THE CONSERVATION OF MIGRATORY BIRDS
IN THE WESTERN PALEARCTIC-AFRICAN
FLYWAY

REVIEW ON THE IMPORTANCE OF
LOSSES INCURRED TO MIGRATORY
BIRDS DURING MIGRATION

Report to the Commission of the European Communities
on the work carried out under Contract 6617/27/89

G.M. Tucker, M.N. McCulloch, & S.R. Baillie

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BTO

CONTENTS

EXECUTIVE SUMMARY

1. The taking of selected species of migratory birds in E.C.
    countries and in countries visited by birds from the E.C. was
    investigated. Ringing recoveries were used to describe
    regional variation, seasonal variation and long-term trends
    in the taking of migratory birds. The effects of regional
    variation in the taking of birds on the average annual
    survival rates of different breeding populations was also
    investigated for three species.

2. A total of 140,135 recoveries of 20 species were analysed
    (Table 2.2). These data were supplied by the EURING Data Bank
    and by 18 individual ringing schemes.

3. This study analysed data for the following species: Black
    Kite (Milvus migrans), Red Kite (Milvus milvus), Marsh
    Harrier (Circus aeruginosus), Sparrowhawk (Accipiter nisus),
    Buzzard (Buteo buteo), Skylark (Alauda arvensis), Meadow
    Pipit (Anthus pratensis), Robin (Erithacus rubecula),
    Redstart (Phoenicurus phoenicurus), Wheatear (Oenanthe
    oenanthe), Fieldfare (Turdus pilaris), Song Thrush (Turdus
    philomelos), Redwing (Turdus iliacus), Reed Warbler
    (Acrocephalus scirpaceus), Garden Warbler (Sylvia borin),
    Blackcap (Sylvia atricapilla), Willow Warbler (Phylloscopus
    trochilus), Pied Flycatcher (Ficedula hypoleuca), Goldfinch
    (Carduelis carduelis) and Linnet (Carduelis cannabina).

4. The total number of ringing recoveries due to shooting and
    trapping up to 1980 and from 1980 onwards was mapped for each
    species using 30' by 60' grid squares (Figures 1a and 1b in
    species accounts). This information was also tabulated by
    finding countries (Table 1 in species accounts). These data
    indicated areas where large numbers of birds were taken, but
    are also influenced by ringing effort and reporting rates.

5. The intensity of the taking of birds was measured by the
    calculation of an index which controls for ringing effort and
    reporting rates. Thus:

$$\text{index of birds taken} = \frac{t}{t + f} \times 100$$

    where t = number taken, and f = all other recoveries found
    dead, except certain categories with a strong regional bias
    which were excluded. This index provides a less biased
    relative measure of the proportion of birds taken than the
    number of recoveries due to shooting and trapping expressed
    as a simple percentage of all recoveries. However, some bias
    may remain and the results obtained must therefore be
    interpreted with caution.

6. Indices of birds taken were tabulated and mapped by finding
    countries for recoveries before 1980 and from 1980 onwards
    (Table 2 and Fig. 2 in species accounts). Areas where the
    taking of migratory birds was consistently high were mainly
    around the western Mediterranean. These included southern

France, northern and south-west Spain, Portugal, northern Italy, western Morocco and coastal Algeria.

7.   For all combinations of species and countries for which an individual province had at least 20 hunted recoveries either before 1980 or from 1980 onwards Appendix tables of index of birds taken by province are presented.

8.   Indices of birds taken were calculated for different breeding populations based on the country of ringing and only using records of birds ringed in summer (Table 3 and Fig. 3 in species accounts). Patterns of variation between breeding areas were species specific and reflected the migration routes of particular populations.

9.   Indices of birds taken were calculated for each month (Fig. 6 of species accounts). In Europe most taking of migrants takes place during the autumn migration except for species such as thrushes which are hunted throughout the winter. A different seasonal pattern was found in North Africa with similar numbers of birds being taken in spring and autumn.

10.   The recovery data provide some information on the relative frequencies with which shooting and trapping are used to take particular species. In general most raptors and thrushes which are taken are shot, while the majority of the smaller passerines are trapped.

11   All species other than thrushes (Turdus sp) and Skylark showed a general reduction in index values between the two periods considered (Table 4 and Figs. 4 and 5 of species accounts). This was most pronounced in raptor species. Index values for the period since 1980 were lower in 74% of comparisons. Regression of index values for five-year periods since 1950 on year revealed a statistically significant overall decrease in the taking of birds in the majority of species. These changes are thought to show a real decline in the taking of birds but they may also reflect changed attitudes to reporting the taking of species which are now protected.

12.   Further work is required to calibrate reporting rates with the absolute proportions of birds taken and to establish whether reporting rates have changed with time. The geographical and temporal analyses should be extended to more species than were covered in this study. The relative importance of the taking of birds in influencing the size and dynamics of populations, when compared with other ecological factors, needs to be investigated. Its consequences for populations where large numbers of birds are taken should be urgently and critically examined.

1. INTRODUCTION

It is known that large numbers of migratory birds, especially passerines, are killed by shooting and trapping in Europe every year. The taking of migrants is particularly prevalent in countries bordering the Mediterranean Sea, where the migration routes of many species converge into relatively small areas. The taking of birds in this area has a long history, originally providing a significant source of food but now almost exclusively a recreational pursuit (Woldhek 1979, Massa and Bottoni 1989).

A large proportion of the bird species breeding in Europe are migratory to some degree, either leaving Europe completely after breeding or undergoing a change in distribution within the continent outside the breeding season. This seasonal mobility creates difficulties for the effective conservation of breeding populations of such species as protective legislation, unlike the birds themselves, is frequently confined by political boundaries. Thus protection of bird populations on their breeding grounds alone may be insufficient to safeguard species if they are subjected to threats from human activities in other parts of their annual range.

These problems have beeen addressed in recent years by three major items of international legislation:

The Directive and Resolution of the Council of the European Community on the Conservation of Wild Birds (1979) requires member states to maintain populations of naturally occurring wild birds and to preserve sufficient diversity and area of habitats for their conservation. Enforcement is supervised by the European Commission. The Directive restricts the number of species that may be hunted or used in trade.

The Convention on the Conservation of European Wildlife and Natural Habitats (1979), known as the Bern Convention, came into force in 1982. States party to the Convention are required to maintain populations of native flora and fauna, particularly those considered endangered or vulnerable, including migratory species. Article 4,3 of the Convention requires contracting states to "give special attention to the protection of areas that are of importance for the migratory species specified in Appendix II and III and which are appropriately situated in relation to migratory routes, as wintering, staging, feeding, breeding and moulting areas".

The Convention on the Conservation of Migratory Species of Wild Animals (1983), known as the Bonn Convention, seeks to protect migratory species throughout their range by international co-operation and legislative action. States party to the convention are required to "conserve and, where feasible and appropriate, restore those habitats of the species which are important in removing the species from danger of extinction" (Article III,4a), and to provide for "the maintenance of a suitable network of such habitats appropriately disposed in relation to the migration routes".

Countries party to the above Directive and Conventions are listed in Table 1.1.

In many cases, however, the application of such legislation suffers from lack of quantitative information on the threats posed to the species concerned. This is particularly true of the taking of migratory birds in Europe.

Quantitative data on the numbers killed and the impact of the taking of birds by Man on breeding populations is lacking, however. Few field studies of the taking of migrants have been carried out and most available information is essentially anecdotal and/or confined to relatively small areas. Two approaches have previously been used in attempts to quantify the distribution and extent of the taking of passerines:

1) Field surveys have been made of numbers of hunters, traps, shots fired and birds killed in areas where the taking of birds is known to be concentrated e.g. Cyprus, Malta and Turkey (Magnin 1985,1986,1989).

2) Ornithologists have been asked to estimate, from experience of the taking of passerines in their regions, the probable numbers of participants, birds killed per season per hunter, preferred quarry etc. These largely anecdotal data have been combined with statistics on numbers of hunting permits issued, membership of hunting associations etc. to obtain rough estimates of the levels of the different types of bird killing for whole countries (Woldhek 1979, Massa and Bottoni 1989).

The study carried out by Woldhek (1979), covering the entire Mediterranean area is the only one to have attempted to assess variation in the taking of migratory birds between countries.

Little use has been made, so far, of the information contained in the ringing recovery data held by European ringing schemes. These records include the date, place and cicumstances of each recovery. Care must be taken in interpreting ringing data gathered from such a wide area. The number of birds ringed varies considerably between countries, therefore the availability of ringed birds to be recovered is not constant throughout all parts of Europe. There may also be differences in the probability of rings from dead or captured birds being reported from the various parts of a species' migratory range because of differences in the level of interest in birds, awareness of ringing, language and literacy. In addition to variation in the rate of reporting of recoveries, the quality of information provided by finders may vary between countries. Despite these problems, it is possible to use the European ringing data to provide a general description of geographical variation and time trends in the taking of birds and to test hypotheses concerning the impact of this mortality on populations. Often ringing recoveries provide the only information on the taking of wild birds which is available.

In this study data from most of the major European ringing schemes were analyzed. It was not possible, within the time and resources

available for this project to analyze recovery data for all migratory species. The analyses were limited therefore to a range of species which are likely to be representative of general patterns of the taking of migrants and for which sufficient numbers of recoveries were available. Ringing recovery data for 20 species, comprising five raptors and 15 passerines, were analyzed. These species were: Black Kite (_Milvus migrans_), Red Kite (_Milvus milvus_), Marsh Harrier (_Circus aeruginosus_), Sparrowhawk (_Accipiter nisus_), Buzzard (_Buteo buteo_), Skylark (_Alauda arvensis_), Meadow Pipit (_Anthus pratensis_), Robin (_Erithacus rubecula_), Redstart (_Phoenicurus phoenicurus_), Wheatear (_Oenanthe oenanthe_), Fieldfare (_Turdus pilaris_), Song Thrush (_Turdus philomelos_), Redwing (_Turdus iliacus_), Reed Warbler (_Acrocephalus scirpaceus_), Garden Warbler (_Sylvia borin_), Blackcap (_Sylvia atricapilla_), Willow Warbler (_Phylloscopus trochilus_), Pied Flycatcher (_Ficedula hypoleuca_), Goldfinch (_Carduelis carduelis_) and Linnet (_Carduelis cannabina_).

The main objectives of the project were:

1) To describe geographical variation in the taking of migrant birds between and within E.C. countries and countries visited by birds from the E.C..

2) To identify temporal trends in the taking of the above species, with particular emphasis on any changes associated with the implementation of the E.C. Wild Birds Directive, the Bern and Bonn conventions and the accession of Greece (1979), Spain and Portugal (1986) to the European Community.

TABLE 1.1 : Current status of European countries with respect to recent international bird conservation legislation.

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* = member of E.C. or party to convention
+ = signed but not ratified (December 1988)
- = non-signatory
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Country	E.C. Directive	Bern Convention	Bonn Convention
Albania	–	–	–
Andorra	–	–	–
Austria	–	*	–
Belgium	*	+	–
Bulgaria	–	–	–
Cyprus	–	*	–
Czechoslovakia	–	–	–
Denmark	*	*	*
Finland	–	*	–
France	*	+	+
German DR	–	–	–
FR Germany	*	*	*
Greece	*	*	+
Hungary	–	–	*
Iceland	–	–	–
Ireland	*	*	*
Italy	*	*	*
Liechtenstein	–	*	–
Luxembourg	*	*	*
Malta	–	–	–
Netherlands	*	*	*
Norway	–	*	*
Poland	–	–	–
Portugal	*	*	*
Romania	–	–	–
Spain	*	*	*
Sweden	–	*	*
Switzerland	–	*	–
Turkey	–	*	–
United Kingdom	*	*	*
USSR	–	–	–
Yugoslavia	–	–	–
European Community		*	*

(after Grimmett & Jones 1989)

2. METHODS

2.1 The collection of ringing and recovery data

Conventional bird ringing is carried out throughout Europe in order to collect detailed ecological information on birds, including their movements, ranges, productivity, survival rates, moult strategies, biometrics, body condition and potential flight ranges. For these purposes birds are trapped in a variety of ways by trained and licensed ringers organised by individual national or regional bird ringing schemes. Although many birds are ringed as nestlings the majority are trapped when fully grown. These are most commonly trapped by mist netting.This involves the suspension of very fine netting between two vertical poles in areas of high flight activity. The nets are almost invisible when viewed at an angle of 90 degrees and birds therefore fly into them and become entangled. They are then extracted quickly and safely by a trained ringer. Each bird is fitted with an individually numbered ring made of light but durable alloy and stamped with the ringing scheme's address. For each bird ringed the ring number, species, age, sex, date and place of capture are recorded and stored with the organising ringing scheme.

Close co-operation between the individual European ringing schemes is achieved through EURING, the European Union for Bird Ringing. EURING was set up in the early 1960s to formalise the relations between the different ringing schemes. Thirtyfive ringing schemes are currently members. Standardization of ringing has been acheived through regular meetings, through the use of an agreed computer coding scheme for ringing recovery data and through the establishment of a central repository for computerized recovery data. The EURING Data Bank was established in 1966 at the Institute for Ecological Research at Arnhem, Netherlands. Over one million recoveries are now held on file.

2.2 The computer files of recovery data

All data in the EURING Data Bank are stored according to standardised EURING code, details of which are shown in Table 2.1. The detailed ringing information combined with accuracy and verification codes allow close scrutiny of the data and can distinguish older records which may have been recorded less precisely than today. The accuracy codes also provide a measure of confidence in modern data. Computerised data was also recieved directly form ringing schemes where this was more conveniant or where they could provide more up to date data than that held by the data bank. Some data were also obtained as photocopied recovery forms from Norway, Sweden, West Germany, Lithuania, Czechoslovakia and the Channel Islands. In these cases basic details were extracted (ie. species, ring number, age, sex, ringing date, country and co-ordinates, finding date, country, department, co-ordinates, circumstances and condition) and computerised.

Recovery data were obtained from 19 European schemes and amounted to over 140,000 recoveries in total. The numbers of recoveries obtained from each scheme and for each species are shown in Table 2.2.

2.3 Exclusion of inaccurate and unreliable data

For all analyses carried out in this project data which were thought to be unreliable or inaccurate were excluded. Thus only records fulfilling the following conditions were used:

1. Birds that were healthy at ringing and were not transported or held for over 24 hours after ringing.

2. Birds for which ringing date accuracy is within 14 days either side of the date recorded.

3. Birds for which ringing and recovery co-ordinates are recorded as being accurate to within 30 minutes.

4. Recoveries for which the finding date is accurate to within 30 days either side of the date recorded. In some cases the finding date of a recovery is not stated explicitly by the finder, in which case the date of the letter is used and the recovery included.

5. Recoveries in which the bird's body was not moved (intentionally or unintentionally) after death and prior to finding.

6. Recoveries where some information on the finding circumstances was provided.

7. Recoveries which involved more than just the finding of a ring or ring and leg.

2.4 Reported causes of death

As this study is concerned only with causes of avian mortality and with the estimation of survival rates all recoveries of healthy birds recaptured and released by ringers (EURING finding condition code 8) have been excluded from the analysis.

Some recoveries from members of the public involve birds found still alive, usually in a sick or injured condition. Many of these birds die later and nearly all would have done so without intervention. These records are therefore treated as if reported dead.

Relevant details of the EURING finding condition and finding circumstances codes are shown in Table 2.3. Those relating to shot or intentionally trapped birds are described in full.

2.5 Definition of "birds taken"

Birds were classified as 'taken' if killed, or trapped and effectively removed from the population either by legal or illegal hunting, for sport and, or consumption. Birds killed or trapped to protect crops, other animals or human health, for scientific investigations or to retrieve rings or marks are not classified as 'taken'. Thus EURING finding circumstances codes 10, 11 19, 20 and 21 define 'taken' birds unless code 20 is combined with a finding condition code of 8 in which case this indicates that the bird was trapped for ringing (see Table 2.3). In order not to differentiate between legal and illegal hunting all further references to the above defined category will use the term 'taken'.

Birds taken with finding circumstances codes of 10 and 11 are classed as shot whilst those with codes of 20 and 21 are classed as trapped. Those with code 19 are defined as taken by an unknown method. However, general references to "shot and trapped" birds refers to all taken birds and not just those taken by those specific methods.

2.6 Derivation of the index of birds taken

In order to measure relative levels of shooting and trapping, an index of birds taken was calculated. For this purpose a "found dead" class was created which included all birds recovered dead but not recorded as "taken", except for the following categories:

    shot or trapped to protect crops
    entangled in crop protection nets
    accidentally trapped in traps set for other species
    killed in road accidents
    taken by cats
    dead in poor condition as a result of excessive cold or heat.

These categories were excluded as they were found to have large regional differences in their frequency of occurrence. The index was then derived for each sample of recovery data as follows:

$$\text{Index of birds taken} = \frac{t}{(t+f)} \times 100$$

Where;

    t = number of recoveries of birds taken by man
        (as defined above)
    f = number of recoveries of birds "found dead"

The index can range from 0 (no birds recovered as a result of their being taken) to 100 (all birds recovered as a result of their being taken). This provides a less biased relative measure of proportions of birds taken by Man than the percentage of all recoveries which are in the taken by Man category (Coulson and

Brazendale 1968). Caution is required when comparing such indices between different geographical areas or time-periods. Variation in index values could arise from changes in the proportion of recoveries resulting from causes of mortality other than shooting and trapping, rather than from differences in the proportion of birds taken.

2.7 Statistical analysis

Analysis of the data in this study was carried out using two recovery periods; firstly, recoveries before 1 January 1980 and secondly, recoveries from 1 January 1980 onwards. In the first recovery period nearly all recoveries are after 1950, and the majority after 1970. The recovery period from 1980 includes recovery data up to and including 1988 for most countries. These recovery periods allow calculation of up-to-date indices which cover the period after the implementation of the E.C. Wild Birds Directive and the Bern Convention, whilst taking into account the minimum sample sizes required to produce reliable indices. Differences in index levels between the two periods were tested using Fisher's Exact Test (Sokal & Rolhf 1981).

Differences between the proportions reported as shot, trapped or taken by an unknown method between the two analysis periods were tested by G-tests (Sokal & Rolhf 1981), but only when all expected values were greater than 5.

Indices of birds taken were also calculated for breeding populations by restricting samples to those birds ringed between 1 April and 31 August inclusive. Although some late migrants from northern populations could be included in some more southerly populations by these criteria, most birds would be expected to be on or near their breeding grounds over most of their range. Use of more restricted limits would have reduced the sample sizes and the resulting precision further than any gain from excluding late migrants.

Regression analysis of index values calculated for each 5-year period from 1950 was carried out to test for linear trends. However, regressions were only carried out where all index values other than for the first period (1950-54) were derived from 10 or more recoveries. A weighted regression technique was used, in which the 5-year indices were weighted by the square root of the sample size.

All statistical analyses were carried out on the British Trust for Ornithology's Prime computer using the SAS statistical software package (SAS Institute Inc. 1985).

2.8 Interpretation of results

The ringing recoveries used in this analysis are the result of reports from members of the public and not from organised sampling programmes. Therefore all results arising from analysis of such data must be interpreted critically with due attention to

potential sources of bias in the data set. In particular total numbers of recoveries at any place and time will vary according to the number of birds ringed and the probability of being reported. Ringed birds dying in remote areas or where literacy and knowledge of ringing is low will have low reporting rates irrespective of the cause of recovery. Thus the maps of recoveries presented in this report must be interpreted in relation to ringing effort and reporting rates. With other factors being equal, areas with higher numbers of ringed birds and higher reporting rates (eg. Britain) will have high numbers of recoveries of taken birds. However, despite this, mapping of the numbers of recoveries of taken birds is useful as an initial indication of the areas where large numbers of birds are being taken.

Index values can indicate areas of intensive shooting and trapping by controlling for the number of ringed birds within an area and the overall reporting rate. However, they must be interpreted carefully for several reasons.

Firstly, the probability of dead ringed birds being reported varies considerably with the cause of death. Birds shot, trapped, or found as a result of Man's activities have a higher chance of recovery than those dying from other causes. Thus the index is not an estimate of the true proportion taken (after exclusion of some other causes). Similarly, the percentage taken, based upon all recoveries (other than inaccurate and unreliable data) and presented in Table 2 of each species chapter only provides a index of the proportion taken, and not an estimate of the true percentage of birds taken.

Secondly, comparison of indices between countries should be treated with caution. Although ringing effort and overall reporting rates are controlled for, the tendency for shot and trapped birds to be reported may vary between countries as a result of social factors. Where hunting is illegal or discouraged, or where ringing schemes and natural history societies have high profile anti-hunting campaigns then high percentages of ringed taken birds may not be reported. Although an overall decrease in reporting would be controlled for within the index, a systematic suppression of taken recoveries would decrease index values. This effect cannot be tested for with the data used in this study, however. Thus small differences between countries in index values may reflect social attitudes to reporting taken birds. However, large differences are unlikely to be attributable to this affect.

Thirdly, index values may vary with time as a result of changing attitudes towards reporting taken birds as above. Thus comparison of temporal trends in indices could reflect these changes, especially in view of the increased opposition to hunting in some countries. If changes in index values result from taken birds not being reported then this cannot be tested for. However, if taken birds are reported as just found dead then this can be tested for if the number of ringed birds is known, because the reporting rate can be calculated and the proportion of found dead birds examined for an increase. However, at present sufficiently detailed

information on ringing effort is not available. Thus temporal trends in indices (significant or otherwise) should be treated with caution.

Fourthly, increases in the proportions of taken birds reported as specifically shot or trapped may occur through generally increased levels of detail provided in recovery letters as a result of increased literacy or awareness or ringing procedures. Thus where shooting and trapping are predominant causes of ringing recoveries spurious increases in the index of taken birds may occur. However, these are likely to be slight for most countries of recovery. Temporal trends in the proportional use of different methods for taking birds must also be interpreted carefully, with reference to all three categories of reported method.

Despite the limitations of the ringing recovery data and its potential biases, this analysis provides the only quantitative assessment of geographical and temporal trends in the taking of migratory birds in Europe to date.

TABLE 2.1.   Main fields used to store ringing recovery data in EURING Data bank files.

1.   General information

Ringing scheme   Ringing scheme identification code.

Ring-number

Species and sub-species

Species verification

Sex and verification

2.   Ringing information

Ringing condition   Indicates records where the bird was
                                        not a normal wild and healthy one when
                                        ringed, or whether moved or held
                                        captive.

Age   Age of bird when ringed, coded as
                                        EURING age code (e.g. nestling,
                                        juvenile, adult).

Status and brood size   Codes for breeding, at colony etc.

Moult, biometrics or   Indicates whether bird was moulting
pullus age   flight feathers when ringed OR pullus
                                        age.

Plumage or accuracy of
pullus age

Ringing date

Ringing date accuracy   Number of days within which ringing
                                        date is known.   It is normally known
                                        precisely.

Ringing place   Country and regions (county, department
                                        etc) where the bird was ringed.

Ringing place text   Text describing where the bird was
                                        ringed.

Ringing co-ordinates,   Two figure latitude and longitude at
quadrant and accuracy   which the bid was ringed, recorded to
code   the nearest minute with quadrant code.

3. **Finding information**

Finding date

Finding date accuracy	Number of days within which finding date is known.
Finding place	Country and region (county, department etc.) where the bird was recovered.
Finding co-ordinates, quadrant and accuracy code	Two figure latitude and longitude at which the bird was recovered, recorded to the nearest minute with quadrant code.
Finding condition	Whether bird was dead, sick, healthy etc. when found.
Finding circumstances	Cause of recovery (death). See Table 2.3.
Finding circumstances presumed\bird moved or transported	Indicates records where the cause of death was inferred or where the bird was moved before recovery.
Finding status	Codes as for Ringing Status.
Finding moult	Indicates whether bird was moulting flight feathers when found.

4. **Other information calculated from EURING Data**

Distance	Distance between ringing and finding places in km.
Direction	Bearing of finding place from ringing place in degrees.
Elapsed time	Number of days between ringing and finding dates.

Table 2.2 Total ringing recoveries received from each ringing country for each species

	NO	SV	DK	SF	LT	GB	BL	NH	FR	CI	DF	HL	PL	CS	HG	HE	IT	ES	TOTAL
Black Kite	-	0	0	1	-	0	2	0	87	0	52	118	-	-	-	290	0	54	604
Red Kite	-	25	0	0	-	27	5	2	20	0	1.11	350	-	-	-	57	0	25	622
Marsh Harrier	-	58	38	140	-	28	31	414	73	0	63	181	-	-	-	0	1	2	1029
Sparrowhawk	-	587	1218	2030	-	2175	760	1798	84	0	212	1016	-	-	-	47	0	5	9932
Buzzard	-	528	570	694	-	411	437	1111	227	0	1221	1637	-	-	-	428	1	54	7319
Skylark	-	10	30	64	-	183	863	288	232	4	6	151	-	-	-	33	0	0	1864
Meadow Pipit	-	45	69	94	-	774	2162	605	88	7	5	159	-	-	-	38	0	26	4072
Robin	416	1190	965	11047	60	7165	1181	592	1072	106	457	879	853	180	33	1075	360	246	27877
Redstart	-	116	163	443	-	283	235	199	226	1	238	767	-	-	-	112	3	5	2791
Wheatear	-	15	11	109	-	281	36	44	22	2	13	231	-	-	-	11	3	1	779
Redwing	-	171	91	2240	-	1564	1219	396	177	26	3	378	-	-	-	41	63	3	6372
Fieldfare	280	154	97	1900	-	674	700	149	94	8	16	332	-	-	-	246	9	1	4660
Song Thrush	187	924	887	1846	55	10776	1274	1177	908	155	728	1758	593	-	121	818	805	71	23078
Reed Warbler	25	630	302	321	-	3540	1127	1365	514	189	108	2493	-	-	-	118	32	39	10803
Garden Warbler	39	74	120	287	-	264	430	136	116	3	54	198	-	-	-	60	9	29	1819
Blackcap	94	130	84	893	6	1297	1628	238	883	17	433	376	65	91	30	251	378	358	7252
Willow Warbler	-	423	357	651	-	1719	234	494	79	24	17	301	-	-	-	69	1	27	4396
Pied Flycatcher	-	698	204	3399	-	1658	43	2358	121	0	361	7406	-	-	-	157	3	12	16420
Goldfinch	-	6	12	10	-	1059	754	237	681	47	232	1032	-	-	-	195	3	132	4400
Linnet	-	14	125	31	-	1471	3110	687	575	95	152	763	-	-	-	91	2	40	7156

Ringing country codes are as given in Table 2.4. HL refers to data supplied by Helgoland ringing scheme for birds ringed in East and West Germany.

TABLE 2.3. EURING codes for finding condition and details relevant to this analysis.

Finding condition

Code	Finding condition
0	Condition completely unknown
1	Dead but no information on how recently the bird had died (or been killed).
2	Freshly dead - within about a week.
3	Not freshly dead - information available that it had been dead for more than about a week.
4	Found sick, wounded, unhealthy etc. and known to have been released.
5	Found sick, wounded, unhealthy etc. and not released or not known if released.
6	Alive and probably healthy but taken into captivity.
7	Alive and probably healthy and certainly released.
8	Alive and probably healthy and released by ringer.
9	Alive and probably healthy but ultimate fate of bird is not known.

