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Selostus: **Suuria elohopeapitoisuuksia Suomen merikotkissa.**

Pohdittaessa merikotkien viimeaikaisen vähenemisen syitä on tuotu esiin kasvinsuojeluaineiden eli biosidien aiheuttamien myrkytystilojen mahdollinen osuus pesintätulosta alentavana tekijänä. Kuuden kuolleena löytyneen merikotkan elimistä suoritetut kemialliset analyysit tukevat tätä olettamusta. Viiden keväällä ja kesällä 1966 löydetyn merikotkan sisältämät elohopeamäärät olivat niin suuria, että lintujen katsotaan kuolleen elohopeayhdisteistä aiheutuneeseen myrkytykseen. Mainituissa kotkissa todettiin myös suuria määriä kloorattuja hiilivetyjä. Täten biosidit näyttävät lisäävän aikuisten lintujen kuolleisuutta. Toisaalta on olemassa riittävät perusteet otaksua, että ne alentavat pesintätulosta. Merikotkien sisältämien biosidien arvellaan ainakin suurelta osalta olevan peräisin maamme rajojen ulkopuolelta. Nuoret kotkat voivat talvisilla muuttomatkoillaan kerätä niitä itseensä, ja toisaalta kotkan ravinnokseen käyttämät vesilinnut voivat elimistössään tuoda niitä meille talvehtimisalueiltaan.

Observations on the bird fauna in Koitilaiskaira (Finnish Lapland)

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Introduction

The observation area consists of a planned nature reserve around the fjeld Koitilainen north of the river Luiro (KemL), 67° 45′ N (Fig. 1). According to, for instance, MERIKALLIO (1958), the area lies in the southern part of Forest-Lapland (Metsä-Lappi).

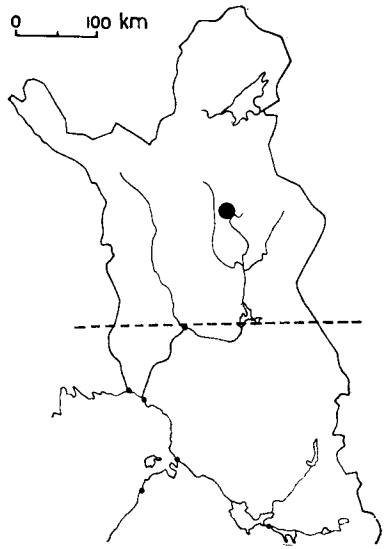

Fig. 1. The location of the study area to the north of the arctic circle.
Kuva 1. Tutkimusalueen sijainti.

MIKKOLA (1931) gives a melancholic picture of the area of Koitilaiskaira: »It is the most monotonous, the flattest, and worst of all Lapland one can ever find because of its endless and bottomless open bogs, pine swamps and forest lands covered by a soft rug of mosses; at the same time, however, it is a vast land, which shows all the severe and barren features of Forest-Lapland.»

The fjeld Koitilainen reaches 406 m above sea level and the surrounding lowlands lie at 200—250 m in altitude.

The forests of the area can be divided into two categories: lowland forests and forests of the fjeld slopes. Stands of the former category mainly occur on moist, fine sand and they are spruce dominated mixed stands with birch as second species on Hylocomium-Myrtillus site (HMT) (the forest site types according to KALELA (1961)). On the higher hills, there are also Empetrum-Myrtillus site (EMT) pine stands.

The stands on the lower slopes of Koitilaisfjeld represent Empetrum-Myrtillus site and higher up partly Myrtillus-Calluna-Cladina site (MCCIT) pine stands. There are also pine stands on rocky ground. Mountain birch stands, which agree with the subalpine Empetrum-

Myrtillus site (sEMT) (see HÄMET-AHTI, 1963) and bare boulders are found on the upper slopes and on the summits. The treeless alpine zone proper is nearly lacking.

