

On the breeding of the Pine Grosbeak *Pinicola enucleator* in NE Finland¹

ERKKI PULLIAINEN

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The paper is based mainly on 37 nest records made in Itäkaira, NE Finland, in 1971—78. The interval between the arrival (February and early March) of migrants and the onset of egg-laying (late May and early June) appears to be the longest among the northern passerine birds. Spruce-dominated forests were favourite nesting habitats and spruces favourite nest sites. The eggs were laid at intervals of 1—2 days. Complete clutches contained 2—5 eggs, 4 being the most usual number. No seasonal change was found in the clutch size. The incubation period was 13—15 days and the nestling period 13—17 days. The flushing distance of an incubating female was only 0—30 cm. Young fledged from about one third of the clutches laid.

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

Introduction

The range of the Pine Grosbeak *Pinicola enucleator* is confined to northern parts of the coniferous forests of Europe, northern Asia and North America (Voous 1960). The northern distribution of the species is perhaps one of the reasons why its breeding biology is so poorly known (see e.g. the reviews by Dement'ev & Gladkov 1954, v. Haartman et al. 1963—72, Holmström 1963, Bent et al. 1968, v. Haartman 1969, Haftorn 1971, Newton 1972). The published information consists mainly of scattered notes on nest finds (e.g. Montell 1917, Vladimirskaia 1948, Tenovuo 1955, Holm 1970, Pulliainen & Hakanen 1972). St. Quintin (1906), Bernhoft-Osa (1956, 1960) and Adkisson (1977)

have studied the breeding of Pine Grosbeaks in captivity. The present author has made observations on the breeding biology of the species in eastern Itäkaira, NE Finland, since 1971, and this paper reports the results obtained so far.

Material and methods

In summers 1971—78, field observations were made on Pine Grosbeaks in the surroundings of the Värriö Subarctic Research Station (67°44'N, 29°37'E). The author and other members of the staff of the Research Station moved daily in the study area, which comprises pure spruce (*Picea abies*) and pure pine (*Pinus sylvestris*) forests and mixed forests of spruce,

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pine and birch (*Betula* spp.), as well as bogs, subalpine birch forests and alpine summits of fells. During these years 37 nests of the Pine Grosbeak were found, some of which, however, yielded very scanty data. Observations on these birds were made during the other seasons as well, although not daily.

Results

Arrival. In 1971—78, no Pine Grosbeaks were observed in the study area from November to January. Closer attention was paid to their arrival in two of the years. In 1973 the first individuals were seen on 4 February (Pulliainen 1974) and in 1974 on 24 February. In 1975—78, they arrived either in February or in early March, but daily observations were not made.

Nesting habitats and nest sites. The nesting habitats of 37 Pine Grosbeak pairs in the study area were:

Spruce or spruce-dominated mixed forests	No. of pairs	%
— at edge of bog	9	24
— in ravine with brook or river	18	49
— on flat terrain	6	16
Pine or pine-dominated mixed forests on a hill	4	11

The birds thus clearly preferred spruce and spruce-dominated forests, especially in moist places. Not a single pair was found in pure mountain birch forest, but some at the upper edge of the coniferous forest zone (alt. ca. 415 m) on the slope of a fell.

Of the 37 nests found, 32 were in spruces, 3 in pines, 1 in a juniper and 1 in an unknown site, probably a juniper. The heights of the nests above the ground were:

<1	1.0-1.9	2.0-2.9	3.0-3.9	4.0-4.9	5.0-5.9	>6 m
1	6	12	4	9	3	1

Of 28 nests, 23 were adjacent to the main trunk of the tree, two at a distance of 5 cm, one 30 cm, one 50 cm and one 120 cm from it. Two nests were situated in a fork of the trunk and one on the branches of two spruces growing side by side. Of the 26 nests only one was on the northern side of the main trunk, and the bulk in southerly directions from it:

N	NE	E	SE	S	SW	W	NE
1	—	2	3	10	4	6	—

All the three nests found in pines were situated in relatively young trees and easily detected by man, while the nests in spruces were mostly very difficult to detect, because they were situated in the part of the tree where the branches formed a "thicket".