Finding circumstances

Primary Division: Miscellaneous

Primary Division: Shot

Code	
10	Shot - not for reasons 12-16 below.
11	Found shot
12	Shot to protect crops, foodstuffs, animals or game species.
13	Shot in the course of nature protection procedures.
14	Shot to protect human life - air-strike prevention, human health consideration.
15	Shot to provide plumage for decoration or commerce (taxidermy, fishing lures etc) OR shot as part of a scientific investigation.
16	Shot because it was ringed or marked.
19	'Capturado', 'Tue' etc. - words or phrases used in various languages indicating that the bird has been 'hunted' and is likely to have been shot in the majority of cases rather than to have been taken by other means.

Primary Division: Intentionally by man (not shot)

code

20   Hunted, trapped, poisoned intentionally by man
             (NB not shot). Not for reasons set out 21-26
             below.

21   Trapped for caging (NB birds taken into captivity
             for treatment are not included here).

code

22   Trapped, poisoned etc. to protect crops,
             foodstuffs, animals or game species.

23   Trapped, poisoned etc. during nature protection
             procedures.

24   Trapped, poisoned etc. to protect human life.

25   Trapped, poisoned etc. for plumage or during
             scientific investigation.

26   Trapped, poisoned etc. because it was ringed.

27   Found at or in nest-box or other structure
             specially placed or modified by man for birds to
             use.

28   Ring number of metal ring read in field without
             the bird being caught.

29   Bird identified as an individual in the field from
             colour marks, bird not caught.

Primary Division: Accidentally by Man (pollution)

Primary Division: Accidentally by Man (not pollution)

Primary Division: Natural causes - diseases etc.

Primary Division: Predated, other than by Man.

Primary Division: Other natural circumstances.

TABLE 2.4. Euring codes used in this report for finding and ringing countries.

Code	Country
AG	Algeria
AU	Austria
BG	Bulgaria
BL	Belgium
CI	Channel Islands
CS	Czechoslovakia
CY	Cyprus
DF	West Germany
DD	East Germany
DK	Denmark
EG	Egypt
ER	Ireland
ES	Spain and Gibraltar
FR	France
GB	United Kingdom
GR	Greece
HE	Switzerland
HG	Hungary
IA	Italy
IL	Israel
KN	Luxembourg
LE	Lebanon
LT	Libya
MA	Morocco
ME*	Middle East (Iran, Iraq, Jordan, Saudi Arabia, Bahrain, Kuwait, United Arab Emirates and Yemen)
ML	Malta
NA*	North Africa (Morocco, Algeria, Tunisia)
NL	Netherlands
NO	Norway
PL	Poland
PO	Portugal
RO	Romania
SA*	Sub-Saharan Africa
SF	Finland
SU	Soviet Union
SV	Sweden
SY	Syria
TO	Tunisia
TU	Turkey
YU	Yugoslavia

* = not a EURING code

3. BLACK KITE (MILVUS MIGRANS)

3.1 Range

The Black Kite is a summer visitor to Europe and has an extensive breeding range, being absent only from the British Isles, the Low Countries and from Scandinavia other than the extreme east of Finland. The species also breeds in north-west Africa and Asiatic Turkey. European Black Kites winter in Africa, south of the Sahara.

3.2 Population trends

There has been a slight north-westerly expansion of the Black Kite's breeding range in recent years, numbers having increased in parts of central Europe (Cramp and Simmons 1980, Harrison 1982).

3.3 Migration

Most European Black Kites have a south-westerly migration route to their African wintering grounds (Table 3.1). Migrating Black Kites avoid flying long distances over the sea, the majority crossing the Mediterranean at the Straits of Gibraltar (Schifferli 1967, Bernis 1975). Kites from eastern European breeding populations show greater variation in migratory route than those in the west, some birds reaching Africa by way of Italy and the Sicilian Channel. Only a few use the Bosporus crossing (Cramp and Simmons 1980).

3.4 Status

The Black Kite has full legal protection in all E.C. countries (Bertelsen and Simonsen 1989). Amongst non-E.C. countries around the Mediterranean for which information was available in 1979, only Malta and Egypt permitted the taking of Black Kites (Woldhek 1979).

3.5 Geographical variation in the taking of Black Kites

During the period prior to 1980 only Italy, Spain, Morocco and France amongst countries providing at least 10 recoveries had indices of Black Kites taken greater than 25 (Table 3.2). The index value for Italy was almost twice as high as those for any of the countries on the south-western migration route. Indices from the eastern flyway tended to be high but sample sizes were small. The index of birds taken in sub-Saharan Africa was greater than 50 but it seems reasonable to assume that this overestimates the taking of Black Kites as the reporting rate for birds dying from other causes is likely to be low in that region. Spain and Morocco had the highest index values north of the Sahara during the period from 1980 onwards while Italy, which previously had the highest index, provided no recoveries of shot or trapped Black Kites.

Recoveries of Black Kites in Spain have been widely distributed but most were in the eastern half of the country. In France most recoveries have been taken in the vicinity of the Pyrenees or in the north-east. Italian recoveries of taken birds have all been from the north of the country (Fig. 3.1a,b).

The East German breeding population of Black Kites has a higher index of birds taken than any other for which at least 10 recoveries are available. Indices decrease to the south and west with French and Spanish breeding birds having the lowest in Europe (Table 3.3, Fig. 3.3). This indicates that the majority of Black Kites taken in these countries are migrants from elsewhere.

3.6 Temporal variation in the taking of Black Kites

The index of Black Kites taken since 1980 was lower than that for the earlier period in all countries for which there were comparative data, though in no country was the difference statistically significant (Table 3.2).

Index values for five-year periods declined with time in France, Spain, Italy and North Africa (Fig. 3.4). Regression of index of birds taken on year for these countries combined, all minor countries combined and all countries revealed a significant inverse relationship in each case (Table 3.3, Fig. 3.5). This suggests a general decline in the taking of Black Kites over the last 40 years.

Analysis of the percentage of Black Kites taken each month in France, Spain, Italy and North Africa indicates that birds are taken on both autumn and spring migration, particularly in September and October and in April and May (Fig. 3.6). A smaller proportion are taken in autumn in North Africa than in the three European countries.

3.7 Methods used to take Black Kites

Prior to 1980 more Black Kites (42%) were known to have been shot than were trapped (19%) though the method used to obtain the remaining recoveries was not specified. This situation was reversed from 1980, 30% of taken birds being shot and 50% being trapped. However, no country showed any significant change in the proportion of Black Kites taken by each of these methods between the two periods (Table 3.2).

TABLE 3.1a The distribution of Black Kites recovered due to shooting and trapping before 1980 in relation to their area of origin. The percentage of taken birds recovered in each country is shown for each national ringing scheme. Percentages within parentheses are based on less than ten recoveries.

Country of recovery	Country of ringing													
	UK	CI	NO	SV	DK	SF	DD	DF	NL	BL	FR	ES	IA	HE
GB	–	–	–	–	–	0	0	0	–	–	0	–	–	0
CI	–	–	–	–	–	0	0	0	–	–	0	–	–	0
ER	–	–	–	–	–	0	0	0	–	–	0	–	–	0
NO	–	–	–	–	–	0	0	0	–	–	0	–	–	0
SV	–	–	–	–	–	0	0	0	–	–	0	–	–	0
DK	–	–	–	–	–	0	0	0	–	–	0	–	–	0
SF	–	–	–	–	–	0	0	0	–	–	0	–	–	0
SU	–	–	–	–	–	0	0	0	–	–	0	–	–	0
PL	–	–	–	–	–	0	0	0	–	–	0	–	–	0
DD	–	–	–	–	–	0	(7.0)	0	–	–	0	–	–	0
DF	–	–	–	–	–	0	0	(6.3)	–	–	0	–	–	0
NL	–	–	–	–	–	0	0	0	–	–	0	–	–	0
BL	–	–	–	–	–	0	0	0	–	–	0	–	–	0
KN	–	–	–	–	–	0	0	0	–	–	0	–	–	0
FR	–	–	–	–	–	0	44.2	(25.0)	–	–	0	–	–	(18.4)
ES	–	–	–	–	–	0	(4.7)	(25.0)	–	–	(50.0)	–	–	(21.1)
PO	–	–	–	–	–	0	0	0	–	–	0	–	–	0
IA	–	–	–	–	–	0	(20.9)	(18.8)	–	–	0	–	–	0
HE	–	–	–	–	–	0	0	0	–	–	0	–	–	(10.5)
AU	–	–	–	–	–	0	0	0	–	–	0	–	–	0
CS	–	–	–	–	–	0	(7.0)	0	–	–	0	–	–	0
HG	–	–	–	–	–	0	0	0	–	–	0	–	–	0
RO	–	–	–	–	–	0	(2.3)	0	–	–	0	–	–	0
BG	–	–	–	–	–	0	0	0	–	–	0	–	–	0
YG	–	–	–	–	–	0	0	0	–	–	0	–	–	0
GR	–	–	–	–	–	0	0	(6.3)	–	–	0	–	–	0
TU	–	–	–	–	–	0	0	0	–	–	0	–	–	0
CY	–	–	–	–	–	0	0	0	–	–	0	–	–	0
ML	–	–	–	–	–	0	0	0	–	–	0	–	–	0
SY	–	–	–	–	–	0	0	0	–	–	0	–	–	0
LE	–	–	–	–	–	(100)	0	0	–	–	0	–	–	0
IL	–	–	–	–	–	0	0	0	–	–	0	–	–	0
ME	–	–	–	–	–	0	0	0	–	–	0	–	–	0
EG	–	–	–	–	–	0	0	0	–	–	0	–	–	0
LT	–	–	–	–	–	0	0	0	–	–	0	–	–	0
TO	–	–	–	–	–	0	0	0	–	–	0	–	–	(2.6)
AG	–	–	–	–	–	0	0	(6.3)	–	–	0	–	–	(2.6)
MA	–	–	–	–	–	0	(4.7)	(12.5)	–	–	(50.0)	–	–	(23.7)
SA	–	–	–	–	–	0	(9.3)	0	–	–	0	–	–	(21.1)
TOTAL NO.	–	–	–	–	–	1	43	16	–	–	2	–	–	38

Note: No data available for Poland, Czechoslovakia or Hungary.

TABLE. 3.1b The distribution of Black Kites recovered due to shooting and trapping from 1980 onwards in relation to their area of origin. The percentage of taken birds recovered in each country is shown for each national ringing scheme. Percentages within parentheses are based on less than ten recoveries.

Country of recovery	Country of ringing													
	UK	CI	NO	SV	DK	SF	DD	DF	NL	BL	FR	ES	IA	HE
GB	–	–	–	–	–	–	–	–	–	–	–	0	–	0
CI	–	–	–	–	–	–	–	–	–	–	–	0	–	0
ER	–	–	–	–	–	–	–	–	–	–	–	0	–	0
NO	–	–	–	–	–	–	–	–	–	–	–	0	–	0
SV	–	–	–	–	–	–	–	–	–	–	–	0	–	0
DK	–	–	–	–	–	–	–	–	–	–	–	0	–	0
SF	–	–	–	–	–	–	–	–	–	–	–	0	–	0
SU	–	–	–	–	–	–	–	–	–	–	–	0	–	0
PL	–	–	–	–	–	–	–	–	–	–	–	0	–	0
DD	–	–	–	–	–	–	–	–	–	–	–	0	–	0
DF	–	–	–	–	–	–	–	–	–	–	–	0	–	0
NL	–	–	–	–	–	–	–	–	–	–	–	0	–	0
BL	–	–	–	–	–	–	–	–	–	–	–	0	–	0
KN	–	–	–	–	–	–	–	–	–	–	–	0	–	0
FR	–	–	–	–	–	–	–	–	–	–	–	0	–	0
ES	–	–	–	–	–	–	–	–	–	–	–	(33.3)	–	(28.6)
PO	–	–	–	–	–	–	–	–	–	–	–	0	–	0
IA	–	–	–	–	–	–	–	–	–	–	–	0	–	0
HE	–	–	–	–	–	–	–	–	–	–	–	0	–	(14.3)
AU	–	–	–	–	–	–	–	–	–	–	–	0	–	0
CS	–	–	–	–	–	–	–	–	–	–	–	0	–	0
HG	–	–	–	–	–	–	–	–	–	–	–	0	–	0
RO	–	–	–	–	–	–	–	–	–	–	–	0	–	0
BG	–	–	–	–	–	–	–	–	–	–	–	0	–	0
YG	–	–	–	–	–	–	–	–	–	–	–	0	–	0
GR	–	–	–	–	–	–	–	–	–	–	–	0	–	0
TU	–	–	–	–	–	–	–	–	–	–	–	0	–	0
CY	–	–	–	–	–	–	–	–	–	–	–	0	–	0
ML	–	–	–	–	–	–	–	–	–	–	–	0	–	0
SY	–	–	–	–	–	–	–	–	–	–	–	0	–	0
LE	–	–	–	–	–	–	–	–	–	–	–	0	–	0
IL	–	–	–	–	–	–	–	–	–	–	–	0	–	0
ME	–	–	–	–	–	–	–	–	–	–	–	0	–	0
EG	–	–	–	–	–	–	–	–	–	–	–	0	–	0
LT	–	–	–	–	–	–	–	–	–	–	–	0	–	0
TO	–	–	–	–	–	–	–	–	–	–	–	0	–	0
AG	–	–	–	–	–	–	–	–	–	–	–	0	–	0
MA	–	–	–	–	–	–	–	–	–	–	–	(33.3)	–	(28.6)
SA	–	–	–	–	–	–	–	–	–	–	–	(33.3)	–	(28.6)
TOTAL No. a	–	–	–	–	–	–	–	–	–	–	–	3	–	7

Note: No data available for Poland, Czechoslovakia or Hungary.

TABLE 3.2. BLACK KITE: Indices of birds taken before 1980 and from 1980 onwards for each   country of recovery.

	Index (all methods)[a]		% hunted[b]		Total recoveries[c]		Shooting Index[a]		Trapping Index[a]		G test[d]
	-1980	1980+	-1980	1980+	-1980	1980+	-1980	1980+	-1980	1980+	
GB	-	-	-	-	-	-	-	-	-	-	-
CI	-	-	-	-	-	-	-	-	-	-	-
ER	-	-	-	-	-	-	-	-	-	-	-
NO	-	-	-	-	-	-	-	-	-	-	-
SV	-	-	-	-	-	-	-	-	-	-	-
DK	-	-	-	-	-	-	-	-	-	-	-
SF	-	-	-	-	-	-	-	-	-	-	-
SU	-	(0)	-	0	--	1	-	(0)	-	(0)	-
PL	-	-	-	-	-	-	-	-	-	-	-
DD	14.3	-	12.5	0	24	1	4.8	-	9.5	0	-
DF	4.0	(0)	3.2	0	31	5	4.0	(0)	0	(0)	-
NL	(0)	-	0	-	3	-	(0)	-	(0)	-	-
BL	-	-	-	-	-	-	-	-	-	-	-
KN	-	-	-	-	-	-	-	-	-	-	-
FR	34.1	(0)	30.7	0	101	10	10.2	(0)	9.1	(0)	-
ES	38.5	15.0	37.5	15.4	40	26	25.6	10.0	7.7	5.0	-
PO	-	-	-	-	--	-	-	-	-	-	-
IA	72.2	(0)	59.1	0	22	1	22.2	(0)	5.6	(0)	-
HE	5.8	3.1	4.9	2.7	81	37	2.4	0	1.5	3.1	-
AU	-	-	0	-	1	-	-	-	-	-	-
CS	(100.0)	-	100.0	-	3	-	(100.0)	-	(0)	-	-
HG	(0)	-	0	-	2	-	(0)	-	(0)	-	-
RO	(100.0)	-	100.0	-	1	-	(100.0)	-	(0)	-	-
BG	-	-	-	-	-	-	-	-	-	-	-
YG	-	-	-	-	-	-	-	-	-	-	-
GR	(100.0)	-	100.0	0	1	-	(2.4)	-	(0)	-	-
TU	-	-	-	-	-	-	-	-	-	-	-
CY	-	-	-	-	-	-	-	-	-	-	-
ML	-	-	-	-	-	-	-	-	-	-	-
SY	-	-	-	-	-	-	-	-	-	-	-
LE	(100.0)	-	100.0	-	1	-	(100.0)	-	(0)	-	-
IL	-	-	-	-	-	-	-	-	-	-	-
ME	-	-	-	-	-	-	-	-	-	-	-
EG	-	-	-	-	-	-	-	-	-	-	-
LT	-	-	-	-	-	-	-	-	-	-	-
TO	(50.0)	-	50.0	-	2	-	(50.0)	-	(0)	-	-
AG	(40.0)	(0)	28.6	0	7	1	(0)	(0)	(20.0)	(0)	-
MA	36.8	15.8	29.8	15.0	47	20	13.2	5.3	10.5	5.3	-
SA	54.5	30.0	38.7	23.1	31	13	18.2	0	0	20.0	-

[a]   See chapter 2 (methods) for derivation of indices.   Indices derived from less than 10 recoveries are indicated within parentheses.   Fisher's exact tests (Sokal & Rohlf 1981) were used to compare the proportions taken in each period.   Significance levels ($*<0.05$; $** <0.01$; $*** <0.001$) of the tests are indicated in column 1980+. Tests were carried out on all pairs except where indices were based on less than 10 recoveries.

[b]   Percentage of all recoveries other than those excluded on the basis of poor quality data (see chapter 2) taken by shooting and trapping.

[c]   Total number of recoveries other than those excluded on the basis of poor quality data.

[d]   G test (Sokal & Rohlf 1981) comparison between periods of the proportions of birds taken according to the classes shot, trapped, and shot or trapped.   Significance levels of these comparisons are indicated as above.   'NS' indicates non-significant results where tests were carried out.   Comparisons were not made where the expected frequency in any cell was less than 10.

Table.3.3. Black Kite: Indices of birds taken for each breeding population (across all years).

Breeding Population		Index of birds taken	Sample size
UK	United Kingdom	–	–
CI	Channel Islands	–	–
NO	Norway	–	–
SV	Sweden	–	–
DK	Denmark	–	–
SF	Finland	100	1
SU	USSR (Lithuania only)	–	–
PL	Poland	–	–
DD	East Germany	55.8	77
DF	West Germany	29.1	55
NL	Holland	–	–
BL	Belgium	–	–
FR	France	5.0	40
ES	Spain	10.7	28
IA	Italy	–	–
HE	Switzerland	20.5	220
CJ	Czechoslovakia	–	–
HG	Hungary	–	–

Table 3.4   Regression analysis of temporal trends in the indices of Black Kites taken.

Country of recovery	Intercept	Slope	t	P
Major	198.2	-2.36	-6.21	***
Other	63.9	-0.67	-1.88	n.s.
All	159.3	-1.88	-7.67	***

All regressions used a weighted technique where each 5-year index was weighted by the square root of the sample size.

Countries where 10 or more recoveries occurred in each year after 1950 were analysed. Data from the period before 1950 were not included in the analysis.

Major countries are those with a tradition of taking substantial numbers of birds that use western migration routes.
(i.e. BL, FR, ES, PO, IA, NA).