Along brooks there are birch dominated swamps on quite fertile sites. Between stands on mineral soil and open swamps pine swamps are found. Large »aapa» bogs (treeless and wet sedge bogs) cover in some places over 60 % of the area and can cover even more than 10 sq.km. At least five typical »rimpi» open bogs (very wet bogs with small and shallow ponds) are also found. The real lakes of the study area can be divided into two site types, Elodeid and Carex site types (cf. MARISTO, 1949) (Table 2). In the Elodeid-lakes there are some *Equisetum limosum*-stands. The Carex-lakes are very barren and on the shores there are Carex-zones some metres in width. At Satojärvi this zone is in places some dozens of meters broad.

On the western side of Koitilaiskaira study area clearcut and burned open areas cover several square kilometers. Koitilaisfjeld and the lowlands around it are in their virgin state. Even the reindeer herdsmen visit this wilderness very seldom during the summer time.

Ornithologically the area has remained nearly unknown until Lapin Luonnonystävät (a conservation club in Rovaniemi) proposed that the wilderness should be protected as a nature reserve. Thereafter, some ornithologists have visited the area (see, eg., VALSTE, 1963, TERHIVUO *et al.*, 1965, ULMANEN & VALSTE, 1965). FINNILÄ (1913) explored the western and northern part of the area but not the Koitilaiskaira. Of the authors, HAAPANEN has studied — May 14—21, 1965 — the bird fauna of various forest and peatland site types and lakes, and ULMANEN and VALSTE have studied the lakes between June 2—19, 1963 and June 29— July 24, 1964 (see also ULMANEN & VALSTE, 1965).

Research method

The census on the forest land and on open swamps was made according to the transect method. The width of the transect was on mineral soil 60 m and on peatlands 200 m. Because the aim of the 1965 expedition was not mainly ornithological but, rather, to plan the borders of the nature reserve, it was necessary to make some compromises in exactness, and the bird densities for different forest and peatland site types were not counted, except in Fig. 2 where they are presented, not

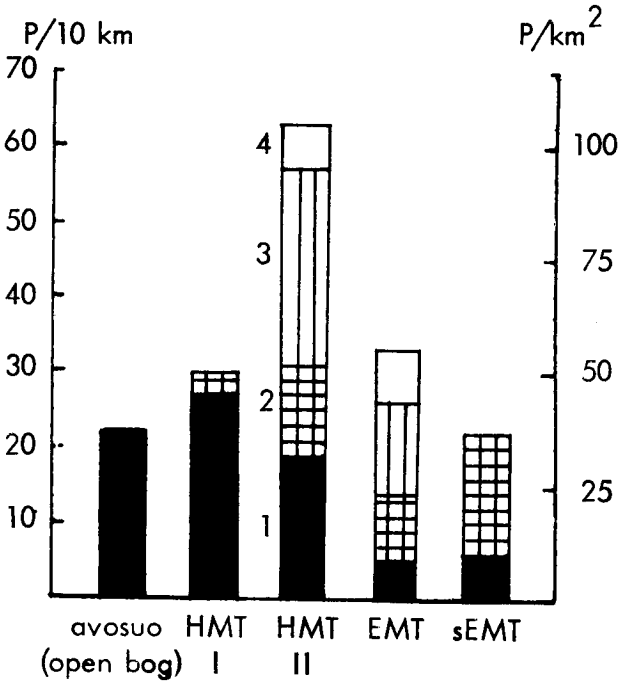

Fig. 2. The total bird densities and the densities of nesting ecology species groups in habitats mentioned in Table 1. The density of the birds of open swamps is now comparable with others (see p. 48). The nesting ecology groups: 1. species nesting on the ground, 2. species nesting in bushes, 3. species nesting in trees and 4. species nesting in holes.