Nest. Four of the five nest bowls studied were asymmetric, the mean measurements being 7.8×7.4 cm (range $9 \times 7.5 - 7 \times 6.5$). The mean depth of the nest bowl was 3.3 cm (range 2.8—3.8). The weight of the nest varied between 21.2 and 58.5 g. The width of the nest bowl was of the same magnitude as that ("70—80 mm") reported by Haftorn (1971), but the depth was smaller than that ("40—50 mm") mentioned by him. The inflexible dead twigs projecting in all directions in the outer part of the nest made it impractical to record the dimensions of the whole nest. Haftorn (1971) reported the diameter as 110—160 mm.

The bowl was made mainly of dry grass and only one of the six nests studied contained some green grass (Table 1). The bottom of the nest bowl was always thin, and its loose structure explains the occasional asymmetry of the nest bowl. The building material found in the present nests is similar to that reported by

TABLE 1. Composition (% of air-dry weight) of the two layers in six nests of the Pine Grosbeak in Itäkaira, NE Finland, in 1978.

Building material	Inner layer		Outer layer	
	Mean	Range	Mean	Range
Dry (and/or green) grass	72	32—100	—	—
Green moss	1	0—4	—	—
Beard moss	5	0—27	—	—
Roots of <i>Vaccinium myrtillus</i>	7	0—39	1	0—3
Dry, dead spruce twigs	7	0—14	62	32—85
Stems of <i>U. uliginosum</i>	—	—	11	1—29
Shoots of juniper	9	0—54	8	0—25
Shoots of Scots pine	—	—	2	0—10
Needles of Scots pine	—	—	+	0—2
Stems of <i>Linnea borealis</i>	—	—	8	0—28
Dry, dead birch twigs	—	—	7	0—19
Shoots of <i>Empetrum hermaphroditum</i>	—	—	+	0—3

other authors (see Montell 1917, Dement'ev & Gladkov 1954, Haftorn 1971).

Egg-laying and clutch size. Eggs were laid with an interval of ca. one day in seven cases and with an interval of ca. two days in one case. Egg-laying started in late May or early June, repeat egg-laying occurring till the end of June (Fig. 1). No evidence of a second clutch has so far been obtained (cf. v. Haartman et al. 1963—72).

The most usual size of completed clutches was 4 eggs, the mean clutch size being 3.8 (Table 2).

Incubation. In the 16 nests checked

during the incubation period, the female was found sitting on the eggs 76 times, the male never; on 20 occasions there was no parent in the nest. The incubating females were generally very unshy, their flushing distance varying between 0 and 30 cm. Some even let themselves be taken by hand from the nest and put back to incubate! The males were also rather unshy during this season, but did not allow themselves to be caught by hand. They were seen either sitting on a branch near the nest or moving around in its vicinity.

The lengths of four incubation periods were 13, 14, 15 and at least 14 days, i.e. ca. 14 days on average. For captive birds, Bernhoft-Osa (1960) re-

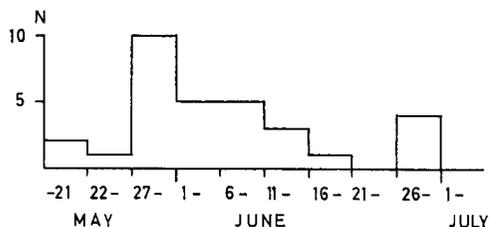


FIG. 1. Commencement of egg-laying in nests of the Pine Grosbeak in Itäkaira, NE Finland, in 1972—78.

TABLE 2. Clutch size of the Pine Grosbeak in Itäkaira, NE Finland.

Onset of egg-laying	Clutch size				\bar{x}	N
	2	3	4	5		
—31 May	1	1	9	—	3.7	11
1—10 June	—	—	6	—	4.0	6
11—20 June	—	2	2	—	3.5	4
21 June—	—	—	1	1	4.5	2
Total	1	3	18	1	3.8	23

ported an incubation period of ca. 13 days and Adkisson (1977) 13–14 days. Both authors observed that only the hen incubated, but according to Løvenskiold (v. Haartman et al. 1963–72), the male may occasionally take a share.

Hatching and nestling period. In four cases hatching took place within one day and in four cases it lasted 1–2 days. Of 55 eggs incubated for the full time, 49 (89%) hatched.