Significance levels indicated are: NS Not significant; * P<0.05; ** P<0.01; *** P<0.00.
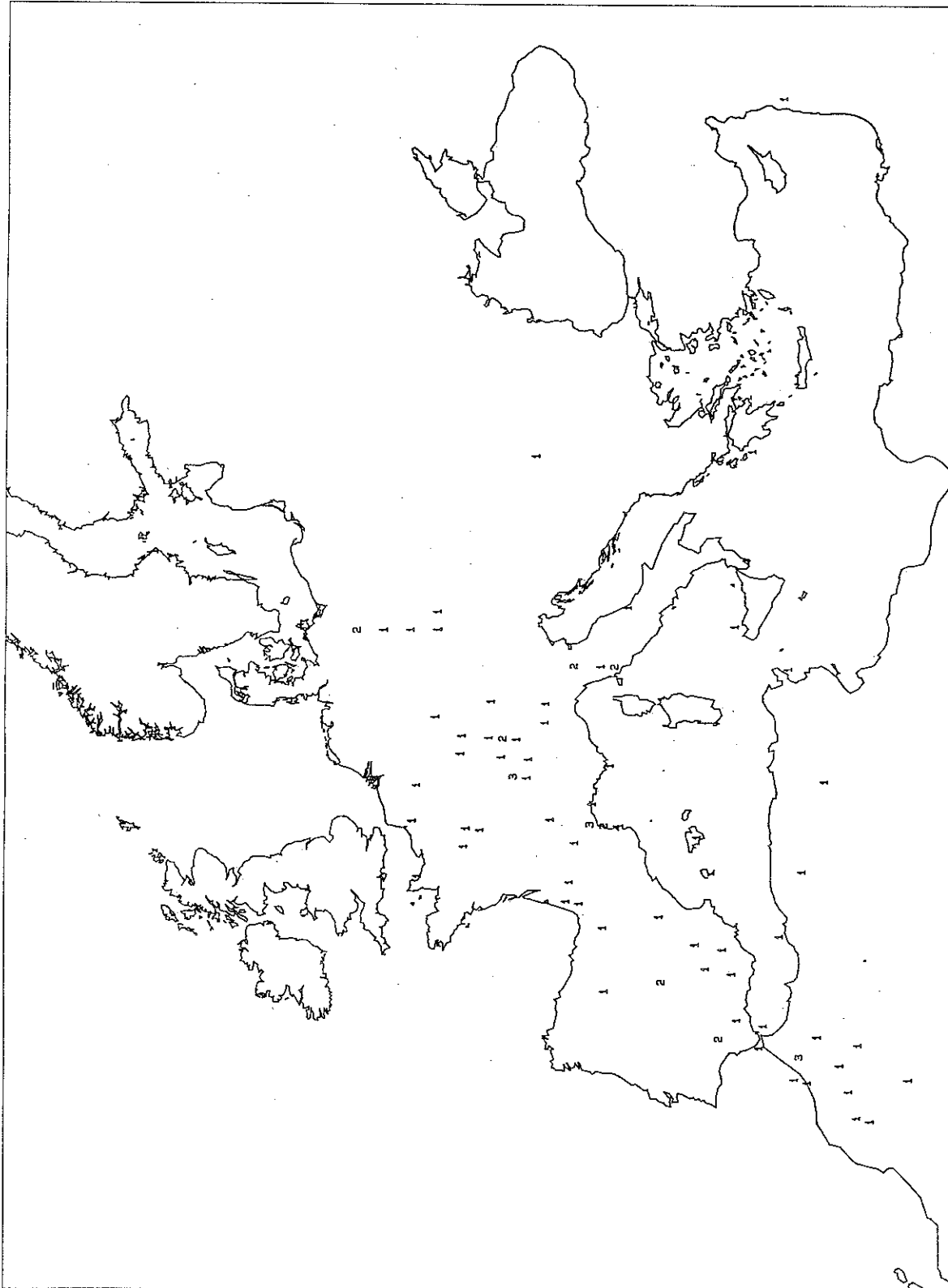
Figure 3.1a Total numbers of Black Kite ringing recoveries resulting from birds taken before 1980 in each 30' by 60' grid square. ** Indicates numbers greater than 99. 9 recoveries were outside the limits of the map.
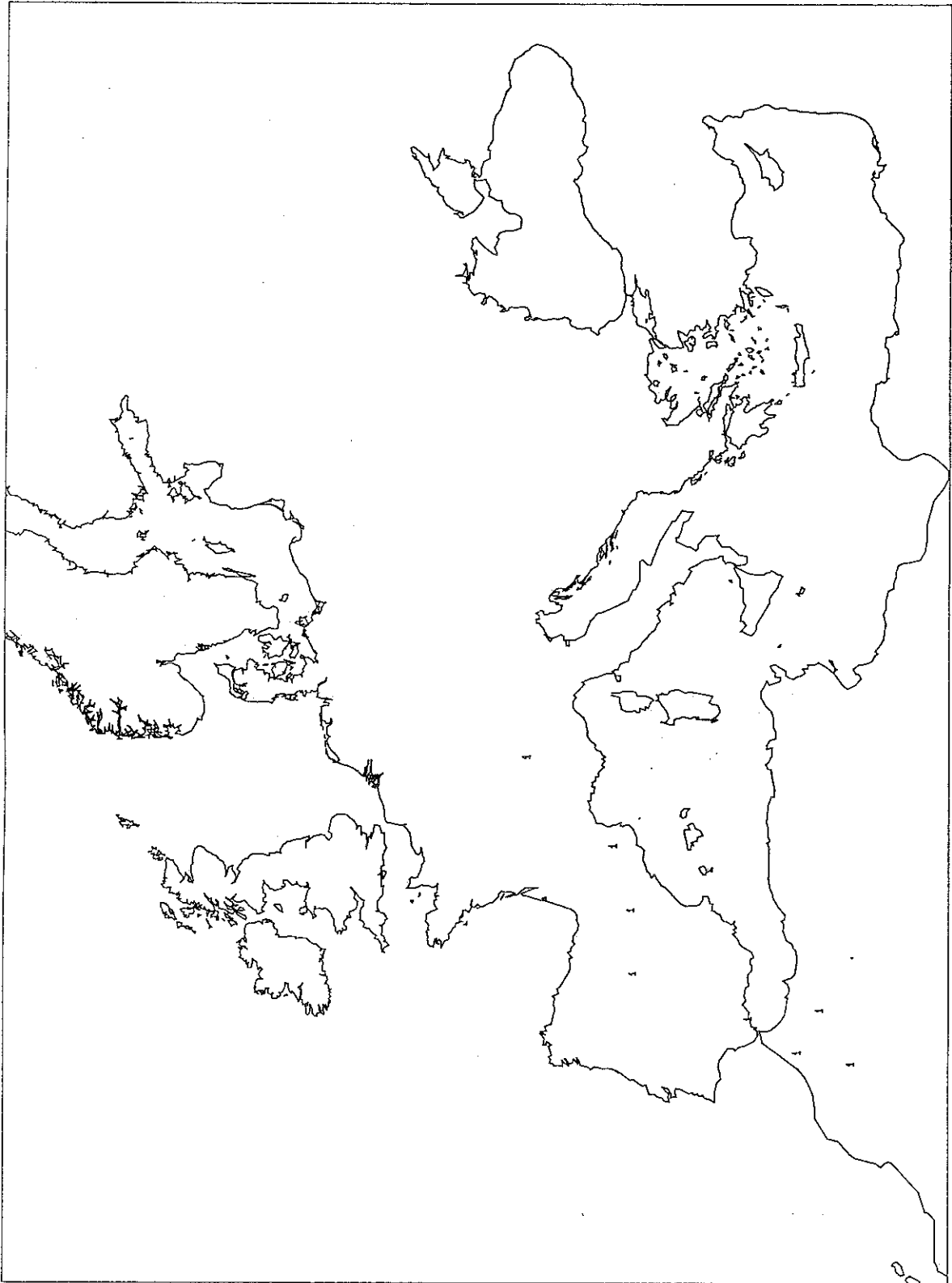
Figure 3.1b Total numbers of Black Kite ringing recoveries resulting from birds taken from 1980 onwards in each 30' by 60' grid square. ** Indicates numbers greater than 99. 3 recoveries were outside the limits of the map.
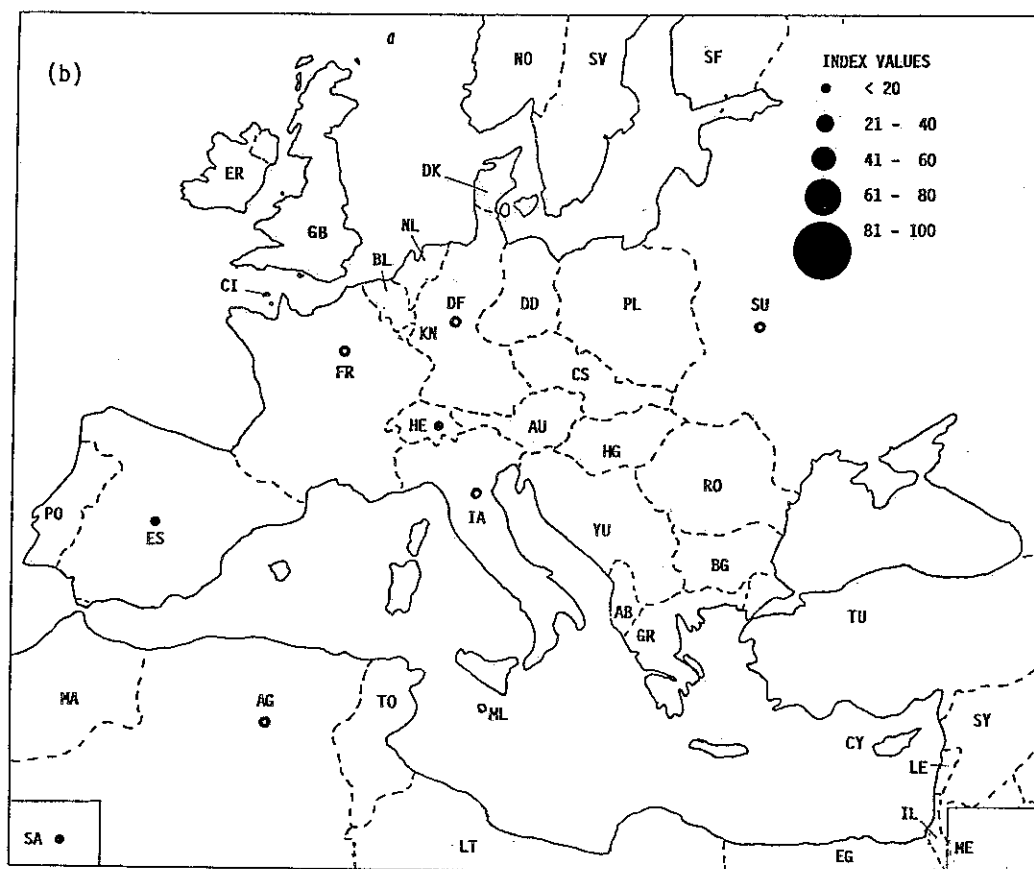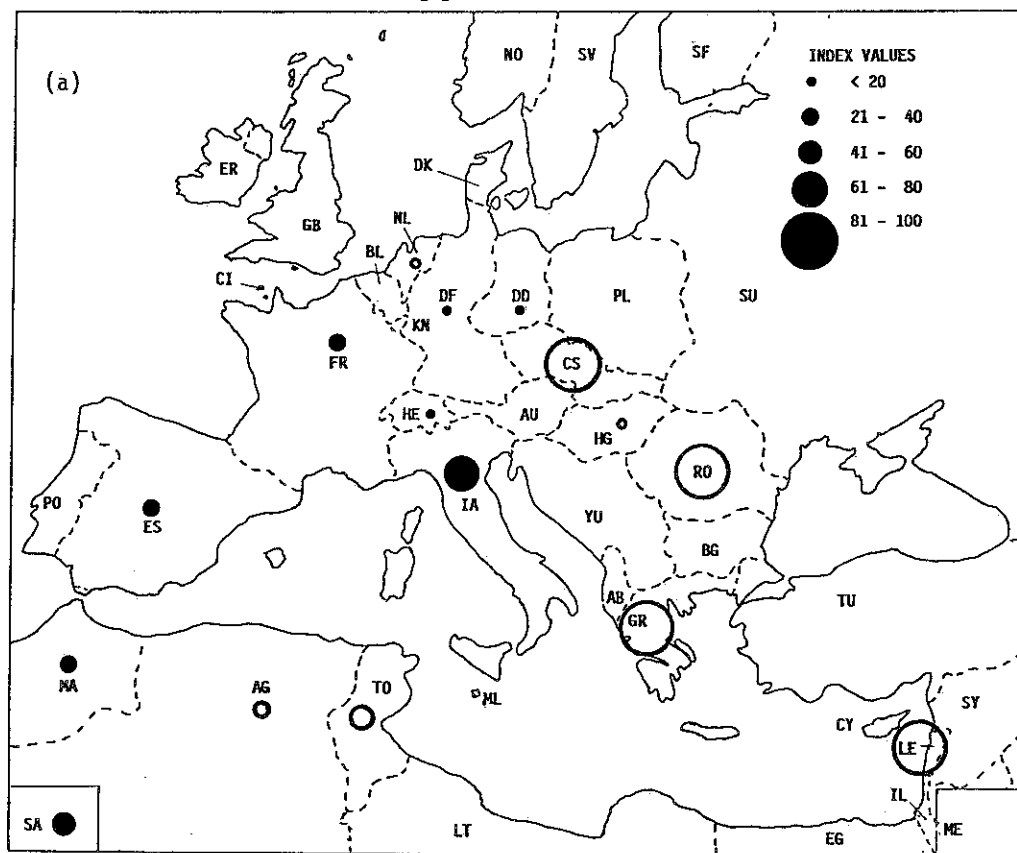
Figure 3.2 Geographical variation in the indices of Black Kite
taken for each country of recovery in the period before 1980 (a) and from
1980 onwards (b).   Solid circles indicate values derived from more than 10
recoveries and open circles indicate those derived from less than 10. Country
codes are indicated in Table 2.4 of the Methods.
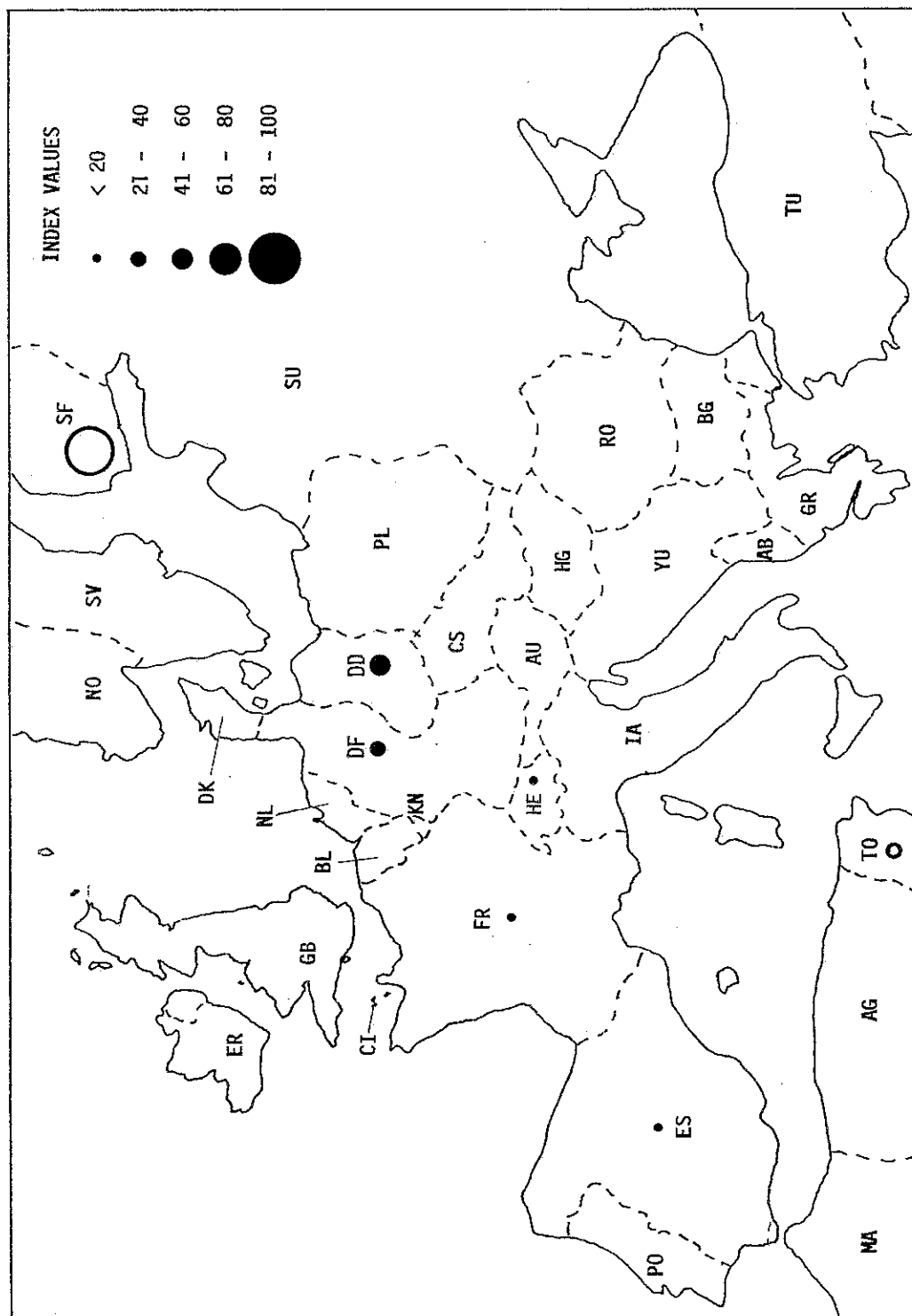
Figure 3.3 Geographical variation in the indices of Black Kite taken over all years for each breeding population. Solid circles indicate values derived from more than 10 recoveries and open circles indicate those derived from less than 10. Country codes are indicated in Table 2.4 of the Methods.

France

Index of birds taken

5 Year period

Italy

Index of birds taken

5 Year period

Spain

Index of birds taken

5 Year period

North Africa

Index of birds taken

5 Year period
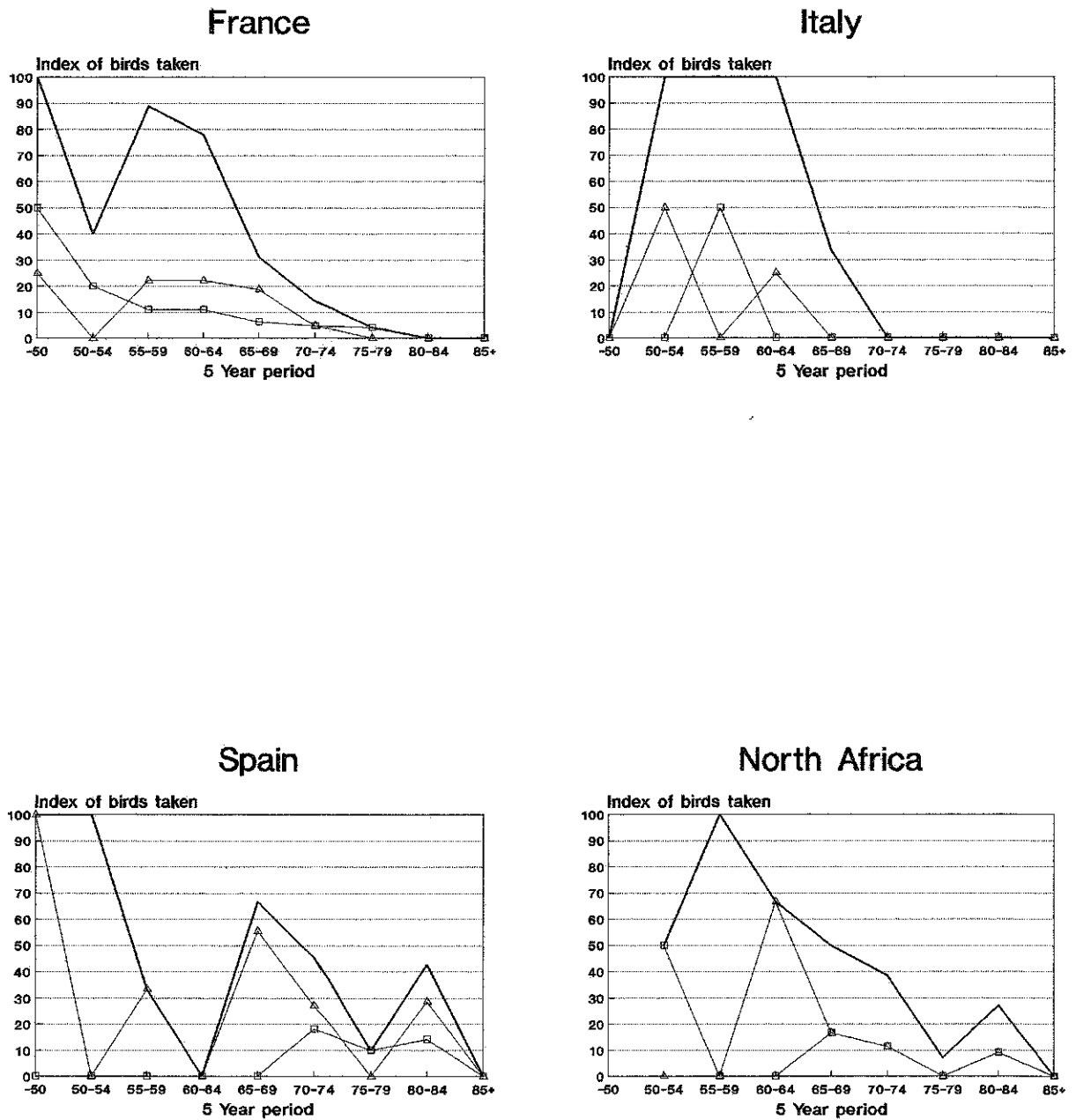
Figure 3.4   Trends in 5-yearly indices of Black Kite taken in individual countries
with high overall indices and sufficient recoveries for analysis.   The bold line without
symbols indicates overall index values, triangles indicate index values based on birds
reported as shot and squares indicate index values based on birds reported as trapped.
The periods -50 and 85+ refer to all recoveries before 1950 and from 1985 onwards
respectively.

FR,ES,IA,NA

Others
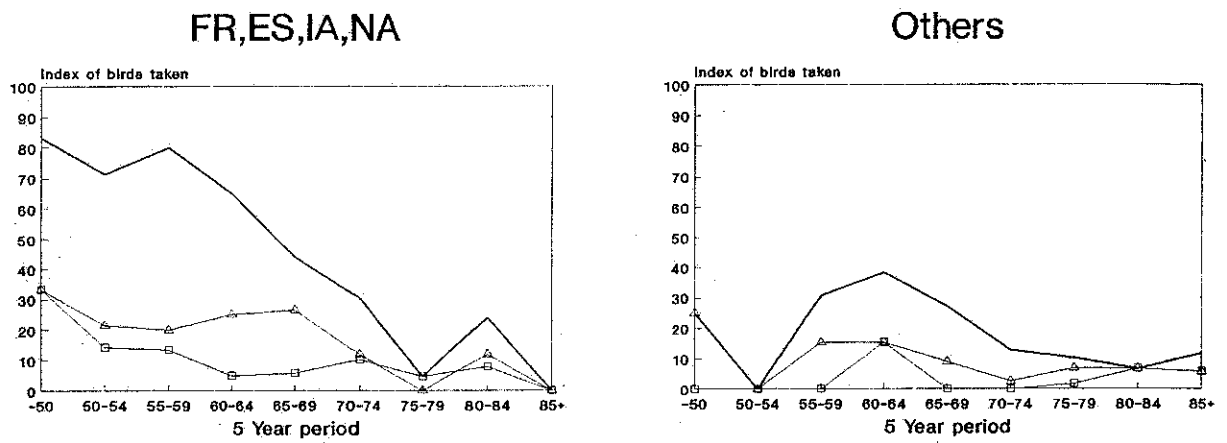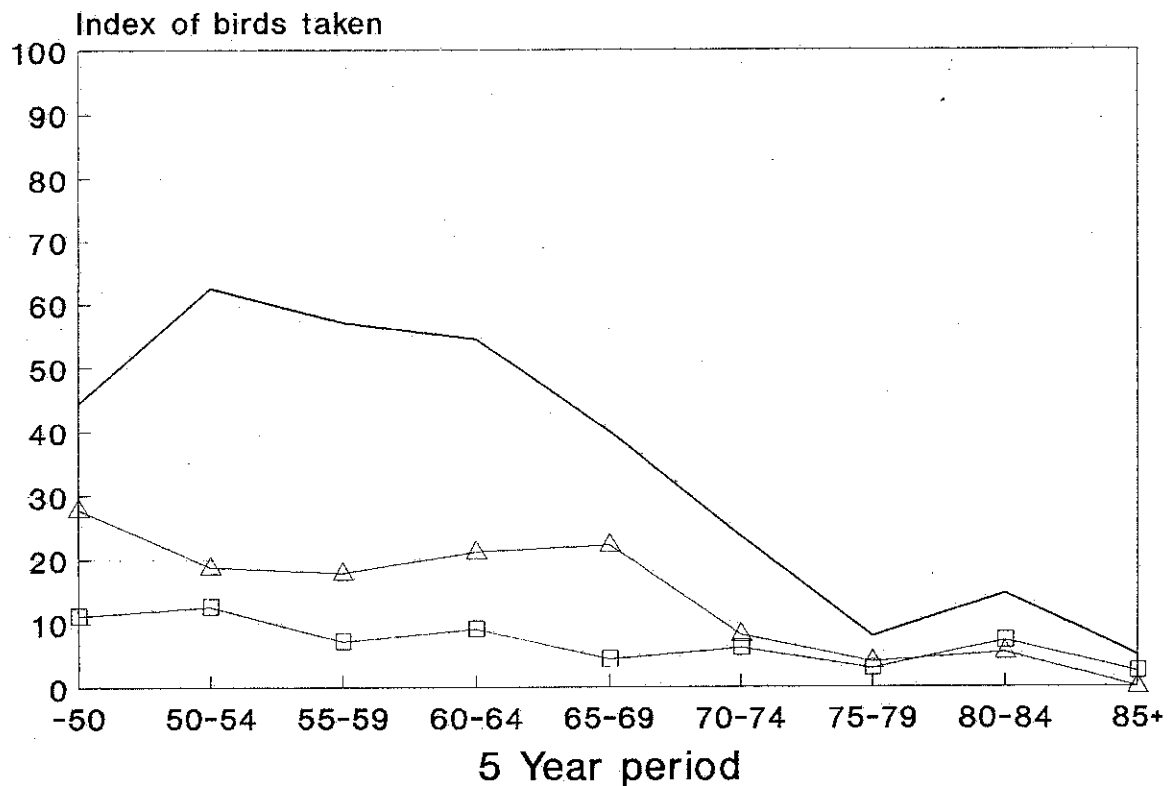
All countries

Figure 3.5   Trends in combined 5-yearly indices of Black Kite
taken in: a) countries, for which data for this species were available,
with a tradition of taking substantial numbers of migratory birds on the
western European flyways (ie FR,ES, IA, NA),
b) other countries and c) all countries.   The bold line with symbols
indicates overall index values, triangles indicate values based on birds
reported as shot and squares indicate index values based on birds reported
as trapped.   The periods -50 and 85+ refer to all recoveries before 1950
and from 1985 onwards respectively.

France

Spain

North Africa

Italy
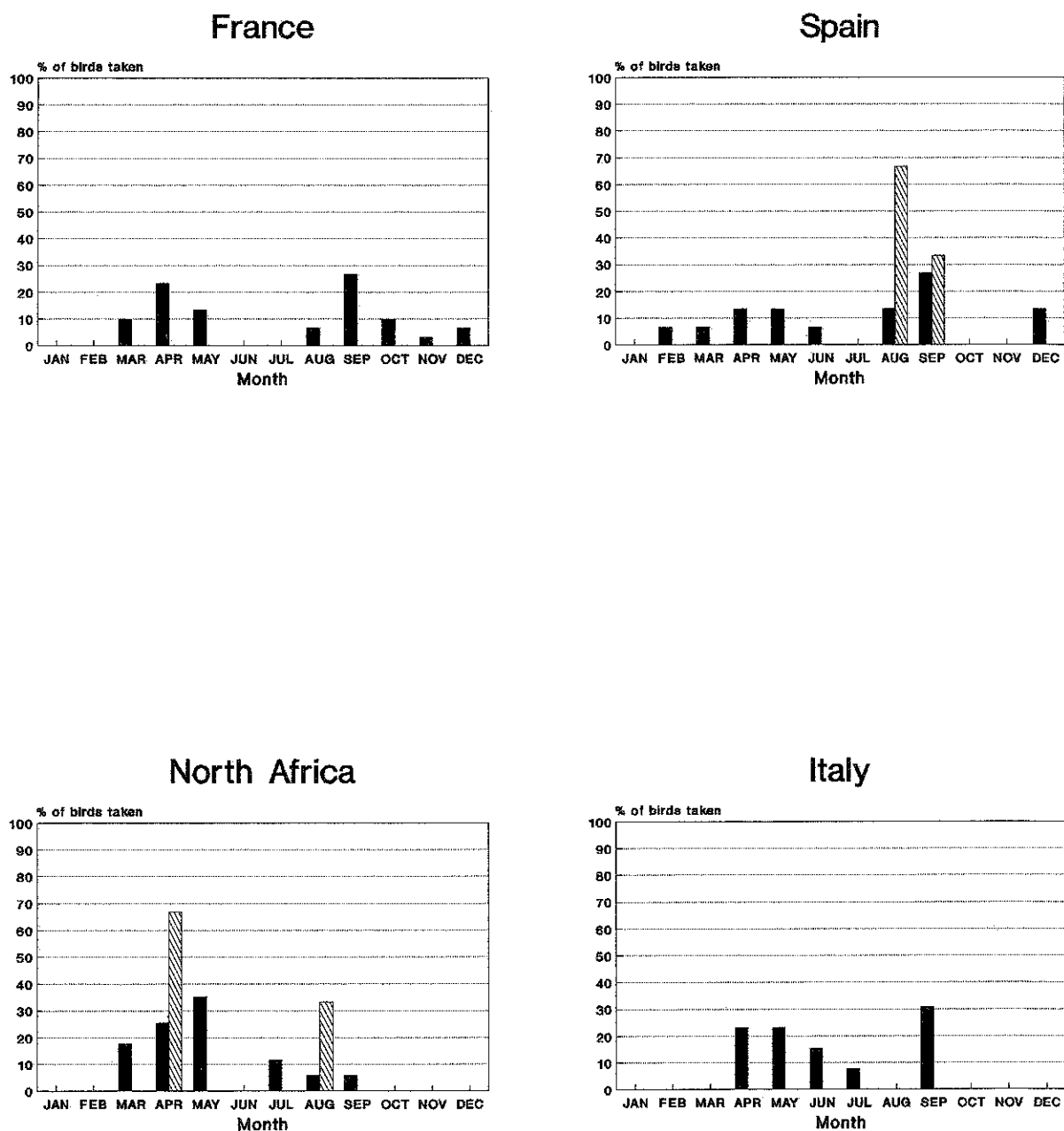
Figure 3.6   Monthly percentages of total Black Kite taken in individual countries with high overall indices and sufficient recoveries for analysis. Solid bars indicate birds from the period before 1980 and hatched bars indicate birds taken from 1980 onwards.

4. RED KITE (MILVUS MILVUS)

4.1 Range

The Red Kite is patchily distributed as a breeding bird in Europe. It is resident in the United Kingdom (Wales), France, Spain, Italy and Yugoslavia but is predominantly a summer visitor north and east of the Alps. The species is absent from Scandinavia (except for a small population in southern Sweden), Austria and the southern Balkans (Harrison 1982). The migratory populations winter south to North Africa and the Middle East.

4.2 Population trends

The range of the Red Kite in north-west Europe and Scandinavia has contracted considerably over the last 150 years probably as a result of persecution of breeding birds and numbers have decreased throughout the continent (Bijleveld 1974, Cramp and Simmons 1980).The small United Kingdom population has increased in recent years (Marchant et al. 1990).

4.3 Migration

The migratory populations of Red Kites from north and central Europe generally move in a south-westerly direction in autumn (Table 4.1). Most winter in France and Iberia with a relatively few continuing to North Africa (Cramp and Simmons 1980). The Straits of Gibraltar is the sea crossing most used by Red Kites (Thiollay and Perthuis 1975). A smaller proportion of northern Red Kites take a more easterly route into Italy and the Balkans. Little is known about the winter distribution of east European breeding populations. In recent years an increasing tendency of Red Kites to winter on their breeding grounds has been reported from some northern areas, particularly Sweden (Ulfstrand 1970).

4.4 Status

The Red Kite has full legal protection in all E.C. countries (Bertelsen and Simonsen 1989). Amongst non-E.C. countries around the Mediterranean for which information was available in 1979, only Malta and Egypt permitted the taking of Red Kites (Woldhek 1979).

4.5 Geographical variation in the taking of Red Kites

The highest indices of Red Kites taken before 1980 were found in south-west Europe. Only East and West Germany, France, Spain and Portugal contributed at least 10 recoveries to the analysis for this period. The last three countries all had indices greater than 60 (Table 4.2). The sample sizes for other countries were too small to provide meaningful results. Most recoveries due to Red Kites being taken came from France (45%) and Spain (38%).

Since 1980 only the United Kingdom, West Germany, France and Spain have provided 10 or more recoveries of Red Kites and no country has an index value greater than 15.

Most recoveries of Red Kites taken in France have come from central and south-western regions. Iberian recoveries have mainly been taken in central Spain and southern Portugal (Fig. 4.1a,b).

The general trend amongst European Red Kites is that breeding populations that are predominantly migratory have higher index values than essentially sedentary populations such as those of the United Kingdom and France (Table 4.3, Fig. 4.3). The Swedish population has an intermediate index value, which might be expected of a small population comprising both migratory and resident birds.

4.6 Temporal variation in the taking of Red Kites

In the majority of countries for which comparative data were available the index of birds taken since 1980 was lower than that for the earlier period (Table 4.2). Increased index values occurred in the United Kingdom, Denmark and Switzerland but only the last two were greater than 10 and were based on very small sample sizes. The reduction in index value was statistically significant in France and Spain.

Indices of Red Kites taken during five-year periods decreased with time in France and Spain (Fig. 4.4). Regression of index values on year for combinations of all countries, major countries and minor countries revealed significant inverse relationships suggesting a general decline in the taking of Red Kites over the last 40 years (Table 4.3, Fig. 4.5).

In France and Spain most Red Kites are taken during autumn and early winter; October being the most important month in France and November and December in Spain (Fig. 4.6).

4.7 Methods used to take Red Kites

Most of the Red Kites that are taken are shot. Prior to 1980 44% of taken recoveries were known to have been shot. Only 12% were reported as trapped. The method used to take the remainder was not specified. Since 1980 all taken recoveries of Red Kites have provided information on the method used. During this period 82% were shot and 18% were trapped. No significant change between periods in the proportion of birds taken by each method was found in any country (Table 4.2).