Kuva 2. Eri biotooppien lintutiheydet ja linnuston pesintäekologinen luonne. Biotoopit samat kuin taulukossa 1. Soiden lintutiheys on tehty vertailukelpoiseksi muiden tiheyksien kanssa (ks. s. 48). Pesintäekologiset ryhmät: 1. maassa pesivät, 2. pensaissa pesivät, 3. puissa pesivät ja 4. koloissa pesivät.

per 1 sq.km, but per 10 km transect. Because the method was the same in all types of forests, the results from various habitats can be considered comparable. The bird densities in open swamps must be divided by a factor of 3.3 before they are comparable with others.

The census on the lakes has been made only once, although Siira (1959) considers it to be insufficient. The census time in June is also a little late (cf. Siira op.cit.) and many females were already incubating. We hope, however, that the results obtained will give some new

information on the species composition of waterfowl in the study area. The densities were estimated on the basis of males encountered (cf. LINKOLA 1959) because the actual ♂ : ♀ ratio does not greatly differ from 1: 1 (LINKOLA 1960, HILDÉN 1964). This method is not, however, valid for *Anas acuta*, whose males were not found at all although several females were observed. Also HILDÉN (l.c.) has observed that pintail males disappear shortly after the females have begun to incubate. The observed ♂ : ♀ ratio of *Anas platyrhynchos*, *A. crecca* and *A. penelope* was on the average 2.7: 1. This coefficient is used to get comparable pintail numbers although it is not known to be the actual situation.

In the table 2 it is is shown the total amount birds/sq. km. including pairs and nonbreeding visitors. On contrary in both summaries (p. 51) only the breeding population has been included. The density value of *Larus ridibundus* is based on the exact nest census made in 1964 (see ULMANEN & VALSTE 1965). According to the amount of birds observed the population has been fairly stable during these years.

The bird fauna

Table 1 presents the vird fauna of open bogs and forests and Table 2 the bird fauna of lakes.

The bird species of open bogs and forests have been dealt with in five groups according to their habitat preferences (see Table 1). In many cases the data has been so insufficient that there are no significant differences, but other data outside the census has also been taken into account as well as the knowledge we have about the habitat preferences of the species in South-Finland (see eg. HAAPANEN 1965). The habitat selection of the species does not seem to differ from that in South-Finland. The spruce dominated mixed stands are, however, in Lapland so thin that the species of thin stands (eg. *Muscicapa striata*, *Anthus trivialis*, *Cuculus canorus* and *Phoenicurus phoenicurus*) are also commonly found there (Table 1).

The species nesting on the ground (cf. HAAPANEN 1965) are most common in burned open areas and in open bogs where this ecological group is the only one found (Fig. 1). The density of the species nesting in bushes is greatest in subalpine brush-like birch stands. The species composition is most various in mixed stands with spruce and birch on Hylocomium-Myrtillus site, where the total bird density is also greatest. All ecological groups are also found in pine stands on Empetrum-Myrtillus site, but because of their lower fertility, the total bird density is only about one half of that in the mixed stands.

From the following summary, where the densities (figures = pairs/sq.km) of breeding populations (excluding visitors eg. *Anser fabalis* and *Cygnus cygnus*) in various lake site types are shown, it can be seen that the density of the Elodeid site is the greatest and the density is lowest in »rimpi» lakes.

Table 1. The bird fauna of open bogs and forest lands. The species have been dealt in five groups according to their habitat preference: 1. the species favouring open bogs, 2. the species favouring burned open areas, 3. the species favouring birchspruce stands, 4. the species favouring pine stands and 5. the species favouring subalpine birch stands. The breadth of the transect is 200 m on open bogs and 60 m on forest land. This must be remembered when comparing the densities.

Taulukko 1. Soiden ja metsien linnusto. Lajit on jaettu viiteen ryhmään niiden esiintymisen painopisteen mukaan. 1. Avosoita suosivat lajit, 2. kuloaukkoja suosivat lajit, 3. kuusi-koivu -sekametsiä suosivat lajit, 4. männiköitä suosivat lajit ja 5. tunturia suosivat lajit. Tutkimuslinjan leveys soilla 200 m, kovilla mailla 60 m.

