

THE HORN BASES OF THE REEDBUCK *REDUNCA ARUNDINUM*

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Abstract — The structure and function of the horn bases of the reedbuck *Redunca arundinum* are discussed. It is shown that the white colouration which often occurs is not caused by glandular secretion but by small horn particles which are shed, exposing the lighter coloured material underneath. The shining horn base probably plays a role in the display behaviour of males.

Introduction

The objective of this study is to elucidate the structure and the function of the conspicuous white horn bases of the common reedbuck *Redunca arundinum*. It is of interest to examine this phenomenon, not only because it is a typical characteristic of the species, but also because Millais (1895) recorded that the horn bases produce an oily secretion during the mating season, a statement which to the best of our knowledge has never been refuted.

This paper is part of a comprehensive field study on the behaviour and the biology of the reedbuck in which the senior author was engaged in the Kruger National Park, Republic of South Africa, from March 1967 to April 1968 (Jungius 1970, 1971a, 1971b).

Material and Methods

The reedbuck is a medium sized antelope with a shoulder height of 80cm – 105cm in rams and 65cm – 95cm in ewes (Haltenorth 1963). The general colour is brown with a marked tendency to buff or yellow. In the Kruger National Park the species frequents reedbeds along rivers, vleis, the tall grassveld and tree savannah. They live very concealed, alone or in families, and are easily overlooked by the careless observer (Jungius 1971a).

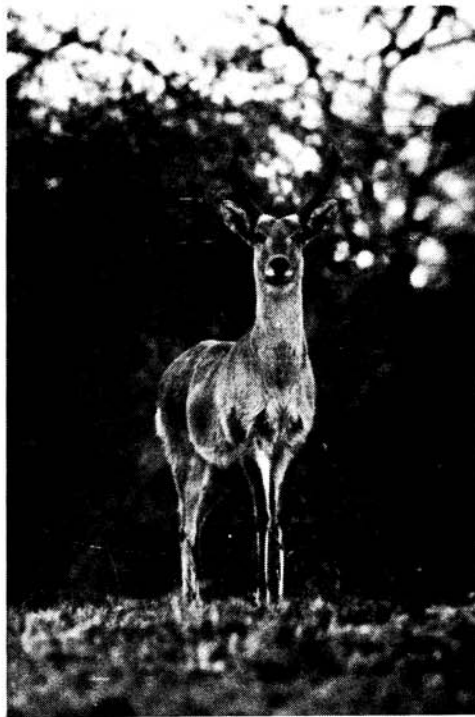


Fig. 1. Adult ram. Note white facial markings.

Horns are carried by rams only (Fig. 1). Horned females which have been recorded in other antelope species occasionally, such as impala (Benzon 1935), waterbuck (Jenkins 1929), saiga (Bannikow 1963) and Uganda kob (Buechner and Schloeth 1965), have not been observed in the reedback. The tips of the horns curve sharply forward. The distance between the tips varies greatly. The maximal hornlength has been recorded by Best, Edmund-Blanc, Witting and Raw (1962) as 45,7 centimeters. The length ranges from 25,0cm – 45,7cm (Haltenorth 1963). The horns are ridged and corrugated in the basal two-thirds; the tips are smooth. It is of interest that the growing pad at the base of the horn consists of a soft, frequently conspicuous greyish-white swelling which persists in adult rams throughout their life. The swelling appears already in yearlings shortly before reaching their first year but it remains concealed. In the second year it becomes obvious and reaches in three of four years the typical half-moon shape form, with a maximum width 2,8cm – 3,3cm varying from 2,8cm – 3,3cm in the middle.

The histological examinations were carried out on material obtained from animals from the Kruger National Park. The samples were taken from three animals immediately after they had been killed by predators or died after being shot. The treatment of the samples (fixed in 4 per cent formaldehyde) followed the usual method with methylbenzoate,

methylbenzoate-celloidin and benzol in paraffin. The 10μ paraffin sections were cut transversely and longitudinally.

Various stains such as Haematoxilin-Eosin (H.E.), "one step trichome" Masson's trichome stain, and Goldner's modification of Masson's trichome stain, were used. In sizes given for the tissues and cells, shrinkage resulting from microtechnical preparation has not been taken into account.

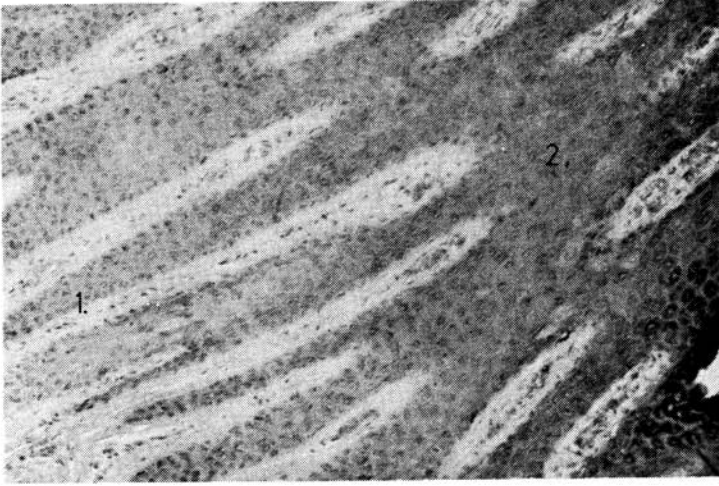


Fig. 2. Horn base: Stratum germinativum. (x120)
1 = stratum basale
2 = stratum spinosum
3 = stratum granulosum
4 = horn layer