TABLE. 4.1a The distribution of Red Kites recovered due to shooting and trapping before 1980 in relation to their area of origin. The percentage of taken birds recovered in each country is shown for each national ringing scheme. Percentages within parentheses are based on less than ten recoveries.

Country of recovery	UK	CI	NO	SV	DK	SF	DD	DF	NL	BL	FR	ES	IA	HE
GB	–	–	–	–	–	–	0	0	–	–	0	–	–	0
CI	–	–	–	–	–	–	0	0	–	–	0	–	–	0
ER	–	–	–	–	–	–	0	0	–	–	0	–	–	0
NO	–	–	–	–	–	–	0	0	–	–	0	–	–	0
SV	–	–	–	–	–	–	0	0	–	–	0	–	–	0
DK	–	–	–	–	–	–	0	0	–	–	0	–	–	0
SF	–	–	–	–	–	–	0	0	–	–	0	–	–	0
SU	–	–	–	–	–	–	0	(1.1)	–	–	0	–	–	0
PL	–	–	–	–	–	–	0	0	–	–	0	–	–	0
DD	–	–	–	–	–	–	(6.8)	0	–	–	0	–	–	0
DF	–	–	–	–	–	–	0	(7.6)	–	–	0	–	–	0
NL	–	–	–	–	–	–	0	0	–	–	0	–	–	0
BL	–	–	–	–	–	–	0	(2.2)	–	–	0	–	–	0
KN	–	–	–	–	–	–	0	0	–	–	0	–	–	0
FR	–	–	–	–	–	–	39.8	48.9	–	–	(100)	–	–	(50.0)
ES	–	–	–	–	–	–	43.7	29.4	–	–	0	–	–	(50.0)
PD	–	–	–	–	–	–	(5.8)	(7.6)	–	–	0	–	–	0
IA	–	–	–	–	–	–	(1.0)	(2.2)	–	–	0	–	–	0
HE	–	–	–	–	–	–	0	(1.1)	–	–	0	–	–	0
AU	–	–	–	–	–	–	0	0	–	–	0	–	–	0
CS	–	–	–	–	–	–	0	0	–	–	0	–	–	0
HG	–	–	–	–	–	–	0	0	–	–	0	–	–	0
RO	–	–	–	–	–	–	0	0	–	–	0	–	–	0
BG	–	–	–	–	–	–	0	0	–	–	0	–	–	0
YG	–	–	–	–	–	–	(1.0)	0	–	–	0	–	–	0
GR	–	–	–	–	–	–	0	0	–	–	0	–	–	0
TU	–	–	–	–	–	–	0	0	–	–	0	–	–	0
CY	–	–	–	–	–	–	0	0	–	–	0	–	–	0
ML	–	–	–	–	–	–	0	0	–	–	0	–	–	0
SY	–	–	–	–	–	–	0	0	–	–	0	–	–	0
LE	–	–	–	–	–	–	0	0	–	–	0	–	–	0
IL	–	–	–	–	–	–	0	0	–	–	0	–	–	0
ME	–	–	–	–	–	–	0	0	–	–	0	–	–	0
EG	–	–	–	–	–	–	0	0	–	–	0	–	–	0
LT	–	–	–	–	–	–	0	0	–	–	0	–	–	0
TO	–	–	–	–	–	–	0	0	–	–	0	–	–	0
AG	–	–	–	–	–	–	0	0	–	–	0	–	–	0
MA	–	–	–	–	–	–	(1.0)	0	–	–	0	–	–	0
SA	–	–	–	–	–	–	(1.0)	0	–	–	0	–	–	0
TOTAL No.	–	–	–	–	–	–	103	92	–	–	2	–	–	16

Note: No data available for Poland, Czechoslovakia or Hungary.

TABLE. 4.1b The distribution of Red Kites recovered due to shooting and trapping from 1980 onwards in relation to their area of origin. The percentage of taken birds recovered in each country is shown for each national ringing scheme. Percentages within parentheses are based on less than ten recoveries.

Country of recovery	Country of ringing													
	UK	CI	NO	SV	DK	SF	DD	DF	NL	BL	FR	ES	IA	HE
	100	–	–	0	–	–	–	0	–	–	–	–	–	0
CI	0	–	–	0	–	–	–	0	–	–	–	–	–	0
ER	0	–	–	0	–	–	–	0	–	–	–	–	–	0
NO	0	–	–	0	–	–	–	0	–	–	–	–	–	0
SV	0	–	–	0	–	–	–	0	–	–	–	–	–	0
DK	0	–	–	(25.0)	–	–	–	0	–	–	–	–	–	0
SF	0	–	–	0	–	–	–	0	–	–	–	–	–	0
SU	0	–	–	0	–	–	–	0	–	–	–	–	–	0
PL	0	–	–	0	–	–	–	0	–	–	–	–	–	0
DD	0	–	–	0	–	–	–	0	–	–	–	–	–	0
DF	0	–	–	0	–	–	–	(50.0)	–	–	–	–	–	0
NL	0	–	–	0	–	–	–	0	–	–	–	–	–	0
BL	0	–	–	0	–	–	–	0	–	–	–	–	–	0
KN	0	–	–	0	–	–	–	0	–	–	–	–	–	0
FR	0	–	–	(75.0)	–	–	–	0	–	–	–	–	–	0
ES	0	–	–	0	–	–	–	(50.0)	–	–	–	–	–	(66.7)
PO	0	–	–	0	–	–	–	0	–	–	–	–	–	0
IA	0	–	–	0	–	–	–	0	–	–	–	–	–	0
HE	0	–	–	0	–	–	–	0	–	–	–	–	–	(33.3)
AU	0	–	–	0	–	–	–	0	–	–	–	–	–	0
CS	0	–	–	0	–	–	–	0	–	–	–	–	–	0
HG	0	–	–	0	–	–	–	0	–	–	–	–	–	0
RO	0	–	–	0	–	–	–	0	–	–	–	–	–	0
BG	0	–	–	0	–	–	–	0	–	–	–	–	–	0
YG	0	–	–	0	–	–	–	0	–	–	–	–	–	0
GR	0	–	–	0	–	–	–	0	–	–	–	–	–	0
TU	0	–	–	0	–	–	–	0	–	–	–	–	–	0
CY	0	–	–	0	–	–	–	0	–	–	–	–	–	0
ML	0	–	–	0	–	–	–	0	–	–	–	–	–	0
SY	0	–	–	0	–	–	–	0	–	–	–	–	–	0
LE	0	–	–	0	–	–	–	0	–	–	–	–	–	0
IL	0	–	–	0	–	–	–	0	–	–	–	–	–	0
ME	0	–	–	0	–	–	–	0	–	–	–	–	–	0
EG	0	–	–	0	–	–	–	0	–	–	–	–	–	0
LT	0	–	–	0	–	–	–	0	–	–	–	–	–	0
TO	0	–	–	0	–	–	–	0	–	–	–	–	–	0
AG	0	–	–	0	–	–	–	0	–	–	–	–	–	0
MA	0	–	–	0	–	–	–	0	–	–	–	–	–	0
SA	0	–	–	0	–	–	–	0	–	–	–	–	–	0
TOTAL No.	1	–	–	4	–	–	–	2	–	–	–	–	–	3

Note: No data available for Poland, Czechoslovakia or Hungary.

TABLE.4.2. RED KITE   Indices of birds taken before 1980 and from 1980 onwards for each country of recovery.

	Index (all methods)[a]		% hunted[b]		Total recoveries[c]		Shooting Index[a]		Trapping Index[a]		G test[d]
	-1980	1980+	-1980	1980+	-1980	1980+	-1980	1980+	-1980	1980+	
GB	(0)	6.3	0	6.3	6	16	(0)	0	(0)	6.3	-
CI	-	-	-	-	-	-	-	-	-	-	-
ER	-	-	-	-	-	-	-	-	-	-	-
NO	-	-	-	-	-	-	-	-	-	-	-
SV	-	(0)	-	0	-	6	-	(0)	-	(0)	-
DK	(0)	50.0	0	50.0	2	2	(0)	(50.0)	(0)	(0)	-
SF	-	-	-	-	-	-	-	-	-	-	-
SU	(100.0)	-	100.0	-	1	-	(100.0)	-	(0)	-	-
PL	(0)	(0)	0	0	2	2	(0)	(0)	(0)	(0)	-
DD	14.0	(0)	14.0	0	50	2	8.0	(0)	6.0	(0)	-
DF	8.8	5.0	8.4	4.6	83	22	1.3	0	6.3	5.0	-
NL	(0)	(0)	0	0	1	1	(0)	(0)	(0)	(0)	-
BL	(100.0)	(0)	100.0	0	2	4	50.0	(0)	50.0	(0)	-
KN	(0)	-	0	-	1	-	(0)	-	(0)	-	-
FR	64.6	14.3***	63.2	12.0	152	25	22.8	14.3	5.4	0	-
ES	74.1	14.8***	71.4	14.8	112	27	40.7	14.8	6.5	0	-
PO	92.9	(0)	92.9	0	14	2	57.1	(0)	0	(0)	-
IA	(100.0)	-	100.0	-	3	-	(33.3)	-	(33.3)	-	-
HE	(14.3)	(20.0)	12.5	16.7	8	6	(0)	(20.0)	(0)	(0)	-
AU	-	-	-	-	-	-	-	-	-	-	-
CS	-	(0)	-	0	-	1	-	(0)	-	(0)	-
HG	-	-	-	-	-	-	-	-	-	-	-
RO	-	-	-	-	-	-	-	-	-	-	-
BG	-	-	-	-	-	-	-	-	-	-	-
YG	(100.0)	-	100.0	-	1	-	(100.0)	-	(0)	-	-
GR	-	-	-	-	-	-	-	-	-	-	-
TU	-	-	-	-	-	-	-	-	-	-	-
CY	-	-	-	-	-	-	-	-	-	-	-
ML	-	-	-	-	-	-	-	-	-	-	-
SY	-	-	-	-	-	-	-	-	-	-	-
LE	-	-	-	-	-	-	-	-	-	-	-
IL	-	-	-	-	-	-	-	-	-	-	-
ME	-	-	-	-	-	-	-	-	-	-	-
EG	-	-	-	-	-	-	-	-	-	-	-
LT	-	-	-	-	-	-	-	-	-	-	-
TQ	-	-	-	-	-	-	-	-	-	-	-
AG	-	-	-	-	-	-	-	-	-	-	-
MA	(100.0)	(0)	100.0	0	1	1	(0)	(0)	(0)	(0)	-
SA	(100.0)	(0)	50.0	0	2	1	(0)	(0)	(0)	(0)	-

a   See chapter 2 (methods) for derivation of indices. Indices derived from less than 10 recoveries are indicated within parentheses. Fisher's exact tests (Sokal & Rohlf 1981) were used to compare the proportions taken in each period. Significance levels (*<0.05; ** <0.01; *** <0.001) of the tests are indicated in column 1980+. Tests were carried out on all pairs except where indices were based on less than 10 recoveries.

b   Percentage of all recoveries other than those excluded on the basis of poor quality data (see chapter 2) taken by shooting and trapping.

c   Total number of recoveries other than those excluded on the basis of poor quality data.

d   G test (Sokal & Rohlf 1981) comparison between periods of the proportions of birds taken according to the classes shot, trapped, and shot or trapped. Significance levels of these comparisons are indicated as above. 'NS' indicates non-significant results where tests were carried out. Comparisons were not made where the expected frequency in any cell was less than 10.

Table.4.3. Red Kite : Indices of birds taken for each breeding population (across all years).

Breeding Population	Index of birds taken	Sample size
UK United Kingdom	5.3	19
CI Channel Islands	-	-
NO Norway	-	-
SV Sweden	20.0	20
DK Denmark	-	-
SF Finland	-	-
SU USSR (Lithuania only)	-	-
PL Poland	-	-
DD East Germany	57.3	178
DF West Germany	40.3	231
NL Holland	-	-
BL Belgium	0	3
FR France	7.7	13
ES Spain	0	15
IA Italy	-	-
HE Switzerland	42.2	45
CJ Czechoslovakia	-	-
HG Hungary	-	-

Table 4.4   Regression analysis of temporal trends in the indices of Red Kites taken.

Country of recovery	Intercept	Slope	t	P
Major	224.8	-2.61	-6.25	***
Other	64.8	-0.74	-4.04	**
All	174.1	-2.06	-4.98	**

All regressions used a weighted technique where each 5-year index was weighted by the square root of the sample size.

Countries where 10 or more recoveries occurred in each year after 1950 were analysed. Data from the period before 1950 were not included in the analysis.

Major countries are those with a tradition of taking substantial numbers of birds that use western migration routes.
(i.e. BL, FR, ES, PO, IA, NA).

Significance levels indicated are: NS Not significant; * P<0.05; ** P<0.01; *** P<0.00.

Figure 4.1a   Total numbers of Red Kite ringing recoveries resulting from birds taken before 1980
in each 30' by 60' grid square. ** Indicates numbers greater than 99.   2 recoveries were outside
the limits of the map.

Figure 4.1b   Total numbers of Red Kite ringing recoveries from birds taken from 1980 onwards
in each 30' by 60' grid square.   ** Indicates numbers greater than 99.   0 recoveries were outside
the limits of the map.
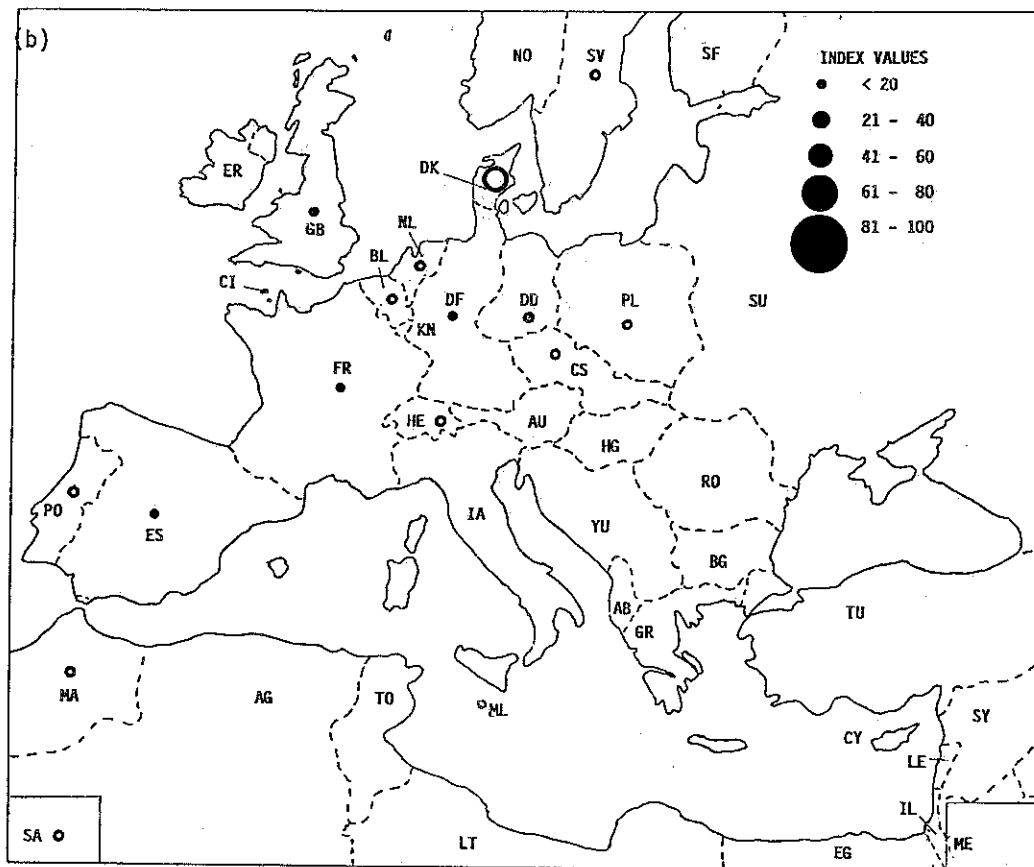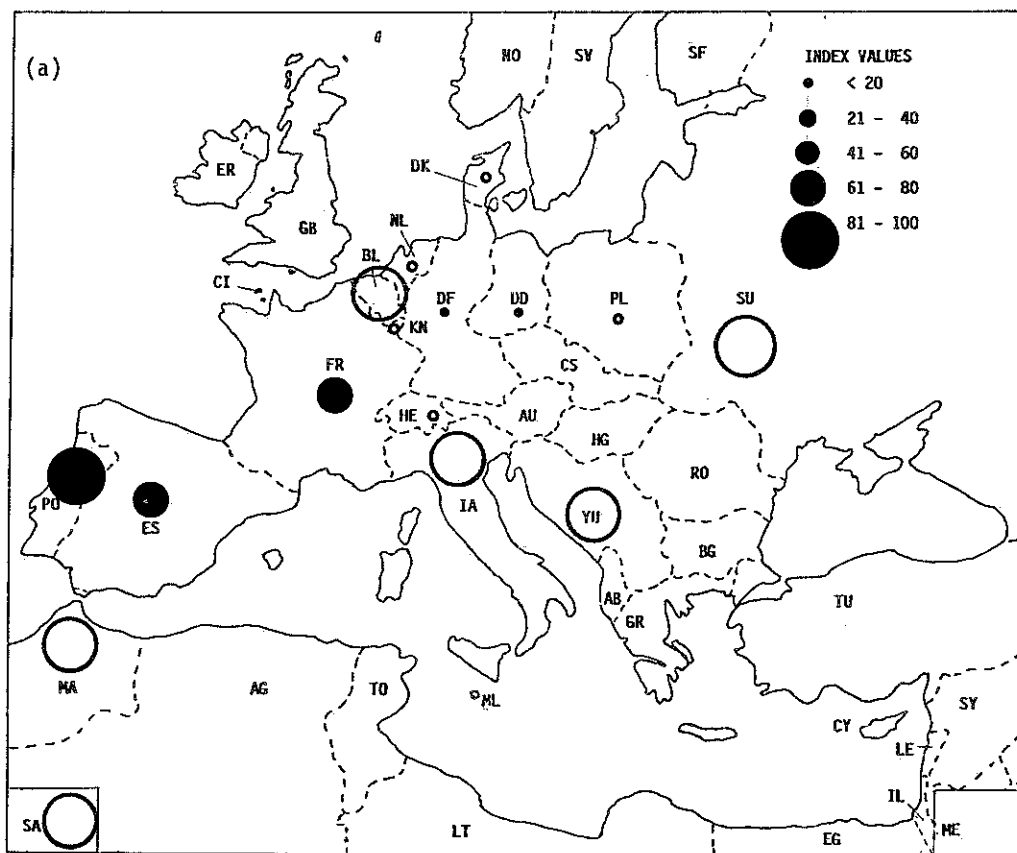
Figure 4.2 Geographical variation in the indices of Red Kite
taken for each country of recovery in the period before 1980 (a) and from
1980 onwards (b).   Solid circles indicate values derived from more than 10
recoveries and open circles indicate those derived from less than 10.
Country codes are indicated in Table 2.4 of the Methods.
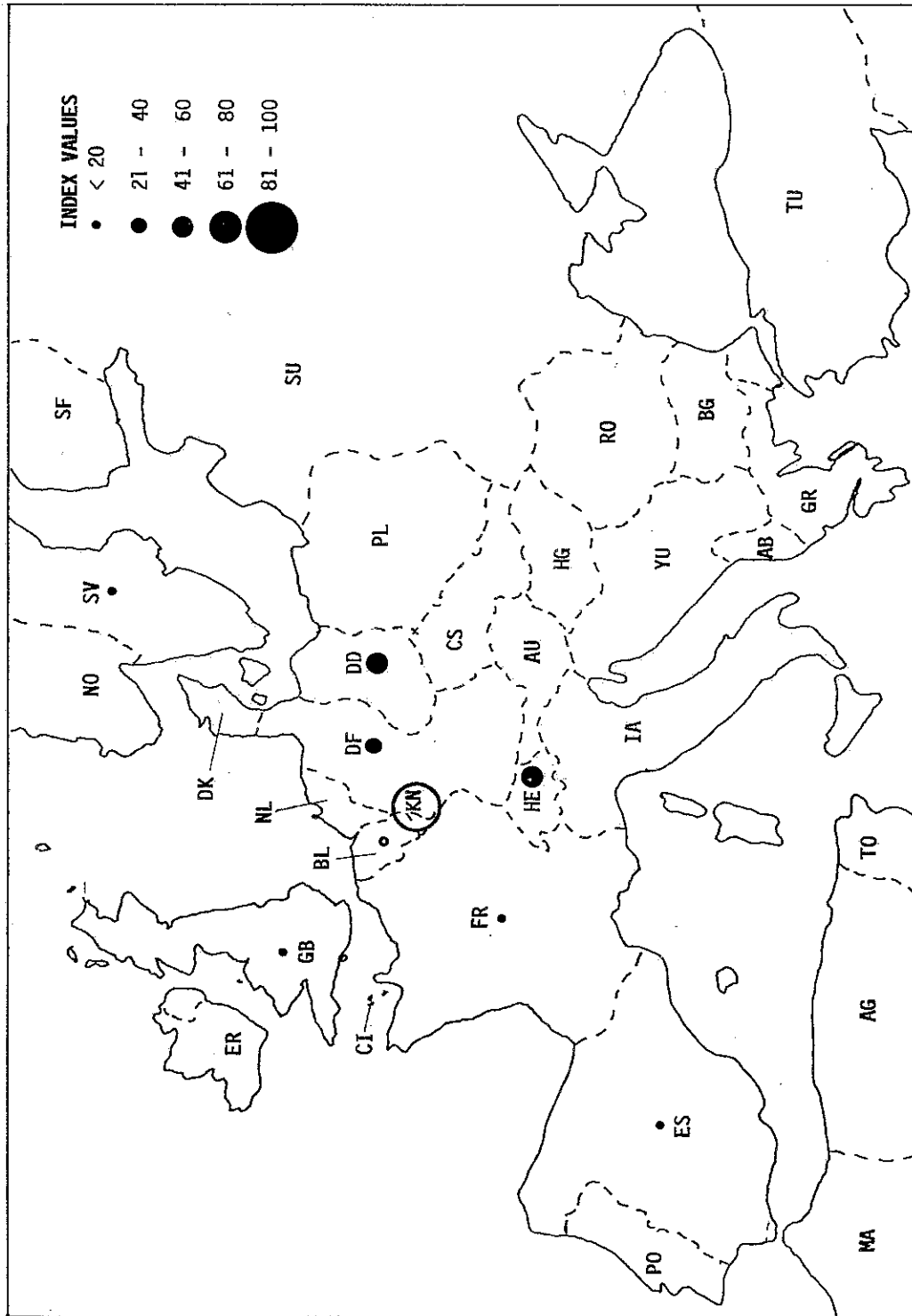
Figure 4.3   Geographical variation in the indices of Red Kite taken over all years for each breeding population.   Solid circles indicate values derived from more than 10 recoveries and open circles indicate those derived from less than 10.   Country codes are indicated in Table 2.4 of the Methods.

France

Index of birds taken

5 Year period

Spain

Index of birds taken

5 Year period
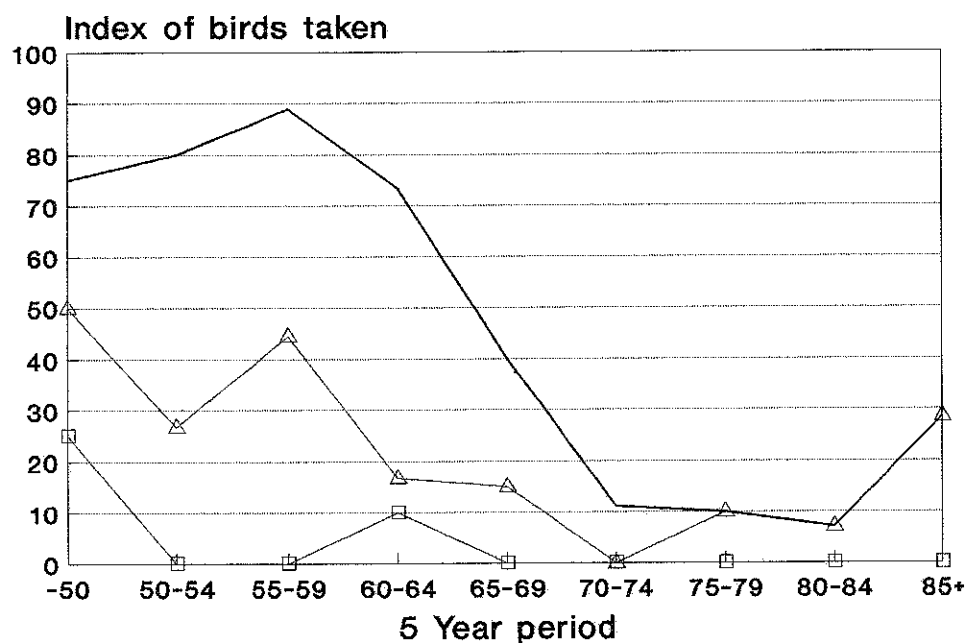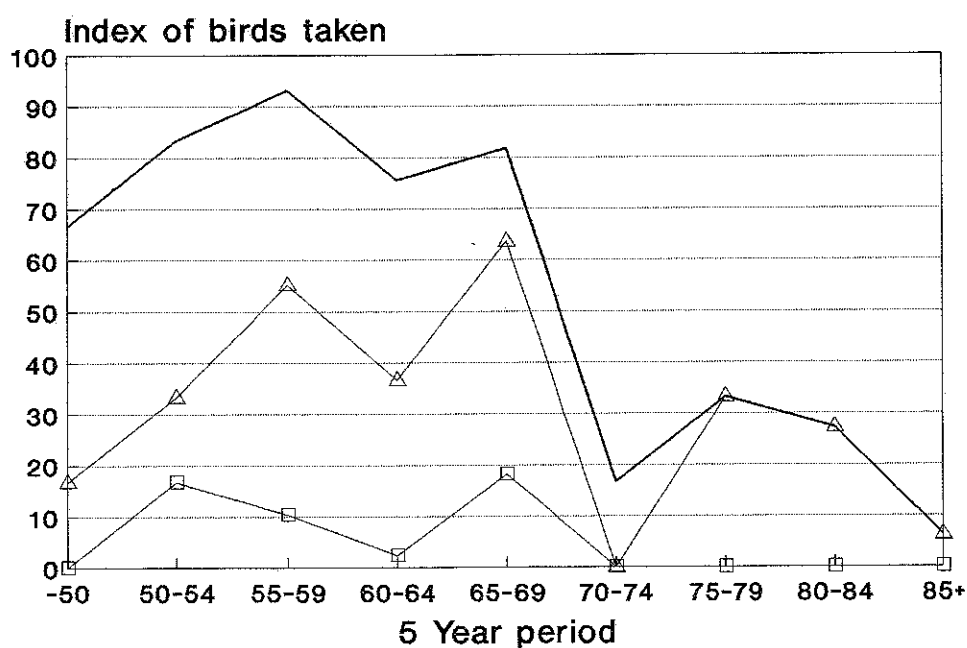
Figure 4.4   Trends in 5-yearly indices of Red Kite taken in individual countries
with high overall indices and sufficient recoveries for analysis.   The bold line without
symbols indicates overall index values, triangles indicate index values based on birds
reported as shot and squares indicate index values based on birds reported as trapped.
The periods -50 and 85+ refer to all recoveries before 1950 and from 1985 onwards
respectively.

