



4-30-1989

Winter habitats and foods of Blue Grouse in the Sheeprock Mountains, Utah

Peter J. Perkins

Utah Cooperative Fish and Wildlife Research Unit, Utah State University

Frederick G. Lindzey

Wyoming Cooperative Research Unit, Laramie, Wyoming

Jay A. Roberson

Utah Division of Wildlife Resources, Salt Lake City

Gregory McDaniel

Wyoming Cooperative Research Unit, Laramie, Wyoming

Randy Berger

Utah Division of Wildlife Resources, Salt Lake City

Follow this and additional works at: <https://scholarsarchive.byu.edu/gbn>



Part of the [Anatomy Commons](#), [Botany Commons](#), [Physiology Commons](#), and the [Zoology Commons](#)

Recommended Citation

Perkins, Peter J.; Lindzey, Frederick G.; Roberson, Jay A.; McDaniel, Gregory; and Berger, Randy (1989) "Winter habitats and foods of Blue Grouse in the Sheeprock Mountains, Utah," *Great Basin Naturalist*. Vol. 49 : No. 2 , Article 9.

Available at: <https://scholarsarchive.byu.edu/gbn/vol49/iss2/9>

This Article is brought to you for free and open access by the Western North American Naturalist Publications at BYU ScholarsArchive. It has been accepted for inclusion in Great Basin Naturalist by an authorized editor of BYU ScholarsArchive. For more information, please contact scholarsarchive@byu.edu, ellen_amatangelo@byu.edu.

WINTER HABITATS AND FOODS OF BLUE GROUSE IN THE SHEEPROCK MOUNTAINS, UTAH

Peter J. Pekins^{1,4}, Frederick G. Lindzey², Jay A. Roberson³,
Gregory McDaniel², and Randy Berger³

ABSTRACT.—Winter habitat use and food habits of Blue Grouse (*Dendragapus obscurus*) were studied in an isolated Utah desert mountain range that contained little typical Douglas-fir (*Pseudotsuga menziesii*) winter habitat. Habitat use was concentrated in the Douglas-fir and pinyon (*Pinus edulis*)–juniper (*Juniperus spp.*) habitat. Douglas-fir and pinyon pine were the most consumed foods. Other foods that represented >15% of the composition of an individual fecal sample were limber pine (*Pinus flexilis*), mahogany (*Cercocarpus ledifolius*), juniper, and an *Antennaria*–*Cirsium* type. The breadth in winter diet indicates that Blue Grouse may successfully occupy other habitats when typical winter habitat is scarce.

Blue Grouse in the Intermountain West typically winter in snowbound, open stands of Douglas-fir at elevations above 1,830 m (Marshall 1946, Stauffer and Peterson 1985, Cade 1985). Mixed stands of subalpine fir (*Abies lasiocarpa*), lodgepole pine (*Pinus contorta*), spruce (*Picea engelmannii*)/fir, and spruce/fir–lodgepole pine were used but generally received less use than Douglas-fir stands (Marshall 1946, Harju 1974, Cade 1985). The winter diet of Blue Grouse in the intermountain region is composed almost entirely of conifer needles and buds (Beer 1943, Stewart 1944, Marshall 1946). Douglas-fir dominates (up to 99%) the diet, although lodgepole and limber pine are regularly eaten in particular areas (Harju 1974, Cade 1985, Zwickel and Bendell 1986). Some atypical Blue Grouse winter foods recently identified include the genera *Juniperus*, *Cercocarpus*, *Abies*, *Picea*, and *Antennaria/Cirsium* (Zwickel and Bendell 1986). This disassociation from Douglas-fir apparently illustrates the ability of Blue Grouse to utilize a variety of habitats and forages during winter (Cade 1985, Zwickel and Bendell 1986).

Blue Grouse harvest trends from the Sheeprock Mountains, an isolated, desert mountain range located in central Utah in the Wasatch National Forest, are comparable to those from the Bear River Range in the Wasatch National Forest in the northeast section of Utah. However, the availability of typi-

cal Blue Grouse winter habitat is extremely different between the two areas. The Sheeprock Mountains contain only a few small, isolated stands of Douglas-fir; extensive Douglas-fir and subalpine fir habitat exists on the Bear River Range. The presence of a fall population of Blue Grouse on the Sheeprock Mountains during the fall migration period and the lack of Douglas-fir habitat indicated the Blue Grouse may winter in habitats other than Douglas-fir. The objectives of this study were to (1) determine habitats used by Blue Grouse during winter and (2) determine food habits of wintering Blue Grouse in the Sheeprock Mountains.

STUDY AREA

The Sheeprock Mountains are isolated by flat valleys and desert and contain moderately steep canyons. Elevation ranges from 1,830 m at the valley floor to peaks of 2,745 m. The five major habitats, excluding the valley floor, were sagebrush (*Artemisia spp.*) (40%), pinyon-juniper (30%), oak (*Quercus gambelii*)–mahogany-bitterbrush (*Purshia tridentata*) (28.5%), aspen (*Populus tremuloides*) (1%), and Douglas-fir (0.5%) (Richardson et al. 1982).

