few days previous. The male's condition deteriorated subsequently and he died after 13 days. Prior to necropsy, sections of skin were excised at several places and their thickness measured against a millimeter scale.

RESULTS

Examination of the body of the tahr showed numerous long scrapes on the side of the thorax, flank, and ventrum. Some of these had bled, but not severely. These minor external



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