

Parental care of a pair of Pine Grosbeaks *Pinicola enucleator* during the nestling period¹

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Both parents fed the young from their crops. The female was also fed by the male near the nest. Between 02.00 and 20.00 there was no difference in feeding activity between the two parents. During this period the mean interval between two feedings was about half an hour. The feedings occurred at rather regular intervals throughout this period. The mean number of times the young were fed per 24 hours was 41.6. The feeding ceased around midnight. The length of this ceccation period was the same (on average 6.2 hrs) for the two parents. The male stopped feeding on average an hour earlier than the female and began also about an hour earlier. The timing of the feeding rest is assumed to be mainly determined by light.

Introduction

Only the general characteristics of the Pine Grosbeak's *Pinicola enucleator* biology are known (see e.g. the reviews by BENT et al. 1968, HELMINEN et al. 1971, HAARTMAN et al. 1972). MONTTELL (1917) reported data on nests of the species found in northwestern Lapland. GRENQUIST (1947) studied its winter ecology, while BERNHOFT-Osa (1956, 1960) made observations on the nesting behaviour of a pair of Pine Grosbeaks in captivity.

In the summer of 1972 an opportunity arose to study the parental care of a pair of Pine Grosbeaks with nestlings in northeastern Lapland. The present paper describes the results of these studies.

Methods

The study was carried out near the Värriö Subarctic Research Station, NE-Lapland (67°45' N, 29°45' E), during the period 28.6.—8.7. 1972. A nest (containing three young about four days old) of the Pine Grosbeak was found on June 28th about 350 m N of the

station, on the eastern slope of a hill covered by old Scots pine forest (385 m above sea level), at the height of 1.3 m in a young pine.

On June 28th a TV camera with remotely controlled zoom lens and a pan and tilt head was placed 2 m from the nest. The video-monitor and the remote control panel were situated inside the station building. The Pine Grosbeaks did not react to the slow movements of the camera and the low, monotonous sound produced by it. The same equipment was used by PULLIAINEN (1971) when studying the behaviour of a nesting Capercaillie *Tetrao urogallus* in the same terrain.

The two Pine Grosbeaks were individually marked by rings. During the period 29.6. (16.15)—8.7. (08.20) the times (per 15 minutes) of feeding the young by the parents and other visible behaviour patterns were recorded. Thunderstorms caused two gaps (at 06—07 on July 2nd and at 11.00—12.30 on July 3rd) in the otherwise continuous observations.

The young were weighed at about 8 a.m. every day.

Air temperature and relative humidity were recorded by a thermohygrograph at the meteorological station of the Research Station.

The study was carried out in continuous daylight. The top of the hill, however, prevented the sun being visible from the nest in the evening up to midnight.

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Results

The mean weight increase of the young during the eight days before departure from the nest is shown in Table 1. As the young grew, their daily weight gain gradually decreased. Just before departure from the nest the young weighed on average 36.5 g. On June 29th the adult male weighed 55.2 and the female 55.0 g.

Both parents fed the young by vomiting food from their crops, as reported by BERNHOFT-OSA (1960) and HAARTMAN et al. (1972). The young responded both to the sounds produced by the parents and to their arrival at the nest edge. If the female was sitting on the nest when the male arrived, she immediately arose and stood on the nest edge while the male fed the young. Each feeding lasted about one minute. On June 28th and July 2nd the male was seen feeding the female altogether three times while she was sitting on a branch of the pine tree. Courtship feeding has been observed both before (HAARTMAN et al. 1972) and during the incubation period (BERNHOFT-OSA 1960). On July 8th (11.50) after the departure of the young from the nest the parents fed each other on the nest tree.

Both parents carried away excrement produced by the young. After feeding

TABLE 1. Mean weights of Pine Grosbeak young over a period of eight days before departure from the nest. The figures for the period 30.6.—3.7.1972 represent the means of the weights of three individuals and those for the period 4.—8.7.1972 the weights of two nestlings.

| Date | Mean weight of young, g | Weight increase, g/day |
|-----------|-------------------------|------------------------|
| 30.6.1972 | 14.9 | 4.8 |
| 1.7.1972 | 19.7 | 4.6 |
| 2.7.1972 | 24.3 | 3.1 |
| 3.7.1972 | 27.4 | 2.7 |
| 4.7.1972 | 30.1 | 3.0 |
| 5.7.1972 | 33.1 | 2.4 |
| 6.7.1972 | 35.5 | 0.0 |
| 7.7.1972 | 35.5 | 1.0 |
| 8.7.1972 | 36.5 | |

the parents waited until the young defecated.