METHODS

Circular, nonoverlapping sample plots, 0.04 ha each, were randomly established in

¹Utah Cooperative Fish and Wildlife Research Unit, Utah State University, Logan, Utah 84322–5210

²Wyoming Cooperative Research Unit, Box 3166, University Station, Laramie, Wyoming 82071

³Utah Division of Wildlife Resources, 1596 West North Temple, Salt Lake City, Utah 84116–3154

⁴Present address: Department of Forest Resources, Pettee Hall, University of New Hampshire, Durham, New Hampshire 03824

TABLE 1. Composition of plant fragments (%) in winter fecal droppings of Blue Grouse, Sheeprock Mountains, Utah.

Plant	Freq. ^a	Collection tree			
		Douglas-fir (4) ^b	Pinyon (4)	Mahogany (3)	Juniper (1)
<i>Abies</i>	5	<1 ^c (0-1) ^d	0	1 (0-3)	5
<i>Antennaria-Cirsium</i>	2	0	14 (0-56)	0	0
<i>Cercocarpus</i>	2	0	0	10 (0-26)	0
<i>Dryas</i>	1	0	0	<1 (0-1)	0
<i>Festuca</i>	1	0	<1 (0-1)	0	0
<i>Juniperus</i>	6	0	3 (1-5)	<1 (0-1)	16
<i>Phoradendron</i>	1	<1 (0-1)	0	0	0
<i>Picea</i>	1	<1 (0-1)	0	0	0
<i>Pinus</i>	2	1 (0-3)	0	0	0
<i>Pinus edulis</i>	6	0	82 (37-97)	22 (0-67)	30
<i>Pinus flexilis</i>	2	0	0	<1 (0-2)	45
<i>Pseudotsuga</i>	8	98 (95-100)	<1 (0-1)	66 (0-100)	4
Unidentified seed	1	<1 (0-1)	0	0	0

^aNumber of composite samples (n = 12) in which plant was present.

^bNumber of composite samples.

^cPercent composition based on 60 fields per composite sample.

^dRange of % composition.

two canyons in the five major habitats. Plots were established in approximate proportion to the area occupied by each habitat to evenly distribute sampling intensity among the habitats. Douglas-fir was disproportionately sampled because of its known importance as winter habitat. Elevation of sample plots ranged from 1,830 to 2,600 m. Each plot was completely searched on snowshoes for evidence of grouse use. Grouse sightings, fecal droppings, tracks, snow roosts, and feeding sign (i.e., vegetative litter at the bases of trees) were noted. Any grouse sign observed outside the plots also was noted and assigned to a habitat. Plots were sampled during January-February 1986 and January 1987. Snow was present during all sampling periods.

We searched each habitat for winter fecal droppings during January 1987. Our goal was to collect 6-10 fecal droppings from under different trees in each habitat to obtain a random fecal sample. Droppings were collected randomly from under a tree in an attempt to obtain droppings from different birds if >1 roosted in a tree. Fecal droppings were collected under four Douglas-firs and four pinyon pines, but under only three mountain mahoganies and one juniper; none was found in sagebrush or aspen habitats. A composite sample was formed for each group of droppings collected under a tree. Droppings were frozen in air-tight plastic bags and sent to the Composition Analysis Laboratory (Range Science Department, Colorado State University,

Fort Collins, Colorado) for content identification. Dried samples were homogenized by grinding over a 20-mesh (1-mm) screen. Twenty "fields" on each of three slides per composite sample were examined. Data were presented as percent relative density, an index of dry weight (Sparks and Malechek 1968). This procedure was identical to that employed by Zwickel and Bendell (1986). We assumed that potential biases associated with differential digestibility of various species (Gill et al. 1983) were minimal because of the woody nature of Blue Grouse winter diets (Zwickel and Bendell 1986).

RESULTS

We searched 131 plots, 30 each in pinyon-juniper and Douglas-fir, 33 in oak-mahogany-bitterbrush, 23 in sagebrush, and 15 in aspen. Grouse sign was found only in Douglas-fir plots (7 of 30). During searches for fecal droppings 3 grouse were flushed in Douglas-fir stands, and a group of 6-10 grouse were flushed from a pinyon-juniper stand. Tracks, feeding sign, and fecal droppings were found under pinyon pines in the vicinity where the 6-10 grouse were flushed.

Eleven plant genera were identified in the fecal samples (Table 1). Douglas-fir, pinyon pine, and juniper were found in $\geq 50\%$ of the samples, but juniper never dominated an individual sample. Only Douglas-fir was found in samples collected under all species of trees.

Douglas-fir and pinyon pine were the most consumed foods and the dominant items in the diet under all collection trees, except the juniper (Table 1).

