

Selective factors in the determination of leg length in *Rangifer*

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Leg length shows considerable variation among both domestic reindeer and the wild forms of *Rangifer*, and it appears to be under the control of several selective factors. These include nutritional constraints, the energetic efficiency of foraging through snow of varying depths, the efficiency of locomotion where long migrations occur, and fleetness in relation to predator avoidance. The net energy cost of walking or running a given distance on a hard surface decreases with increasing leg length, and the advantage of increased leg length in decreasing the cost of locomotion is even more pronounced in deep snow. However, the energetic advantages of long legs for movement in deep snow and for migration are counteracted by the energy costs to the animals for growth and maintenance of the additional tissues and possible decreased efficiency in foraging at ground level in the absence of snow. The cline of decreasing leg length in *Rangifer* with increasing latitude is apparently the product of these selective mechanisms. Evidence from domestic and feral reindeer, insular populations, and feeding experiments indicate that changes in the nutritive

quality of the diet can account for short-term changes in leg length, although the changes are usually of an allometric nature. This is consistent with palaeontological material from Greenland which also suggests that relatively rapid changes in body size (i.e. «dwarfism») may result from nutritional stress associated with climatic change.