

A limit for horn length in White of Rasquera Goat

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Allometry refers to the scaling of size of animals and their parts. It is well known that animals are not isometric; that is, their organs generally do not scale in a linear fashion with their bodies. Researchers studying allometry in animals have usually attempted to relate the size of the organ to some functional property of that organ.

Twenty-two male and 27 female well-preserved adult skulls from White of Rasquera Goat breed were studied. Specimens were from a private collection, so no specific permits were required for this study as it involved neither slaughtering of any animal nor manipulation of endangered or protected specimens. The greatest length of the skull has been used to estimate head size. Horn length was measured with a tape along the whole length of the right sheath. The allometric line was quantified by performing a first-order polynomial with a Reduced Major Axis linear method.

Skull length ranged from 9.7 to 13.8 cm and horn length ranged from 30 to 65 cm. Sexual differences were found in mean horn length ($p < 0.001$) but not in mean skull length ($p > 0.05$), with horns being longer in males. The estimated equations were $[\log y = 3.231 - 1.417 \log x]$ and $[\log y = 3.248 - 1.538 \log x]$ for males and females respectively. The negative allometric coefficients α for both sexes indicated hypoallometry.

It seems that the hypoallometric trait in this breed does not affect fitness among animals as they were adult and sexually active animals that died from natural causes. For males, longer horns were consistent with the hypothesis that they need strong horns for their head-to-head combat. Their competition for reproductive opportunities with female animals could generate strong selection favouring long horns, although having horns with a size limit would not affect the male reproductive fitness. The exaggeration of horn lengths in males is probably reinforced by the slight selection of heifers, who direct selection towards “big horned bucks”. With regard to females, our hypothesis is that horn size would contribute to the maintenance of a hierarchy within groups.

Our study has been focused only on horn length, which can be partially understood as its “size”. Biases may have arisen because we used one-dimensional distances, and horns grow by coiling in three dimensions. The use of 3-D geometric morphometric methods would be useful to assess the horn form symmetries, which would help to assess this hypothesis in the domestic goat. For future researches in this direction, each horn “form” would be taken into account.

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