Nightingale (*Luscinia megarhynchos* Brehm) and Woodlark (*Lullula arborea* (L.)) Population in England and Climatic Change.

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(Med et dansk resumé: Bestandstætheden hos Sydlig Nattergal (*Luscinia megarhynchos* Brehm) og Hedelærke (*Lullula arborea* (L.)) i England og klimaændringen).

In a recent paper by M. Philips Price (1961) statistics were given for the warbler population of 200 acres of woodland in the Severn Valley in western England over a period of years from 1927 to 1960.

He was unable to account for the fluctuations in the population of Nightingales (*Luscinia megarhynchos*) during this period by relating them to the available habitat, as could be done for the other species of warblers that were recorded. In this area the Nightingale was present in small numbers until 1934, after which there was a sharp increase in 1934–6. Subsequently the numbers were sustained at a new level until 1948, rising to a new peak in 1949–50. There was a slight decrease from 1951–6, followed by a sharp decrease in 1956–9 when numbers fell to their pre-1934 level. During its period of increase the species extended its range into parts of Wales but receded again as the population decreased.

In a paper on the population of the Woodlark (*Lullula arborea*) in the London area (Harrison 1961) statistics were given for the number of occupied territories recorded between 1923 and 1957. This species reoccupied the London area in 1923 and was subsequently present in small numbers. The population rose in 1936, but decreased again, apparently because of hard winters, and remained low until 1944. Numbers rose sharply between 1944 and 1946, dropping after the hard winter of 1946–7, and then rising to a very high level in 1950–2. There was a sharp decline in 1953, and a steady fall in numbers after this date.

The two sets of data are shown on the accompanying graph (fig. 1). While it must be borne in mind that with the small population totals involved differences of a few individuals may appear unduly significant, there nevertheless appears to be a

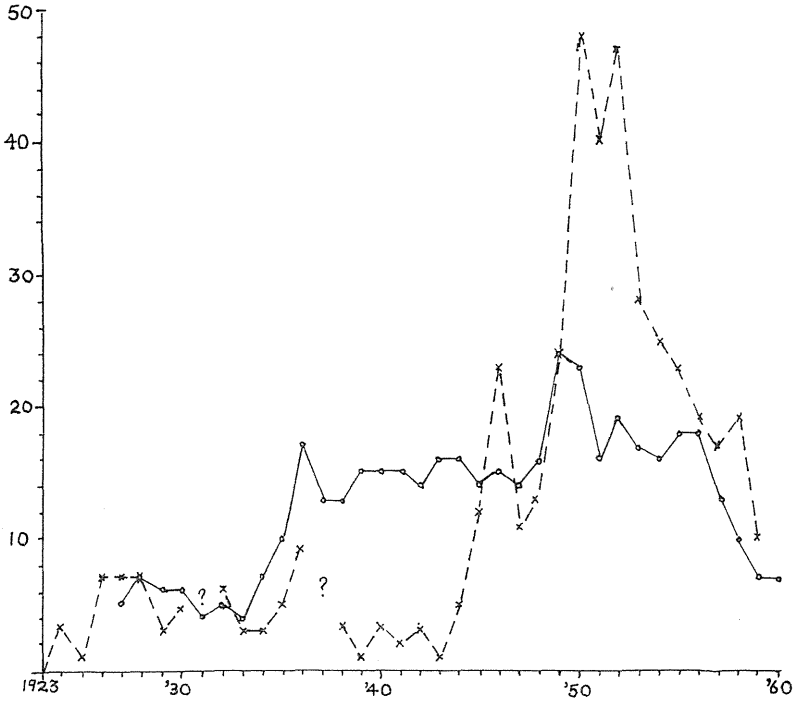

Fig. 1. Fluctuations in size of Nightingale (*Luscinia megarhynchos*) and Woodlark (*Lullula arborea*) populations. *Abscissa:* Years; the period from 1923 to 1960. *Ordinate:* Population size. *Unbroken line:* Nightingale population in 200 acres of Woodland. *Dashed line:* Occupied Woodlark territories in the London area. *Svingninger i bestandsstørrelsen hos Sydlig Nattergal* (Luscinia megarhynchos) *og Hedelærke* (Lullula arborea). Abscisse: *År; perioden fra 1923 til 1960.* Ordinat: *Populationsstørrelse.* Ubrudt linie: *Sydlig Nattergals population i 200 acres skovland.* Stiplet linie: *Optagne Hedelærke-territorier i London området.*

distinct correlation between the population fluctuations of the two species.