ES,FR

Index of birds taken

Others

Index of birds taken

All countries

Index of birds taken

5 Year period
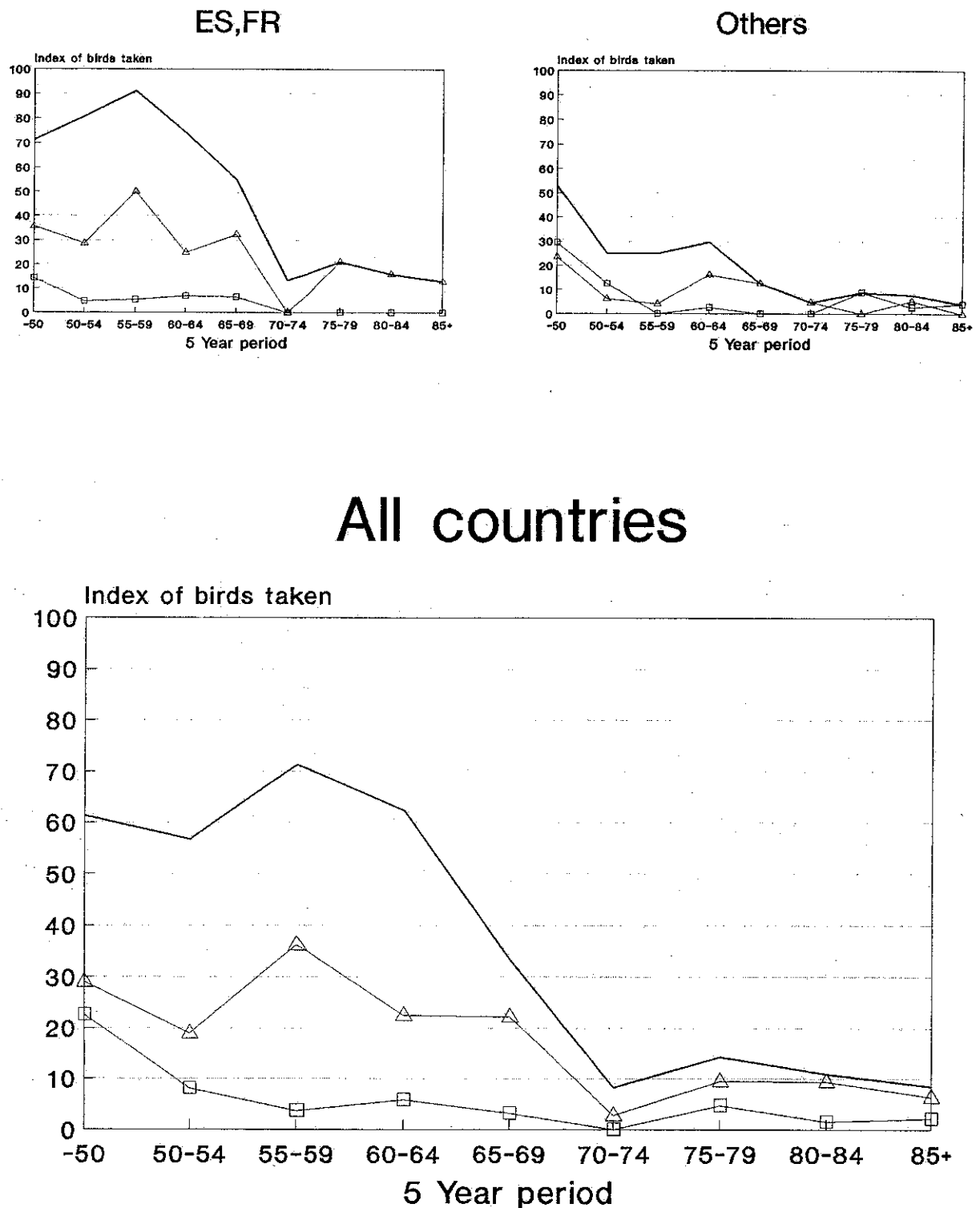
Figure 4.5   Trends in combined 5-yearly indices of Red Kite
taken in: a) countries, for which data for this species were available,
with a tradition of taking substantial numbers of migratory birds on the
western European flyways (ie ES, FR),
b) other countries and c) all countries.   The bold line with symbols
indicates overall index values, triangles indicate values based on birds
reported as shot and squares indicate index values based on birds reported
as trapped.   The periods -50 and 85+ refer to all recoveries before 1950
and from 1985 onwards respectively.

France
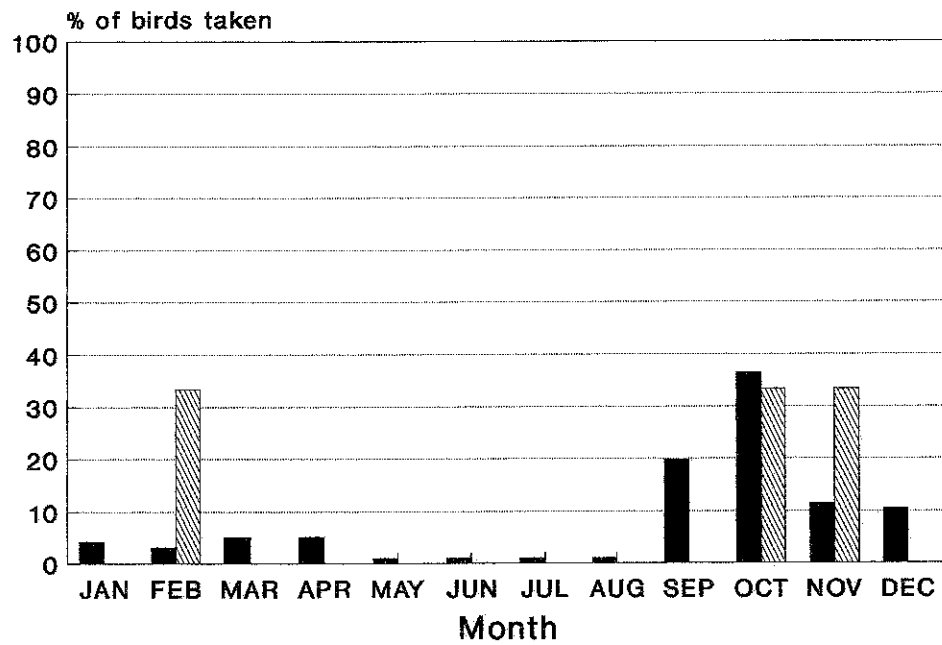
Spain
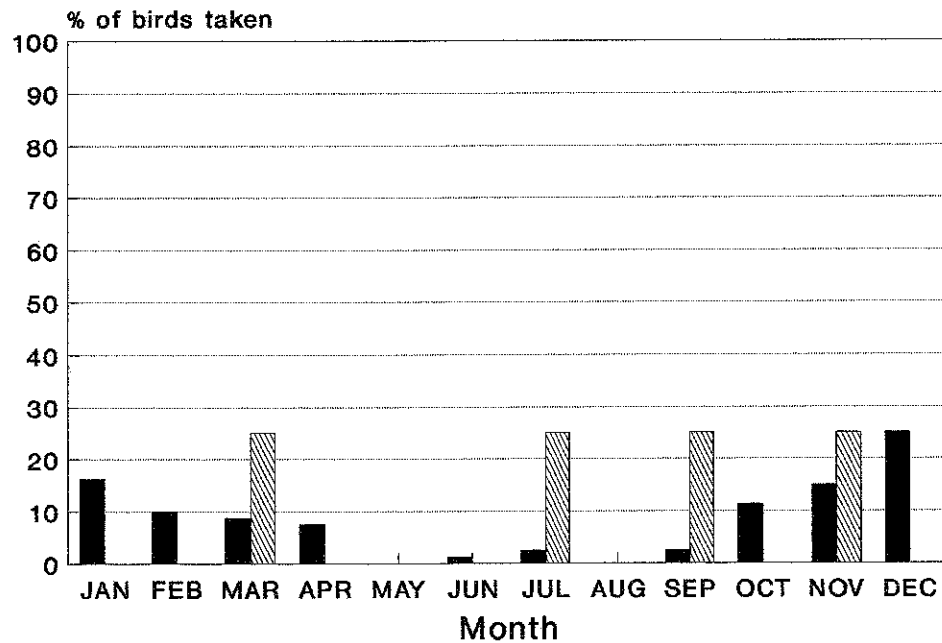
Figure 4.6 Monthly percentages of total Red Kite taken in individual countries with high overall indices and sufficient recoveries for analysis. Solid bars indicate birds from the period before 1980 and hatched bars indicate birds taken from 1980 onwards.

5. MARSH HARRIER (CIRCUS AERUGINOSUS)

5.1 Range

The Marsh Harrier is a summer visitor to Europe north and east of a line from the Netherlands to the east coast of the Adriatic. In Scandinavia the species is confined to southern Sweden and the Baltic coast of Finland. To the south of the line Marsh Harriers are present throughout the year but are patchily distributed in the south-east of the United Kingdom, the Netherlands, Belgium, France, Iberia, northern Italy and the Balkans (Harrison 1982). The species also breeds in north-west Africa and Asiatic Turkey. Some migratory Marsh Harriers remain within Europe but most winter in tropical Africa.

5.2 Population trends

The Marsh Harrier has undergone a severe decline over most of its European range during this century as a result of habitat-loss and persecution (Bijleveld 1974, Cramp and Simmons 1980). There have been recent increases in the depleted Netherlands and United Kingdom populations, however (Spencer 1983).

5.3 Migration

A few Marsh Harriers are resident within Europe but most migrate in a south-westerly direction to African wintering areas in autumn. Marsh Harriers from north-west and central Europe and Sweden pass through France and Iberia (Table 5.1). This species is not so dependent on narrow sea-crossings as other raptors of similar size (Moreau 1972). Little is known about the movements of east European Marsh Harriers but recoveries from the Finnish population have occurred mainly in Italy, the central Mediterranean and Tunisia (Cramp and Simmons 1980). Few Marsh Harriers cross the Bosporus.

5.4 Status

The Marsh Harrier has full legal protection in all E.C. countries (Bertelsen and Simonsen 1989). Amongst non-E.C. countries around the Mediterranean for which information was available in 1979, only Malta and Egypt permitted the taking of Marsh Harriers (Woldhek 1979).

5.5 Geographical variation in the taking of Marsh Harriers

Prior to 1980 indices of Marsh Harriers taken were generally high throughout Europe and North Africa (Table 5.2). Only the United Kingdom, Norway, Sweden, the Netherlands, Austria and Cyprus had index values lower than 25. The highest indices amongst countries providing at least 10 recoveries were found in western Europe. Belgium, France, Spain and Italy all had index values greater than

60. The Soviet Union was unique amongst north-eastern countries in having a high index of 70.6. During this period the percentage of birds taken in France (34%) was almost three times that for any other country. Italy and Spain were the only other countries contributing 10% or more of the total number taken. Indices for Algeria and Morocco were high but based on small sample sizes.

No single country with 10 or more recoveries had an index of birds taken greater than 33.3 for the period from 1980 onwards. Spain and Morocco had the highest indices amongst these countries but the index for the Soviet Union remained at a similar value (75) to that of the earlier period, though based on few recoveries.

The more sedentary southern and western breeding populations, such as those of the United Kingdom, France and Spain, have lower indices of birds taken than those to the north and east which are largely migratory (Table 5.3, Fig. 5.3). Within Scandinavia the Finnish population has an index value more than twice that for Swedish birds. This may be attributable to a greater proportion of Marsh Harriers being taken locally in Finland and to the Finnish birds' more easterly migration route resulting in a proportion being taken in the Soviet Union.

5.6 Temporal variation in the taking of Marsh Harriers

The index of Marsh Harriers taken during the period since 1980 was lower than that for the earlier period in all countries for which comparative data were available, other than in Sweden, U.S.S.R., and Algeria (Table 5.2). The indices for all these three countries were based on less than 10 recoveries, however. Reductions in index values were statistically significant in West Germany, the Netherlands, Belgium, France, Italy and Morocco.

The indices of birds taken for five-year periods declined with time in all countries analyzed and all regressions of index on year revealed significant inverse relationships (Table 5.3, Fig. 5.4, Fig. 5.5). This suggests a general decline in the taking of Marsh Harriers over the last 40 years.

Analysis of the percentage of Marsh Harriers taken in each month in Belgium, France, Spain, Portugal, Italy and North Africa indicated that most are taken between August and November, the timing of the peak advancing with decreasing latitude. This coincides with the progress of the migrating birds (Fig. 5.6).

5.7 Methods used to take Marsh Harriers

Most Marsh Harriers are taken by shooting. Prior to 1980 61% of taken recoveries were known to be the result of shooting and at least 9% were trapped. The method used to take the remainder was not specified. Since 1980 the proportion reported as shot has remained almost unchanged at 60% while trapping has increased to 23%, though the latter is probably an artefact of more precise reporting. No significant change in the proportion of Marsh Harriers taken by each method was found in any country.

TABLE. 5.1a The distribution of Marsh Harriers recovered due to shooting and trapping before 1980 in relation to their area of origin. The percentage of taken birds recovered in each country is shown for each national ringing scheme. Percentages within parentheses are based on less than ten recoveries.

Country of recovery					Country of ringing									
	UK	CI	NO	SV	DK	SF	DD	DF	NL	BL	FR	ES	IA	HE
GB	(66.7)	–	–	0	0	0	0	2.0	0	0	–	–	–	–
CI	0	–	–	0	0	0	0	0	0	0	–	–	–	–
ER	0	–	–	0	0	0	0	0	0	0	–	–	–	–
NO	0	–	–	0	0	0	0	0	0	0	–	–	–	–
SV	0	–	–	0	0	0	0	0	0	0	–	–	–	–
DK	0	–	–	0	(27.3)	0	0	(2.0)	(1.5)	0	–	–	–	–
SF	0	–	–	0	0	(13.5)	0	0	0	0	–	–	–	–
SU	0	–	–	(25.0)	0	21.2	0	0	0	0	–	–	–	–
PL	0	–	–	0	0	(9.6)	(2.0)	0	0	0	–	–	–	–
DD	0	–	–	0	0	0	(14.3)	0	0	0	–	–	–	–
DF	0	–	–	0	(9.1)	0	(8.2)	(14.3)	0	0	–	–	–	–
NL	0	–	–	0	0	0	0	(2.0)	(13.9)	(9.1)	–	–	–	–
BL	0	–	–	0	0	0	(4.1)	(4.1)	(12.3)	(36.4)	–	–	–	–
KN	0	–	–	0	0	0	0	0	0	0	–	–	–	–
FR	(33.3)	–	–	(25.0)	(36.4)	(5.8)	22.5	44.9	53.9	(54.6)	–	–	–	–
ES	0	–	–	(25.0)	(18.2)	(3.9)	(8.2)	(16.3)	(10.8)	0	–	–	–	–
PO	0	–	–	0	0	0	0	0	(1.5)	0	–	–	–	–
IA	0	–	–	0	0	25.0	28.6	(6.1)	0	0	–	–	–	–
HE	0	–	–	0	0	0	0	0	0	0	–	–	–	–
AU	0	–	–	0	0	0	0	0	0	0	–	–	–	–
CS	0	–	–	0	0	(1.9)	(8.2)	(2.0)	0	0	–	–	–	–
HG	0	–	–	0	0	(5.8)	0	0	0	0	–	–	–	–
RO	0	–	–	0	0	0	0	0	0	0	–	–	–	–
BG	0	–	–	0	0	0	0	0	0	0	–	–	–	–
YG	0	–	–	0	0	(1.9)	0	0	0	0	–	–	–	–
GR	0	–	–	0	0	0	0	0	0	0	–	–	–	–
TU	0	–	–	0	0	0	0'	0	0	0	–	–	–	–
CY	0	–	–	0	0	0	0	0	0	0	–	–	–	–
ML	0	–	–	0	0	(7.7)	0	0	0	0	–	–	–	–
SY	0	–	–	0	0	0	0	0	0	0	–	–	–	–
LE	0	–	–	0	0	0	0	0	0	0	–	–	–	–
IL	0	–	–	0	0	0	0	0	0	0	–	–	–	–
ME	0	–	–	0	0	0	0	0	0	0	–	–	–	–
EG	0	–	–	0	0	0	0	0	0	0	–	–	–	–
LT	0	–	–	0	0	0	0	0	0	0	–	–	–	–
TO	0	–	–	0	0	(1.9)	0	0	0	0	–	–	–	–
AG	0	–	–	0	(9.1)	(1.9)	(4.1)	0	(3.1)	0	–	–	–	–
MA	0	–	–	0	0	0	0	(6.1)	(1.5)	0	–	–	–	–
SA	0	–	–	(25.0)	0	0	0	0	(1.5)	0	–	–	–	–
TOTAL No.	3	–	–	4	11	52	49	49	65	11	–	–	–	–

Note: No data available for Poland, Czechoslovakia or Hungary.

TABLE. 5.1b The distribution of Marsh Harriers recovered due to shooting and trapping from 1980 onwards in relation to their area of origin. The percentage of taken birds recovered in each country is shown for each national ringing scheme. Percentages within parentheses are based on less than ten recoveries.

Country of recovery	Country of ringing													
	UK	CI	NO	SV	DK	SF	DD	DF	NL	BL	FR	ES	IA	HE
GB	(100)	–	–	0	0	0	–	–	0	0	0	0	–	–
CI	0	–	–	0	0	0	–	0	0	0	0	–	–	–
ER	0	–	–	0	0	0	–	0	0	0	0	–	–	–
NO	0	–	–	0	0	0	–	0	0	0	0	–	–	–
SV	0	–	–	(20.0)	0	0	–	0	0	0	0	–	–	–
DK	0	–	–	0	0	0	–	0	0	0	0	–	–	–
SF	0	–	–	0	0	(14.3)	–	0	0	0	0	–	–	–
SU	0	–	–	(20.0)	0	(28.6)	–	0	0	0	0	–	–	–
PL	0	–	–	0	0	0	–	0	0	0	0	–	–	–
DD	0	–	–	0	0	0	–	0	0	0	0	–	–	–
DF	0	–	–	0	0	0	–	0	0	0	0	–	–	–
NL	0	–	–	0	0	0	–	0	(15.4)	0	0	–	–	–
BL	0	–	–	0	0	0	–	0	0	0	0	–	–	–
KN	0	–	–	0	0	0	–	0	0	0	0	–	–	–
FR	0	–	–	0	0	(14.3)	–	(100)	(15.4)	(100)	–	–	–	–
ES	0	–	–	(20.0)	0	0	–	0	(23.1)	0	0	–	–	–
PO	0	–	–	0	0	0	–	0	0	0	0	–	–	–
IA	0	–	–	(20.0)	0	0	–	0	0	0	0	–	–	–
HE	0	–	–	0	0	0	–	0	0	0	0	–	–	–
AU	0	–	–	0	0	0	–	0	0	0	0	–	–	–
CS	0	–	–	0	0	0	–	0	0	0	0	–	–	–
HG	0	–	–	0	0	0	–	0	0	0	0	–	–	–
RO	0	–	–	0	0	0	–	0	0	0	0	–	–	–
BG	0	–	–	0	0	0	–	0	0	0	0	–	–	–
YG	0	–	⸱	0	0	0	–	0	0	0	0	–	–	–
GR	0	–	–	0	0	0	–	0	0	0	0	–	–	–
TU	0	–	–	0	0	0	–	0	0	0	0	–	–	–
CY	0	–	–	0	0	0	–	0	0	0	0	–	–	–
ML	0	–	–	0	0	0	–	0	0	0	0	–	–	–
SY	0	–	–	0	0	0	–	0	0	0	0	–	–	–
LE	0	–	–	0	0	0	–	0	0	0	0	–	–	–
IL	0	–	–	0	0	0	–	0	0	0	0	–	–	–
ME	0	–	–	0	0	0	–	0	0	0	0	–	–	–
EG	0	–	–	0	0	0	–	0	0	0	0	–	–	–
LT	0	–	–	0	0	0	–	0	0	0	0	–	–	–
TO	0	–	–	0	0	0	–	0	0	0	0	–	–	–
AG	0	–	–	(20.0)	0	(14.3)	–	0	(7.7)	0	0	–	–	–
MA	0	–	–	0	(100)	0	–	0	(15.4)	0	(100)	–	–	–
SA	0	–	–	0	0	(28.6)	–	0	(23.1)	0	0	–	–	–
TOTAL No.	1	–	–	5	1	7	–	1	13	1	1	–	–	–

Note: No data available for Poland, Czechoslovakia or Hungary.

TABLE 5.2. Marsh Harrier: Indices of birds taken before 1980 and from 1980 onwards for each country of recovery.

	Index (all methods)[a]		% hunted[b]		Total recoveries[c]		Shooting Index[a]		Trapping Index[a]		G test[d]
	-1980	1980+	-1980	1980+	-1980	1980+	-1980	1980+	-1980	1980+	
GB	17.7	(12.5)	15.8	11.1	19	9	11.8	(0)	0	(12.5)	-
CI	-	-	-	-	-	-	-	-	-	-	-
ER	-	-	-	-	-	-	-	-	-	-	-
NO	(0)	-	0	-	1	-	(0)	-	(0)	-	-
SV	(0)	(25.0)	0	20.0	9	5	(0)	(25.0)	(0)	(0)	-
DK	41.7	(0)	25.0	0	20	6	25.0	(0)	16.7	(0)	-
SF	29.2	10.0	25.0	8.3	28	12	20.8	10.0	4.2	0	-
SU	70.6	(75.0)	60.0	37.5	20	8	58.8	(50.0)	5.9	(25.0)	-
PL	(100.0)	-	100.0	-	6	-	(83.3)	-	(0)	-	-
DD	26.9	(0)	25.9	0	27	1	19.2	(0)	7.7	(0)	-
DF	27.9	0*	26.7	0	45	16	25.6	0	0	0	-
NL	12.9	1.8**	11.3	1.4	97	143	12.9	1.8	0	0	-
BL	61.5	(0)*	57.1	0	28	8	38.5	(0)	7.7	(0)	-
KN	-	(0)	-	0	-	1	-	(0)	-	(0)	-
FR	63.9	15.2***	61.0	11.9	136	42	34.6	12.1	3.9	3.0	-
ES	61.5	33.3	61.5	33.3	39	12	38.5	33.3	5.1	0	-
PO	(50.0)	(0)	50.0	0	2	2	(50.0)	(0)	(0)	(0)	-
IA	83.3	(12.5)***	83.3	11.1	36	9	27.8	(0)	5.6	(0)	-
HE	-	-	-	-	-	-	-	-	-	-	-
AU	(0)	(0)	0	0	2	2	(0)	(0)	(0)	(0)	-
CS	42.9	(0)	42.9	0	14	1	28.6	(0)	0	(0)	-
HG	(75.0)	(0)	50.0	0	6	1	(25.0)	(0)	(50.0)	(0)	-
RO	-	-	-	-	-	-	-	-	-	-	-
BG	-	-	-	0	-	8	-	-	-	-	-
YG	(50.0)	-	50.0	-	2	-	(50.0)	-	(0)	-	-
GR	-	-	-	-	-	-	-	-	-	-	-
TU	-	-	-	-	-	-	-	-	-	-	-
CY	(0)	-	0	-	1	-	(0)	-	(0)	-	-
ML	(100.0)	-	100.0	-	4	-	(75.0)	-	(0)	-	-
SY	-	-	-	-	-	-	-	-	-	-	-
LE	-	-	-	-	-	-	-	-	-	-	-
IL	-	-	-	-	-	-	-	-	-	-	-
ME	-	-	-	-	-	-	-	-	-	-	-
EG	-	-	-	-	-	-	-	-	-	-	-
LT	-	(0)	-	0	-	1	-	(0)	-	(0)	-
TO	(33.3)	(0)	33.3	0	3	1	(33.3)	(0)	(0)	(0)	-
AG	(75.0)	(75.0)	75.0	75.0	8	4	(37.5)	(25.0)	(12.5)	(0)	-
MA	(80.0)	20.0*	66.7	20.0	6	20	(40.0)	5.0	(20.0)	10.0	-
SA	(28.6)	35.7	25.0	35.7	8	14	(0)	14.3	(14.3)	14.3	-

a   See chapter 2 (methods) for derivation of indices. Indices derived from less than 10 recoveries are indicated within parentheses.   Fisher's exact tests (Sokal & Rohlf 1981) were used to compare the proportions taken in each period. Significance levels (*<0.05; ** <0.01; *** <0.001) of the tests are indicated in column 1980+. Tests were carried out on all pairs except where indices were based on less than 10 recoveries.

b   Percentage of all recoveries other than those excluded on the basis of poor quality data (see chapter 2) taken by shooting and trapping.

c   Total number of recoveries other than those excluded on the basis of poor quality data.

d   G test (Sokal & Rohlf 1981) comparison between periods of the proportions of birds taken according to the classes shot, trapped, and shot or trapped. Significance levels of these comparisons are indicated as above. 'NS' indicates non-significant results where tests were carried out. Comparisons were not made where the expected frequency in any cell was less than 10.

Table.5.3. Marsh Harrier: Indices of birds taken for each breeding population (across all years).

Breeding Population		Index of birds taken	Sample size
UK	United Kingdom	18.2	22
CI	Channel Islands	-	-
NO	Norway	-	-
SV	Sweden	20.9	43
DK	Denmark	62.5	16
SF	Finland	50.4	117
SU	USSR (Lithuania only)	-	-
PL	Poland	-	-
DD	East Germany	68.6	70
DF	West Germany	38.6	127
NL	Holland	24.7	316
BL	Belgium	55.0	20
FR	France	3.7	27
ES	Spain	0	1
IA	Italy	0	1
HE	Switzerland	-	-
CJ	Czechoslovakia	-	-
HG	Hungary	-	-

Table 5.4   Regression analysis of temporal trends in the indices of Marsh Harriers taken.

Country of recovery	Intercept	Slope	t	P
France	222.0	-2.57	-4.25	**
Major	210.5	-2.33	-10.58	***
Other	109.4	-1.25	-5.73	**
All	172.1	-1.98	-13.44	***

All regressions used a weighted technique where each 5-year index was weighted by the square root of the sample size.

Countries where 10 or more recoveries occurred in each year after 1950 were analysed. Data from the period before 1950 were not included in the analysis.

Major countries are those with a tradition of taking substantial numbers of birds that use western migration routes.
(i.e. BL, FR, ES, PO, IA, NA).

