

FALL AND WINTER FOODS OF RUFFED GROUSE IN INTERIOR ALASKA

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THE food habits of the Ruffed Grouse (*Bonasa umbellus*) have been studied throughout much of the species' range. Korschgen (1966) summarized findings of numerous Ruffed Grouse food habits studies conducted prior to 1966. More recently Phillips (1967) and King (1969) reported on the diets of Ruffed Grouse from western portions of their range, but very little has been published concerning any aspect of Ruffed Grouse ecology from the extreme Northwest. This paper reports the contents of 123 Ruffed Grouse crops collected during fall and winter in Alaska from 1960 through 1970.

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METHODS AND MATERIALS

Crops were collected from Ruffed Grouse shot in interior Alaska within 150 miles of Fairbanks (147°42' W; 64° 50' N), mostly in quaking aspen and paper birch woodlands usually containing a small amount of spruce. In interior Alaska such woodlands occur on the south and west aspects of low hills usually less than 2,000 feet in elevation. Common understory species associated with aspen and birch forests include willow, alder, rose, highbush cranberry, and soapberry. Ground cover species include kinnikinnick, lingonberry, yarrow, fireweed, and horsetail. Forests of this type are considered typical Ruffed Grouse habitat in interior Alaska. (Plant names follow Hultén 1968.)

Crops were stored in 10 percent formalin before analysis. Later food items were sorted, identified, and then oven-dried for 1 to 3 days at 70° to 80° C until a constant weight was attained. Weight of each food item was taken to the nearest 0.01 g. Ellison (1966) found that volumetric determination of Spruce Grouse (*Canachites canadensis*) food items was difficult because of error resulting from attempts to measure the volume of crushed berries having a high water content. Berries comprise a high proportion of the fall diet of Ruffed Grouse, consequently no volumetric measurements were attempted in this study. Tabulations in this paper represent combined data for adults and juveniles of both sexes collected during fall and winter.

TABLE 1
RUFFED GROUSE FALL AND WINTER FOODS IN INTERIOR ALASKA

Food items	Fall (49 crops)		Winter (74 crops)	
	% weight	% occurrence	% weight	% occurrence
Rose hips (<i>Rosa acicularis</i>)	40	65	5	27
Highbush cranberry berries (<i>Viburnum edule</i>)	20	31	— ¹	18
Quaking aspen buds and twigs (<i>Populus tremuloides</i>)	10	16	55	55
Kinnikinnick berries (<i>Arctostaphylos uva-ursi</i>)	10	8	—	3
Blueberry berries (<i>Vaccinium uliginosum</i>)	5	25	—	1
Willow buds and twigs (<i>Salix</i> spp.)	4	18	34	61
Unidentified leaves	3	51	—	12
Horsetail shoots (<i>Equisetum</i> sp.)	2	31	—	1
Lingonberry berries (<i>Vaccinium vitis-idaea</i>)	1	20	—	4
Sedge seeds (<i>Carex</i> spp.)	1	4	—	3
Bearberry berries (<i>Arctostaphylos alpina</i>)	1	16	0	0
Clover leaves (<i>Trifolium</i> sp.)	1	2	0	0
Mushrooms (<i>Basidiomycetes</i>)	1	2	0	0
Bunchberry berries (<i>Cornus canadensis</i>)	—	6	0	0
Paper birch buds and twigs (<i>Betula papyrifera</i>)	—	6	2	4
Willow leaves (<i>Salix</i> spp.)	—	10	—	5
Crowberry berries (<i>Empetrum nigrum</i>)	—	4	0	0
Soapberry buds and twigs (<i>Shepherdia canadensis</i>)	—	6	2	20
Yarrow leaves (<i>Achillea</i> sp.)	—	2	0	0
Crowberry leaves (<i>Empetrum nigrum</i>)	—	2	0	0
Twinflower leaves (<i>Linnaea borealis</i>)	—	4	—	4
Unidentified seeds	—	4	0	0
Blueberry leaves (<i>Vaccinium uliginosum</i>)	—	2	0	0
Unidentified grass blades Gramineae	—	2	—	3
Insecta and Arachnida	—	6	0	0
Unidentified berries	0	0	1	1
Quaking aspen leaves (<i>Populus tremuloides</i>)	0	0	—	7
Paper birch catkins (<i>Betula papyrifera</i>)	0	0	—	3
SUMMARY				
Fruits	78	90	6	34
Buds	14	29	92	96
Leaves	4	55	1	26
TOTAL WEIGHT	130.77 g		958.01 g	

¹ Indicates items comprising less than 1 percent of the total dry weight.

FALL AND WINTER FOODS

Fall was regarded as the period from 1 September through 14 October. This beginning date is rather arbitrary but coincides roughly with the beginning of fall leaf coloration, and mid-October is the time when permanent winter snow accumulation starts. The primary fall foods were rose hips, highbush cranberries, buds of quaking aspen, and kinnikinnick berries (Table 1). While not taken in large quantities, blueberries, bearberries, lingonberry, horsetail shoots, and green leaf material from various species were also eaten to some extent during autumn. Insect remains were

found in only three crops, all of which were from juvenile grouse shot early in September.

Winter was considered to be from 15 October through 15 April. Buds and twigs of quaking aspen and various species of willow were by far the major foods during this season (Table 1). However, buds and twigs of soapberry and fruits of rose and highbush cranberry occurred with relatively high frequencies.