The composition of the food vomited by the adults could not be identified exactly with the TV system used. However, it seemed to contain at least some insect matter. The Pine Grosbeaks studied by BERNHOFT-OSA (1960) in captivity fed their young with both insect and plant matter.

The times at which first and last feedings of the young took place are shown in Table 2. The mean duration of the periods during which the parents

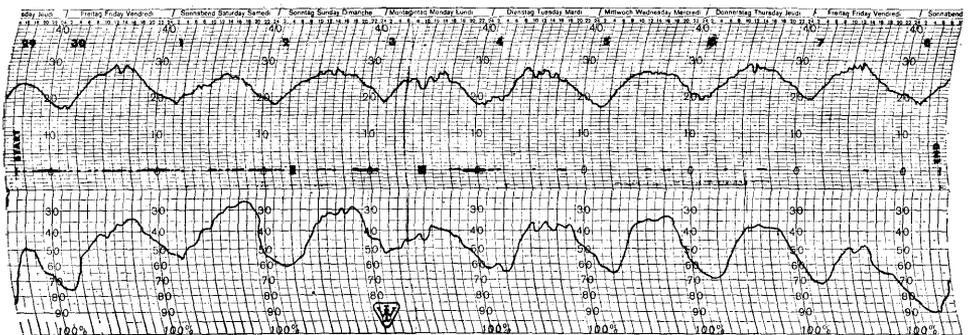


FIG. 1. Temperatures and relative humidities recorded by thermohygrograph during the period 29.6.—8.7.1972. The lines (in the graph at 0° line) show 15-minute-long periods during which the female Pine Grosbeak was seen sitting on the nest. Black columns show periods of no observation.

TABLE 2. The start and finish of feeding periods by the parents of the Pine Grosbeak and the duration of their nightly rest periods during the period 29.6.—8.7.1972 in NE-Lapland. The recording was performed for every 15-minute period.

| | Male | | | Female | | |
|-------|-------|--------|----------------|--------|--------|----------------|
| | Start | Finish | Rest in hrs | Start | Finish | Rest in hrs |
| 29.6. | — | 19.15 | 6.5 | — | 20.15 | 6.0 |
| 30.6. | 01.45 | 19.00 | 6.3 | 02.15 | 21.00 | 5.3 |
| 1.7. | 01.15 | 19.00 | 5.3 | 02.15 | 20.30 | 5.8 |
| 2.7. | 00.15 | 19.00 | 6.0 | 02.15 | 20.30 | 6.0 |
| 3.7. | 01.00 | 19.00 | 6.3 | 02.30 | 21.00 | 5.3 |
| 4.7. | 01.15 | 19.00 | 6.5 | 02.15 | 18.30 | 7.8 |
| 5.7. | 01.30 | 19.30 | 7.0 | 02.15 | 19.30 | 8.0 |
| 6.7. | 02.30 | 19.45 | 5.8 | 03.30 | 19.45 | 6.0 |
| 7.7. | 01.30 | 19.30 | 6.5 | 01.45 | 20.00 | 6.0 |
| 8.7. | 02.00 | — | | 02.00 | — | 6.0 |

rested from feeding were the same (6.2 h) for both parents. In the evening the male stopped feeding the young on average one hour earlier than the female and began feeding again about one hour earlier in the morning. It is worth noting that the long feeding rest did not take place during the coldest hours (usually between 2 and 6 a.m.) of the night (Fig. 1).

During the present study it was warm during the daytime (Fig. 1). Up to July 4th the female protected the young from heat loss at night by sitting on the nest and likewise sheltered the young during the daytime from the direct rays of the sun (Fig. 1). From July 4th the plumage of the young already protected them to some extent from extremes of temperature.

The mean frequencies for feeding the young at different times of the day are shown in Fig. 2. Between 02.00 and 20.00 there was no difference in feeding frequency between the parents. In fact, the parents very often came together to feed the young and also left together. Between 02.00 and 20.00 the young were fed on average 2.2 times per hour. The young were fed at rather regular intervals throughout this period. The total daily number of feedings was on average 41.6.