Significance levels indicated are: NS Not significant; * P<0.05; ** P<0.01; *** P<0.00.
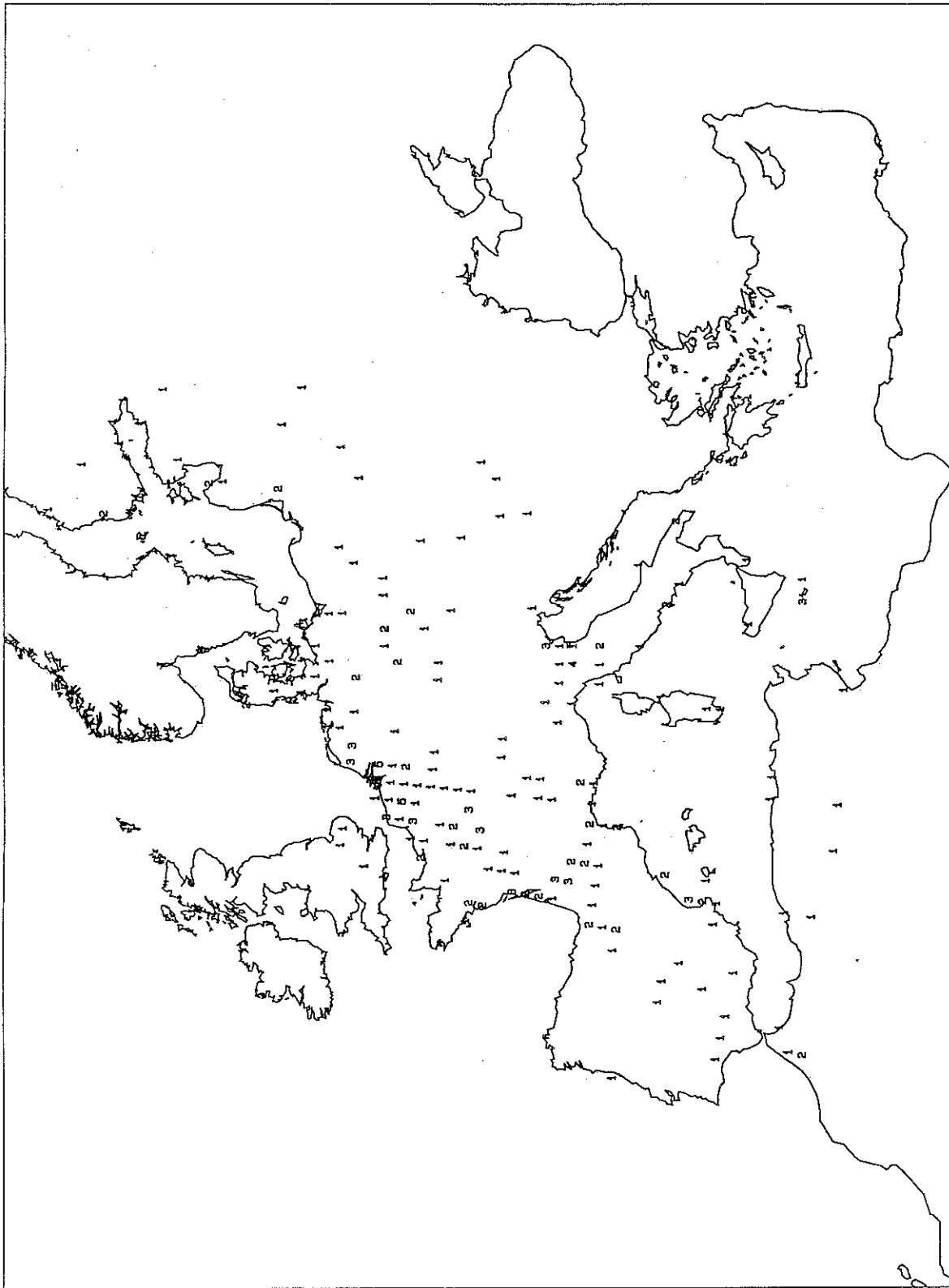
Figure 5.1a Total numbers of Marsh Harrier ringing recoveries resulting from birds taken before 1980 in each 30' by 60' grid square. ** Indicates numbers greater than 99. 3 recoveries were outside the limits of the map.

Figure 9.1b Total numbers of Marsh Harrier ringing recoveries resulting from birds taken from 1980 onwards in each 30' by 60' grid square. ** Indicates numbers greater than 99. 5 recoveries were outside the limits of the map.
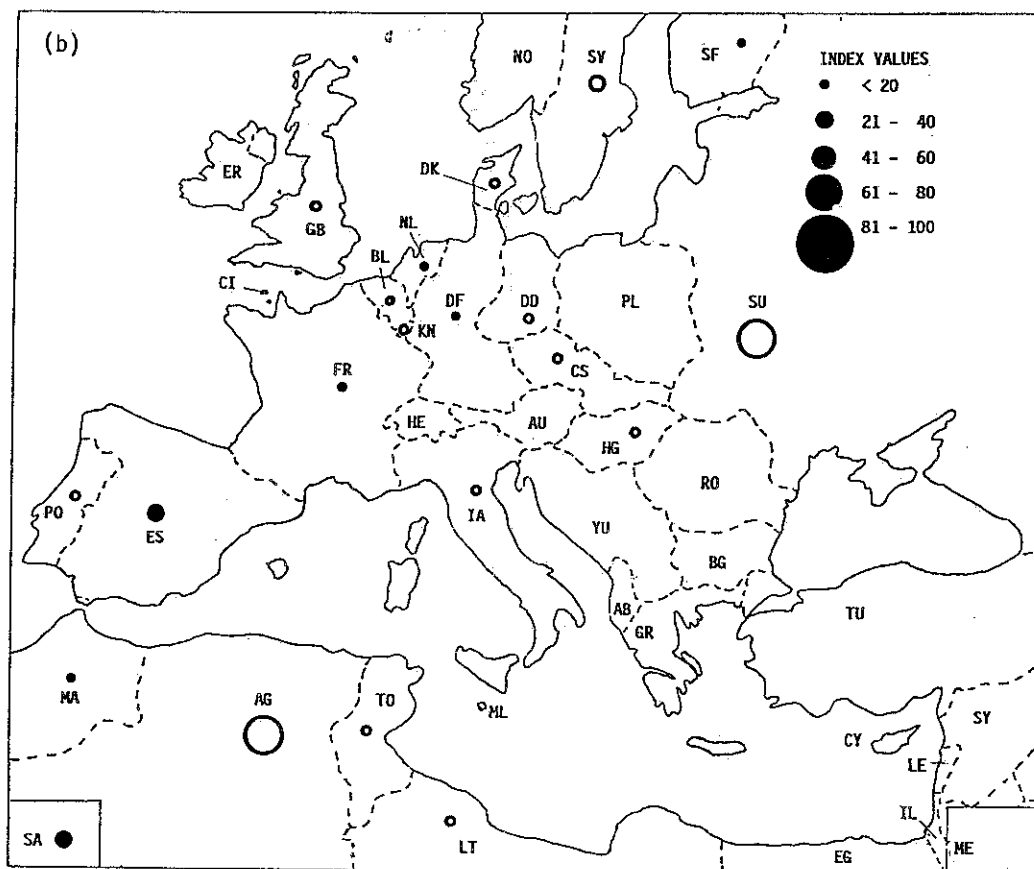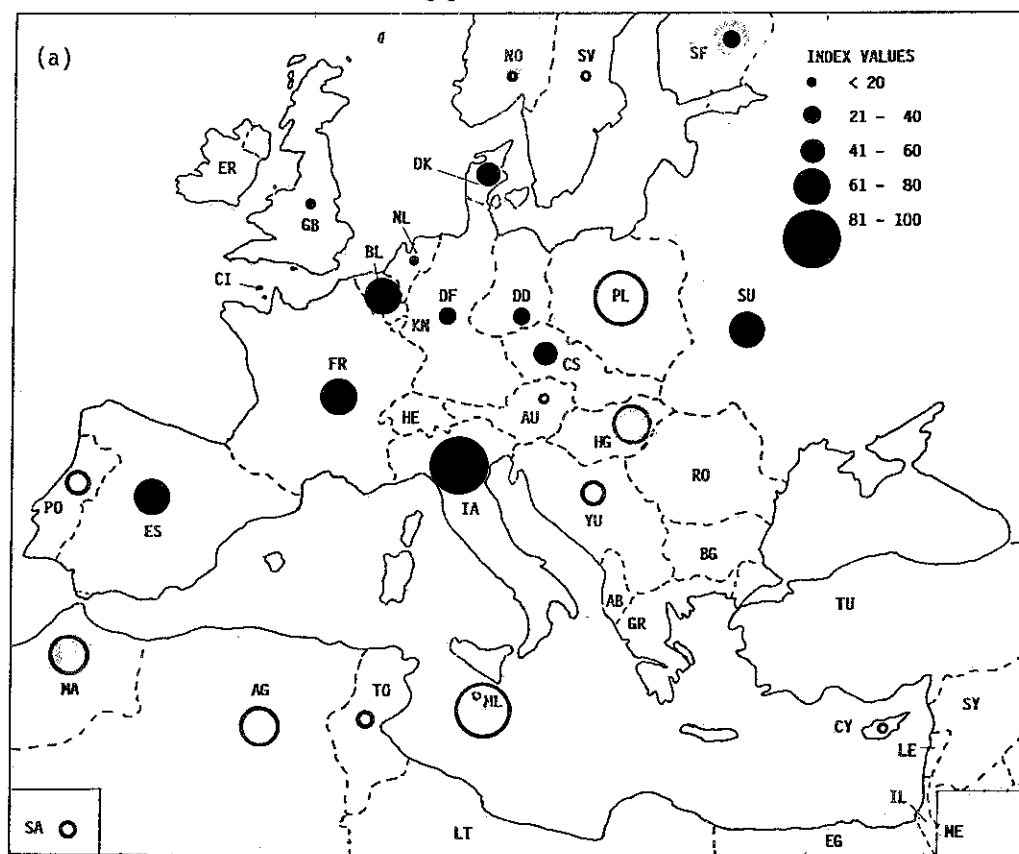
Figure 5.2 Geographical variation in the indices of Marsh Harrier
taken for each country of recovery in the period before 1980 (a) and from
1980 onwards (b).   Solid circles indicate values derived from more than 10
recoveries and open circles indicate those derived from less than 10.
Country codes are indicated in Table 2.4 of the Methods.
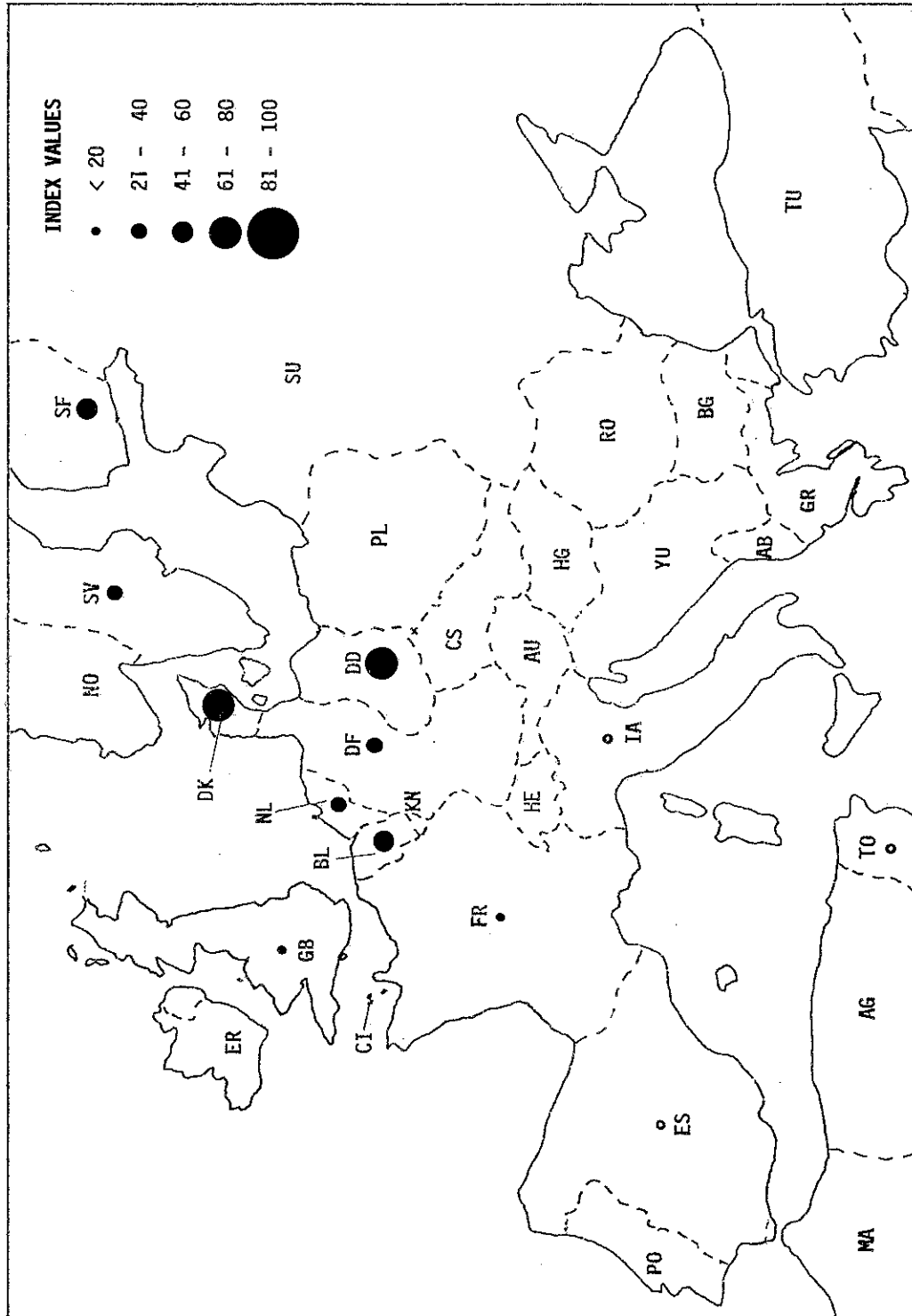
Figure 5.3   Geographical variation in the indices of Marsh Harrier taken over all years for each breeding population. Solid circles indicate values derived from more than 10 recoveries and open circles indicate those derived from less than 10.   Country codes are indicated in Table 2.4 of the Methods.

Belgium
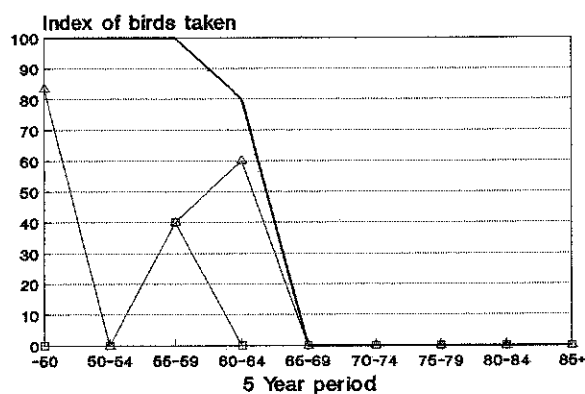
France
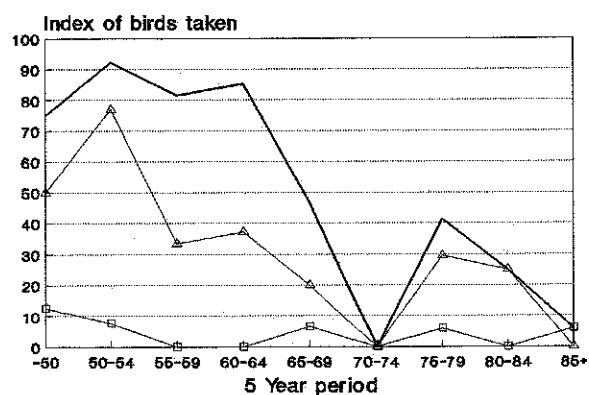
Italy
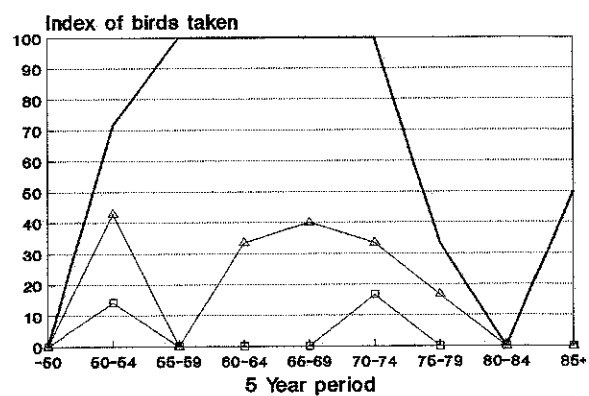
North Africa
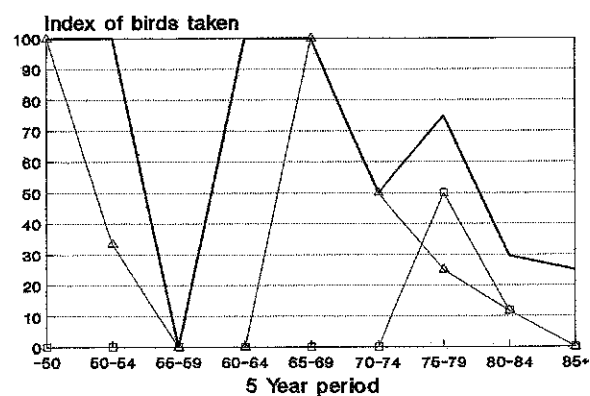
Spain
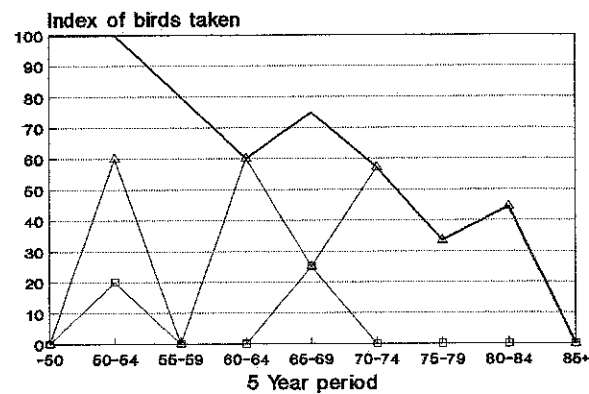
Figure 5.4   Trends in 5-yearly indices of Marsh Harrier taken in individual countries
with high overall indices and sufficient recoveries for analysis.   The bold line without
symbols indicates overall index values, triangles indicate index values based on birds
reported as shot and squares indicate index values based on birds reported as trapped.
The periods -50 and 85+ refer to all recoveries before 1950 and from 1985 onwards
respectively.

BL,ES,FR,IA,NA

Index of birds taken

Others

Index of birds taken

All countries

Index of birds taken
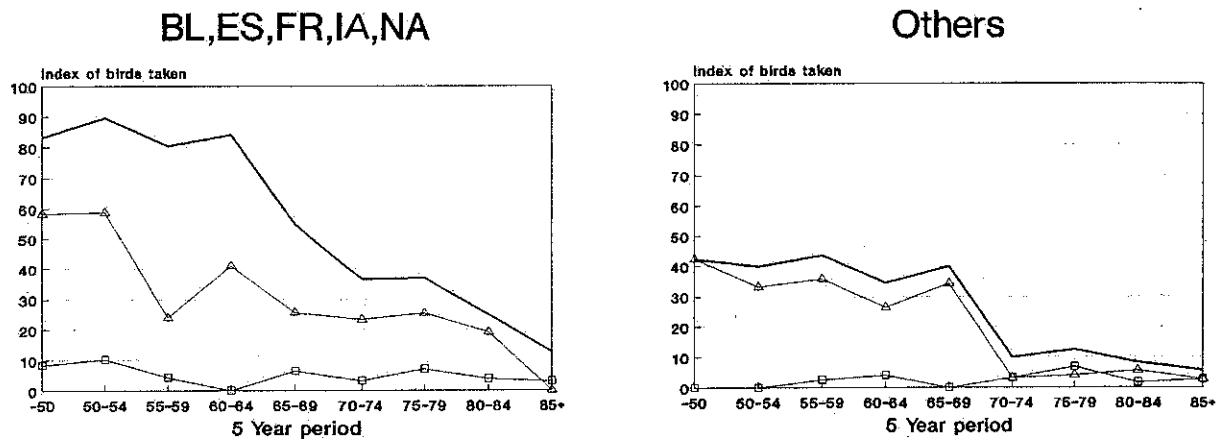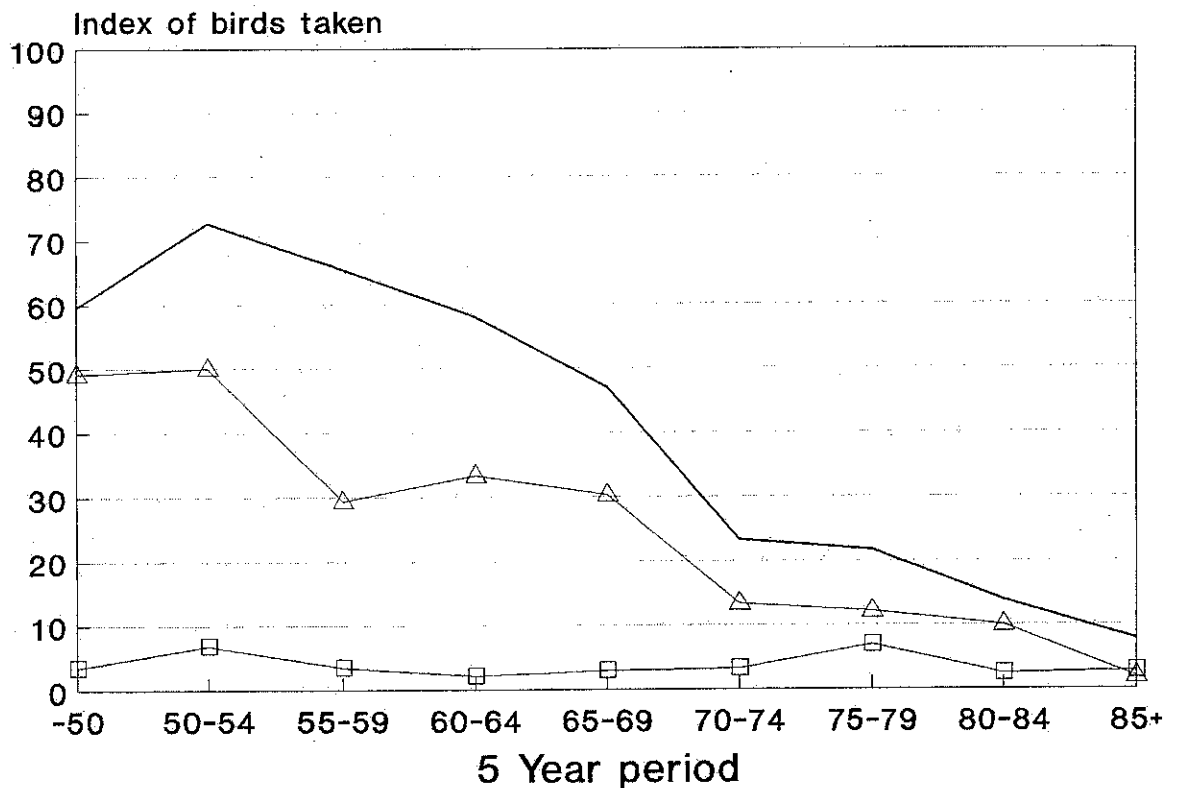
Figure 5.5. Trends in combined 5-yearly indices of Marsh Harrier
taken in: a) countries, for which data for this species were available,
with a tradition of taking substantial numbers of migratory birds on the
western European flyways (ie BL, ES, FR, IA, NA),
b) other countries and c) all countries. The bold line with symbols
indicates overall index values, triangles indicate values based on birds
reported as shot and squares indicate index values based on birds reported
as trapped. The periods -50 and 85+ refer to all recoveries before 1950
and from 1985 onwards respectively.

Belgium

% of birds taken

France

% of birds taken

Spain

% of birds taken

North Africa

% of birds taken

Italy

% of birds taken
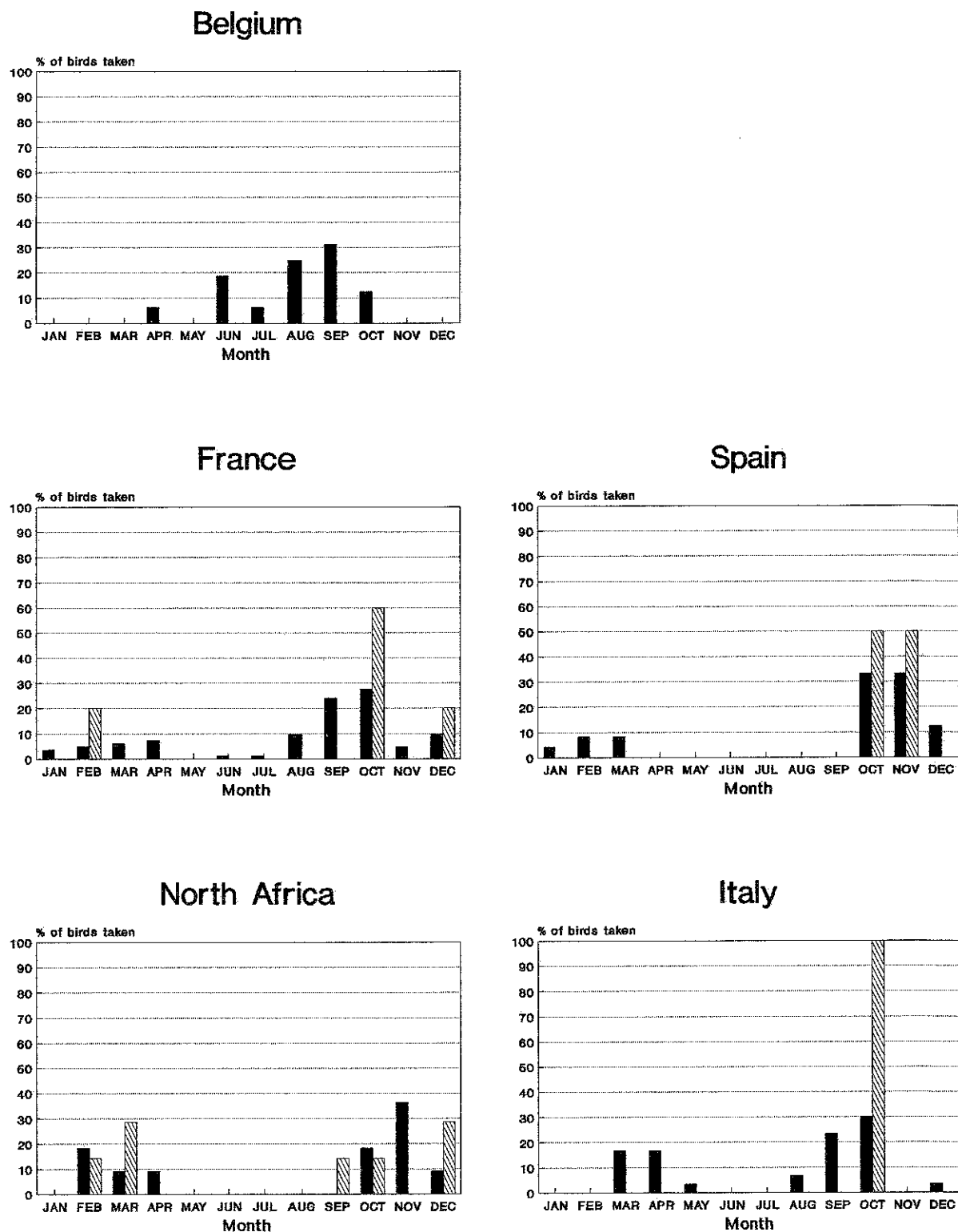
Figure 5.6   Monthly percentages of total   Marsh Harrier taken in individual countries with high overall indices and sufficient recoveries for analysis.   Solid bars indicate birds from the period before 1980 and hatched bars indicate birds taken from 1980 onwards.

