NCASI Fact Sheet

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What Do Caribou Eat -- And Why Is It Important?

SEPTEMBER 2019

Why is Nutrition Important?

Nutrition is vitally important to all life processes. For ungulates such as caribou, inadequate nutrition can negatively impact growth, breeding, survival and susceptibility to disease and predation. In addition, individual animals have different nutritional requirements depending on factors such as age (e.g., calf versus adult), season (e.g., summer versus winter), and physiological state (e.g., adults nursing a calf versus adults without a calf). Generally, growing sub-adults and females with calves during summer have the highest nutritional demands and will be most strongly impacted by inadequate nutrition. Habitat management efforts should be directed at providing resources for these individuals.

An adult female caribou nursing a calf during summer has 2-3 times the nutritional requirements of adults in winter. Photo: Rachel Cook

Are All Plants Created Equal?

The composition of plants in habitats where caribou forage depends on environmental factors such as soil depth and type, moisture, elevation, and amount of overstory canopy cover. In addition, within plant communities, plant species vary relative to nutrient content (energy and protein), toxic compounds (which can cause sickness or death, or decrease digestion of energy or protein), physical protections (e.g., thorns), and general plant structure that can influence how fast it can be eaten and how much can be eaten in one bite.

Herbivores, therefore, must make foraging decisions across many spatial and temporal scales in order to meet their nutritional requirements. Where on the landscape and in what habitats should they forage? What plants offer the highest nutrients and intake while at the same time the lowest toxins? With a constantly changing landscape and the need to avoid humans and predators, caribou must be highly selective with their foraging decisions.

Each pile of vegetation represents 10 bites of that plant species. The left column illustrates 3 lichen species and 1 mushroom species. The middle column illustrates 3 forb species. The right column illustrates 3 deciduous shrub species. The range from the smallest to largest in this example is 0.01 g/bite to 0.47 g/bite – a 50-fold difference! Photo: Rachel Cook

How Do We Measure Nutrition from the Perspective of a Foraging Caribou?

Many techniques exist to measure the abundance and nutrient content, by plant species, of vegetation on the landscape. But what is difficult to measure is the nutritional value of the vegetation type to the animal.

Bottle-raised animals offer the solution. Their 'tameness' allows researchers to easily transport animals to different habitats and to be in very close proximity in order to quantify what plant species are eaten, how fast they are eaten, what size bites are taken, the quality of diets eaten, and how many hours of the day animals forage, rest, and digest. With tame caribou, researchers can directly measure the nutritional value, to a foraging caribou, of each plant community.

Dr. Rachel Cook collects fine-scale foraging data from a bottle-raised female caribou. Photo: Philip Walker

Combined with an intensive, systematic sampling of plant biomass, we can calculate selection (e.g., which plants are eaten in greater proportion to their availability), instantaneous (per minute) and daily (per day) nutrient intakes, and the amount of acceptable forage within plant communities across the landscape. These data support predicting, based on plant composition, the nutritional value of a habitat and more broadly, a landscape -- information which is critically important for managing habitats on behalf of caribou.

What Are The Best Plants for Caribou in Summer?

Our work in the montane, boreal, and alpine communities of northeastern British Columbia showed that caribou are highly selective when choosing plants to eat. Just 28 plant species out of 282 encountered accounted for 78% of their diets. Generally, caribou selected for most deciduous shrubs (e.g., willow, alder, birch, rose), most ground and arboreal lichens, a variety of mushrooms, and a variety of forbs (e.g., lilies, asters, and peas). Caribou avoided evergreen shrubs, conifers, most grasses and graminoids, a ground lichen abundant in northeast BC (*Stereocaulon paschale*), and some forbs.

A bottle-raised female caribou eats Salix in northeastern British Columbia. Photo: Rachel Cook

Knowing what plants caribou eat and do not eat can guide on-the-ground management and restoration decisions. However, even plants commonly selected by caribou still vary in their benefit to a foraging caribou. For example, lichens offer high energy content but low protein content and often offer the smallest bite mass. Thus, caribou supporting calves cannot meet nutritional requirements during summer foraging only on lichens. Deciduous shrubs, on the other hand, can offer high energy and protein content as well as high bite mass, depending on the species and time of year. Therefore, managing for a diverse array of palatable lichens, shrubs, and forbs will offer a more nutritionally valuable environment than would focusing efforts on just one or two species.

For More Information

Contact info@ncasi.org

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