The young left the nest on July 8th (08.20). Disturbance caused by weighing may have shortened to some extent the period spent in the nest. At 08.40 both parents, and at 09.43 the female, visited the empty nest.

On July 4th (01.51—01.54) a Siberian Jay *Perisoreus infaustus* was seen pecking the young with its bill. One of them died. The predator was driven away with the aid of the TV camera, which was moved rapidly by remote control.

The adults are very tame on the nest, as has been emphasized in many previous papers (e.g. BERNHOFT-Osa 1960, HELMINEN et al. 1971). The female could be taken out of its nest without showing any visible escape reaction.

Discussion

PEIPONEN (1970) divided the passerine birds he studied in subarctic conditions into three categories according to the timing of their daily feeding rest:

(1) Species whose feeding rest occurred symmetrically around midnight, suggesting that the rhythm was chiefly regulated by light; (2) Species whose feeding rest was concentrated or restricted to the early morning hours, occurring at the same time as the daily temperature mi-

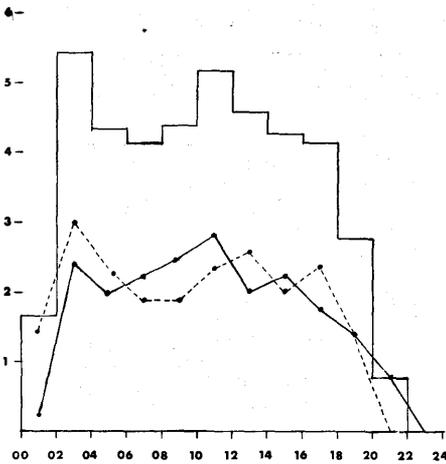


FIG. B. The mean frequencies of feedings of the young performed by the Pine Grosbeak mates. Broken line = male; solid line = female; columns = both sexes together. Vertical axis: number of feedings/two hours. Horizontal axis: time in hours.

nimum, when insect food, broadly speaking, is most difficult to obtain; (3) The Redwing *Turdus musicus* whose feeding rest occurred before midnight and whose feeding activity reached its peak during the hours immediately after midnight. The Pine Grosbeak seems to belong to the first group. Its continuous feeding rest occurs around midnight and seems to be determined by light. PEIPONEN (1970) classified *Carduelis flammea*, *Fringilla montifringilla*, *Motacilla alba*, *M. flava* and *Phylloscopus trochilus* as belonging to this category.

The continuous feeding rest of the Pine Grosbeak lasted on average six hours, whereas PEIPONEN (1970) reported that most passerines studied by him in Lapland in continuous summer daylight had a daily resting period of only 3–5 hours (see also LENNERSTEDT 1969).

The feeding frequency (about 42 times/day) of the young of the Pine Grosbeak is relatively low compared with that of many other passerine birds

in Lapland (see e.g. LENNERSTEDT 1969, PEIPONEN 1970). This is natural with species feeding from the crop.

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Taviokuurnaparin pesäpoikaskauden aikaista käyttäytymistä ja aktiivisuutta tutkittiin kenttä-TV-järjestelmän avulla kesällä 1972 Koillis-Lapissa (67°45'N, 29°45'E). Molemmat vanhemmat ruokkivat poikasiaan kuvustaan oksentamallaan ravintomassalla. Koiraan nähtiin ruokkivan myös naarasta pesäpuussa. Kello 02 ja 20 välisenä aikana ei todettu mitään eroa emolintujen välillä poikasten ruokkimisaktiivisuudessa. Tämän ajanjakson aikana ruokintakertojen välinen aikaero oli keskimäärin noin puoli tuntia. Ruokinnat jakautuivat tasaisesti jakson eri osiin. Emot ruokkivat poikasia yhteensä keskimäärin 41.6 kertaa vuorokauden aikana. Yhtäjaksoinen ruokintalepo ajoittui keskiyön molemmille puolille. Tämän jakson pituus oli sama (6.2 tuntia) molemmilla vanhemmilla. Koiras lopetti poikasten ruokkimisen keskimäärin tuntia aikaisemmin illalla kuin naaras ja aloitti sen myös tuntia aikaisemmin aamulla. Valaistuksen katsotaan pääasiallisesti säätelevän ruokintalevon ajoittumista. Yhden kolmesta poikasesta tappoi kuukkelii.

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