6. SPARROWHAWK (ACCIPITER NISUS)

6.1 Range

The Sparrowhawk breeds throughout Europe, except in the most
northerly parts of Scandinavia and the Soviet Union, and also in
north-west Africa and Asia Minor. Sparrowhawks are present in
winter from the Baltic coast to North Africa and the Nile Valley.
The most southerly occurring birds in Africa are likely to
originate from western Asian populations (Newton 1986).

6.2 Population trends

The Sparrowhawk underwent a severe decline throughout Europe
during the 1960s associated with the effects of organochlorine
pesticides (Cramp and Simmons 1980). Since then many populations,
especially in north-western Europe, have shown varying degrees of
recovery (Newton and Haas 1984, Marchant et al. 1990).

6.3 Migration

European Sparrowhawk populations vary considerably in their
tendency to migrate. The proportion of birds undertaking a
southward movement in autumn tends to increase from south to
north, with north-easterly populations being the most migratory.
Conversely, Sparrowhawks in the British Isles are relatively
sedentary (Newton 1986). European Sparrowhawks migrate over a
series of parallel routes running north-east to south-west
(Michelson and Viksne 1982). This results in a longitudinal
distribution of wintering populations which reflects that farther
north during the breeding season (Table 6.1). In many parts of
central Europe, where Sparrowhawks are found throughout the year,
the breeding population is replaced in winter by birds from the
north (Newton 1986).

Relatively few European Sparrowhawks winter in North Africa and
the Middle East and the species, because of its active flapping
mode of flight, is less dependent on narrow straits to facilitate
sea-crossings. There is, consequently, less concentration of
migrating Sparrowhawks towards crossing points such as the Straits
of Gibraltar and the Bosporus than is the case with many larger
raptor species which progress by soaring (Newton 1986).

6.4 Status

The Sparrowhawk is fully protected in all E.C. countries, though
it may be shot under licence as a pest in Denmark. Woldhek (1979)
reports that taking of Sparrowhawks is permitted by law in some
regions of Yugoslavia and also in Egypt. Trapping for falconry may
be carried out under licence in Tunisia.

6.5 Geographical variation in the taking of Sparrowhawks

During the years prior to 1980 the highest indices of birds taken, in those countries for which at least 10 recoveries were available, occurred in Spain, Italy, France and Czechoslovakia (Table 6.2). Indices were generally high in eastern Europe and the Balkans and lowest in Scandinavia and north-west Europe, exceptions being Ireland and Norway. Only France (19%) Belgium (18%), the United Kingdom (15%) and West Germany (11%) accounted for more than 10% of taken recoveries (Fig. 6.1a).

Spain and Italy also had the highest indices of birds taken since 1980. Indices for Greece and Yugoslavia were also relatively high, though sample-sizes were small.

None of the countries contributing 10% or more of recoveries of taken birds during this period (United Kingdom 23%, Belgium 16%, Netherlands 13%, France 11%) had an index exceeding 15. In Italy all recoveries of taken birds came from the north of the country. Spanish recoveries came mainly from northern and central regions (Fig. 6.1b).

It is known that substantial numbers of Sparrowhawks are trapped for falconry in north-east Turkey (Magnin 1988). It is likely, however, that most of these birds originate from the Soviet Union and, consequently, any recoveries resulting from this practice are not included in the analyses reported here.

Sparrowhawks from the East German breeding population appear to be the most susceptible to being taken (index=44.9) and the Belgian, Danish and West German populations all have indices greater than 20 (Table 6.3, Fig. 6.3). Scandinavian breeding Sparrowhawks have lower indices than most populations breeding to the south. This may be due to high local recovery rates of birds dying from causes other than shooting and trapping and few birds being taken locally. In contrast to the high proportion of recoveries in France resulting from Sparrowhawks being taken, the French breeding population has one of the lowest indices in Europe. This suggests that most Sparrowhawks taken in France are migrants.

6.6 Temporal variation in the taking of Sparrowhawks

Indices of birds taken during the period from 1980 onwards are significantly lower than those for the preceding period in all north-west European and Scandinavian countries for which at least 10 recoveries were available. Similar reductions occurred in East Germany, Poland and Czechoslovakia (Table 6.2). Index values also decreased in all other countries except Greece, though not significantly.

Regression of index of birds taken on year produced significant inverse relationships for all countries and groups of countries analyzed, suggesting a general decline in the taking of Sparrowhawks with time (Table 6.3, Fig. 6.4, Fig. 6.5).

Analysis of the percentage of Sparrowhawks taken in each month in Belgium, France, Spain and Italy showed that most birds are taken in the winter months, especially October and November (Fig. 6.6).

6.7 Methods used to take Sparrowhawks

During the period prior to 1980 20% of all Sparrowhawks taken were recorded as trapped and 65% as shot. The method used to take the remainder was not specified. The corresponding figures since 1980 were 30% trapped and 69% shot. Shooting has declined significantly, relative to trapping, in Belgium since 1980 (Table 6.2). No significant change in the relative importance of the two methods was detected in any other country.

TABLE 6.1a The distribution of Sparrowhawks recovered due to shooting and trapping before 1980 in relation to their area of origin. The percentage of taken birds recovered in each country is shown for each national ringing scheme. Percentages within parentheses are based on less than ten recoveries.

Country of recovery	Country of ringing													
	UK	CI	NO	SV	DK	SF	DD	DF	NL	BL	FR	ES	IA	HE
GB	94.6	–	–	0	0	(0.4)	0	0	(3.4)	(0.7)	0	–	–	0
CI	–	–	–	0	0	0	0	0	0	0	0	–	–	0
ER	(0.7)	–	–	0	0	0	0	0	(0.8)	0	0	–	–	0
NO	(1.4)	–	–	0	0	(0.4)	0	(1.2)	(5.9)	(0.7)	0	–	–	0
SV	0	–	–	(37.5)	0	12.0	(1.2)	(1.2)	(3.4)	(1.5)	0	–	–	0
DK	(0.7)	–	–	(12.5)	(65.9)	8.4	0	0	(1.7)	(0.7)	0	–	–	0
SF	0	–	–	0	(2.2)	12.9	0	(0.6)	0	0	0	–	–	0
SU	0	–	–	0	0	0.9	0	(0.6)	(0.8)	(0.7)	0	–	–	0
PL	0	–	–	(12.5)	0	(2.7)	(1.2)	0	0	0	0	–	–	0
DD	0	–	–	0	(1.1)	(3.6)	54.8	(2.4)	0	0	0	–	–	0
DF	(0.7)	–	–	0	(1.1)	15.6	(3.6)	42.3	(0.8)	(1.5)	0	–	–	0
NL	0	–	–	0	0	(1.8)	0	(1.8)	36.1	(1.5)	0	–	–	0
BL	(0.7)	–	–	0	(4.4)	9.3	0	10.7	23.5	78.1	0	–	–	0
KN	0	–	–	0	0	0	0	0	0	(0.7)	0	–	–	0
FR	(1.4)	–	–	(25.0)	25.3	25.8	14.3	28.0	22.7	13.9	(100)	–	–	(100)
ES	0	–	–	0	0	(0.4)	(4.8)	9.5	(0.8)	0	0	–	–	0
PO	0	–	–	0	0	0	0	(0.6)	0	0	0	–	–	0
IA	0	–	–	(12.5)	0	(0.9)	(4.8)	(0.6)	0	0	0	–	–	0
HE	0	–	–	0	0	0	0	0	0	0	0	–	–	0
AU	0	–	–	0	0	0	0	0	0	0	0	–	–	0
CS	0	–	–	0	0	(3.6)	15.5	0	0	0	0	–	–	0
HG	0	–	–	0	0	(0.4)	0	0	0	0	0	–	–	0
RO	0	–	–	0	0	0	0	0	0	0	0	–	–	0
BG	0	–	–	0	0	0	0	0	0	0	0	–	–	0
YG	0	–	–	0	0	(0.4)	0	0	0	0	0	–	–	0
GR	0	–	–	0	0	(0.4)	0	0	0	0	0	–	–	0
TU	0	–	–	0	0	0	0	0	0	0	0	–	–	0
CY	0	–	–	0	0	0	0	0	0	0	0	–	–	0
ML	0	–	–	0	0	0	0	0	0	0	0	–	–	0
SY	0	–	–	0	0	0	0	0	0	0	0	–	–	0
LE	0	–	–	0	0	0	0	0	0	0	0	–	–	0
IL	0	–	–	0	0	0	0	0	0	0	0	–	–	0
ME	0	–	–	0	0	0	0	0	0	0	0	–	–	0
EG	0	–	–	0	0	0	0	0	0	0	0	–	–	0
LT	0	–	–	0	0	0	0	0	0	0	0	–	–	0
TO	0	–	–	0	0	0	0	(0.6)	0	0	0	–	–	0
AG	0	–	–	0	0	0	0	0	0	0	0	–	–	0
MA	0	–	–	0	0	0	0	0	0	0	0	–	–	0
SA	0	–	–	0	0	0	0	0	0	0	0	–	–	0
TOTAL NO.	147	–	–	8	91	225	84	168	119	137	1	–	–	1

TABLE 6.1b The distribution of Sparrowhawks recovered due to shooting and trapping from 1980 onwards in relation to their area of origin. The percentage of taken birds recovered in each country is shown for each national ringing scheme. Percentages within parentheses are based on less than ten recoveries.

Country of recovery	Country of ringing													
	UK	CI	NO	SV	DK	SF	DD	DF	NL	BL	FR	ES	IA	HE
GB	100	–	–	0	0	0	–	0	0	(3.7)	0	0	–	–
CI	0	–	–	0	0	0	–	0	0	0	0	0	–	–
ER	0	–	–	0	0	0	–	0	0	0	0	0	–	–
NO	0	–	–	0	0	0	–	0	0	0	0	0	–	–
SV	0	–	–	0	(14.3)	(2.5)	–	0	0	0	0	0	–	–
DK	0	–	–	0	(71.4)	0	–	0	(2.7)	(3.7)	0	0	–	–
SF	0	–	–	0	0	(15.0)	–	0	0	0	0	0	–	–
SU	0	–	–	(12.5)	0	(5.0)	–	0	0	0	0	0	–	–
PL	0	–	–	0	0	(12.5)	–	0	0	0	0	0	–	–
DD	0	–	–	0	0	(7.5)	–	0	0	0	0	0	–	–
DF	0	–	–	(12.5)	0	(10.0)	–	(38.1)	(2.7)	(3.7)	0	0	–	–
NL	0	–	–	0	0	(2.5)	–	(9.5)	56.8	(3.7)	0	0	–	–
BL	0	–	–	(25.0)	0	(2.5)	–	(14.3)	(21.6)	63.0	0	0	–	–
KN	0	–	–	0	0	0	–	0	0	0	0	0	–	–
FR	0	–	–	(50.0)	(14.3)	(7.5)	–	(19.1)	(8.1)	(18.5)	(100)	0	–	–
ES	0	–	–	0	0	0	–	(19.1)	(8.1)	(3.7)	0	(100)	–	–
PO	0	–	–	0	0	–	–	0	0	0	0	0	–	–
IA	0	–	–	0	0	(5.0)	–	0	0	0	0	0	–	–
HE	0	–	–	0	0	0	–	0	0	0	0	0	–	–
AU	0	–	–	0	0	0	–	0	0	0	0	0	–	–
CS	0	–	–	0	0	(2.5)	–	0	0	0	0	0	–	–
HG	0	–	–	0	0	(2.5)	–	0	0	0	0	0	–	–
RO	0	–	–	0	0	0	–	0	0	0	0	0	–	–
BG	0	–	–	0	0	0	–	0	0	0	0	0	–	–
YG	0	–	–	0	0	(17.5)	–	0	0	0	0	0	–	–
GR	0	–	–	0	0	(2.5)	–	0	0	0	0	0	–	–
TU	0	–	–	0	0	0	–	0	0	0	0	0	–	–
CY	0	–	–	0	0	0	–	0	0	0	0	0	–	–
ML	0	–	–	0	0	0	–	0	0	0	0	0	–	–
SY	0	–	–	0	0	0	–	0	0	0	0	0	–	–
LE	0	–	–	0	0	0	–	0	0	0	0	0	–	–
IL	0	–	–	0	0	0	–	0	0	0	0	0	–	–
ME	0	–	–	0	0	0	–	0	0	0	0	0	–	–
EG	0	–	–	0	0	0	–	0	0	0	0	0	–	–
LT	0	–	–	0	0	0	–	0	0	0	0	0	–	–
TO	0	–	–	0	0	0	–	0	0	0	0	0	–	–
AG	0	–	–	0	0	0	–	0	0	0	0	0	–	–
MA	0	–	–	0	0	0	–	0	0	0	0	0	–	–
SA	0	–	–	0	0	0	–	0	0	0	0	0	–	–
TOTAL NO.	42	–	–	8	7	40	–	21	37	27	1	2	–	–

Note: No data available for Poland, Czechoslovakia or Hungary.

TABLE 6.2. Sparrowhawk: Indices of birds taken before 1980 and from 1980 onwards for each country of recovery.

	Index (all methods)[a]		% hunted[b]		Total recoveries[c]		Shooting Index[a]		Trapping Index[a]		G test[d]
	-1980	1980+	-1980	1980+	-1980	1980+	-1980	1980+	-1980	1980+	
GB	20.2	4.3***	17.2	3.6	845	1201	18.1	4.1	1.5	0.2	-
CI	-	-	-	0	-	1	-	-	-	-	-
ER	40.9	6.9**	36.0	6.1	25	33	36.4	6.9	0	0	-
NO	30.2	0*	28.3	0	46	19	20.9	0	4.7	0	-
SV	14.7	0.7***	12.9	0.6	303	362	10.9	0.7	1.5	0	-
DK	35.4	2.8***	20.5	1.4	409	504	31.2	1.6	3.4	1.2	-
SF	14.7	2.0***	12.3	1.4	260	432	12.8	2.0	1.4	0	-
SU	45.5	17.7	27.8	4.2	18	72	27.3	5.9	0	11.8	-
PL	44.4	8.6**	42.1	6.9	19	72	27.8	6.9	11.1	1.7	-
DD	28.1	3.0***	26.1	2.6	226	117	14.8	1.0	11.0	2.0	-
DF	27.3	3.1***	23.9	2.7	477	561	19.4	2.1	6.7	1.1	-
NL	13.3	2.6***	11.9	2.0	439	1227	6.1	1.2	6.4	1.4	-
BL	63.0	14.1***	52.8	8.8	339	352	27.1	5.0	18.3	9.1	***
KN	(50.0)	(0)	50.0	0	2	2	(50.0)	(0)	(0)	(0)	-
FR	66.2	12.6***	63.6	10.6	305	198	37.9	11.4	11.6	0.6	-
ES	74.2	52.6	69.7	52.6	33	19	45.2	47.4	19.4	5.3	-
PO	(50.0)	-	50.0	-	2	-	(50.0)	-	(0)	-	-
IA	69.2	30.0	69.2	30.0	13	10	7.7	0	7.7	30.0	-
HE	0	0	0	0	11	31	0	0	0	0	-
AU	(0)	(0)	0	0	3	6	(0)	(0)	(0)	(0)	-
CS	61.8	6.7***	58.3	6.3	36	16	50.0	0	2.9	6.7	-
HG	(50.0)	(33.3)	50.0	33.3	2	3	(50.0)	(33.3)	(0)	(0)	-
RO	-	-	-	-	-	-	-	-	-	-	-
BG	(0)	(0)	0	0	1	1	(0)	(0)	(0)	(0)	-
YG	(100)	63.6	100	53.9	1	13	(100)	45.5	(0)	18.2	-
GR	(50.0)	(100)	50.0	100	2	1	(50.0)	(0)	(0)	(100)	-
TU	-	-	-	-	-	-	-	-	-	-	-
CY	-	-	-	-	-	-	-	-	-	-	-
ML	-	-	-	-	-	-	-	-	-	-	-
SY	-	-	-	-	-	-	-	-	-	-	-
LE	-	-	-	-	-	-	-	-	-	-	-
IL	-	-	-	-	-	-	-	-	-	-	-
ME	-	-	-	-	-	-	-	-	-	-	-
EG	-	-	-	-	-	-	-	-	-	-	-
LT	-	-	-	-	-	-	-	-	-	-	-
TO	(100)	-	100	-	1	-	(0)	0	(100)	-	-
AG	-	-	-	-	-	-	-	-	-	-	-
MA	(0)	-	0	-	1	-	(0)	-	(0)	-	-
SA	0	-	-	-	-	-	-	-	-	-	-

[a]   See chapter 2 (methods) for derivation of indices. Indices derived from less than 10 recoveries are indicated within parentheses.   Fisher's exact tests (Sokal & Rohlf 1981) were used to compare the proportions taken in each period. Significance levels (*<0.05; ** <0.01; *** <0.001) of the tests are indicated in column 1980+. Tests were carried out on all pairs except where indices were based on less than 10 recoveries.

[b]   Percentage of all recoveries other than those excluded on the basis of poor quality data (see chapter 2) taken by shooting and trapping.

[c]   Total number of recoveries other than those excluded on the basis of poor quality data.

[d]   G test (Sokal & Rohlf 1981) comparison between periods of the proportions of birds taken according to the classes shot, trapped, and shot or trapped. Significance levels of these comparisons are indicated as above. 'NS' indicates non-significant results where tests were carried out. Comparisons were not made where the expected frequency in any cell was less than 10.

Table.6.3. Sparrowhawk: Indices of birds taken for each breeding population (across all years).

Breeding Population		Index of birds taken	Sample size
UK	United Kingdom	11.2	1498
CI	Channel Islands	-	-
NO	Norway	-	-
SV	Sweden	4.2	284
DK	Denmark	25.0	360
SF	Finland	13.0	877
SU	USSR (Lithuania only)	-	-
PL	Poland	-	-
DD	East Germany	44.9	167
DF	West Germany	23.5	567
NL	Holland	6.8	1002
BL	Belgium	28.9	83
FR	France	3.9	52
ES	Spain	66.7	3
IA	Italy	-	-
HE	Switzerland	0	17
CJ	Czechoslovakia	-	-
HG	Hungary	-	-

Table 6.4   Regression analysis of temporal trends in the indices of Sparrowhawks taken.

Country of recovery	Intercept	Slope	t	P
Belgium	213.7	-2.49	-6.46	***
France	208.3	-2.37	-13.95	***
Major	203.7	-2.32	-9.92	***
Other	100.9	-1.20	-6.42	***
All	135.5	-1.62	-6.75	***

All regressions used a weighted technique where each 5-year index was weighted by the square root of the sample size.

Countries where 10 or more recoveries occurred in each year after 1950 were analysed. Data from the period before 1950 were not included in the analysis.

Major countries are those with a tradition of taking substantial numbers of birds that use western migration routes. (i.e. BL, FR, ES, PO, IA, NA).

Significance levels indicated are: NS Not significant; * P<0.05; ** P<0.01; *** P<0.001.

Figure 6.1a Total numbers of Sparrowhawk ringing recoveries resulting from birds taken before 1980 in each 30' by 60' grid square. ** Indicates numbers greater than 99. 4 recoveries were outside the limits of the map.

1

1

1

1

1

1

1

1

1

1

1

1

1

3

1

6 2

2 4 1 1 1

2 1 1

4 1 3 1 1 1

1 2

1 4 5 2 1 1

1 1 1

10 3 6 2 1

2 8

4 15 3

1 1 1 1

1 1 1 1

1 1 1

1

1 1

1 1

1 1 2

2

1 1

1 1 1

1

1 1

1

1

1

1

Figure 6 .1b   Total numbers of Sparrowhawk ringing recoveries from birds taken from 1980 onwards
in each 30' by 60' grid square.   ** Indicates numbers greater than 99.   2 recoveries were outside
the limits of the map.
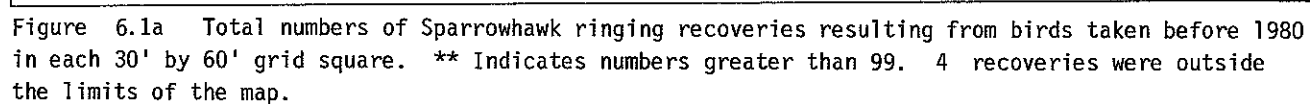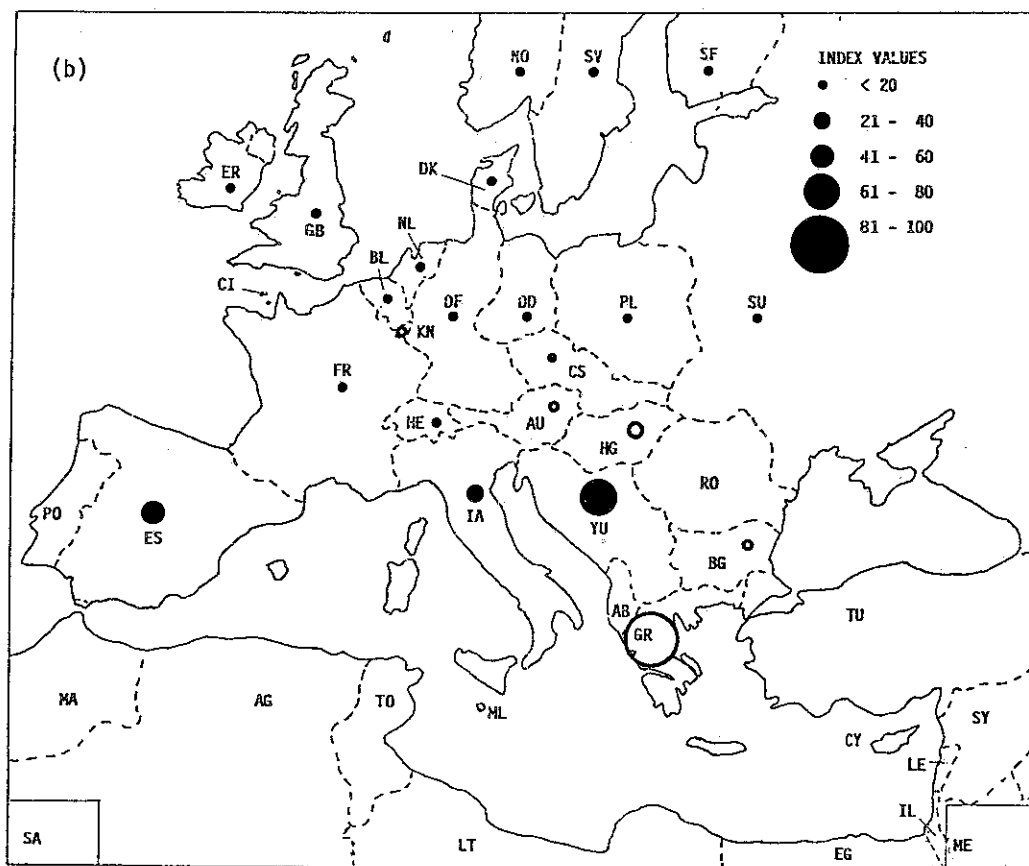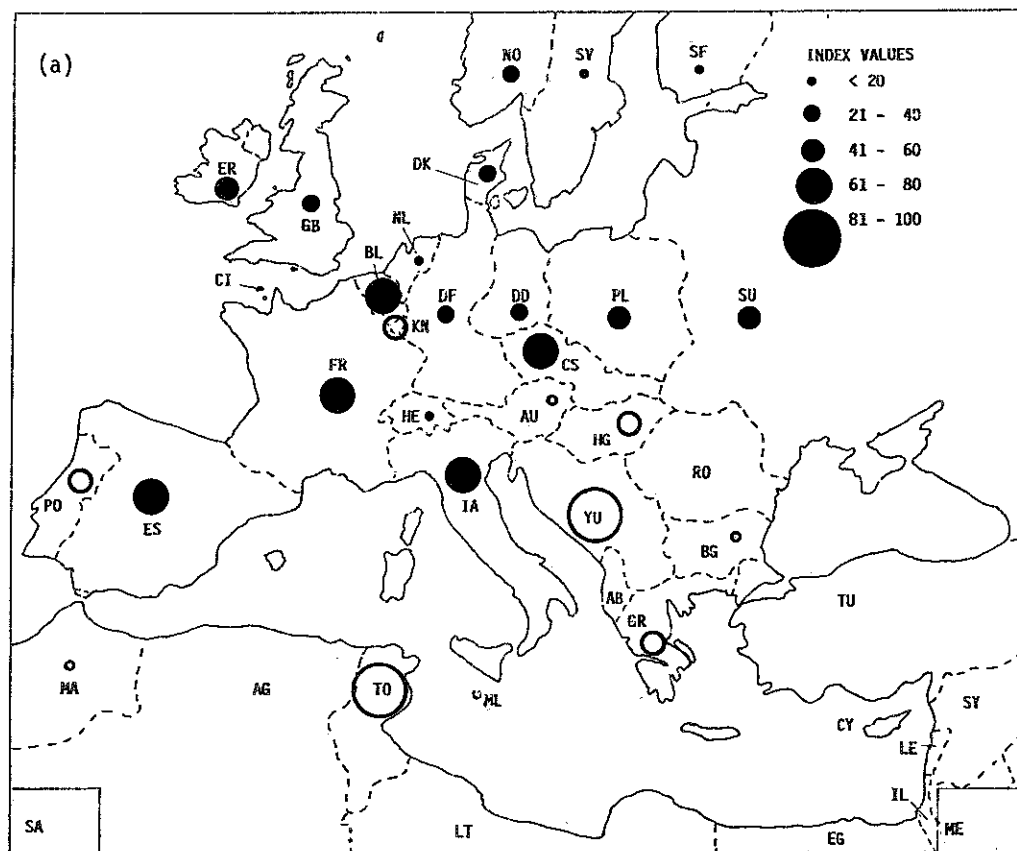
Figure 6.2 Geographical variation in the indices of Sparrowhawk
taken for each country of recovery in the period before 1980 (a) and from
1980 onwards (b). Solid circles indicate values derived from more than 10
recoveries and open circles indicate those derived from less than 10.
Country codes are indicated in Table 2,4 of the Methods.

