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Use of Trembling Aspen Bark by Moose in a Browse-Abundant Habitat During Winter

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Abstract

Moose (*Alces alces*) are reported to feed on the bark of hardwood trees in winter only when browse plants are in short supply. Our observations during a wildlife research and monitoring project at the Prince George regional airport, Prince George, British Columbia in February 2008, however, revealed that Moose ate the bark of trembling aspen (*Populus tremuloides*) trees even when other more preferred browse plants, such as red-osier dogwood (*Cornus stolonifera*), appeared plentiful. Although more extensive surveys should be conducted throughout the winter, our findings suggest that Moose may consume bark in winter as part of a "forage mixing strategy" rather than as an attempt to avoid starvation.

Key Words: barking, *Alces alces*, forage, hardwood, ungulate, winter range

Introduction

In winter, Moose (*Alces alces*) feed predominantly on the current annual shoots (twig growth of the previous summer) of woody deciduous shrubs and trees. Although twigs of trembling aspen (*Populus tremuloides*), birch (*Betula* spp.) and willow (*Salix* spp.) comprise the most abundant and important source of winter food for moose in northern British Columbia, red-osier dogwood (*Cornus stolonifera*) is one of the most heavily browsed plants in the region (Eastman 1977).

As twigs become less available through consumption as winter progresses, Moose, in some cases, start stripping and eating bark from trees such as aspen and willow. Bark, thought to be only normally stripped from trees and eaten after all other forms of browse are depleted, is reportedly only eaten in late winter and generally considered a "starvation food" (Renecker and Schwartz 1998).

As part of a larger study to monitor the use of woodland properties of the Prince George Regional Airport by ungulates, we observed substantial use of bark from aspen trees by Moose during mid-winter in a mixed-wood forest containing healthy, abundant and only minimally browsed red-osier dogwood. This consumption of bark appeared to contradict the commonly held notion that moose use bark only when twigs are scarce. Hence, we investigated the use of trembling aspen bark by Moose where winter browse of a preferred woody species was overtly abundant and grew as an understory shrub in association with and near mature aspen.

Methods

We conducted our study about four kilometres east of Prince George, British Columbia, Canada in the western woodlands (30 ha) of the property of the Prince George regional airport (53º53'10.23"N; 122º42'24.31"W; Figure 1). The site is in the subboreal spruce forest ecotype (Meidinger and Pojar 1991), has rolling topography, and is at approximately 690 m in elevation. The climate of the area is continental and characterized by seasonal extremes with cold winters and warm, moist summers. Mean annual precipitation is approximately 46 cm; snow fall

averages approximately 200 cm and mean annual temperatures range from 1.7 to 5° C (Environment Canada 2011). During winter, snow thickness is generally less than 80 cm. The landscape is dominated by coniferous forests of hybrid white spruce (*Picea engelmannii* x *glauca*) and subalpine fir (*Abies lasiocarpa*). Lodgepole pine (*Pinus contorta* var. *latifolia*) and trembling aspen pioneer secondary successional sites (Meidinger and Pojar 1991).

Our study area is fenced with 2.5-m high wildlife fencing which acts to restrict movements of large animals into the airside properties of the airport. Large predators are essentially absent, although bears and Coyotes (*Canis latrans*) occasionally manage to dig under the fence. Human disturbance in the area is limited to occasional fence inspections by airport staff.

On 23 February 2008, we looked for signs of browsing on trembling aspen bark by Moose. Whenever we discovered freshly barked trembling aspen (recent tracks of Moose were readily identified), we located the nearest red-osier dogwood plant (only in 1 case was the dogwood more than 5 m from the aspen tree) and using high resolution photography (Cannon 5D 12.8 megapixel, 4368 x 2912 resolution), photographed dogwood plants located near each barked tree (Figure 2). We located and photographed 30 sets of trembling aspen/red-osier dogwood couplets in total over the course of a day. Using techniques modified from Boyd and Svejcar (2005), we analyzed these photographs and determined the number of browsed to un-browsed shoots, and from such, estimated the percentage of shoot removal.

Figure 1. Aerial view of the Prince George regional airport, Prince George, BC. The wooded area to the left (circled) is where the trembling aspen barking by Moose was recorded and studied.

Figure 2. Typical couplet of trembling aspen and red-osier dogwood found in the study area showing browsed trembling aspen bark next to a minimally browsed red-osier dogwood plant.

Results

Our results revealed that an average of 28.7±18.6% of current annual shoots was removed from red-osier dogwood plants growing in the vicinity of barked trembling aspen trees (n = 30). Dogwoods growing away from aspens appeared to be browsed at similar intensities.

Discussion

The 29% utilization of red-osier dogwood is similar to the weight-based estimate of 33% reported by Eastman (1977) on Moose winter ranges near Prince George. Our findings suggest that barking of trembling aspen trees by Moose was not solely due to a lack of browse or that Moose were having difficulty locating food. An average of 71 percent of current annual shoots still remained on red-osier dogwood, the most preferred browse species in our study area.

Our sample size is small. However, if Moose only resort to barking when other winter foods are scarce, this should presumably happen at all spatial scales including the tree and tree patch levels. Furthermore, human-habituated Moose at the Northern Lights Wildlife Shelter in Smithers, BC (about 400 km west of our study site) strip bark from trembling aspen trees as early as January each winter, despite the fact that Moose have access to other browse in nearby open woodlands and, as well, are fed plant material twice per day at the shelter (Figure 3; personal communication Angelika Langen, Manager - Northern Lights Wildlife Shelter, Smithers, BC).

A unique feature of the airport woodlands in which our study was conducted is that it is fenced off from use by Moose and deer; only occasionally, when the three-m high wildlife fence is breeched by a fallen tree, do large animals such as Moose gain access to the study area. Once inside, Moose have a veritable cornucopia that is replete with browse in amounts not found outside the airport property. Thus, despite the fact that willows, birch, trembling aspen, and plenty of red-osier dogwood comprise the shrub layer in these woodlands and that such browse was readily available above the snow pack, Moose specifically selected trembling aspen bark. Moose trails through the snow indicated that Moose often passed right by red-osier dogwood plants (in some cases browsing on them) to access the trembling aspen bark.

In our study area, Moose were barking trees in mid-February. Barking typically occurs in early spring (Renecker and Hudson 1985), but has occurred during winter in areas with high densities of Moose and limited winter food resources (Risenhoover 1987). Neither of these conditions characterized our study area.

Figure 3. Resident Moose of the Northern Lights Wildlife Shelter (including the one pictured here) are known to bark trembling aspen and willows early in the winter despite an abundance of nearby browse and supplemental feed.

Herbivores consume plant parts from different species and plant types and do so in different proportions and mixes (Renecker and Schwartz 1998), even when the most preferred or nutritious food items are abundant (Parsons et al. 1994). In broad agreement with our estimates, Moose in northern Sweden removed only 17-26% of available bites in winter while consuming foods considered of poorer quality along foraging paths. Although such behaviour by Moose may seem counterintuitive, the seeming importance of forage mixing during short times and small spatial scales cannot be disregarded (Shipley et al. 1998). In this respect, our findings suggest that barking by Moose may be more related to the importance of variety in the diet than to desperation foraging and, at least in our study area, is not something Moose do only when starving or when more preferred foods are limited.

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