

Food selection in the tetraonid hybrids *Lyrurus tetrrix* x *Tetrao urogallus*, *Lyrurus tetrrix* x *Lagopus lagopus* and *Tetrao urogallus* x *Lagopus lagopus*

ERKKI PULLIAINEN

PULLIAINEN, E. 1982: *Food selection in the tetraonid hybrids Lyrurus tetrrix* x *Tetrao urogallus*, *Lyrurus tetrrix* x *Lagopus lagopus* and *Tetrao urogallus* x *Lagopus lagopus*. — *Ornis Fennica* 59:170—174.

The numbers and types of food items found in the crops and/or gizzards of the natural hybrids *Lyrurus tetrrix* x *Tetrao urogallus* (6 exx.), *Lyrurus tetrrix* x *Lagopus lagopus* (4) and *Tetrao urogallus* x *Lagopus lagopus* (2) were recorded in N Finland. Two specimens of the first of these hybrids had eaten *Pinus sylvestris* needles, the typical winter food of *Tetrao urogallus*, three of them had eaten *Betula* catkins, the typical winter food of *Lyrurus tetrrix*, and one had chosen both types of food. One specimen of the second hybrid had eaten both *Betula* spp. and *Salix* spp. Of the specimens of the third hybrid, one had eaten the typical autumn food of *Lagopus lagopus* and the other the typical late autumn food of *Tetrao urogallus*. Thus evidence was obtained that the food selection behaviour of a hybrid may be caused by gene(s) from the father and/or mother.

Erkki Pulliainen, Department of Zoology, University of Oulu, and Värriö Subarctic Research Station, University of Helsinki, SF-90100 Oulu 10, Finland.

Introduction

The main winter food of the Capercaillie *Tetrao urogallus* in northern Fennoscandia consists of the needles, shoots and buds of the Scots pine *Pinus sylvestris*, that of the Black Grouse *Lyrurus tetrrix* consists of the catkins and twigs of *Betula* spp., and that of the Willow Grouse *Lagopus lagopus* of the catkins and twigs of *Betula* spp. and/or shoots of *Salix* spp. Differences also occur in the composition of their autumn diets (Semenov-Tian-Šanskij 1960, Pulliainen 1970, 1976, 1979, 1982, Pulliainen & Iivainen 1981).

Intergeneric hybrids of these tetraonids occur in nature from time to time (Gray 1958), and their choice of food may be expected to throw interesting light on the inherited food selection patterns of these gallinaceous species. Hunters usually send any strange-looking game birds they obtain to the nearest Zoological Museum for identification, and the Zoological Museum of the University of Oulu possesses crop and/or gizzard samples from 12 tetraonid hybrids killed in northern Finland during the last 20 years. The following is a case report on these samples.

¹ Report No. 131 from the Värriö Subarctic Research Station

Material and methods

The material consists of 12 specimens of the following three hybrids (the male parent mentioned first), which had some food matter in their crops and/or gizzards: *Lyrurus tetrrix* x *Tetrao urogallus* (6), *Lyrurus tetrrix* x *Lagopus lagopus* (4) and *Tetrao urogallus* x *Lagopus lagopus* (2). The specimens were identified by Mr. Heikki Kangasperko. The crop and gizzard samples were stored either dry (dried at 65°C) or in alcohol. The numbers of the different food items in the crop samples were counted, while the gizzard samples were only analysed qualitatively.

Results

Lyrurus tetrrix x *Tetrao urogallus*. Two of the six hybrids had eaten pine needles, the typical winter food of the Capercaillie, three had eaten birch catkins (and other birch fragments), the typical winter food of the Black Grouse, and one both types of food (Table 1). In addition to pine or birch, the birds shot in October had also fed on *Vaccinium myrtillus*, or on oats from the cultivated area around the city of Oulu. Three individuals also had fragments of *Empetrum nigrum* in their gizzards.

