Changes in numbers of migrants ringed at Danish bird observatories during the years 1966—75

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(Med et dansk resumé: Ændringer i antallet af ringmærkede trækfugle på nogle danske fuglestationer i perioden 1966 - 75)

INTRODUCTION

In the autumns of 1968 - 69 - 70 a constant trapping of birds was carried out at Bodensee in southernmost Germany (Berthold 1972). During these three years nearly all species showed a significant decline in the number ringed, and Berthold considers this decrease as indicative of "exceptionally high or longterm declines" of the breeding populations in the recruitment areas of the Bodensee migrants. The recruitment area is thought to be Middle Europe north of Bodensee. Further reports on declines since 1968, especially of Redstart *Phoenicurus phoenicurus,* Sedge Warbler *Acrocephalus schoenobaenus,* and Whitethroat *Sylvia communis,* have been published (Glue 1970, Batten 1971, Berthold 1973, 1974, Wink 1974, Winstanley *et al.* 1974).

In this paper, the ringing results of five spring seasons from Hesselø and four spring seasons from Christians Ø are treated in order to decide whether the yearly numbers of migrants ringed at Danish bird observatories show a corresponding decrease. Furthermore, the ringing results from Hjelm published by Hansen (1973, 1974, 1975) will be discussed.

MATERIALS AND METHODS

Hesselø, Hjelm, and Christians Ø are small islands. The first two are situated in the southern part of Kattegat. The latter in the Baltic Sea northeast of Bornholm. As revealed by ringing recoveries the southeastern part of Norway, Sweden and partly Denmark should be considered the most important breeding areas of the migrants of Hjelm and Hesselø, whilst the migrants on Christians Ø breed in Sweden, Finland, and partly westernmost Russia.

In the years of 1966 - 1971 ringing was carried out at Hesselø during the following periods: 1) April 16 — June 22 1966, 2) April 27 — June 6 1967, 3) April 8 — May 31 1969, 4) April 25 — June 2 1970, and 5) April 3 — May 25 1971 (Rabøl 1967, 1969, Tønder & Rabøl 1972, Møller & Petersen 1973). The birds were trapped in nets, which were distributed all over the island in all kinds of vegetation. The nets were open every day from dawn to the middle of the afternoon, and numbered 15 - 20 in 1966 - 67, 30 in 1969, and 22 - 25 in 1970 - 71. In order to correct the influence of the different numbers of nets on the numbers of ringed birds I have divided the numbers of ringings by 3 (1966 - 67), 5 (1969), and 4 (1970 - 71) (Table 1).

As a general rule only data from the period April 16 — May 25 are used. This period is, however, extended to include May 26 — May 31 for the very late arriving migrants, Reed Warbler *Acrocephalus scirpaceus,* Icterine Warbler *Hippolais icterina,* and Garden Warbler *Sylvia borin.* As this extension is not possible for 1971 that year is omitted from Table 1 concerning these species.

The lack of April 16 — April 24 1970 is considered insignificant because of the very cold and delayed spring that year. As the migration of Willow Warbler *Phylloscopus trochilus* and Whitethroat proceeds until the end of May, ringings of these species from May 26 — May 31 1970 are included in Table 1.

In 1967 the trapping started on April 27, and the numbers of ringed Wren *Troglodytes troglodytes,* Robin *Erithacus rubecula,* and Chiffchaff *Phylloscopus collybita* are presumably 10 - 15% below what they would

have been if the trapping had been initiated on April 16. The earliest migrant, Dunnock *Prunella modularis,* is completely omitted from the table this year.

On Christians Ø trapping has been carried out during the following periods: 1) March 25 — June 15 1970, 2) April 11 — May 29 1972, 3) April 10 — June 9 1973, and 4) April 14 — June 7 1975 (Møller 1970, Sørensen 1972, Pihl 1975, B. Jacobsen *in litt.*).

The late migrants are underrated in 1972 and are omitted from Table 2. For 1970 only the period April 11 — June 10 is used. The numbers of nets used has varied somewhat from year to year, but it is supposed that the overall activity has been roughly the same in the four seasons dealt with.

RESULTS

The corrected numbers of birds ringed on *Hesselø* are presented in Table 1. Any trends

Table 1. The number of birds ringed at Hesselø corrected for differences in the numbers of nets used (comp. text).

Antallet af fugle ringmærket på Hesselø korrigeret for forskelle i det antal net der er benyttet (sammenlign teksten).