Site type; stand *Tyyppi; puusto*	Open bogs *Avosuot*		HMT Burned open area *Kuloaukko*		HMT birch – spruce *koivu – kuusi*		EMT pine *mänty*		sEMT birch – pine *koivu – mänty*	
The length of transects, km *Tutkimuslinjan pituus, km*	21.1		8.1		17.5		10.7		3.1	
	p	p/10 km	p	p/10 km	p	p/10 km	p	p/10 km	p	p/10 km
1.										
Anas platyrhynchos	2	1	–	–	–	–	–	–	–	–
A. crecca	2	1	–	–	–	–	–	–	–	–
A. acuta	1	1	–	–	–	–	–	–	–	–
Gallinago gallinago	12	6	–	–	–	–	–	–	–	–
Lymnocryptes minimus	10	5	–	–	–	–	–	–	–	–
Tringa glareola	19	9	1	1	–	–	–	–	–	–
T. erythropus	16	8	1	1	–	–	–	–	–	–
T. nebularia	5	2	1	1	–	–	–	–	–	–
Limicola falcinellus	5	2	–	–	–	–	–	–	–	–
Philomachus pugnax	28	13	–	–	–	–	–	–	–	–
Phalaropus lobatus	1	1	–	–	–	–	–	–	–	–
Sterna paradisaea	3	1	–	–	–	–	–	–	–	–
Emberiza schoeniclus	4	2	–		–		–		–	–
2.										
Oenanthe oenanthe	–	–	1	1	–	–	1	1	–	–
Anthus pratensis	19	9	4	5	–	–	–	–	–	–
Motacilla alba	2	1	4	5	–	–	–	–	–	–
M. flava	18	9	8	10	–	–	–	–	–	–
3.										
Tetrao urogallus	–	–	–	–	2	1	1	1	–	–
Tetrastes bonasia	–	–	–	–	1	1	–	–	–	–
Parus cinctus	–	–	–	–	1	1	–	–	–	–
Turdus philomelos	–	–	–	–	4	2	–	–	–	–
T. musicus	–	–	–	–	7	4	3	3	–	–
Phylloscopus trochilus	–	–	1	1	36	20	4	4	–	–
Muscicapa striata	–	–	–	–	9	5	3	3	–	–
M. hypoleuca	–	–	–	–	4	2	1	1	–	–
Anthus trivialis	–	–	–	–	4	2	–	–	–	–

Site type; stand *Tyyppi; puusto*	Open bogs *Avosuot*		HMT Burned open area *Kuloaukko*		HMT birch – spruce *koivu – kuusi*		EMT pine *mänty*		sEMT birch – pine *koivu – mänty*	
The length of transects, km *Tutkimuslinjan pituus, km*	21.1		8.1		17.5		10.7		3.1	
	p	p/10 km	p	p/10 km	p	p/10 km	p	p/10 km	p	p/10 km
Loxia curvirostra	–	–	–	–	2	1	–	–	–	–
Fringilla montifringilla	–	–	–	–	27	15	5	5	–	–
4.										
Cuculus canorus	–	–	–	–	2	1	2	2	–	–
Perisoreus infaustus	–	–	–	–	–	–	1	1	–	–
Turdus viscivorus	–	–	–	–	–	–	1	1	–	–
Phoenicurus phoenicurus	–	–	–	–	3	2	4	4	–	–
5.										
Pluvialis apricaria	–	–	–	–	–	–	–	–	1	3
Numenius phaeopus	2	1	–	–	–	–	–	–	1	3
Carduelis flammea	–	–	3	4	11	6	6	6	5	16
Total *yhteensä*	149	72	24	29	113	63	32	32	7	22

Elodeid site *Elodeidi—tyyppi*	Carex site *Carex—tyyppi*	»Rimpi» lake site *Rimpijärvet*
50	30	20

In the following summary the species composition of the breeding population in lakes and the bird densities (figures = pairs/sq.km) are shown. (The data from various lake site types is here connected.)