Lyrurus tetrrix x *Lagopus lagopus*. Two of the four hybrids had fed on the stems of *Vaccinium myrtillus* (plus some berries and leaves), the typical late autumn diet of the Willow Grouse. The third, killed in October, had fed on both these and birch twigs, and the fourth, killed in December, on birch and willow twigs (Table 2).

Tetrao urogallus x *Lagopus lagopus*. The hybrid killed in September had fed on food items typical of the diet of the Willow Grouse, i.e. stems of *Vaccinium myrtillus*, birch and willow twigs, whereas the hybrid killed in

October had also fed on pine needles and utricles of *Carex* spp., typical late autumn food of the Capercaillie (Table 3).

Discussion

The composition of the diet in tetraonid birds is known to be affected by (1) the food-plant preferences of the species; (2) the local availability of the preferred food; (3) the nutritive value of the food available; (4) the physiological state of the bird; (5) the physical structure of the vegetation and (6) competition between the tetraonid species (reviewed in Moss & Hanssen 1980). Pulliainen (1965, 1979) showed experimentally for the Partridge *Perdix perdix* and the Capercaillie under natural conditions that these gallinaceous birds tend to avoid excessively rapid changes in diet.

Ten of the present hybrids were killed in late September-October, when the Capercaillie, the Black Grouse and the Willow Grouse may all eat stems of *Vaccinium myrtillus* once these plants have shed their leaves (Pulliainen 1979, unpubl. data). Interest thus attaches to the other kinds of food eaten by these birds. None of the 94 Capercaillie killed in N Finland in October (Pulliainen 1979) had eaten any parts of *Betula* spp., but four (Nos. 3-6) of the present six specimens of the hybrid *Lyrurus tetrrix* x *Tetrao urogallus* had done so, while two (Nos. 1-2) had eaten food typical of the Capercaillie (Table 1). One *Lyrurus tetrrix* x *Lagopus lagopus* hybrid (No. 10) had eaten both birch and willow twigs, which suggests that it had moved on the surface of the snow like a Willow Grouse when feeding (Table 2). None of the over 1000 Willow Grouse studied in N

Finland throughout the year (Pulliainen & Iivanainen 1981, unpubl. data) had eaten pine needles, but one of the specimens of *Tetrao urogallus* x *Lagopus lagopus* (No. 12) had done so.

The Capercaillie shifts from feeding on the ground to feeding in the crowns of pine-trees when the depth of the snow exceeds 20 cm, but it will also feed on pine needles on the ground (Pulliainen 1979). Thus in this respect the feeding level does not determine the type of food taken.

The males of the Black Grouse and Capercaillie do not tend or associate with their young, so that hybrids Nos. 3, 4, 5, 6 and 12 could not have learned from their fathers to select the species-specific food of the male parent (Tables 1 and 3). Hybrids 11 and 12 were actually seen in the flock of a female Willow Grouse.

Black Grouse may now and then eat small amounts of first-year cones and needles of the Scots pine in autumn and early winter (Pulliainen unpubl. data), and such food is eaten in greater quantity when they have fed on oats at artificial feeding sites for a long time and need to remedy a deficiency of manganese and selenium (Marjakangas 1980). However, this can hardly be the explanation of the choice of Scots pine needles by specimens 1, 2 and 6 of *Lyrurus tetrrix* x *Tetrao urogallus*.

It is possible that the gene(s) from the male Black Grouse caused specimens 3, 4 and 5 (Table 1) to feed on *Betula* spp. and the gene(s) from the male Capercaillie caused No. 12 (Table 3) to feed on Scots pine. Similarly, the diets of the hybrids may have been influenced by the gene(s) from the mothers; for example, the *Lyrurus tetrrix* x *Lagopus lagopus*

TABLE 1. Number of food items found in the crops of 6 specimens of the hybrid *Lyrurus tetrrix* x *Tetrao urogallus* from Northern Finland and notes on the food in their gizzards. *En* = *Empetrum nigrum*, *Um* = *Vaccinium myrtillus*.