	1966	1967	1969	1970	1971
Jynx torquilla	2.3	4.0	26	11	8.8
Troglodytes troglodytes	12	9.3	24	25	15
Turdus philomelos	28	33	37	48	39
Saxicola rubecula	4.0	11	19	5.5	3.5
Phoenicurus phoenicurus	135	142	87	127	69
Erithacus rubecula	154	153	161	260	224
Acrocephalus scirpaceus	18	24	29	16	
Acrocephalus schoenobaenus	15	20	7	8.5	4.3
Hippolais icterina	14	16	6.6	13	
Sylvia atricapilla	37	43	51	47	36
Sylvia borin	53	60	63	73	
Sylvia communis	121	61	28	31	28
Sylvia curruca	50	33	66	49	51
Phylloscopus trochilus	284	307	397	242	251
Phylloscopus collybita	31	23	37	23	23
Ficedula hypoleuca	99	61	129	124	45
Muscicapa striata	15	21	14	16	
Prunella modularis	65		198	82	52
Emberiza schoeniclus	18	17	51	11	14

in the numbers could be revealed by regression analyses. As, however, the number of years is very low (5 or 4), statistically significant trends ($p < 0.05$) are difficult to demonstrate, and are not found. The estimated slope is positive for 8 species, and negative in 11 species. However, the coefficient of correlation (r) is often very small — especially in the decreasing species. $r^2 > 0.30$ is found in just 7 species. Of these, Wren, Song Thrush *Turdus philomelos,* Robin, and Garden Warbler increase, whereas Redstart, Sedge Warbler, and Whitethroat decrease. 1969 is the peak year for most species — at least partly due to very favourable weather conditions in the first half of May. The results of the regression analyses should thus be interpretated with considerable caution. If the mean numbers in 1966 - 67 are compared with the mean numbers in 1970 - 71, and if differences between the two means less than 20% are considered insignificant, 5 species increased (Wryneck *Jynx torquilla,* Wren, Song Thrush, Robin, and Garden Warbler), whereas 6 species decreased (Whinchat *Saxicola rubetra,* Redstart, Reed Warbler, Sedge Warbler, Whitethroat, and Reed Bunting *Emberiza schoeniclus*).

Table 2. The number of birds ringed at Christians Ø.

Antallet af fugle ringmærket på Christians Ø.

	1970	1972	1973	1975
Jynx torquilla	33	48	13	24
Troglodytes troglodytes	41	61	60	78
Turdus philomelos	113	155	80	327
Saxicola rubetra	89	42	27	21
Phoenicurus phoenicurus	271	289	239	191
Erithacus rubecula	1219	1028	1968	1627
Acrocephalus scirpaceus	98		95	39
Acrocephalus schoenobaenus	12	12	4	4
Hippolais icterina	66		113	50
Sylvia atricapilla	105	145	91	56
Sylvia borin	251		332	134
Sylvia communis	46	51	47	35
Sylvia curruca	124	205	151	94
Phylloscopus trochilus	389	736	504	559
Phylloscopus collybita	40	16	27	35
Ficedula hypoleuca	146	235	149	154
Muscicapa striata	71		91	77
Prunella modularis	80	95	79	317
Lanius collurio	86	97	90	129
Emberiza schoeniclus	23	9	9	12

The number of birds ringed in the four spring seasons at *Christians Ø* are shown in Table 2. If we compare the earliest years 1970 and 1972 with the two later years, 1973 and 1975, and omit differences between means less than 20%, 5 species show an increase (Wren, Song Thrush, Robin, Icterine Warbler, and Dunnock), and 9 species decrease (Wryneck, Whinchat, Redstart, Blackcap *Sylvia atricapilla,* Lesser Whitethroat *S. curruca,* Reed Warbler, Sedge Warbler, Pied Flycatcher *Ficedula hypoleuca,* and Reed Bunting).

The results should be considered with caution in the Icterine Warbler, Dunnock, Reed Warbler, Sedge Warbler, Pied Flycatcher, and Reed Bunting due to either few birds or a very large total in a single year.

DISCUSSION

In contrast with the Bodensee investigation of Berthold (1972), but in accordance with other

investigations (Wink 1974 and Stolt & Österlöf 1975) there is no evidence of a general decrease of the number of passerine migrants resting on Hesselø and Christians Ø. However, some of the species were clearly decreasing during the six years, and it is noteworthy that Glue (1970) mentions a corresponding strong decline in the British breeding populations of the same species (Redstart, Sedge Warbler, and Whitethroat), and that a similar decline since 1968 in these and a few other species, e.g. Whinchat and Lesser Whitethroat has been observed in Middle and Western Europe (Berthold 1973, 1974).

