Change of habitat preference during the summer in certain passerines

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Two censuses were carried out on 18 plots in Itäkaira, NE Finnish Lapland, between 27 June and 13 August 1971. Additional data on *Motacilla flava thunbergi* were collected in Sodankylä in 1973. The six most abundant species could be grouped into three categories according to changes in habitat: (1) no apparent habitat change during the summer *(Turdus iliacus* and *Anthus pratensis),* (2) preferred habitat changed *(Phylloscopus trochilus* and *Carduelis flammea)* and (3) certain breeding habitats virtually abandoned during the summer *(Fringilla montifringilla* and *Motacilla flava).* It is suggested that food may be responsible for the habitat change of *Ph. trochilus, C. flammea* and *F. montifringilla,* whereas shelter may be decisive for *M. flava.*

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Introduction

Little is known about changes in habitat preference occurring during the summer in bird species. Such changes have been reported for the Redpoll *Carduelis flammea* (PEIPONEN 1957, 1962, 1967, HILDÉN 1969), the Fieldfare *Turdus pilaris* and the Siskin *Carduelis spinus* (v. HAARTMAN et al. 1963—72), the Crossbill *Loxia curvirostra* (HAAPANEN 1966) and the Linnet *Carduelis cannabina* (TAST 1968). However, except in the study of HAAPANEN (1966), attention has mainly been restricted to the breeding season. v. HAARTMAN (1969) observed that the same individual of the Pied Flycatcher *Ficedula hypoleuca* may nest in different types of forests in different years, and SOVERI (1940), who censused the bird fauna in the commune of Lammi in S Finland, has discussed the changes in habitats occurring from one season to another. However, changes of habitat preference during and immediately after the same breeding season have not previously been analysed statistically in Finland.

Material and methods

The census work was carried out in Itäkaira, NE Finnish Lapland (roughly 68°N and 29°E), between 27 June and 13 August 1971. Zoogeographically, the study area belongs to forest Lapland (MERIKALLIO 1958, JÄRVINEN & VÄISÄNEN 1973). The 18 study plots (each about 40 ha) were chosen from different forest types (KALELA 1961), peatland types (RUUHIJÄRVI 1960) and fell habitats (KALLIOLA 1961).

TABLE 1. The density (pairs/km², in brackets ind./km²) of different bird species in the five study habitats censused before 10 July.

Species	Birch HMT (84 ha)	Birch EMT (85 ha)	Pine EMT (88 ha)	Seedling EMT (40 ha)	Flark fen (84 ha)
Phylloscopus trochilus	104	46	31	8	6
Fringilla montifringilla	77	22	31	—	1
Carduelis flammea	5(+79)	1(+32)	—(+41)	3(+65)	2(+8)
Motacilla flava	7	16	1	3	55
Anthus pratensis	—	6	—	—	64
Turdus iliacus	8	8	6	15	1
Muscicapa striata	12	6	5	—	—
Tringa glareola	4	1	—	—	12
T. hypoleucos	8	6	—	—	—
Emberiza schoeniclus	6	8	—	—	—
Philomachus pugnax	2	—	—	—	12
Motacilla alba	8	4	—	—	—
Limicola falcinellus	—	—	—	—	12
Luscinia svecica	5	5	—	—	—
Phoenicurus phoenicurus	1	7	1	—	—
Oenanthe oenanthe	—	—	—	8	—
Turdus ericetorum	4	1	1	—	—
Anthus trivialis	4	1	—	—	—
Parus cinctus	—	—	5	—	—
Cuculus canorus	1	—	—	3	—
Ficedula hypoleuca	2	1	—	—	—
Emberiza rustica	1	1	—	—	—
Bucephala clangula	2	—	—	—	—
Anas crecca	1	1	—	—	—
Pluvialis apricaria	—	—	—	—	2
Numenius phaeopus	—	—	—	—	2
Capella gallinago	—	1	—	—	1
Tetrao urogallus	—	—	1	—	—
Lagopus lagopus	1	—	—	—	—
Parus montanus	1	—	—	—	—
Pinicola enucleator	—	1	—	—	—
Acrocephalus schoenobaenus	1	—	—	—	—
Lymnocryptes minimus	—	—	—	—	1
Loxia spp.	(16)	—	(32)	—	—
Perisoreus infaustus	(1)	(1)	—	—	—
Total	265(+96)	143(+33)	82(+73)	40(+65)	171(+8)

Forest sample plots

1. Birch-dominated *(Betula pubescens tortuosa)* HMT along a river (2 plots). Mainly HMT forest mixed with peatland, and EMT and MCCIT forest patches.