The length of the nestling period varied as follows: once 13, twice 14, twice 15, once 16 and once 17 (only one chick in the last nest!) days. Earlier records are available only for captive birds: slightly more than 14 days (St. Quintin 1906, Bernhoft-Osa 1960) or 15–18 days (Adkisson 1977).

Nesting success. The success of 23 clutches is known. Little more than one third of the clutches survived to the date of fledging (Table 3). The main predator was the Siberian Jay *Perisoreus infaustus* (see also Pulliainen & Hakanen 1972), which breeds abundantly in the study area. It is not known whether there was any predation by the Raven *Corvus corax* (nests regularly in the area), the Hooded Crow *Corvus corone* (one pair nesting in the middle of the study area since 1973), the Pine Marten *Martes martes* or the Red Squirrel *Sciurus vulgaris*.

Discussion

v. Haartman et al. (1963–72) concluded that the Pine Grosbeak is a migratory bird in Lapland, and this agrees with all the data so far obtained from northern Fennoscandia north of the Arctic Circle (Munsterhjelm 1910, Montell 1917, Kurkisola

TABLE 3. Success of 23 clutches of the Pine Grosbeak in Itäkaira, NE Finland.

Success	No.	%
Young left the nest	9	39
Robbed during the egg-laying or incubation period	7	30
Abandoned during the egg-laying or incubation period	1	4
Robbed during the nestling period	4	17
Abandoned during the nestling period	1	4
Nest fell from tree	1	4

1947, Vladimirskaia 1948, Ottow 1949, Holm 1970, Haftorn 1971, the present study). But these birds may overwinter in the area only ca. 100 km south of the Circle if enough food (e.g. rowan-berries) is available (Grenquist 1947, Komonen 1950). The migrants return to their breeding area as early as in February or the beginning of March (see references quoted above). In Lapland they feed mainly on spruce buds (Holmström 1963, Haftorn 1971, Pulliainen 1974). Although this food was also there during the absence of the Pine Grosbeaks, it was often covered by snow or rime. This, together with the scarcity of rowan-berries and the short daylight period around the turn of the year, may make conditions too unfavourable for the Pine Grosbeaks and force them to migrate.

Among the passerine birds of northern Fennoscandia, the Pine Grosbeak has the longest interval between the arrival of migrants and the onset of egg-laying (Fig. 2). For most northern passerines this interval is very short (see the review by Irving 1972). In some other respects, too, the Pine Grosbeak differs from the common passerine behaviour pattern. It does not form pairs or occupy territories until in early May (Dement'ev & Gladkov 1954). As the birds do not need early territoriality (see e.g. v.

Haartman 1968), there is evidently no lack of suitable territories for a long time. However, if male Pine Grosbeaks in captivity are put near each other during the breeding season, they may fight for long spells (Adkisson 1977).

In the present study area a variety of nesting habitats were almost equally available to the Pine Grosbeaks, but they clearly preferred spruce-dominated forests, though pine-dominated forests were also accepted. No nests were found in pure mountain birch forest. Thus the situation is very similar to that in NW Finland (Montell 1917) and in the adjacent Lapland Game Preserve, Kola Peninsula (Vladimirskaja 1948). This species may, however, nest in the subarctic birch forests, either regularly (in northernmost Norway, Haftorn 1971) or sporadically (Vladimirskaja 1948, Tenovuo 1955, Holmström 1963, v. Haartman et al. 1963—72, Holm 1970). In coniferous forests the nests are mostly in spruces (Montell 1917, Dement'ev & Gladkov 1954, Holmström 1963, Holm 1970, the present study; cf. v. Haartman et al. 1963—72, v. Haartman 1969) and in birch forests mostly in birches or in junipers (v. Haartman et al. 1963—72, Holm 1970, Haftorn 1971).

In northern Fennoscandia the Siberian Jay is the worst enemy of the Pine Grosbeak (Pulliainen & Hakanen 1972, the present study). When searching for food in conifers Siberian Jays jump upwards from branch to branch. The bulk of the nests of the Pine Grosbeak are situated either in the dense upper part of the crowns of relatively small spruces or on the lower branches of young pines (Montell 1917, Holm 1970, the present study), where the searching technique of the

Siberian Jays may make it difficult to find them.