Anas crecca	4.0	*Melanitta fusca*	1.5
Sterna paradisaea	3.1	*Phalaropus lobatus*	1.1
Larus ridibundus	2.7	*Mergus albellus*	0.7
Melanitta nigra	2.7	*M. serrator*	0.4
Anas acuta	2.7	*M. merganser*	0.4
A. platyrhynchos	2.5	*Motacilla alba*	0.4
A. penelope	2.5	*Gavia stellata*	0.4
Aythya fuligula	2.2	*G. arctica*	0.3
Bucephala clangula	2.0	*Acrocephalus schoenobaenus*	0.1

There were nest boxes on the shores of Saiveljärvi and the holenesters (*Bucephala clangula, Mergus albellus* and *M. merganser*) were especially abundant at this lake.

The bird fauna of rivers differs markedly from that around lakes. *Bucephala clangula, Mergus merganser* and *Tringa hypoleuca* were peculiar to rivers (see Table **2**).

Table 2. The bird fauna of lakes and rivers.

Taulukko 2. Vesien linnusto.

Lake site type	Type 1.	Type 2.	Type 3.	Type 4.	Lakes (total)	Rivers & brooks
Area (ha)	563.4	124.5	115.0	3.3	806.2	5 kms
Gavia arctica	0.7	1.6	–	–		–
G. stellata	1.1	–	–	–		–
Anas platyrhynchos	4.6	6.4	2.6	–	4.6	1
A. crecca	4.4	3.2	7.8	–	4.7	4
A. penelope	5.1	–	–	–	3.6	–
A. acuta	1.1	0.8	0.9	–	1.0	–
Aythya fuligula	2.5	5.6	0.9	30.3	3.0	–
Bucephala clangula	5.0	5.6	–	–	4.3	10
Clangula hyemalis	–	4.0	–	–	0.6	–
Melanitta fusca	2.3	13.7	–	–	3.7	–
M. nigra	0.9	23.2	–	–	4.2	–
Mergus serrator	1.1	–	–	–	0.7	1
M. merganser	0.7	–	–	–	0.5	8
M. albellus	2.5	4.0	–	–	2.4	–
Anser fabalis	1.6	9.6	–	–	2.6	1
Cygnus cygnus	1.4	5.6	–	–	1.9	–
Vanellus vanellus	–	–	–	–	–	1
Tringa hypoleuca	0.2	–	–	–	0.1	7
Phalaropus lobatus	4.6	5.6	0.9	–	4.2	–
Larus argentatus	1.2	–	–	–	0.9	–
L. ridibundus	17.6	–	–	–	12.3	–
Sterna paradisaea	5.0	7.2	8.7	30.3	6.0	2
Acrocephalus schoenobaenus	0.2	–	–	–	0.1	–
Motacilla alba	0.4	3.2	–	–	0.7	4
Total:	64.2	99.3	21.8	60.6	63.5	39

The number given indicates the number of bird exx/sq. kilometer, with the exception of »rivers & brooks» where the number indicates the number of bird exx/5 kms shore-line studied. Type 1. = Carex site type, Type 2. = Elodeid site type, Type 3. = »rimpi»-lakes, Type 4. = the lake Tojottamanlampi. The title »rivers & brooks» encounters 2 kms shore-line of the river Kitinen and 3 kms shore-line of some smaller brooks.

Some notes on different species

In addition to species mentioned in Tables 1 and 2, the following species were also found in 1965:

Aquila chrysaëtos
Buteo lagopus
Apus apus
Delichon urbica

Accipiter gentilis
Circus cyaneus
Pandion haliaëtos
Falco columbarius
Lagopus lagopus
Corvus corax
Saxicola rubetra
Bombycilla garrulus
Emberiza rustica
E. pusilla

For the following species, found in 1962–1964 in the study area and adjacent cultivated areas, see ULMANEN & VALSTE (1965).

