

WINTER FOOD OF WHITE-TAILED PTARMIGAN IN COLORADO

By H. F. QUICK

The Southern White-tailed Ptarmigan, *Lagopus leucurus altipetens*, was observed in Colorado by the writer in the years 1941 to 1947. Observations were made on various occasions in the Sawatch Range of Gunnison County, the Ten Mile and Williams ranges of Eagle and Pitkin counties, the vicinity of Berthoud Pass, and in Rocky Mountain National Park. Ptarmigan were seen in all seasons of the year, but this report relates to the winter season when observation is simplified by readable signs of activity in the snow.

In the winter in this region, deep snow limits the available food to a few species of plants. Most abundant are the various willows and alpine fir, some alder, little bog birch, Englemann spruce and limber pine. On wind-swept rock fields lichens, mosses and withered alpine plants are available. Here, too, ptarmigan find grit in the little basins of weathered rock between boulders.

It was noted that the largest flocks of birds were found in high alpine basins where willows were abundant. Ptarmigan appeared in flocks of five to thirty in these basins. Occasionally single birds were found in alpine conifer types such as dwarfed alpine fir, sometimes called "shinnery" or "shintangle," and in stunted limber pine stands at timber line. Birds were sometimes seen on high-angled rock slopes which are generally bare of snow. When flushed from this habitat, ptarmigan would usually dive off in fast flight for the snow basins lying below. Sometimes, when the observer was climbing, birds would be flushed at the tip of an approaching ski from hiding places under the snow. The birds would burst from concealment in a puff of powder snow and hurtle off 30 or 40 yards to drop duck-like into the snow and hiding. Flights of half a mile have been witnessed. On one occasion in Rocky Mountain National Park, a flock of about 25 birds flew up-mountain directly across a wind of gale proportion. The flight power of ptarmigan seems to be as strong as that of some of the other members of its family, although at times their hesitancy to fly might belie this ability.

After a few periods of observation the writer noted considerable browsing of ptarmigan by tracking the birds. Signs in the snow made interpretation rather easy. Ptarmigan not only take the buds of willow but also nip off whole twigs as large as 15 mm. long and 2 mm. in diameter. The occurrence of twig stubs with shreds of bark torn down the stem suggested a plot method of food habits study similar to that used for investigations of big-game food habits. Several trial plots of one square foot each were marked at random and the availability of vegetation rated. Then a count of the browsed twigs was made as an index of use. One plot with an availability of approximately 150 twigs was browsed 40 times, or 26.6 per cent. On this particular plot, only willow occurred. This method was used only as a trial and is mentioned as an aid to further study. The changing snow level creates a varying availability by alternately covering and exposing different levels of vegetation; this factor would require consideration in such a study.

The method used in this report was mainly the analysis of droppings. Over 500 droppings were collected off the surface of the snow and from roosting holes in the snow. Usually six to ten droppings would be found in a roosting hole. Droppings were easily collected off the snow surface among the willows which the birds seem to favor.

Of the collections made, 145 droppings were weighed and measured separately, the remainder being weighed and analyzed in bulk. All samples were first oven dried. The

measurements taken were length and maximum diameter in millimeters. These measurements were taken to aid in identification, since the local ranges of blue grouse and ptarmigan sometimes overlap. Analyses were made by soaking and disintegrating specimens in a watch glass and by the use of binocular dissecting microscope and compound microscope. The laboratory work was done at Colorado State College, in the Division of Forestry and Range Management, where herbarium specimens from the region were available for comparison.

Table 1 condenses the dimensions of the droppings which were measured individually. In general, a considerable difference in the size of blue grouse and ptarmigan droppings occurs, those of ptarmigan being much the smaller. Piles of droppings of both species are frequently found on snow banks but are readily distinguishable after a little study.

Table 1
Weights and Measurements of 145 Ptarmigan Droppings

	Maximum	Minimum	Average
Length	30 mm.	13 mm.	24.3 mm.
Diameter	7 mm.	4 mm.	6.1 mm.
Weight	0.25 gm.	0.10 gm.	0.177 gm.

Table 2 shows a series of selected samples which indicate the general character of the contents of all the samples. Willows constitute most of the winter food of ptarmigan in the area considered. Most droppings consisted of a finely ground mass of willow twigs

Table 2
Contents of Ptarmigan Droppings

Sample	Number of droppings	Weight of sample: gms., oven dried	Contents by per cent of total volume		
			Willow	Fir	Grit
1	6	.65	95.0	5.0	trace
2	17	1.72	90.0	10.0	trace
3	5	.89	90.0	8.0	2.0
4	10	1.40	90.0	10.0	trace
5	10	1.30	90.0	10.0	none
6	3	.30	100.0	0.0	none
7	2	.30	100.0	0.0	trace
8	20	3.70	90.0	5.0	5.0
9	33	9.50	87.0	10.0	3.0
10	20	3.70	90.0	5.0	5.0

and buds. A branched twig 6 mm. long and 2 mm. thick with a bud attached was found in a dropping. In this same individual dropping an entire needle of an alpine fir was found. Apparently both escaped grinding in the gizzard. Many droppings contained shreds of wood fibre which approximated 15 mm. in length. These could be identified only as a species of "hardwood, likely willow." Bud scales were numerous. Although macerated, they were identifiable.

Grit in the ptarmigan diet is probably very essential. The nature of the food of this bird is tough and fibrous and would seem to require considerable grinding. The occurrence of grit in individual ptarmigan droppings varied from zero to as much as 25 per cent by volume. Pure angular white quartz grit was most commonly found. Particles of granite and feldspars occurred in lesser amounts. The maximum dimension of the largest grit found was 5 mm., a piece of white quartz. The greatest quantity of grit by weight was 0.9 grams of a total weight of 3.7 grams, or 24.3 per cent by dry weight obtained

from a single series of 20 droppings. In a series of 33 droppings, there were 1.1 grams of grit in a total oven-dry weight of 9.5 grams. This amount of grit was 11.6 per cent by weight of the sample and 3 per cent by volume.

SUMMARY

The winter food of White-tailed Ptarmigan in the southern Rocky Mountain region consists chiefly of the buds and woody twigs of the various species of alpine willows. Needles of the alpine fir are eaten by ptarmigan but to a lesser extent than willow buds and twigs. Ptarmigan obtain grit from the wind-swept boulder fields but prefer to roost and browse in protected basins where willows are abundant.

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