# Relationships between body weight and body measurements of reindeer

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Genus *Rangifer* populates the northernmost habitat of the *Cervidae* and shows alterations in body weight, skeletal growth rate and nutritional state with the marked seasonal changes in its environmental conditions. Body weight and measurements have long been the standard criteria for evaluation of growth in domestic animals. Body weight has been also used most by workers to describe growth and body size in reindeer and caribou. The numerical values of the weight to length ratios of skeletal bones are not so much expressions of growth rates, but rather of the growth patterns of these bones. Body measurements and ratios are useful taxonomic criteria and are used in *Rangifer* systematics. The results indicate that body ratios, such as shoulder height/foreleg length and shoulder height/back length are independent of body size and thus primarily of genetic origin (Nieminen & Helle 1980). The objective of this study was to measure the apparent age- and sex-related growth and the seasonal changes in body weight and body measurement in semidomesticated reindeer.

During different seasons in 1969 - 85 the body weight was measured in Kaamanen experimental station and in different herding cooperatives from 2932 reindeer females ranging from birth to 14 years of age and from 1037 males ranging from birth to 10 years of age. General physical development was measured after the first 4 months of life by chest circumference and back length taken from 1490 females and 510 males. The mean birth-weight of female calves was 5.0 kg. Male calves weighed 0.3 kg more. After the first 6 months of life, body weight of reindeer calves followed alternating periods of positive and negative growth. The body weight increased until the age of about 3.5 years in females and until the age of 5 - 7 years in males. In winter both young and adult females lost between 13 and 19% of their prime autumn weight. However, the percentage of prime autumn weight lost by males in winter increased from about 10% the first year to 33% at maturity. The fluctuations of body weight are largely attributed to the seasonal depostition and mobilization of fat reserves. Growth of reindeer ceased in winter because of either an inherent physiological rhythm or a decline in nutritive value of the diet, or both.

The body weight of female reindeer was highly correlated with the back length ($r=0.809$) and chest circumference ($r=0.860$). Similar relationships were also found for male reindeer ($r=0.892$ and 0.872, respectively). However, the best relationships were noted between the body weight and the joint measure (back length + chest circumference) in female ($r=0.877$) and male reindeer ($r=0.941$). Similar relationships have been shown for domestic species. There were some differences in relationships between the body weight and the joint measure in young and over 3-year-old females and males. Differences were also found in these relationships during autumn and winter.