

FOOD HABITS AND HABITAT USE OF PUTORAN SNOW SHEEP, (OVIS NIVICOLA BOREALIS).

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Abstract: Data from the central Putoran Plateau during May-June 1983 are presented along with data from other researchers. Food habits were determined from analysis of rumen contents and feeding sites. In May-June, graminaceous plants and lichens were the predominant forages and comprised 70 and 20-25% of the diet, respectively. The diets of males and females differed due to vegetational availability differences related to differential habitat use. Following green-up, legumes became the preferred forage. During late summer and early fall, snow sheep used a wide variety of forage plants. As the season progressed, cured forages again became dominant. The proportion of the winter diet made up by lichens was inversely related to the amount of grasses and reflected the declining forage quality of grasses during the winter. Snow sheep feeding sites during May-June were usually on the south slopes and therefore snow-free. When snow was present, sheep fed by pawing through the snow and occasionally digging into the soil to uncover roots and rhizomes. The actual manner of feeding is described.

Various authors have reported on different aspects of snow sheep ecology (Michurin and Mironenko 1966, Pavlov 1977, Borzhonov et. al. 1979, Larin 1983, Fedosenko 1985). Despite that, knowledge of Putoran snow sheep (Ovis nivicola borealis), habitat use and food habits are limited.

In general, females occupy the upper parts of the slopes during and in the first weeks following lambing. Males use the lower slopes and high river terraces at this time. During green-up, females occupy the entire slope.

Larin (1983) observed that females with lambs and subadults occupy sites within the 900 to 1100m zone during summer and early autumn. The animals feed on mountain tundras in close proximity to rocky outcrops which are used as escape cover and protection from foul weather. Adult males occurred at elevations above 1400m at that time.

Winter habitat use data are very limited. Borzhonov (1979) found tracks and feeding sites on lower slopes in dense larch forests in the middle fork of the Kholokit River.

The purpose of this report is to describe the food habitats and habitat use during May-June 1983 in the Central part of the Putoran Plateau and to bring together the results of other similar studies.

STUDY AREA

The Putoran Plateau is situated in the southern part of the Taimyr Peninsula. The boundary of the plateau is dissected by narrow canyon-like gorges with steep rocky slopes. The primary study area was in the central part of the plateau near Ayan lake.

Snow sheep occur here as small, scattered bands the occurrence of which is determined by the distribution and availability of those steep, rocky slopes.

RESULTS

Food Habits

Food habits of Putoran snow sheep were determined from examination of rumen contents and sheep feeding site analysis (Fedosenko et. al. 1985, Michurin and Mironenko 1966, and Larin 1983). A list of the various foods consumed is given in Table 1.

Cured grasses and sedges and lichens were the most important foods in rumen samples of males in early May, comprising 70 and 20-25% of the rumen contents, respectively. Cottongrass and sedges were the predominant graminaceous foods. Cladonia and Cetraria were the more important lichens. Shrubs and mosses were relatively unimportant, 4-5% by volume of rumen contents.

Examination of feeding sites of males in early May showed similar trends. Important grasses were Cobresia simplicuscula, Festuca rubra, Trisetum spicatum, Luzula sp., and Carex rupescens. Lichens included Cladonia deformis, Thamnolia vermiculatus, and Stereocaulon alpinum. The main forbs in the diet were Silene pauciflora, Oxytropis spp., and, rarely, Arnica iljinii. Oxytropis was eaten by digging the roots along road cuts.

The food habits of male and female snow sheep in early May were quite different, reflecting availability based on differences in habitat use. Because males occupy the lower slopes near or in the forest border, lichens played a more important role in their diet.

Snow sheep food habits change markedly with green-up in early June and leguminous species, especially Astragalus and Oxytropis, were favored. During summer and early fall, a wide variety of graminaceous plants, forbs, and shrubs were used (Table 1). Lichens and green mosses were lightly used during that period.

Cured grasses, sedges and cereals predominated in the rumen contents of a male killed in early September (54.5%) (Larin 1983). Forbs and shrubs comprised 33 and 10%, respectively, of the rumen contents. Lichens, mosses and fall green-up were relatively unimportant.