DISCUSSION

The abundance of sign found in Douglas-fir stands signified the importance of this relatively scarce habitat to Blue Grouse occupying the Sheeprock Mountains. Sign found in pinyon-juniper stands indicated that this habitat also was used by Blue Grouse. Because there was a much greater proportion of pinyon-juniper than Douglas-fir, our sampling efforts may have been inadequate to evaluate the relative importance of pinyon-juniper to Blue Grouse. However, wherever Blue Grouse occupied Douglas-fir and pinyon-juniper habitat simultaneously, Douglas-fir was more extensively used by Blue Grouse.

The diversity of species found in fecal droppings supported the conclusion of others that Blue Grouse exhibit adaptability in their winter diets (Bendell and Zwickel 1984, Cade 1985, Zwickel and Bendell 1986). Pinyon pine has not been previously identified as a winter food, although needles of other pines were commonly consumed in other areas (Marshall 1946, Harju 1974, Cade 1985, Zwickel and Bendell 1986). The presence of pinyon pine in droppings found under trees other than pinyon pine indicated that feeding on this species may be common in the Sheeprock Mountains. Although Zwickel and Bendell (1986) suggested that pines may be preferred to Douglas-fir as food, our data showed that Douglas-fir was more commonly consumed than pinyon pine.

This preliminary effort has documented Blue Grouse use of habitats other than Douglas-fir during winter on the Sheeprock Mountains. It appeared to us that Blue Grouse preferred the limited, available Douglas-fir stands. Although Blue Grouse both roosted and fed in pinyon pines, it is unknown whether pinyon-juniper stands, in the absence of Douglas-fir, could support the existing Blue Grouse population. Winter survival depends on meeting both nutritional and cover requirements, particularly during periods of severe weather. Pekins (1988) demonstrated that Douglas-firs provide protective microhabitats that decrease thermoregulatory

costs during winter. Similar protection presumably is required for overwinter survival in other habitats.

Small Douglas-fir stands may be critical to the long-term dynamics of Blue Grouse in the Sheeprock Mountains and in other areas of the species range where typical winter habitat is isolated or not abundant. Small stands of Douglas-fir should be protected until it is demonstrated that alternate habitat types can support wintering Blue Grouse, particularly during rigorous winters.

ACKNOWLEDGMENTS

We thank Terry Shraeder for field assistance and the Bureau of Land Management for housing. This project, supported by the Utah Division of Wildlife Resources and the U.S. Forest Service, was conducted under the auspices of the Utah Cooperative Fish and Wildlife Research Unit, Utah State University.

LITERATURE CITED

- BEER, J. R. 1943. Food habits of the Blue Grouse. *J. Wildl. Manage.* 7: 32-44.
- BENDELL, J. F., AND F. C. ZWICKEL. 1984. A survey of the biology, ecology, abundance, and distribution of the Blue Grouse (Genus *Dendragapus*). Pages 163-192 in *Proc. Third Internat. Grouse Sympos.* World Pheasant Association, Suffolk.
- CADE, B. S. 1985. Winter habitat preferences and migration patterns in Blue Grouse in Middle Park, Colorado. Unpublished thesis, Colorado State University, Fort Collins. 101 pp.
- GILL, R. B., L. H. CARPENTER, R. M. BARTMANN, D. L. BAKER, AND C. G. SCHOONVELD. 1983. Fecal analysis to estimate mule deer diets. *J. Wildl. Manage.* 47: 902-915.
- HARJU, H. J. 1974. An analysis of some aspects of the ecology of Dusky Grouse. Unpublished dissertation, University of Wyoming, Laramie. 142 pp.
- MARSHALL, W. H. 1946. Cover preferences, seasonal movements and good habits of Richardson's Grouse and Ruffed Grouse in southern Idaho. *Wilson Bull.* 58: 42-52.
- PEKINS, P. J. 1988. Winter ecological energetics of Blue Grouse. Unpublished dissertation, Utah State University, Logan. 155 pp.
- RICHARDSON, R. E., F. V. LUKE, AND W. J. MADER. 1982. Wildlife habitat management plan for the Vernon division. USFS unpublished report.
- ROBERSON, J. A. 1988. Utah upland game annual report, 1987. Publication 88-7. Utah Div. Wildl. Res., Salt Lake City, Utah. 215 pp.
- SPARKS, D. R., AND J. C. MALECHEK. 1968. Estimating percentage dry weight in diets using a microscopic technique. *J. Range Manage.* 21: 264-265.

- STAUFFER, D. F., AND S. R. PETERSON. 1985. Ruffed and Blue Grouse habitat use in southeastern Idaho. *J. Wildl. Manage.* 49: 459-466.
- STEWART, R. E. 1944. Food habits of the Blue Grouse. *Condor* 46: 112-120.
- ZWICKEL, F. C., AND J. F. BENDELL. 1986. Variations in the winter diet of Blue Grouse. *World Pheasant Assoc., J.* XI: 44-52.