

as compared with 53 km/d for the six day migrants (method B). This difference was to be expected, as the day migrants have to use part of the daylight hours for feeding and are more inclined to follow the topographical leading lines than are the night migrants. The irruptive species, and irregular and partial migrants travel particularly slowly. The average speed of the 12 species included in the table is only 26 km/d, and maximum speeds exceeding 100 km/d are recorded for only *Bombycilla garrulus*, *Regulus regulus*, *Aegolius funereus* and *Nucifraga caryocatactes*. The low speed of migration results from several features typical of the behaviour of these birds: (1) they keep strictly to topographical leading lines and prefer to make long detours rather than to cross extensive open areas; (2) they frequently reverse their direction under the influence of the wind conditions; (3) they pause or deviate from the direction of migration to exploit good food supplies found en route.

Considerable differences in the speed of migration may exist between adult and juvenile birds. In waders, for instance, adults migrate much faster than juveniles, as shown for the Dunlin *Calidris alpina* by Saurola (1980); of the birds ringed in Pori on the Finnish west coast and checked at Ottenby in Sweden, the adults had covered this distance of 660 km in 3–6 days, on average 4.5 ($N = 6$), and the juveniles in 4–25 days, on average 13 ($N = 19$). In the present report, however, age and sex differences in migratory speed have not been analysed.

Selostus: Suomessa rengastettujen lintujen syysmuutonopeudesta

Tiedonantoon on koottu suomalaisista rengaslinnuista elokuuhun 1982 mennessä kertyneet syysmuuton nopeutta valaisevat löydöt. Epätavallisten ja epäluotettavien tietojen karsimiseksi aineistoon hyväksyttiin vain tietyt ehdot täyttävät löydöt. Tärkeimmät ehdot olivat: lintu rengastettu ja löydetty alle 50 vrk:n ja

kullekin lajille määritetyn syysmuuttokauden kuluessa; rengastus- ja löytöpaikkojen etäisyys vähintään 50 km; löytötiedot täsmällisesti ilmoitetut; lintu löydettyessä ei mätä.

Taulukossa on esitetty keski- ja huippunopeudet (km/vrk) kaikista niistä lajeista, joista em. ehdot täyttäviä löytöjä on vähintään viisi. Keskinopeus on laskettu kahdella tavalla: $A =$ kaikkien yksilöiden keskinopeuksien keskiarvo, $B =$ kaikkien yksilöiden muuttomatkojen summa jaettuna kestoajojen summalla. Menetelmän B katsotaan vastaavan paremmin lintujen keskinopeutta koko muuttomatalla, siihen kuuluvine lepotaukoineen. Menetelmien antama ero on suuri monilla kahlaajilla, jotka taittavat pitkiä taipaleita pysähtymättä, ja pieni tasaisemmin matkaavilla varpuslinnuilla.

Keskinopeudet ovat yleensä huippunopeuksia paljon alhaisempia, mihin lepotaukojen lisäksi vaikuttavat sääolojen mukaan vaihtelevat lentosuunnat ja laajatkin kiertomatkat. Kahlaajat ovat nopeimpia muuttajia, varpuslinnuista yömuuttajat matkaavat nopeammin kuin päivämuuttajat, ja erityisen hitaita ovat vaelluslinnut ja osittaismuuttajat.

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Changes in the roosting habits of a pheasant *Phasianus colchicus* population in winter

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The Itä-Pakila allotments in Helsinki, where I have systematically studied Pheasants since 1970, are the winter quarters of the local population; the neighbourhood broods and

other individuals gather there in October–November. The population is highest at the beginning of winter (Table 1), but by spring only 50–80 % remain due to fatalities. The

TABLE 1. The number of Pheasants in different roosts.

Winter	Observation days	Size of population at the beginning of winter	Number of individual Pheasants in different roosts					
			Spruce		Deciduous tree or top of hedge		Snow roost	
			Maximum	Average	Maximum	Average	Maximum	Average
1970—74	37 ¹	38—43	43	25.6	—	—	—	—
1974—75	53	43	43	24.4	5	2.7	—	—
1975—76	30	38	30	26.2	11	4.2	—	—
1976—77	32	38	33	15.3	6	3.4	6	0.6
1977—78	29	33	33	8.8	6	3.2	1	0.8
1978—79	28	30	12	7.3	9	5.8	3	0.6
1979—80	32	31	5	3.3	15	7.1	3	2.1
1980—81	28	42	11	3.0	30	13.4	12	2.5
1981—82	33	46	4	0.8	36	18.5	3	1.8

¹ Average of the four winters

population may be temporarily dispersed by sudden, heavy snowfalls, as happened particularly in the last two winters. For instance, from 13 to 16 December 1981, 45 cm of snow fell, completely scattering the population, which spent the next few weeks within a 1—1.5 km radius of the allotments. The first individuals returned on 28 January and the last at the beginning of March.