2. Birch-dominated EMT (2 plots). Mainly EMT forest with abundant *Salix* spp. close to rivers and brooks; peatland patches and traces of MCCIT forests at the edges.

3. Pine-dominated *(Pinus silvestris)* EMT (2 plots). EMT mixed with traces of HMT.

4. Seedling stand of EMT (1 plot). Mainly pines (up to 4 m).

5. MCCIT (3 plots). Dry, pine-dominated forests.

6. Spruce-dominated *(Picea abies)* HMT (1 plot). Fairly fertile forest.

7. Burned HMT (1 plot). Dead, partly burned *Picea.*

Peatland sample plots

8. Flark fen (2 plots). Almost treeless aapa

fen, small areas of open water *("rimpi")*, abundant hummock ridges.

9. Sedge fen (1 plot). Almost treeless aapa fen, a few hummock ridges and *"rimpis"*.

Fell sample plots

10. *Regio alpina* (2 plots). Treeless fell top, one of the plots covered with mountain heath, the other mainly with stones.

11. *Regio subalpina* (1 plot). Mountain birch forest.

The sample plots were surveyed twice during the summer, mostly during the daytime. During the first census (27 June to 23 July) the plots were studied by two observers (50 m apart). The time spent ranged from about 5 to 8.5 h per plot, depending on the habitat. The second census (26 July to 13 August) was carried out by the author, who spent at least two hours in each study plot. In homogeneous habitats, birds observed outside the plot during the survey were also included.

In this paper, only those plots that are important to the species in question are noted. For instance, the birch-dominated HMT and EMT are not considered in the case of the Grey-headed Wagtail *Motacilla flava thunbergi*, since the pairs were observed in peatland patches within these plots. For further information about the breeding season, timing of migration, study plots, census dates, weather and the methods applied, see SAARI (1973).

Additional observations on the Grey-headed Wagtail were made in the vicinity of Mutenia, near the Lokka reservoir in Sodankylä, between 30 May and 10 July, 1973.

The numbers of individuals and pairs observed in each species in different habitats during the first and the repeat census were compared statistically with the chi-squared test.

Results

In five habitats the census was carried out before 10 July; the results are given in Table 1. Because of habitat heterogeneity, certain species seem to occur in odd habitats, e.g. the Meadow Pipit *Anthus pratensis* and the Grey-headed Wagtail in birch-dominated EMT. Species and individual birds considered accidental (non-breeding) are omitted from the table (see SAARI 1973). However, the densities (individuals/km^2) of early breeders (the crossbills *Loxia* spp. and the Siberian Jay *Perisoreus infaustus)* are included.

The six most abundant species were chosen for a detailed analysis. They could be grouped into three categories according to changes in habitat: (1) no apparent habitat change, (2) preferred habitat changed and (3) certain breeding habitats abandoned (Fig. 1).

No apparent habitat change. The species of this category are the Redwing *Turdus iliacus* and the Meadow Pipit (differences between first and repeat censuses not significant in *T. iliacus*, though nearly significant, $P<0.05$, in *A. pratensis)*. Few birds were found in late summer, mainly owing to the decline of singing and warning activities, and also to their greater shyness, especially in the case of the Redwing. The nearly significant difference in the habitats of the Meadow Pipit was due to a slight decrease on the fens and an increase in drier habitats.