In the case of the Woodlark the changes in population appear to be closely linked with long-term changes in climate. As with the Nightingale there was evidence of an extension of breeding range in the British Isles during the period when the population was highest. Unlike the Nightingale the Woodlark suffers from the effects of hard winters and as a result the numbers show greater variation when these occur.

These two species differ in that one is a summer visitor and the other a resident, but both are species whose main distribution is to the south of Great Britain, and whose northern limit

of distribution in this area is in the southern part of the British Isles. This distribution does not coincide with any well-marked ecological boundary, and is likely to be a response to climatic factors. It therefore seems that the population fluctuations shown by both these species is a response to long-term changes in climate, and is most apparent at the northern limits of their distribution.

There is evidence of similar changes in species distribution in other parts of northern Europe during the same period. PALMGREN (1960), writing in 1958 of the Finnish birds refers to the "swift extension of range of a number of southern birds during the last 50–75 years". He is cautious of attributing this to climatic factors when human factors might be partly responsible, but SALOMONSEN (1948) shows that similar changes were occurring in Greenland, Iceland, Faroes, and Denmark, during this period.

SALOMONSEN distinguishes between two periods of recent climatic change in Denmark, one prior to 1930 when there was an amelioration of winter temperatures, and the other after 1930 when summer temperatures increased, different species being affected by each. This may have been true of the species under consideration, the Woodlark, which began to increase in the early 1920's, being affected by winter temperatures; while the Nightingale, which would only be affected by the summer temperatures, increased from 1934 onwards.

Unfortunately no published data seems to be available to determine whether the fall in numbers since the mid-1950's is a general trend or a temporary, or local, occurrence.

Summary

A comparison of the Nightingale population of 200 acres of Woodland in England since 1927 and the Woodlark population of the London area since 1923 reveals similar general fluctuations in numbers. It is suggested that this is correlated with long-term climatic changes during this period, and that it is comparable with similar changes in the northerly distribution of southern species recorded elsewhere in Scandinavia and the North Atlantic region.

DANSK RESUMÉ

Bestandstætheden hos Sydlig Nattergal (*Luscinia megarhynchos* Brehm) og Hedelærke (*Lullula arborea* (L.)) i England og klimaændringen.

Ved et studium af bestanden af Sydlig Nattergal (*Luscinia megarhynchos*) i 200 acres skovland i det vestlige England i 1927–1960 opdagedes svingninger i bestandstætheden som ikke kunne skyldes ændringer af biotopen, i modsætning til forholdet hos forskellige arter af sangere, hvis bestandsstørrelse kunne sættes i relation til biotopændringer. Populationstætheden hos Hedelærken (*Lullula arborea*) i London området i perioden 1923–1960 viste lignende svingninger som hos Sydlig Nattergal. Begge arter var tilstede i ringe tal indtil midten af 1930erne, da bestanden tiltog, idet dog Hedelærkens bestand senere igen aftog rimeligvis på grund af hårde vintre. Der var en hastig tiltagen i antal i den sidste del af 1940erne og maksimum nåedes omkring 1950, hvorefter der viste sig en stadig aftagen; se fig. 1.

De nævnte forandringer synes at have relation til klimaændringen. Hos begge arter foregik en udvidelse af yngleudbredelsen i de Britiske Øer da bestandstætheden var størst. Begge arter har deres hovedudbredelse syd for de Britiske Øer, og deres nordgrænse forløber i den sydlige del af Storbritanien. Denne grænse synes at være afhængig af klimatiske og ikke økologiske faktorer. Der er blevet påvist lignende ændringer i udbredelsen hos andre arter i andre dele af Nordeuropa i samme periode, øjensynligt ligeledes i tilknytning til klimaændringen (jfr. Salomonsen 1948, Palmgren 1960).

References.

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