Tiedonantoja • Brief reports

Population trends of Finnish Starlings in the 1970s

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Line transect data can be used for many purposes (JÄRVINEN & VÄISÄNEN 1978a), but their application to monitoring annual changes in bird populations has not been tested before. We were thus most interested to learn that v. HAARTMAN (1978) had observed a sharp decline in the Starling *Sturnus vulgaris* population at Lemsjöholm in SW Finland in 1976. As the data were fairly extensive, the observation is convincing (X^2 test between the data for 1975 and 1976: $P<0.001$). No clear recovery occurred at Lemsjöholm in 1977, though the numbers for 1977 were slightly higher than for 1976.

We used line transect data to study the annual fluctuations in Starling populations in 1973—77 as follows. We divided the mainland of Finland into 100-km zones on the basis of the Finnish uniform grid system (north-south coordinates 66—77). A zone was included in the calculations for a given year if the transects censused measured at least 12 km. As more than 12 km were censused in each zone in 1976, it was chosen as the index year (population=100). The densities for the well-studied zones (Fig. 1) in different years were then compared with the densities for the same zones in 1976. The index values thus derived for 1973—77 were as follows:

1973	*1974*	*1975*	*1976*	*1977*
110	175	110	100	180

These data suggest that the populations were low in 1976, though not so dramatically low as at Lemsjöholm. Further, our data do not indicate any remarkable decrease from 1975 to 1976, nor any persistence of low numbers in 1977.

The transect data are, however, not very reliable: the transects studied each year were not the same, and the distribution of the transects within the 100-km zones varied from year to year. Further, the Starling is a difficult species to study in line transect censuses, as flocks often occur during the census period in June. A way of testing whether the index values of two years differ significantly is to compare these years zone by zone. If the data for many zones suggest a similar change, the trend is probably real, but otherwise the change is likely to be due to sources of error in the method. Such a comparison (see data in Fig. 1) suggests that the index values for 1973—76 do not differ significantly. A real increase seems to have occurred in 1977; in each of the seven zones in which Starlings were recorded in 1976—77, the density estimate was higher in 1977 than in 1976. The probability of such an event occurring by chance is 1/128 (two-tailed probability 1/64).

As Starling flocks may heavily bias the data for single zones, we calculated new index values by excluding the zone having the greatest effect on the *difference* between the two years compared. We thus made the index values more similar to each other by removing the most deviating zone in each comparison. The recalculated values were:

1973	*1974*	*1975*	*1976*	*1977*
95	135	100	100	165

Although they have been manipulated somewhat arbitrarily, these figures may be more reliable than those given earlier. We thus conclude that, in contrast to the nest-box population at Lemsjöholm, the Finnish Starling population was fairly stable in 1973—76, but possibly increased in 1977.

Two remarks on the method may still

be made. First, the results obtained when 24 km was used as a critical limit instead of 12 km did not necessitate any modification of these conclusions. Second, when the method was applied to other common species, it proved powerful enough to reveal many of the annual fluctuations which are obvious to active field ornithologists.

Comparison of our index figures for the mainland of Finland with data from three independent sources supports our conclusion that the sharp decline observed at Lemsjöholm in 1976 had a local character.

(1) On transects (13.1 km) censused in both years on the Åland Islands, *more* Starlings were observed in 1976 than in 1975 (JÄRVINEN et al. 1977).

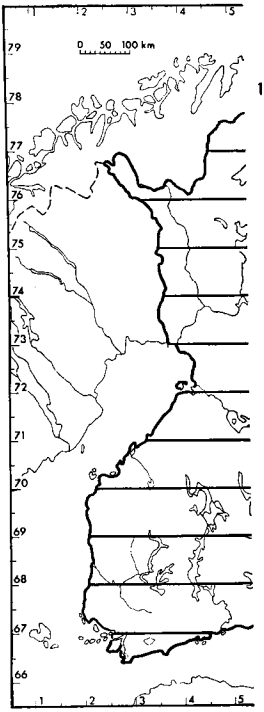
(2) Annual index figures based on extensive mapping studies are available from Great Britain for 1962—76 (BATTEN & MARCHANT 1976, 1977a, b). The index year (population=100) is 1966. During the 15-year period, the farmland population of Starlings varied between 77 and 100 (exception: 1962, index 66), and the woodland population between 86 and 125 (first data for 1965). No trends are apparent in the British data. Preliminary information (J. H. Marchant, in litt.) suggests that 1977 was a normal year for the British Starlings.

(3) Annual index figures are also available from Sweden for 1970—76 (SVENSSON 1977a, b). The Swedish data suggest a decrease of 18 % for Starlings in 1976 ($P<0.05$), but SVENSSON (1977b) concludes that the Starling has shown "very stable numbers". Preliminary data (S. Svensson, in litt.) suggest that no significant changes occurred in Swedish Starling populations in 1977.