Contrarily, other species have increased on Hesselø and Christians Ø, especially Wren, Song Thrush, Robin, and Garden Warbler. In 1969 the Wryneck appeared in unusual large numbers (131 were ringed at Hesselø). In the following years there has been a decline back to what could be considered as the normal number.

Material from the springs of 1971, 1972, 1973, and 1974 from Hjelm (Hansen 1973, 1974, 1975) show an increase of Wren, Song Thrush, Robin, Pied Flycatcher, Willow Warbler, and Reed Bunting, whilst Redstart, Whitethroat and Lesser Whitethroat decreased until 1973, whereas larger numbers again were caught in 1974. But in 1974 the capture on Hjelm was larger than other years for most species due to favourable weather conditions. Only a few Sedge Warblers were captured. The increase of the Robin is remarkable. In the period April 11 to May 15 the ringing numbers in the 4 years were 790, 1404, 2267, and 2651.

To conclude, there has been a strong decline in the numbers of Redstart, Sedge Warbler, and Whitethroat, and some decline in the numbers of Whinchat and Lesser Whitethroat, and the Sedge Warbler seems now to be a very scarce bird. This decline could well have started in 1968 as in other European countries, and there is no evidence that it has stopped as yet. In contrast to this there has been a continuous increase in the numbers of Wren, Song Thrush, and Robin. The other changes in the material are considered to be either due to variations in local factors (especially weather conditions) or random variation.

Berthold (1972, 1973, 1974) discusses the possible causes to the decline of these former species, and concludes (1974) that the drought in the Sahel province of Africa is the most important factor, but it is not impossible that the increasing industrial pollution and use of pesticides contribute to the serious situation.

The three increasing species winter in Western Europe, and the weather in these areas has been exceptionally mild in the past winters. This may be the cause of the increase of these species.

Investigations of this sort, using ringing results from bird observatories could as a supplement to investigations in the breeding areas be a valuable method of registrating longterm changes in bird populations. The number of birds caught at a single bird observatory is much larger and comes from areas bigger than a study area in a population study. Contrarily a lot of environmental factors influence the number of birds ringed, e.g. windforce, cloudiness, and visibility. Furthermore, it is difficult to trap with the same effort in different years or to make precise corrections for differences in effort. Some of these difficulties could be overcome by comparing material from several bird observatories and several years.

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DANSK RESUME

Ændringer i antallet af ringmærkede trækfugle på nogle danske fuglestationer i perioden 1966-75

Siden 1968 er der konstateret tilbagegang for en del småfugle i Vesteuropa, både for trækgæster og ynglefugle (Berthold 1973, 1974). For at undersøge om der er foregået lignende ændringer i de bestande, der passerer Danmark på trækket, har jeg analyseret ringmærkningsdata indsamlet på Hesselø og Christians Ø om foråret. På Hesselø er benyttet materiale fra årene 1966, 1967, 1969, 1970 og 1971, og fra Christians Ø er benyttet 1970, 1972, 1973 og 1975. Hesselø tallene er korrigeret for forskelle i antallet af net ved at dividere ringtallene med 3 (1966 og 1967), 5 (1969) og 4 (1970 og 1971). Resultatet er vist i Tabel 1. Ringtallene for Christians Ø er vist i Tabel 2. Da der ikke er arbejdet i helt samme perioder alle årene, er arter, hvor dette skønnes at have betydning for resultatet, udelukket af tabellerne i enkelte år.

Der har været nærmest katastrofal tilbagegang i antallet af Rødstjert *Phoenicurus phoenicurus*, Sivsanger *Acrocephalus schoenobaenus*, og Tornsanger *Sylvia communis*, og i mindre grad tilbagegang hos

Bynkefugl *Saxicola rubetra* og Gærdesanger *Sylvia curruca.* Tilbagegangen antages af de fleste forfattere at skyldes tørken i Sahelområdet i Afrika (f.eks. Berthold 1974). Til gengæld har der været en kraftig forøgelse af Gærdesmutte *Troglodytes troglodytes,* Sangdrossel *Turdus philomelos* og Rødhals *Erithacus rubecula,* formentlig på grund af de senere års milde vintre. Vendehals *Jynx torquilla* optrådte i 1969 i usædvanligt stort antal. Siden da har der været en jævn tilbagegang mod et mere normalt antal. Ved sammenligning med materiale fra Hjelm (Hansen 1973, 1974 og 1975) ses, at der her er sket lignende ændringer.

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