Preferred habitat changed. The Willow Warbler *Phylloscopus trochilus* and the Redpoll belong to this category (differences statistically highly significant). Willow Warblers moved partially from birch-dominated to coniferous habitats (mainly MCCIT). In my opinion, the change is real and not due to the circumstance that a silent individual would be harder to detect in a

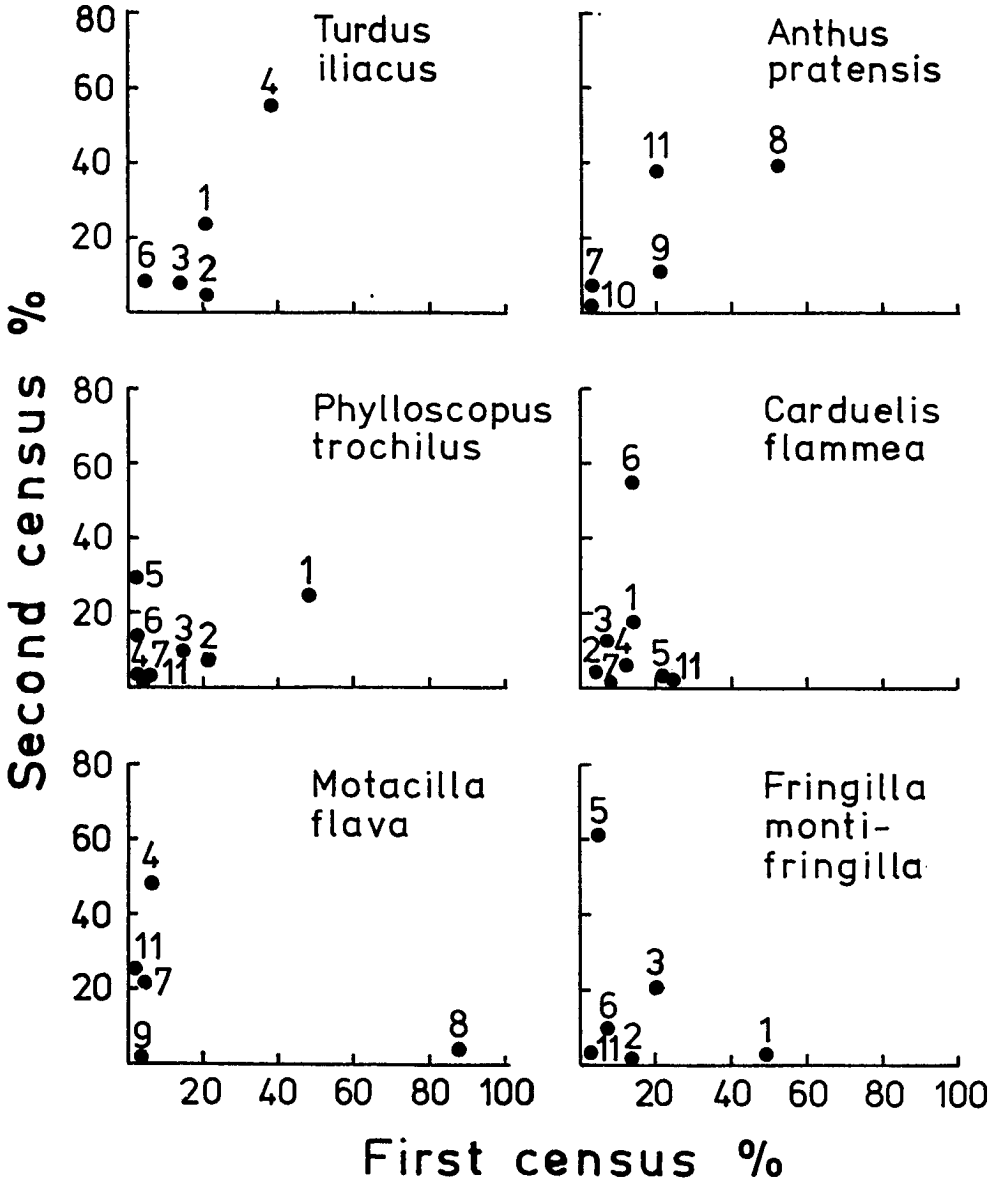

FIG. 1. Change of habitat preference during the summer. Vertical axis = percentages of individuals in the second census; horizontal axis = percentages of pairs in the first census. The percentages are based upon the following numbers of observations: Redwing: first census 39 pairs/second census 22 exx.; Meadow Pipit: 99 pairs/62 exx.; Willow Warbler: 216 pairs/50 exx.; Redpoll: 650 exx./224 exx.; Grey-headed Wagtail: 53 pairs/43 exx.; Brambling: 153 pairs/130 exx. The numbers above the dots indicate the habitats (see list of sample plots in text).

broadleaved than in a coniferous habitat. Redpolls moved partially from dry and open habitats to more fertile ones, mainly spruce-dominated HMT. In late summer, this species was virtually absent from the *regio subalpina*, whereas it abounded in spruce forests.