The winter daily rhythm of the Pheasants in the study area followed a set pattern until spring 1974: the birds spent the days in the allotments, mainly resting, and roosted in spruces on the edge of a wood 100—300 m to the north. The 20—25 m diameter roost of the cocks was separated from that of the hens by a 20—25 m boundary zone (Lehtonen 1975).

Since autumn 1974, some of the Pheasants have begun roosting permanently on the branches of the allotment apple trees, the top of hawthorn hedges and occasionally on horizontal wooden scaffolding (Table 1; Fig. 1). The number roosting in deciduous trees and bushes grew slowly at first but increased rapidly from 1978 to an average of 88% in the winter of 1981—82. The groups of 2—8 (sometimes even 12) birds usually contain individuals of both sexes. The roost in the spruces has almost completely disappeared.

The literature emphasises that Pheasants prefer roosting in dense spruces as these offer good cover (Raitasuo 1977). This preference is

probably not particularly strong, since the Itä-Pakila population have begun to favour completely open roosts. The same change has been taking place since winter 1980—81 in nearby Tuomarinkylä, where the winter population (28 in December 1981) roosts predominately in aspens and other deciduous trees. I have not found any evidence for the report that Pheasants prefer roosting in old Magpie nests (v. Haartman et al. 1967).

Pheasants roosting together always maintain a gap of over 10 cm between individuals. I have not observed competition for the best roosting places leading to their occupation by the dominant individuals in the group hierarchy (Raitasuo 1977). On the contrary, careful observation has shown that the roosting place of certain individually known Pheasants changes arbitrarily on different nights in relation to other group members.

Roosting Pheasants keep the day position, with neck raised and feathers tightly pressed against the body, for 5—20 minutes and sometimes even 1.5—2.0 hours. Then they fluff themselves up, arch their backs and, pulling in their necks, bend forward into the sleeping position. Contrary to the report of Kroll (1973), Pheasants never sleep with their head under their wing. Neither have I observed that "the birds close their eyes approximately and hour after beginning to roost" (Raitasuo 1977). Hundreds of my observations show that Pheasants' eyes stay open during the middle of the night



FIG. 1. Group of Pheasants roosting in an apple tree. — Photo L. Lehtonen.

and even in the early hours of the morning. To test the sight observations, I photographed two hens in the sleeping position from over 50 m away, by remote control, on 22 November 1981, at hourly intervals from 19.00 to midnight. The Pheasants' eyes were open in every photograph.

Roosting in snow was first confirmed on 20 December 1976 (Table 1). Pheasants roost in this way mainly in cold, windy weather. The roosting hole, usually 8–12 cm, exceptionally even 25 cm deep, is generally close to a bush (Fig. 2). The bird digs the normally steep-sided hole by kicking the snow backwards and turning around in the hole. The hole is nearly always open but, during snowstorms, drifting snow may cover the bird completely. On 4 January 1982, at 08.65, I found a hen Pheasant accidentally when my boot touched something soft in the snow. A moment later the bird broke through the 30 cm thick snow and flew off quickly.

In unfavourable conditions the Pheasant may dig a tunnel, partially roofed and under 30 cm long, in the soft snow of a slope or side of a ditch, using its beak and pushing with the front of its body (28.12.1977 and 15.1.1982). It places its head towards the end of the tunnel with its tail sticking out. The Pheasant almost always spends just one night in the snow, though when there is a hard frost and snowstorms it may spend up to two days.

During severe frosts some Pheasants sink into a state of hypothermia, or something resembling it, completely losing their reaction sensitivity (Lehtonen 1975). I have observed this only twice amongst birds roosting in

snow: 21.1.1979 (-16°C) and 27.1.1980 (-20°C). On the earlier occasion, at 07.00, I was checking the roosting Pheasants when my dog led me to a hawthorn hedge where a hen Pheasant lay fluffed up in a hole. The dog sniffed at the bird from 10–15 cm away for about 20 seconds and then began to bark. Despite the noise, the Pheasant, eyes open, did not react at all. When I revisited the place at 09.09, the bird had gone. Intensity in roosting Pheasants is an exceptional phenomenon. Even though the escape reaction weakens at night, birds roosting in snow normally flee from people and dogs at 5–20 m distance.

A probable reason for the change in the night habitat of the Itä-Pakila Pheasants is the presence of 1–2 Goshawks *Accipiter gentilis* in the area in winter. On the first occasion, 13.2.1973, 17.03–17.06, a female Goshawk was seen to try to prey on the roosting Pheasants, causing them to fly off in panic. Many of them fled to the day territory, where they remained restless for at least 1–2 hours. Repeatedly after this the Goshawks attacked the roosting Pheasants. To avoid the danger, some of the Pheasants began in the winter of 1974–75 to roost in the day territory and were later joined by almost the whole population.