No.	Date of kill	Sex	Commune of kill	Crop contents			Gizzard contents
				Needles of <i>Pinus sylvestris</i>	<i>Betula</i> spp. catkins buds	<i>Vaccinium myrtillus</i> leaves stems berries	
1	2.10.1973	♂	Kittilä	4	—	33	Pine needles, seeds of <i>En</i>
2	13.10.1963	♂	Vaala	15	—	46	Pine needles, stems of <i>Um</i>
3	18.10.1967		Pudasjärvi	—	43	19	Birch catkins, stems of <i>Um</i> , berries of <i>En</i>
4	18.10.1979	♂	Oulu	—	117	8	Not studied
5	25. 1.1962	♂	Taivaalkoski	—	105	12	Birch catkins and twigs
6	10.1981	♂	Oulainen	—	—	—	Pine needles, parts of <i>En</i> and a twig of <i>Betula</i> sp.

TABLE 2. Numbers of food items found in the crops of 4 specimens of the hybrid *Lyrurus tetrrix* x *Lagopus lagopus* from Northern Finland and notes on the food in their gizzards. *En* = *Empetrum nigrum*, *Um* = *U Vaccinium myrtillus*, *Jf* = *Juncus filiformis*.

No.	Date of kill	Sex	Commune of kill	Crop contents								Gizzard contents	
				<i>Betula</i> spp. twigs	buds	<i>U Vaccinium myrtillus</i> stems	berries	<i>V. vitis-idaea</i> leaves	berries	<i>Salix</i> spp. twigs	<i>Ledum palustre</i> leaves		<i>Juncus</i> sp.
7	10.10.1981	♀	Inari	14	—	290	7	2	—	—	—	6	Birch twigs, stems of <i>Um</i> , seeds of <i>En</i> and <i>Jf</i>
8	12.10.1974	♂	Pello	—	—	125	—	—	10	—	16	—	Not studied
9	10.1972	♂	Enontekiö	—	—	—	—	—	—	—	—	—	Stems of <i>Um</i> , seeds of <i>En</i>
10	12.12.1975	♂	Muonio	303	70	226	—	—	—	402	—	—	Birch twigs, willow twigs

TABLE 3. Numbers of food items found in the crops of 2 specimens of the hybrid *Tetrao urogallus* x *Lagopus lagopus* from Northern Finland and notes on the food in their gizzards. *En* = *Empetrum nigrum*, *Um* = *U Vaccinium myrtillus*.

No.	Date of kill	Sex	Commune of kill	Crop contents									Gizzard contents	
				<i>Betula</i> spp. catkins	<i>Pinus sylvestris</i> needles	<i>Vaccinium myrtillus</i> stems	berries	<i>Empetrum nigrum</i> berries	<i>Calluna vulgaris</i> shoots	<i>Ledum palustre</i> leaves	<i>Carex</i> spp. leaves	seeds		
11	26. 9.1973	♂	Pello	—	—	40	27	—	—	—	—	—	—	Birch and willow twigs, seeds of <i>En</i>
12	16.10.1973	♂	Pello	50	10	126	—	40	10	3	6	350	—	Stems of <i>Um</i> , seeds of <i>En</i>

hybrid No. 10 (Table 2) had fed on *Salix* spp.

Tetraonids feeding on the typical woody winter diet may have difficulty in digesting and processing its resins (reviewed in Bryant & Kuropat 1980). The observation that the Black Grouse may occasionally feed on cones and needles of the Scots pine in normal conditions suggests that it has no major problems in dealing with their resins. Thus the hybrids may also be able to deal with mixtures of various resinous foods.

Such cases of natural hybridization afford clues to the inheritance of food selection patterns in gallinaceous birds. This subject is of special interest, since there are plans to develop hybrids of the type tetraonid x *Gallus domesticus*, which would eat needles and/or twigs and would also have the gamey flavour of a tetraonid.