Lyrurus tetrix
Grus grus
Fulica atra
Charadrius hiaticula
Calidris temminckii/minutus
Asio flammeus
Surnia ulula
Picoides tridactylus
Dryocopus martius
Alauda arvensis
Hirundo rustica
Riparia riparia
Corvus corone
Parus major
P. montanus
Turdus pilaris
Luscinia svecica
Erithacus rubecula
Sylvia borin
Sturnus vulgaris
Carduelis spinus
Pinicola enucleator
Fringilla coelebs
Emberiza citrinella
E. hortulana

Anser fabalis. – The Bean Goose apparently breeds rather commonly in the swamps, but its density is very difficult to estimate. Flocks of immature birds in swamps and birds which come to the lakes for feeding are often observed (see, eg., Table 2).

Cygnus cygnus. – In 1965 two Whooper Swan nests were found in »rimpi» bogs, in addition, 2 + 4 + 1 exx. were observed. According to the local people, there are two additional birds in the area. The Whooper Swan population consists, according to our estimate, of 2–3 breeding pairs and, in addition, 6–8 nonbreeding, apparently immature birds.

Aquila chrysaëtos. – The nest with two nestlings was found in 1965 on the slope of Koitilaisfjeld.

Pandion haliaëtos. – Perhaps one pair breeds yearly in the northern part of the study area.

Larus ridibundus. – From 1956 the Black-headed Gull has been found in lake Satojärvi. In 1964, 14 nests were found. The mean of the clutch was 1.8. This colony is perhaps the northernmost in Finland (see ULMANEN & VALSTE 1965).

Emberiza pusilla. – The only species not included in the list of ULMANEN & VALSTE (1965) was found in the birch stand near lake Satojärvi. The bird was a singing male.

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S e l o s t u s: **Linnustosta eri kasvillisuustyypeillä Sodankylän Koitilaiskairassa.**

Sen jälkeen kun Lapin Luonnonystävät ehdotti Koitilaiskairan rauhoittamista, on runsaasti lintuhavaintoja tehty tältä alueelta, joka oli näihin asti säästynyt ornitologisesti lähes tuntemattomana (Valste 1963, Terhivuo & al. 1965 ja Ulmanen & Valste 1965). Mainituissa kirjoituksissa on selostettu alueen lajistoa. Tässä kirjoituksessa keskitytään eri biotooppien linnuston kuvaamiseen.

Metsien ja soiden linnusto on laskettu linja-arviomenetelmällä. Linjan leveys oli metsissä 60 m ja soilla 200 m. Lintutiheydet on laskettu pareina/10 km tutkimuslinjaa. Kuvassa 2 on myös tiheydet neliökilometriä kohden. Vesillä lintutiheydet on laskettu soveltaen Linkolan (1959 ja 1960) ja Siiran (1959) esittämiä menetelmiä.

Metsien ja avosoiden linnusto on esitetty taulukossa 1. Kuvassa 2 on eri metsä- ja suobiotooppien lintutiheydet ja pesintäekologisten lajiryhmien esiintyminen ko. tyypeillä. Vesien linnusto on esitetty taulukossa 2. Sivulla 51 olevasta yhdistelmästä selviää eri järvityyppien lintutiheydet. Järvilinnuston koostumus on esitetty sivulla 51 olevassa yhdistelmässä (luvut pareja/km^2).

Joutsenkannaksi arvioitiin kesällä 1965 2–3 pesivää paria ja lisäksi 6–8 pesimätöntä lintua. Pikkusirkku tavattiin kesällä 1965 alueelle uutena lajina.

Havaintoja lintujen pesimiskauden päättymisvaiheesta

OLAVI HILDÉN ja PENTTI LINKOLA

Lintujemme pesimiskauden päättymisvaihetta valaisevaa aineistoa on kerätty ja julkaistu varsin niukasti. Tämä johtuu varmaankin siitä, että lintujentutkijain retkeilyaktiviteetti on syyskesällä keväiseen ver-