

Effects of age and reproductive status on body composition in Svalbard reindeer

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Summary: In continental populations of *Rangifer* fertility in females is normally both high and relatively constant. The largest recorded variation in annual rate of pregnancy within a single population is less than two-fold (range = 57.0–87.0 %, T. Skogland, pers. comm.). In high arctic island populations, by contrast, fertility is highly variable: annual rates of birth in Svalbard reindeer (*R. tarandus platyrynchus*), for example, vary up to eight-fold (range = 9.0–73.3 %, Tyler 1987, see also Thomas 1982). The physiological mechanisms responsible for changes in fertility in cervids are not known. However, fertility in females is influenced by both body weight and fat reserves (Dauphiné 1976, Leader-Williams and Ricketts 1982, Reimers 1983, Thomas 1982) and in red deer *Cervus elaphus* these effects have been shown to be independent (Albon et al. 1986). Body weight and fat reserves are, in turn, influenced by age (Albon et al. 1986) and reproductive status (Dauphiné 1976, Leader-Williams and Ricketts 1982). The influence of age and reproductive status on body composition was studied in female Svalbard reindeer (aged 2 to 12 years) shot in late autumn and early winter. Yield (non-lactating) females were on average heavier, fatter and tended to contain more muscle than lactating females. Mean ingesta free body weights: yield = 62.5 kg (n = 18), lactating = 53.7 kg (n = 18, $P < 0.001$). Mean total dissectible fat (TDF): yield = 14.5 kg (n = 19), lactating = 10.8 kg (n = 19, $P < 0.001$). Mean muscle index (g dry weight/femur length cm^{-3}): *M. gluteobiceps*, yield = 12.0 (n = 16), lactating = 10.8 (n = 16, $P > 0.1$ ns); *M. semitendinosus*, yield = 3.4 (n = 17), lactating = 2.9 (n = 15, $P > 0.07$ ns). There were no significant relations-

hips between age and the dry weights of indicator muscles in either lactating or yield females once differences in body (skeletal) size had been corrected for. TDF, however, was inversely related to age in both yield ($P < 0.05$) and lactating females ($P < 0.002$). Moreover, the effect of age on TDF was greater in lactating compared to yield females ($0.05 < P < 0.10$). This suggests that the net cost of reproduction, in terms of the effect of reproductive success (rearing a calf to 5 mo.) on females' reproductive potential, is likely to increase with increasing age. The study will continue with the intention of comparing age-specific body weights and fat reserves between years and examining relationships between these parameters and annual rates of pregnancy.

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