Acknowledgements. The author wishes to express his sincere gratitude to Mr. Heikki Kangasperko for identification of the hybrids, to Miss Hannele Pulkinen, Mr. Raimo Saarelma and Mr. Paavo Tunkkari for technical assistance, and to Prof. Olli Halkka for stimulating discussions and critical reading of the manuscript.

Selostus: Kanalinturisteytymien ravinnosta

Tutkimuksessa selvitetään 12 Pohjois-Suomessa pyydetyn kanalinturisteytymän kuvun ja lihasmahan sisältöä. Kuudesta korpimetsosta (*Lyrurus tetrrix* x *Tetrao urogallus*) kaksi oli syönyt männynneulasia, metson talvista vakioravintoa, kolme taas koivunurpuja, tyypillistä teeren talviravintoa; yksi oli käyttänyt molempia ravintokohteita (taul. 1). Neljästä riekoteerestä (*Lyrurus tetrrix* x *Lagopus lagopus*) yksi oli syönyt sekä koivun että pajun oksia, siis molempien kantalajien perusravintoa (taul. 2). Kahdesta riekkometsosta (*Tetrao urogallus* x *Lagopus lagopus*) toinen oli syö-

nyt tyypillistä riekon ravintoa, toinen taas metsolle tunnusomaisesti myös männynneulasia (taul. 3). Tulosten perusteella risteytymien ravinnonvalintaa ohjaavat molempien kantalajien geenit.

References

- BRYANT, J. P. & P. J. KUROPAT 1980: Selection of winter forage by subarctic browsing vertebrates: The role of plant chemistry. — *Ann. Rev. Ecol. Syst.* 11:261—285.
- GRAY, A. P. 1958: Bird hybrids. A check-list with bibliography. — England.
- MARJAKANGAS, A. 1980: Miksi teeri hakoo mäntyjä? Onko ruokintaravinnossa puutteita? — *Metsästys ja kalastus* 1980(6): 20—22.
- MOSS, R. & I. HANSEN 1980: Grouse nutrition. — *Nutr. Abstr. Rev.* B 50:555—567.
- PULLIAINEN, E. 1965: Studies on the weight, food and feeding behaviour of the Partridge (*Perdix perdix* L.) in Finland. — *Ann. Acad. Sci. Fenn. (A IV)* 93:1—76.
- PULLIAINEN, E. 1970: Metsnon talviravinnon valinnasta ja koostumuksesta (Summary: Composition and selection of winter food by the Capercaillie (*Tetrao urogallus*) in northeastern Finnish Lapland). — *Suomen Riista* 22:67—72.
- PULLIAINEN, E. 1976: Small intestine and caeca lengths in the Willow Grouse (*Lagopus lagopus*) in Finnish Lapland. — *Ann. Zool. Fennici* 13:195—199.
- PULLIAINEN, E. 1979: Autumn and winter nutrition of the Capercaillie (*Tetrao urogallus*) in the northern Finnish taiga. — *In* T. W. I. LOVEL (ed.): *Woodland Grouse* 1978, pp. 92—97. Sudbury.
- PULLIAINEN, E. 1982: Differences in breeding, foraging and wintering strategies between the Capercaillie (*Tetrao urogallus* L.) and Willow Grouse (*Lagopus l. lagopus* L.) and their ecological and conservation importance. — *In* C. KEMPF (ed.): *Grand Tetras* (in press).
- PULLIAINEN, E. & J. IVANAINEN 1981: Winter nutrition of the Willow Grouse (*Lagopus lagopus* L.) in the extreme north of Finland. — *Ann. Zool. Fennici* 18:263—269.
- SEMENOV-TIAN-ŠANSKIJ, O. 1960: Ekologija terevinyh ptits. — *Tr. Lapl. Gos. Zapovednika* 5:1—318.

Received March 1982