Certain breeding habitats abandoned. The Brambling *Fringilla montifringilla* and the Grey-headed Wagtail belong to this category (differences highly significant). Bramblings had almost completely left birch forests in late summer and big flocks were observed in coniferous forests, mainly in MCCIT. Grey-headed Wagtails had almost completely abandoned the fens and moved into fairly open but dry habitats, especially the *regio subalpina* and open and seedling forests stands. Similarly, several pairs (broods) had moved from their breeding fen to its pine-dominated edges in Mutenia by 6 July 1973. On 8 July, warning calls were heard from flocks of Grey-headed Wagtails, and it was my impression that the birds had moved, at least partly, into wooded habitats. It thus seems that the species leaves its nesting habitats on the open fens soon after the young have fledged and moves into wooded terrain. My own observations also indicate that, after their arrival in spring, the Grey-headed Wagtails do not settle down at once in the fens but stay in dry and open habitats and arrive in the fens only just before the onset of egg-laying.

Discussion

The habitat changes may be due to at least two factors, food requirements and the need for shelter. During the nestling period food requirements are high and the birds usually feed their young with protein-rich animal matter, choosing habitats which are suitable in this respect. The summer food of these species has not yet been studied in detail in the boreal zone of Lapland, but a change in diet during the summer has been reported in the following species studied by me: the Redpoll (PEIPONEN 1962), the Willow Warbler (KUUSISTO 1941) and the Brambling (v. HAARTMAN et al. 1963—72). In these species, food may be responsible for the habitat change. In the Grey-headed Wagtail, shelter may be critical because this species is fairly conspicuous and the observations made in 1973 suggest that it prefers the fens only when breeding. The Meadow Pipit, which prefers insect food, like the Grey-headed Wagtail, but has cryptic colouring remains on the fens to a much greater extent.

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Selostus: **Eräiden varpuslintujen biotoopinvaihto kesällä Metsä-Lapissa**

Kesällä 1971 laskettiin nk. Itäkairassa Koillis-Lapissa kahteen kertaan 18 näytealan (kukin n. 40 ha) linnusto. Ensimmäiset laskennat tehtiin 27.6.—23.7. ja uusintalaskennat 26.7.—13.8. Ensimmäisessä takseerauksessa kaksi havainnoitsijaa kävivät näytealat läpi linjoissa. Uusintalaskennassa yksi havainnoitsija vietti vähintään kaksi tuntia alalla. Näytealat ja menetelmät on kuvattu tarkemmin SAAREN (1973) opinnäytetyössä. Lisää aineistoa kerättiin keltavästäräkistä kesällä 1973 Sodankylässä. Muutamien biotooppien lintutiheydet on esitetty taulukossa 1.

Kuusi yleisintä lintulajia voitiin ryhmitellä

biotoopin vaihdon kannalta seuraavasti (kuva 1, jossa on vaaka-akselilla prosenttiosuus havainnoista ensi laskennassa ja pystyakselilla osuus toisessa laskennassa):

1. Biotooppi ei sanottavasti vaihdu kesän aikana: niittykirvinen ja punakylkirastas.
2. Biotoopin valinnassa muutoksia: pajulintu ja urpiainen.
3. Lajit, jotka häviävät eräiltä pesimäbiotoopeilta kokonaan: järripeippo ja keltavästäräkki.

Pajulinnun, urpiaisen ja järripeipon biotoopin vaihto riippunee ravinnosta, kun taas suoja saattaa olla ratkaisevana tekijänä keltavästäräkin biotoopin vaihtoon.

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