By forage type, fruits and buds were the most common foods taken during both seasons (Table 1). The dietary shift from fruits to buds probably occurs in mid-October; however, the relationship of snow coverage to timing of the shift was not determined. Leaves of various species occurred in crops obtained during both seasons, but made up little of the samples by weight.

The number of species found in individual crops was greater in fall than winter. Thirty percent of the winter crops contained a single food item compared with 19 percent for fall, further showing greater dietary variety during autumn. Of winter crops containing a single food species 73 percent contained willow buds, 23 percent aspen buds, and 4 percent buds of soapberry.

Fresh crop weights (crop including contents) of 23 fall and 45 winter-shot grouse averaged 10.0 g and 39.1 g respectively. The heaviest crop, 100.7 g was collected during winter. Lack of knowledge concerning daily feeding schedules may bias crop weight comparison, but it appears that during winter relatively large quantities of food are required. West and Meng (1966) reported that greater quantities of food were in crops of winter-collected Willow Ptarmigan (*Lagopus lagopus*) than those taken in fall or spring. Grit occurred in 18 percent of the fall and 11 percent of the winter crops; but as most birds were collected along gravel roads, no conclusions regarding seasonal retention of grit can be made.

DISCUSSION

Aspen and willow buds were the main winter foods, together comprising 89 percent by weight of all foods found in 74 winter collected crops. The importance of aspen woodlands to Ruffed Grouse is mentioned by Gullion (1966) and Rusch and Keith (1971). Korschgen (1966), summarizing Ruffed Grouse food habits studies, emphasizes the importance of aspen as a winter food source to Ruffed Grouse throughout its range north of 40 degrees latitude and east of 66 degrees longitude. Phillips (1967) recorded rose and aspen as important fall and winter foods in northern Utah. Little reference to willow as an important winter food for Ruffed Grouse has been made.

In Alaska, fruiting shrubs are covered by snow during most of the winter,

consequently buds of aspen and, to a lesser extent, willow may assume higher importance as winter foods in Alaska than elsewhere. The male flowering buds of aspen are considered a highly nutritious food source for Ruffed Grouse (Gullion 1966). Conversely, Hill et al. (1968) found that captive Ruffed Grouse lost weight rapidly when fed a diet of male flower aspen buds for a 10-day period, but these findings have little bearing on the ability of wild birds to exist on aspen buds. Abrupt change to a relatively high fiber diet produced weight loss in captive Red Grouse (*Lagopus lagopus scoticus*) and Spruce Grouse (Moss and Parkinson 1972, Boag pers. comm.). Severe weight loss and a negative nitrogen balance would be expected when hand-reared Ruffed Grouse are subjected to a change from commercial feed to a diet of aspen buds. Most Alaska Ruffed Grouse examined appeared to be in good condition as indicated by the amount of body fat, though severe losses of weight occurred after an unusual icing condition in 1968 (McGowan 1969). It is not known if Alaskan Ruffed Grouse can exist for long periods on a diet of aspen buds. Willow buds ranked first by frequency during winter, and both aspen and willow may be required to sustain Ruffed Grouse during this season.

SUMMARY

Analysis of 123 Ruffed Grouse crops collected during fall and winter from interior Alaska showed rose hips, highbush cranberries, kinnikinnick berries, and blueberries to be dominant fall foods with a shift to buds occurring in October. Buds of quaking aspen and willow were the major winter foods. Ruffed Grouse ate a more varied diet in fall than winter. While aspen and willow were dominant winter foods, only 30 percent of crops collected during that season contained a single food item.

LITERATURE CITED

- ELLISON, L. 1966. Seasonal foods and chemical analysis of winter diet of Alaskan Spruce Grouse. *J. Wildl. Mgmt.* 30: 729-735.
- GULLION, G. W. 1966. A viewpoint concerning the significance of studies of game bird food habits. *Condor* 68: 372-376.
- HILL, D. C., E. V. EVANS, AND H. G. LUMSDEN. 1968. Metabolizable energy of aspen buds for captive Ruffed Grouse. *J. Wildl. Mgmt.* 32: 854-858.
- HULTÉN, E. 1968. *Flora of Alaska and neighboring territories*. Stanford, California, Stanford Univ. Press.
- KING, D. 1969. Spring and summer foods of Ruffed Grouse on Vancouver Island. *J. Wildl. Mgmt.* 33: 440-442.
- KORSCHGEN, L. J. 1966. Foods and nutrition of Ruffed Grouse in Missouri. *J. Wildl. Mgmt.* 30: 86-100.
- McGOWAN, J. D. 1969. Starvation of Alaskan Ruffed and Sharp-tailed Grouse caused by icing. *Auk* 86: 142-143.

- MOSS, R., AND J. A. PARKINSON. 1972. The digestion of heather (*Calluna vulgaris*) by Red Grouse (*Lagopus lagopus scoticus*). *Brit. J. Nutr.* 27: 285-298.
- PHILLIPS, R. L. 1967. Fall and winter food habits of Ruffed Grouse in northern Utah. *J. Wildl. Mgmt.* 31: 827-829.
- RUSCH, D. H., AND L. B. KEITH. 1971. Ruffed Grouse-vegetation relationships in central Alberta. *J. Wildl. Mgmt.* 35: 417-429.
- WEST, G., AND M. S. MENG. 1966. Nutrition of Willow Ptarmigan in northern Alaska. *Auk* 83: 603-615.

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