The branches of the apple trees and tops of the hawthorn hedges of the roost do not offer as good protection from the wind and cold as do the dense spruces, but they are much safer, as it is easy to see approaching raptors from a distance. Roosting in the snow is probably due to the better protection it affords in severe weather conditions than the tops of the hedges and branches of the deciduous trees.



FIG. 2. A hen Pheasant roosting in snow. — Photo L. Lehtonen.

Selostus: Fasaanikannan muuttuneista yöpymistavolista talvella

Kirjoitus perustuu Helsingin Itä-Pakilan siirtolapuutarhan 30—46 yksilön fasaanipopulaation talvien yöpymistapojen tutkimiseen vuosina 1970—82. Alunperin linnut nukkuivat kuusikossa, missä ♂♂:lla oli halkaisijaltaan 20—25 m:n laajuinen ja ♀♀:lla niistä 20—25 m:n päässä oleva samansuuruinen yöveviiri. Syksystä 1974 lähtien osa linnuista alkoi yöpyä siirtolapuutarhan omenapuiden oksilla (kuva 1) ja orapihlaja-aitojen päällä, minne lähes kaikki siirtyivät talveen 1981/82 mennessä (taul. 1). Vuodesta 1976 lähtien jotkut fasaanit ovat epäsuotuisien sääolojen vallitessa viettäneet yön lumikuopassa (kuva 2), jonka ne muovaavat pehmeään hankeen potkimalla lunta taaksepäin ja kieppumalla paikallaan ympäri. Talvimyrskyjen aikana tuuli saattaa kasata lunta lintujen päälle niin että ne jäävät kokonaan hangen peittoon.

Päivisin Itä-Pakilan fasaanit ovat arkoja (pakoetäisyys 15—30 m), mutta öisin niiden reaktioherkkyys heikkenee (pakoetäisyys 1—3 m). Ankarien pakkasjaksojen aikana jotkut yksilöt vaipuvat hypotermiaan tai sitä muis-

tuttavaan tilaan, jolloin ne eivät reagoi lainkaan edes räikeään häirintään.

Todennäköisenä syynä yöveviirin siirtymiseen tuuheasta kuusikosta avoimempaan lehtipuumaastoon oli se, että saalistava kanahaukka pääsi helposti yllättämään kuudessa lepäävät fasaanit. Lehtipuissa uniasentoiset, mutta silmänsä läpi yön auki pitävät fasaanit sen sijaan näkevät lähestyvän vihollisen jo kaukaa. Lumikiepeissä yöpyminen puolestaan johtuu hangen tarjoamasta lämmön- ja tuulensuojasta.

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Chemical composition of plant matter eaten by young chicks of the Willow Grouse *Lagopus lagopus* in northern Finland

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In contrast to the precocial chicks of many other gallinaceous birds, those of the Willow Grouse eat considerable amounts of plant matter during the first days of their lives (Lid & Meidell 1933, Spidsø 1980, Myrberget 1981). This makes it desirable to pay some attention to both the digestive system of these chicks and the chemical composition of their plant food. This paper is a preliminary report of studies on the nutritive value of the plant matter eaten by young Willow Grouse chicks in Eastern Finnish Forest Lapland.

Six Willow Grouse chicks were caught in the Värriötunturi fell area in summer 1981. Their crop contents were analysed immediately to discover which were the main plant components. These plant parts (spore capsules of *Polytrichum commune*, leaves and flowers of *Vaccinium uliginosum*) were collected at the killing sites on the following day, stored in plastic bags at -20°C and analysed by Viljavuuspalvelu Oy in autumn 1981 (for methods, see Pulliainen 1978).

The data support the earlier finding that spore capsules of Bryophyta generally constitute at least a third of the diet of very young Willow Grouse chicks, their proportion decreasing with increasing age (Lid & Meidell 1933, Spidsø 1980). Spore capsules of *Polytrichum commune* are most common, but those of *Bryum* and *Pohlia* are also eaten (Table 1; cf. Spidsø 1980).

Even one-day-old chicks eat considerable amounts of spore capsules (Table 1), which appear to be rich in sugars (56%) and potassium (10 mg/g), but poor in crude protein (7%), crude fat (4%) and phosphorus (1.8 mg/g) (Table 2). They are very soft, which suggests that their digestibility is high, and they probably provide the energy needed by the chicks to keep up their body temperature in cold weather when they are not being brooded (see Myhre et al. 1975). The chicks evidently select spore capsules for their sugar content rather than for their protein or P content.