The population trends of Finnish Starlings in the 20th century may thus be summarized as follows. A general increase is clear from the following index figures, based on our unpublished line transect data (about 4500 km):

1936—49	*1952—63*	*1973—77*
10	52	100

(The most representative years for the periods are 1944, 1955 and 1976.) The above trend, suggesting an at least 10-fold increase in the present century, has two exceptions. First, the increase has not been very sharp in southernmost Finland (Åland Islands) from the 1920s to the 1970s (JÄRVINEN & VÄISÄNEN 1978b). This implies that a considerable proportion of the Finnish population increase is due to expansion northwards. Second, the population maximum



1973	1974	1975	1976	1977
0	–	–	0	–
–	–	–	0	0
–	–	0	0	0
–	–	14	0	0
–	3	5	0	0
–	0	4	0	4
–	–	0	3	22
0	15	27	17	23
24	22	3	13	23
–	82	41	19	32
–	77	43	36	42
64	40	16	51	103

FIG. 1. The 100-km zones used in the study (left; part of eastern Finland omitted), and the densities of Starlings (right; pairs/10 km²) observed in the different years. Dash= transects censused measured less than 12 km; zero=no Starlings observed. Annual totals of transect km: 112 (1973), 220 (1974), 318 (1975), 451 (1976) and 1062 (1977).

was apparently reached in the 1960s, for a decrease has subsequently been observed in nest-box populations both in northern Finland (OJANEN et al. 1978) and at Lemsjöholm (v. HAARTMAN 1978).

Selostus: **Kottaraistemme kannanvaihteluista**

v. HAARTMAN (1978) on äskettäin todennut Lempisaaren pönttökottaraisten jyrkästi vähenneen 1976. Kannat olivat niukat myös 1977. Tämän johdosta arvioitiin linjalaskenta-aineistosta vuosittaiset tiheydet Suo-

men 100 km:n vyöhykkeille (kuva 1). Lukujen perusteella voitiin laskea kottaraiskantaa kuvaavat indeksit vuosille 1973—77 (1976 =100): vuosina 1973—76 Suomen kanta oli lähellä 100:a, mutta 1977 kanta näyttää olleen vahvempi (tilastollisesti merkitsevä kasvu vuodesta 1976). Lempisaaren katastrofi on siis ilmeisesti ollut luonteeltaan paikallinen. Manner-Suomen linjalaskentaindeksejä tukevat muilta alueilta saatavilla olevat tiedot: Ahvenanmaalla tehdyn linjalaskentakokeen (1975—76) tulokset sekä laajoihin kartoitusaineistoihin perustuvat brittiläiset (1962—77) ja ruotsalaiset (1970—77) kannan kehitystä kuvaavat indeksit.

Kottaraisen populaatiokehitystä Suomessa luonnehditaan lyhyesti. Vuosisadan alkupuolelta nykypäiviin verraten kanta on ainakin kymmenkertaistunut (Ahvenanmaalla kasvu on tosin ollut vaatimattomampi), mutta 1960-luvulla tiheys näyttää olleen korkeampi kuin 1970-luvulla (ks. Ornis Fennica 1/1978).

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Nedgång i en starpopulation i Salo

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I anledning av v. Haartmans samt Ojanens, Orells och Meriläs artiklar (Ornis Fennica 1978:1) om nedgång i starpopulationer lämnar jag här siffror för starholkar i Salo. Antalet holkar har under åren varit mellan 12 och 15. För år 1963 finns tyvärr inga uppgifter. En markerad nedgång i populationen observeras fr.o.m. 1975. Någon minskning i ungproduktionen, i varje fall vid ringmärkningsåldern, har inte konstaterats.

År	Antal kullar	Antal ungar i ringmärkningsålder
1961	8	35
1962	11	41
1964	10	41
1965	10	43
1966	10	42
1967	9	44
1968	13	41
1969	14	58
1970	9	44
1971	9	39
1972	9	28
1973	10	39
1974	8	34
1975	3	8
1976	2	7
1977	4	21

Summary: **Decrease in a Starling population**

Further to the reports on a decrease in the Finnish Starling *Sturnus vulgaris* population in the 1970s (Ornis Fennica 1978: 1), data are presented on the population trend in an area in SW Finland (60°21'N, 23°06'E). In 1961—74, the number of clutches in 12—15 nest-boxes under observation varied between 8 and 14, whereas in 1975—77 the number was 2—4. The proportion of young alive at the age of ringing (second column in the table) did not show any decline.