The nests of the Pine Grosbeak are mainly on the S, SW and SE sides of the conifers (Fig. 1), where in Lapland the branches are generally longer and more leafy. The thrushes (*Turdus* spp.) also build their nests mostly on the same sides of the conifers (Pulliainen 1978).

Montell (1917) reported that the clutch size of the Pine Grosbeak is "3—4 eggs, never more". Since then clutches of 5 eggs have been found, although seldom (see Dement'ev & Gladkov 1954, Holmström 1963, v. Haartman et al. 1963—72, v. Haartman 1969, Holm 1970, Haftorn 1971, Newton 1972). v. Haartman (1969) reported the mean size of all clutches known to him as 3.8, and that of seven clutches known to be completed as 3.3. During the present study (Table 2) the mean clutch size of 23 completed clutches was 3.8.

In his review of clutch size in birds, Klomp (1970) reported that most bird species show a seasonal change in clutch size. He found only five exceptions, none of which was a passerine species. The present data (Table 2) and other observations made in northern Fennoscandia (Munsterhjelm 1910, Montell 1917, Ottow 1949, Tenovuo 1955, v. Haartman 1969) suggest that there is no seasonal change in the clutch size of the Pine Grosbeak. The zone where this species nests in Fennoscandia is very narrow. Egg-laying begins more or less simultaneously in late May and early June (Montell 1917, Holmström 1963, v. Haartman et al. 1963—72, v. Haartman 1969, Haftorn 1971, the present study) throughout this zone, and also in other parts of the range in Eurasia (Dement'ev & Gladkov 1954). Thus it is natural that the clutch size should

be maximal for the species at that time. It is noteworthy that repeat clutches appear to be of the same size.

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Selustus: Taviokuurnan pesimäbiologiasta Koillis-Suomessa

Taviokuurnan pesimäbiologiaa on tutkittu Itäkairan itäosassa (67°44'N, 29°37'E) vuosina 1971—78, jolloin löydettiin yhteensä 37 pesää. Alueella ei ole tavattu taviokuurnia marras-tammikuussa. Muuttajat palaavat helmikuussa tai maaliskuun alussa, mutta pesiminen alkaa vasta toukokuun loppussa tai kesäkuun alussa. Tämä on pisin tunnettu aika kevätmuuton päättymisen ja muninnan alkamisen välillä pohjoisessa pesivillä varpuslinnuilla. Näyttää ilmeiseltä, että lajilla ei ole pitkään aikaan ollut puutetta sopivista pesimäreviireistä tällä alueella.

Taviokuurnille oli tarjolla pesimispaikoiksi kuusi-, mänty-, koivu- ja sekametsiä sekä erilaisia soita ja tunturipaljakoita. Ne suosivat selvästi kuusivaltaisista, kosteilla paikoilla kasvavia metsiä. Etsinnöistä huolimatta yhtään pesää ei löydetty tunturikoivuöhykkeestä. 86 % pesistä sijaitsi kuusissa, usein tuuheiden oksien muodostamassa ”tiheikössä”. Pesät sijaitsivat useimmiten 1—5 m korkeudella maasta oksan päällä rungon vieressä sen eteläpuolella, missä Lapin havupuiden oksat ovat pitemmät ja tuuheimmat kuin rungon pohjoispuolella.

Muniminen tapahtui 1—2 vuorokauden välein. Munaluku vaihteli rajoissa 2—5, keskiarvo 3.8. Uusintapesintää esiintyi kesäkuun loppuun saakka. Tämän aineiston ja muiden käytettävissä olevien havaintojen mukaan munaluku ei näytä muuttuvan lyhyen pesimiskauden aikana. Haudonta kesti 13—15 ja pesäpoikasaika 13—17 vrk. Hautovan naaraan pakoetäisyys oli vain 0—30 cm. Eräät naaraat antoivat ottaa itsensä käteen ja asettaa takaisin hautomaan. Koiraat olivat hiukan arempia. Hiukan yli kolmasosasta pesistä lähti poikasia lentoon. Kuukeli on taviokuurnan pesien pahin ryöstelijä tutkimusalueella.

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