

Index measurements of carcass composition for Coats Island caribou

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During a 2-year study of the ecology of barren-ground caribou (*Rangifer tarandus groenlandicus*) on Coats Island, Northwest Territories, Canada, 27 side dissections were conducted; bone, muscle, and fat were separated and weighed. Mature female caribou made up 17 of the 27 dissections and the remaining 10 were calves ranging in age from 1 week to 11 months. The extreme cycle of body condition in Coats Island caribou permitted the study to span the range from fat fall animals to emaciated spring animals near starvation. Weight of the gastrocnemius muscle (a small, readily identifiable muscle in the hind quarter) was an accurate predictor of total muscle weight ($\ln(\text{total muscle in kg}) = -2.791 + 1.071 \ln(\text{gastrocnemius weight in g})$; $r^2=0.98$). The regression was not affected by age or condition, and muscle composition varied little with season except in very lean animals, in which intramuscular fat decreased. Weight of the femur was an equally useful predictor of total bone weight ($\ln(\text{total bone in kg}) = -4.878 + 1.137 \ln(\text{femur weight in g})$; $r^2=0.98$). This regression was also unaffected by age or condition. Three carcass fat depots — subcutaneous, intermuscular, and pelvic — and two internal depots — omental and perirenal — were graphed against the total fat in these depots for each animal. Age and body condition again had little effect on the curves for each depot. Subcutaneous fat was the latest maturing but the earliest depleted. A multiple

regression using depth of back fat and weight of kidney fat to predict dissectable fat in the 5 depots was developed ($\text{weight of total fat in kg} = -0.178 + 1.058 (\text{d.b.f. in cm}) + 24.147 (\text{weight of kidney fat in kg})$; $r^2=0.98$). These allometric relationships based on anatomical dissection permit relatively accurate prediction of body composition using simple index measurements. Comparison with similar studies on domestic reindeer (*R. t. tarandus*) and Svalbard reindeer (*R. t. platyrhynchus*) gave comparable predictions when adjustments were made for technique. The relationships between weights of components of the three tissues and total tissue weight are relatively constant across subspecies of *Rangifer tarandus*, as would be expected from studies with domestic sheep (*Ovis aries*) and cattle (*Bos taurus*).