The rumen contents of two males, killed in November, were examined (Michurin and Mironenko 1966). Over 80% of the diet was cured forages. Shrubs, shrub willow, birch and lapland willow comprised 10% of the diet, and 5% of the diet were lichens.

Salt licks were used in spring and summer.

Feeding Behavior

The pattern of feeding varied seasonally and females generally spent more time feeding than males. In early May and June, snow sheep fed throughout the day with feeding periods alternating with rest periods. Initially, about 2/3 of the time is spent feeding and 1/3 is spent resting. As the season progressed, the relative amount of time spent feeding decreased, although they always spent more time feeding than resting.

Table 1. Food Habits of Putoran snow sheep (various authors).

Food	May ₁ R S ¹	May ₃ F S ³	4	Sept ₅ R S ⁵	Nov ₆ R S ⁶
Grass/Sedges	47%			54.5%	85%
Grasses				31.4%	
Eriophorium spp.	xx ²				
Cobresia simplicuscula		xx			
Festuca rubra		xx			
Hierochloe alpina			xx		
Poa spp.			xx		
Trisetum spicatum		xx			
Sedges/Rushes				22.0%	
Carex rupescens		xx			
C. spefuscidula			xx		
Lazulu spp.		tr			
Forbs	tr			33.0%	
Arnica iljinii		xx			
Astragalus spp.					xx
Drias octopetela			xx		
Hedysarum spp.					xx
Oxytropis nigrescens			xx		
Oxytropis spp.		xx			
Pachypleurum spp.					xx
Polygonum bistorta			xx		
Silene pauciflora		xx			
Trees/Shrubs	4-5%			10.0%	10%
Betula nana			xx		xx
Cassiope tetragona			xx		xx
D. punctata					xx
Salix polaris			xx		
S. pulchra			xx		
S. spp.					xx
Vaccinium uliginosum			xx		xx
Cowberries					xx
Lichens	35%			2.4%	5%
Alectoria nigricans			xx		
Cetraria nivalis			xx		
C. cacullata			xx		
C. spp.	7-9%				
Cladonia arbusus			xx		
C. deformis		xx			
C. spp.	25%				
Parmelia spp.	tr				
Peltigera aphtosa			xx		
P. spp.	tr				
Stereocaulon alpinum		xx			
Thamnolia vermiculatis		xx			
Green Mosses				1.1%	
Aulacomnium turgidum			xx		
Hylocomium splendens			xx		

*1 Early May rumen samples, Fedosenko et. al. 1985.

*2 xx = occurred in diet, no frequency/volume implied

*3 Early May feeding site analysis, Fedosenko et. al. 1985.

*4 Late summer-early fall, Larin 1983.

*5 September rumen samples, Larin 1983.

*6 November rumen samples, Michurin and Mironenko 1966.

The manner of feeding was similar to that of the Siberian ibex (Fedosenko 1983). Prior to green-up, sheep fed in a small area. After green-up, they used the whole slope while feeding.

Snow was usually absent from the feeding sites in May-June. When it did occur, sheep were forced to dig for food, which they did by pawing with the forelegs. Females usually dug without raising their muzzle and generally pawed 2-9 times between bites ($x=3.5$). The animals rake snow rather intensively for an average of 30 seconds per period. The diggings of two adult males were 22 to 28 cm deep and covered areas of 30x50 and 100x250 cm. Different foods were found in each hole.

From early May on, as the soils thaw, sheep, especially males, dug for roots and rhizomes. Four to 7 strokes (one serial) were made between bites and two males were observed to make 9 and 13 serials, respectively, in 6 minutes.

Seasonal nutrition varied from fall and winter to spring, especially for males. The decrease in use of cured grasses and the resultant increase in use of lichens reflected the declining nutritional quality of the graminaceous plants. Putoran snow sheep nutritional characteristics were similar to those of Yakut and Chucotka snow sheep (Egorov 1965 and Zhelezhov 1981) which switch from Icelandic moss to lichens. Only on Koryak is the role of lichens felt to be unimportant (Chernyaviski 1963).

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