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Brief communication

Growth and body composition of arctic caribou

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Nutrition and growth have been considered inseparable prior to puberty in mammals, and first summer growth is an important determinant of: adult body size, likelihood of overwinter survival, and potential reproductive success. Knowledge of growth and its regulators is therefore critical to understanding and predicting changes in herd productivity. In addition, the relative importance of milk intake to growth rate changes with age (White, 1992), and the timing of nutritional independence may be affected by both regulatory (endogenous) and ecological components.

We characterized growth and body composition of free-ranging arctic caribou from two herds. Calves of the Central Arctic herd were collected at birth, and at 24, 44 and 130 days after peak calving, while adult females were collected 30 days prior to calving, and 24 and 130 days post-calving. Porcupine Herd calves were collected at 0, 24, and 100 days after peak calving. Animals were weighed, eviscerated and skinned, and selected organs and muscles were dissected and weighed. Left halves were frozen, and were minced 3 times in a meat grinder (calves), or sliced into sections with a bandsaw (adults; Huot & Picard, 1988). The homogenate or sawdust was collected for chemical analysis.

No differences in first-summer growth were found between herds. Body weight and skeletal size increased with age to approximately 100 days, but growth was greatly reduced or absent between 100 and 130 d. The proportion of water, protein, and ash in the ingesta-free body was relatively constant from birth to autumn, but fat varied through nearly the annual range observed in adult females. Calves were leanest (1.9% body fat) 6 weeks after calving, during the period of insect harassment and increasing nutritional independence, defined by declining milk intake (White & Luick, 1984; Parker *et al.*, 1990) and suckling rate (Parker *et al.*, 1990; Lavigueur & Barrette, 1992). They were fattest (6.1% fat) in autumn. Percent fat in autumn calves was more similar to that of George River Herd caribou (Huot, 1989) than that of captive reindeer (Ringberg *et al.*, 1982) or Coat's island caribou (Adamczewski *et al.*, 1987). Calves were approximately 8 times heavier in autumn than when born, and the increase was accounted for as water (53.0%), protein (18.5%), fat (5.7%), ash (4.8%), and alimentary fill (18.9%). Adult females were approximately 1.6 times heavier than calves in autumn, and the difference was accounted for by water (45.8%), protein (23.0%), fat (7.7%), ash (6.5%), and alimentary fill (17.1%).

Body weight was a good predictor of ingesta-free body weight ($r = 0.99$), because variation in alimentary fill at a particular body weight was relatively small. However, variance in the relation between body weight and ingesta-free body weight increased with age and body size. In juvenile caribou only, both body weight and skeletal dimensions were good predictors of body composition. The inverse relation between percent body fat and percent body water was similar to that described previously for reindeer, and for other mammal species. However, arctic caribou gained or lost 1.05 units of fat per unit water, a much smaller change in fatness than the 1.5 units reported in Svalbard reindeer (Reimers *et al.*, 1982).

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