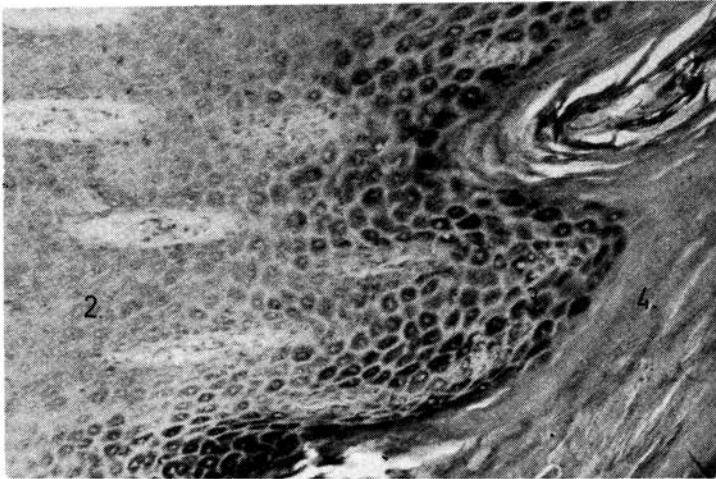


Fig. 3. Horn base: Stratum granulosum and horn layer. (x120)

Results and Discussion

Histological examinations of samples taken of the horn bases show the normal structure of horn (Fig. 2 and Fig. 3). A glandular character of the horn bases could not be confirmed and must be discarded. There are no signs of secretion. The following interpretation can be given for this phenomenon and its function: the external appearance of the pads at the horn bases resemble in colour and structure the horns of young rams which appear at an age of 6-8 months (Jungius 1971a). Initially the horns grow straight during the first few months and later the tips curve forward (Fig. 4). At this stage horns appear to grow out of a whitish



Fig. 4. Subadult ram (\pm 18 months). Lower part of horn surrounded by new horn. Note dark auricular patch.

cylinder which surrounds the bottom two-thirds. This lower part of the horns are similar in colour to the swellings at the horn bases of adult males, whereas the upper third is black. A similar phenomenon is known from other juvenile ungulates and is explained by Mohr (1965) as follows: the lower white parts of the horn represent new horn material through which the black material, the so-called permanent horn, is growing. The pressure from the horn material growing from beneath, and the growing process of the horn core, causes the outer horn material to peel off in small pieces. Consequently the lighter horn material surrounding the permanent horn material is exposed. A

similar process seems to take place in the growing pad at the horn bases in sub-adult and adult males.

The light colour of the horn bases can also be caused by rubbing (Fig. 5) This can result from play fights (rubbing the foreheads, twisting and

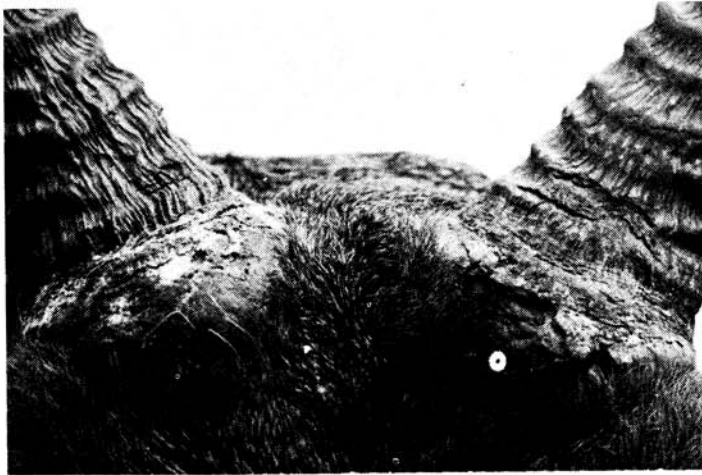


Fig. 5. Horn base of adult ram. White colour due to rubbing.

horn play with interlocked horns), fights (pushing and clashing), soil horning, or when playing with objects (rubbing the forehead up and down against branches, twisting the head to and fro with the branches between the horns). These activities result in flakes peeling off, exposing the lighter horn material below (Fig. 6) The process can be imitated by gently rubbing dark horn bases of captured or killed rams with wood or the back of a knife.



Fig. 6. Horn base of adult ram. Note flaked-off horn particles.

This white material may play a particular role in the display patterns of males. It is well known that the colouration of most animals can be divided into camouflaging functions and social warning functions. The basic colour pattern of the reedbuck, (dark dorsally, light sides and white belly) is found in many mammals and is referred to as "counter-shading" (Cott 1957; Portmann 1956). Illumination and shade intensify camouflage (Hesse-Doflein 1943; Jungius 1971a). Subsidiary to a particular behaviour pattern such as "freezing" (motionless watching in case of danger), this may be a vital element for survival.

Other parts of the reedbuck are conspicuous such as the gular patch and the ventral surface of the tail which are of importance in the social behaviour of this species (Jungius 1971a). When displayed they give special prominence to the animal and emphasize movements and actions. It may be concluded that colouration in the reedbuck has a double function, as in many other vertebrates, i.e. those of "camouflage" and "display" (Portmann 1956). The shining horn bases can only be part of the latter group.

When adopting the proud posture (Jungius 1971a) the neck is erect and the head held high, with the gular patch partly exposed. In the reedbuck this patch is not as distinctly developed as for instance in the Uganda kob where rams flash their gular patches by head flagging when facing each other during display ceremonies (Buechner and Leuthold after Walther 1965). In contrast to the kob the white face markings such as the white parts of the upper lips, the white spots at the corner of the eyes and the white horn bases are strongly developed and give prominence to the male in this department. They are particularly conspicuous when the head is moved during head flagging or threat display (horn presentations, Jungius 1971a). When threatening with angled horns or low horns, the white face markings is no longer outstanding but the white horn bases are now particularly prominent and represent a distinct signal which probably underlines the threatening position of the horns.

Therefore, it is assumed that the main function of this white colouration is a social one and of particular importance during display ceremonies.

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