74
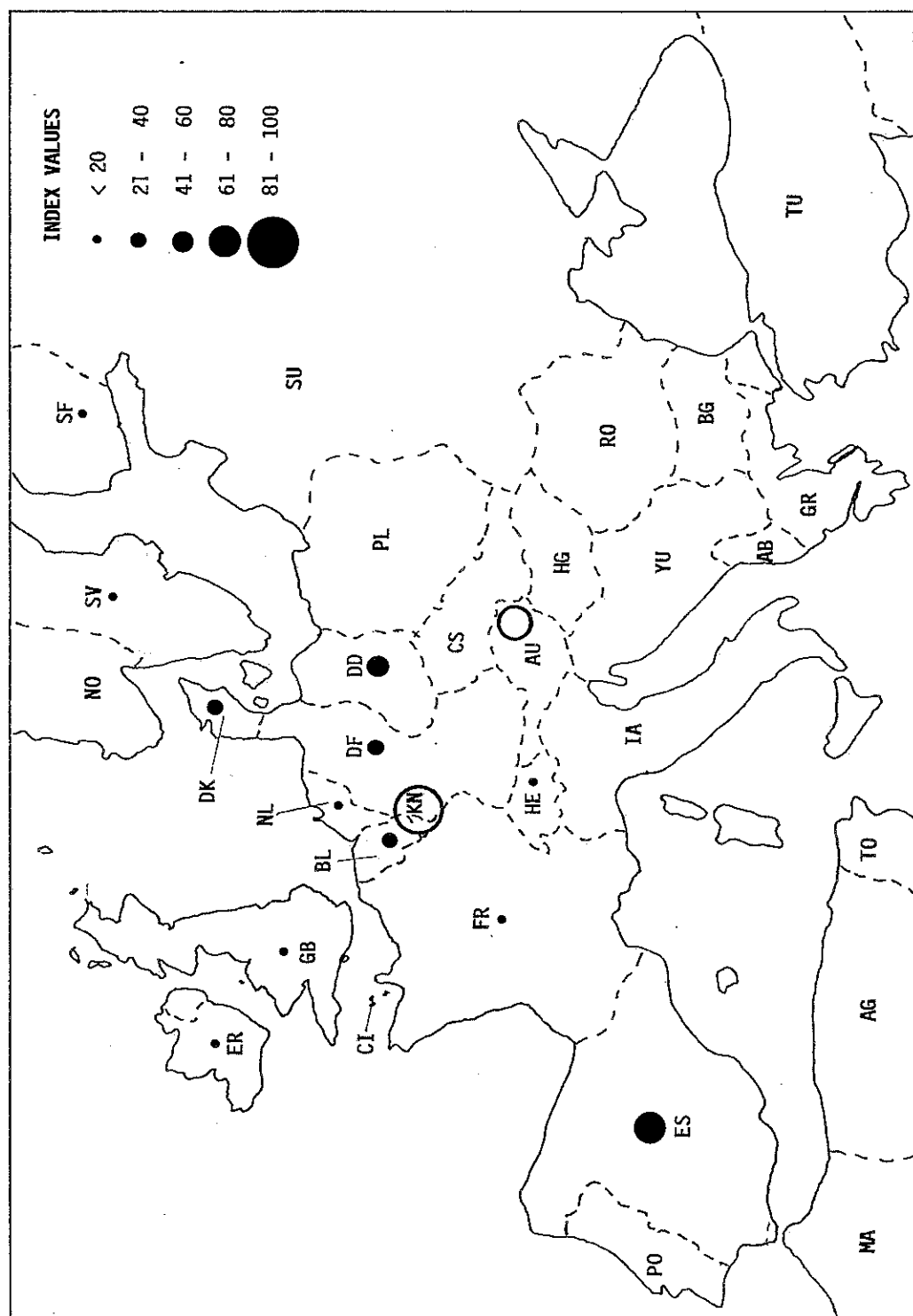
Figure 6.3 Geographical variation in the indices of Sparrowhawk taken over all years for each breeding population. Solid circles indicate values derived from more than 10 recoveries and open circles indicate those derived from less than 10. Country codes are indicated in Table 2.4 of the Methods.

Belgium

France

Spain

Italy
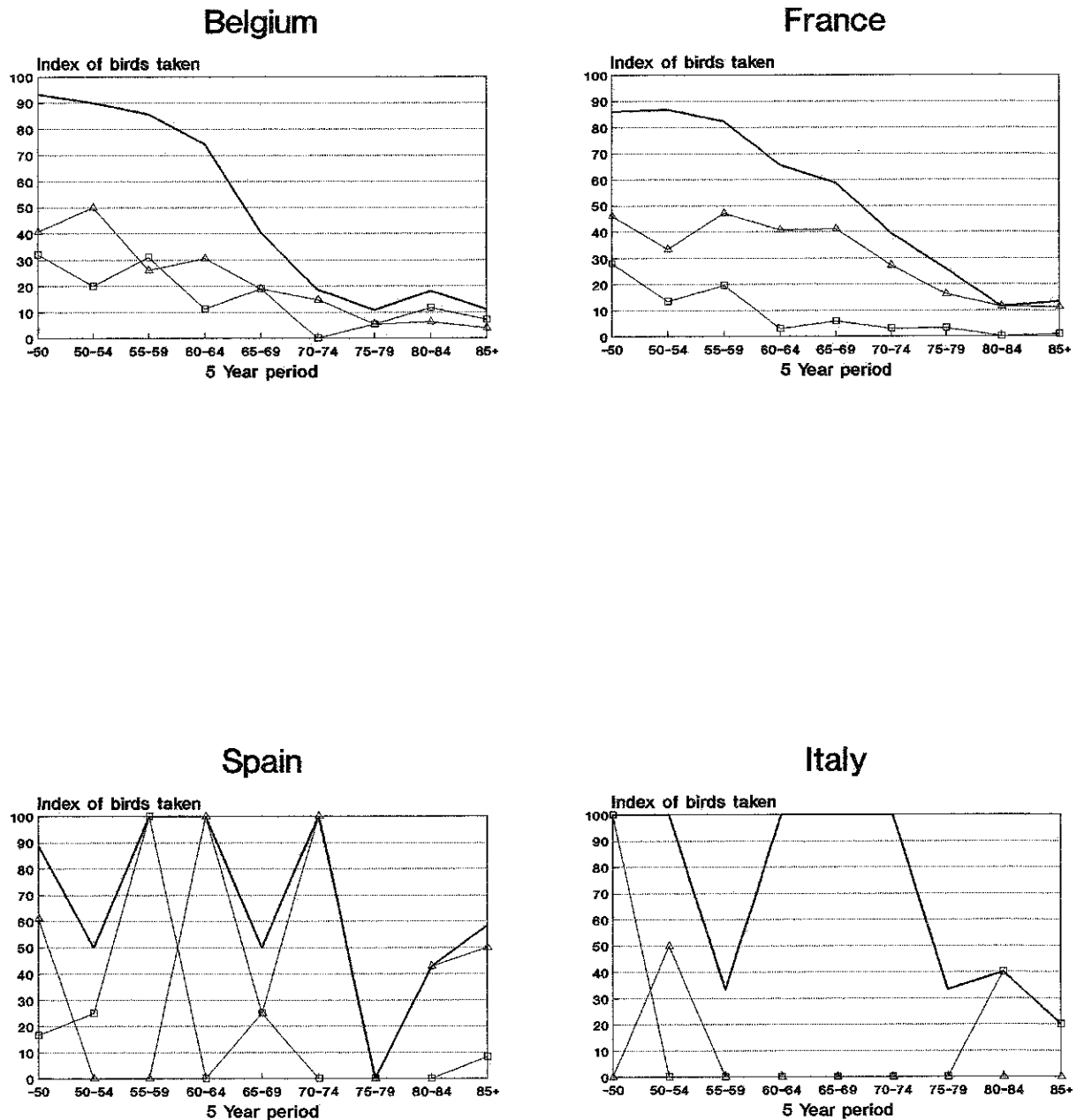
Figure 6.4   Trends in 5-yearly indices of Sparrowhawk taken in individual countries with high overall indices and sufficient recoveries for analysis.   The bold line without symbols indicates overall index values, triangles indicate index values based on birds reported as shot and squares indicate index values based on birds reported as trapped. The periods -50 and 85+ refer to all recoveries before 1950 and from 1985 onwards respectively.

BL,ES,FR,IA

Index of birds taken

Others

Index of birds taken

All countries

Index of birds taken

5 Year period
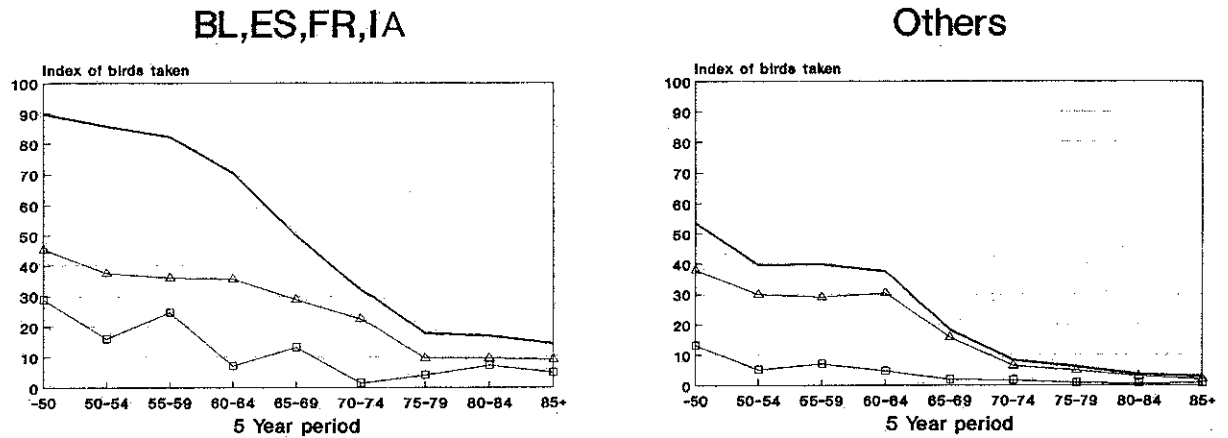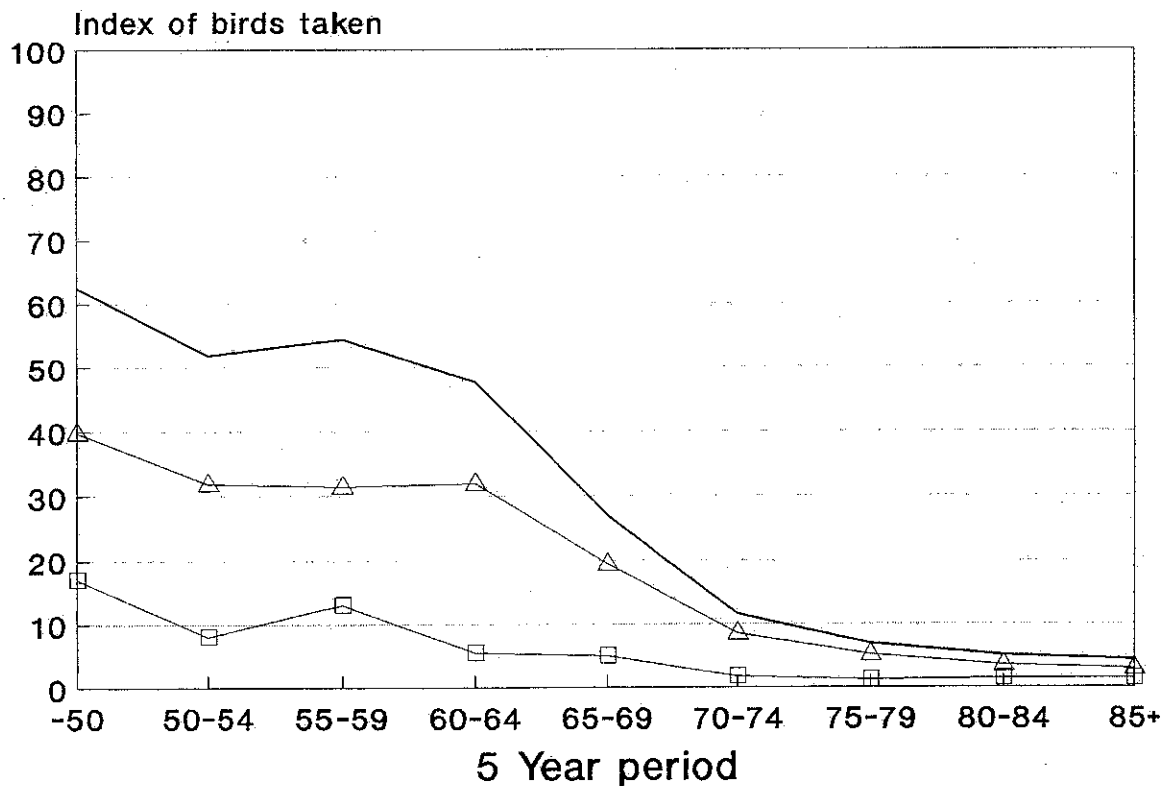
Figure 6.5.   Trends in combined 5-yearly indices of Sparrowhawk
taken in: a) countries, for which data for this species were available,
with a tradition of taking substantial numbers of migratory birds on the
western European flyways (ie BL, ES, FR, IA),
b) other countries and c) all countries.   The bold line with symbols
indicates overall index values, triangles indicate values based on birds
reported as shot and squares indicate index values based on birds reported
as trapped.   The periods -50 and 85+ refer to all recoveries before 1950
and from 1985 onwards respectively.

Belgium

France

Spain

Italy
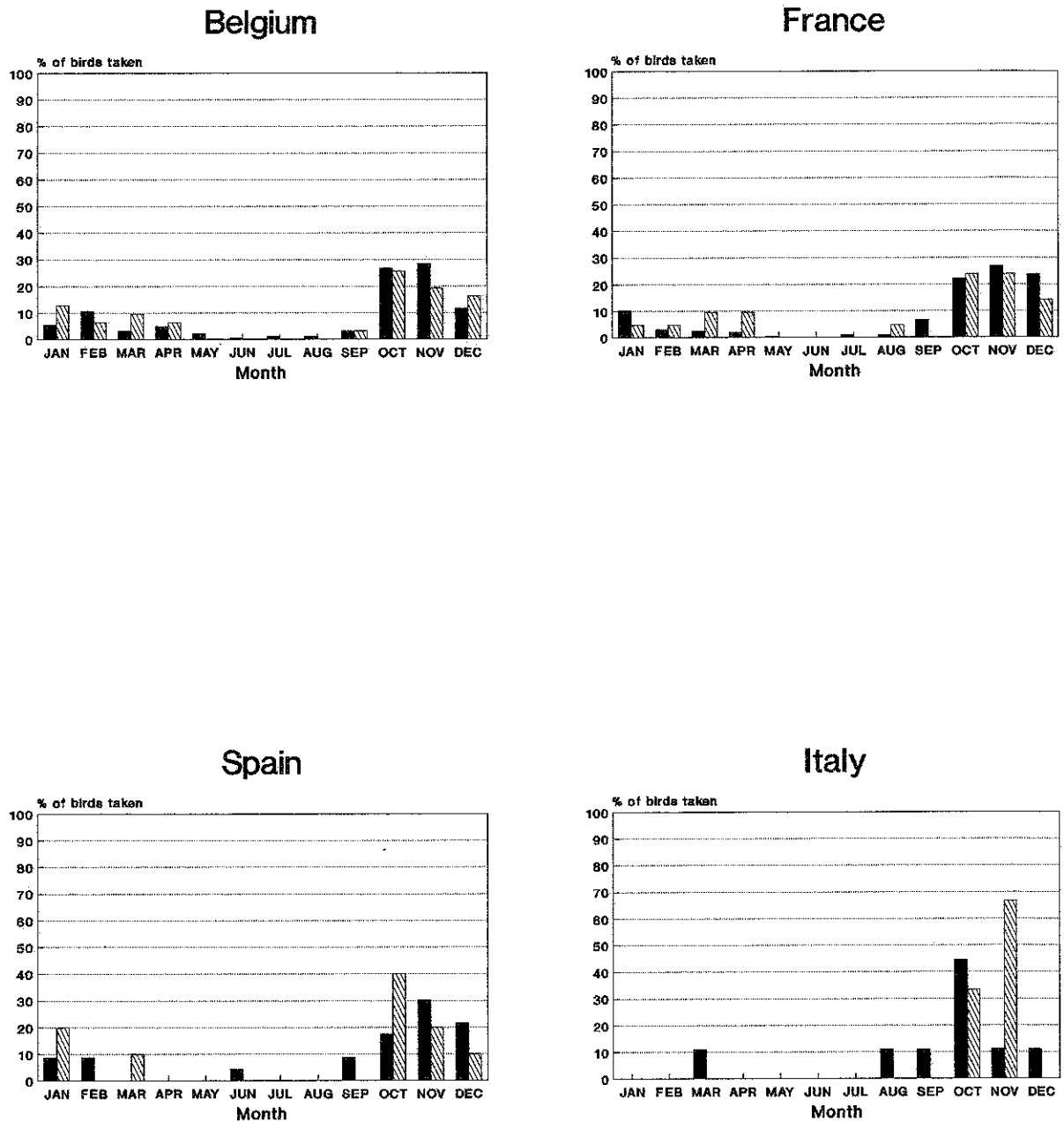
Figure 6.6 Monthly percentages of total Sparrowhawk taken in individual countries with high overall indices and sufficient recoveries for analysis. Solid bars indicate birds from the period before 1980 and hatched bars indicate birds taken from 1980 onwards.

7. BUZZARD (BUTEO BUTEO)

7.1 Range

The Buzzard breeds throughout Europe south of the Arctic Circle, except for most of Norway, southern Ireland and western Portugal (Harrison 1982). The species is present throughout the year in the British Isles and from southern Sweden to the Mediterranean. A small proportion of Buzzards from western European populations winter in North Africa while more northerly and easterly populations move south of the Sahara.

7.2 Population trends

The Buzzard has been reported as declining in many European countries during this century as a result of habitat-loss, direct persecution and the effects of agricultural chemicals. Populations in north-west Europe may now be stabilizing and increasing (Cramp and Simmons 1980, Marchant et al. 1990).

7.3 Migration

As in the previous species, the tendency of Buzzards to migrate varies between geographical populations within Europe. The proportion of Buzzards migrating increases from south-west to north-east (Cramp and Simmons 1980). The distance tavelled during migration generally increases with breeding latitude. Buzzards breeding in the British Isles are relatively sedentary (Picozzi and Weir 1976). Most European Buzzards migrate in a south-westerly direction in autumn. During this period many Scandinavian birds move into the Netherlands, Belgium, France and Iberia (Neilsen 1977). These may be joined by Buzzards from around the eastern Baltic (Table 7.1).

Because of its soaring mode of flight the Buzzard can only undertake relatively short sea-crossings. Migrating birds are therefore funnelled through the Iberian Peninsula to the Straits of Gibraltar, through the northern Balkans to the Bosporus and, to a lesser extent, through Italy to the Sicilian Channel. Buzzards crossing the Bosporus probably mainly originate in the western U.S.S.R. and east-central Europe. A small proportion of Finnish birds also use this route (Cramp and Simmons 1980).

7.4 Status

The Buzzard is fully protected in all E.C. countries, though it may be shot under licence as a pest in Denmark (Bertelsen and Simonsen 1989). The survey carried out by Woldhek (1979) indicates that the species was, at that time, protected in all non-E.C. Mediterranean countries for which information was available, with the exception of Malta.

7.5 Geographical variation in the taking of Buzzards

The indices of birds taken in the years prior to 1980 suggest generally high levels of shooting and trapping of Buzzards throughout Europe during this period (Table 7.2). Amongst countries providing at least 10 recoveries, only the United Kingdom, Sweden, East Germany, Luxembourg and Switzerland had indices lower than 25. The highest indices were mainly obtained from countries where Buzzards are concentrated on migration. Lebanon, Czechoslovakia, the Soviet Union, Spain, Italy and France all had index values of 50 or greater. Only France (24%) and West Germany (25%) accounted for more than 10% of all recoveries of Buzzards taken.

Turkey, Yugoslavia and Spain were the only countries with 10 or more recoveries to have indices of birds taken exceeding 25 for the period from 1980 onwards. Countries contributing at least 10% of the total number of taken recoveries since 1980 were: West Germany (11%), Spain (10%), Belgium (10%).

Recoveries of Buzzards due to shooting and trapping are distributed throughout north-western Europe with concentrations around the Low Countries and northern France and in central Germany (Fig. 1a,b). Recoveries from eastern Europe are fewer and more widely scattered. Most Spanish recoveries come from northern and central regions with surprisingly few from the south of the country.

Buzzards breeding in Denmark appear to have the highest probability of being taken (Table 7.3, Fig. 7.3). Populations from East and West Germany and Finland all have indices greater than 25. A considerably lower index for Buzzards breeding in Sweden compared to those in Finland probably reflects the taking of raptors being more prevalent in the latter country prior to 1980. The more easterly migration route taken by some Finnish Buzzards has resulted in many being taken in the U.S.S.R., whereas no Swedish-ringed Buzzards have been shot or trapped there (Table 6.1).

7.6 Temporal variation in the taking of Buzzards

Indices of Buzzards taken during the period since 1980 were lower than those for the earlier period in all countries other than Bulgaria, Greece, Syria and Lebanon. The reductions were significant in Denmark, Finland, U.S.S.R., Poland, West Germany, Holland, Belgium, France and Czechoslovakia (Table 7.2).

Indices of birds taken for five-year periods declined with time in Belgium, France, Spain and Italy. Regression of index on year revealed significant inverse relationships in all countries and groups of countries analyzed.

Analysis of the percentage of Buzzards taken in each month in Belgium, France, Spain and Italy shows that most are taken between October and March, especially in November and December (Fig. 7.6).

7.7 Methods used to take Buzzards

During the period prior to 1980 at least 16% of all Buzzards taken were trapped and 68% were shot. The method used to take the remainder was not specified. The corresponding figures since 1980 were 19% trapped and 77% shot. In none of the countries analyzed did the relative importance of these methods change significantly between periods.

The distribution table is on page 81.

TABLE 7.1a The distribution of Buzzards recovered due to shooting and trapping before 1980 in relation to their area of origin. The percentage of taken birds recovered in each country is shown for each national ringing scheme. Percentages within parentheses are based on less than ten recoveries.

Country of recovery	Country of ringing													
	UK	CI	NO	SV	DK	SF	DD	DF	NL	BL	FR	ES	IA	HE
GB	100	–	–	0	0	0	0	0	0	0	0	–	–	0
CI	0	–	–	0	0	0	0	0	0	0	0	–	–	0
ER	0	–	–	0	0	0	0	0	0	0	0	–	–	0
NO	0	–	–	0	0	0	0	0	0	0	0	–	–	0
SV	0	–	–	(21.1)	(6.4)	(0.6)	0	0	(3.1)	0	0	–	–	0
DK	0	–	–	(21.1)	73.4	(0.6)	0	(0.2)	0	(1.9)	0	–	–	0
SF	0	–	–	0	0	20.7	0	0	0	0	0	–	–	0
SU	0	–	–	0	0	49.4	(0.3)	(0.2)	0	0	0	–	–	0
PL	0	–	–	0	0	(0.6)	(2.8)	(0.2)	0	0	0	–	–	0
DD	0	–	–	0	0	0	34.5	(1.0)	0	0	(14.3)	–	–	0
DF	0	–	–	0	13.8	(0.6)	14.5	49.4	(12.5)	(3.9)	0	–	–	(27.3)
NL	0	–	–	0	0	0	0	(2.0)	40.6	(7.7)	0	–	–	0
BL	0	–	–	(10.5)	(3.2)	(2.4)	(2.4)	7.5	(25.0)	67.3	0	–	–	0
KN	0	–	–	0	0	0	(0.3)	(0.2)	0	0	0	–	–	0
FR	0	–	–	(26.3)	(3.2)	(4.9)	30.3	36.7	(12.5)	19.2	(85.7)	–	–	(36.4)
ES	0	–	–	(10.5)	0	0	(0.3)	(0.7)	0	0	0	–	–	0
PO	0	–	–	(5.3)	0	0	0	0	(3.1)	0	0	–	–	0
IA	0	–	–	(5.3)	0	(3.1)	0	0	0	0	0	–	–	(9.1)
HE	0	–	–	0	0	0	(0.3)	(0.2)	0	0	0	–	–	(18.2)
AU	0	–	–	0	0	0	0	(0.5)	0	0	0	–	–	(9.1)
CS	0	–	–	0	0	(2.4)	14.1	(1.0)	(3.1)	0	0	–	–	0
HG	0	–	–	0	0	0	0	0	0	0	0	–	–	0
RO	0	–	–	0	0	(0.6)	0	0	0	0	0	–	–	0
BG	0	–	–	0	0	(1.2)	0	0	0	0	0	–	–	0
YG	0	–	–	0	0	(1.2)	0	0	0	0	0	–	–	0
GR	0	–	–	0	0	(1.2)	0	0	0	0	0	–	–	0
TU	0	–	–	0	0	(1.8)	0	0	0	0	0	–	–	0
CY	0	–	–	0	0	0	0	0	0	0	0	–	–	0
ML	0	–	–	0	0	0	0	0	0	0	0	–	–	0
SY	0	–	–	0	0	(1.8)	0	0	0	0	0	–	–	0
LE	0	–	–	0	0	(4.9)	0	0	0	0	0	–	–	0
IL	0	–	–	0	0	0	0	0	0	0	0	–	–	0
ME	0	–	–	0	0	(0.6)	0	0	0	0	0	–	–	0
EG	0	–	–	0	0	0	0	0	0	0	0	–	–	0
LT	0	–	–	0	0	0	0	0	0	0	0	–	–	0
TO	0	–	–	0	0	0	0	0	0	0	0	–	–	0
AG	0	–	–	0	0	0	0	0	0	0	0	–	–	0
MA	0	–	–	0	0	0	0	0	0	0	0	–	–	0
SA	0	–	–	0	0	(1.2)	0	0	0	0	0	–	–	0
TOTAL No.	27	–	–	19	94	164	290	411	32	52	7	–	–	11

Note: No data available for Poland, Czechoslovakia or Hungary.

TABLE 7.1b The distribution of Buzzards recovered due to shooting and trapping from 1980 onwards in relation to their area of origin. The percentage of taken birds recovered in each country is shown for each national ringing scheme. Percentages within parentheses are based on less than ten recoveries.

Country of recovery						Country of ringing								
	UK	CI	NO	SV	DK	SF	DD	DF	NL	BL	FR	ES	IA	HE
GB	100	–	–	0	0	0	–	0	0	0	–	0	–	0
CI	0	–	–	0	0	0	–	0	0	0	–	0	–	0
ER	0	–	–	0	0	0	–	0	0	0	–	0	–	0
NO	0	–	–	0	0	0	–	0	0	0	–	0	–	0
SV	0	–	–	(17.7)	0	2.1	–	0	0	0	–	0	–	0
DK	0	–	–	(29.4)	(100)	0	–	(7.7)	0	0	–	0	–	0
SF	0	–	–	0	0	(12.8)	–	0	0	0	–	0	–	0
SU	0	–	–	0	0	21.3	–	0	0	0	–	0	–	0
PL	0	–	–	0	0	0	–	0	0	0	–	0	–	0
DD	0	–	–	0	0	0	–	(7.7)	0	0	–	0	–	0
DF	0	–	–	(5.9)	0	0	–	(61.5)	(20.8)	0	–	0	–	(25.0)
NL	0	–	–	(5.9)	0	0	–	0	62.5	0	–	0	–	0
BL	0	–	–	0	0	0	–	(23.1)	(16.7)	(75.0)	–	0	–	0
KN	0	–	–	0	0	0	–	0	0	0	–	0	–	0
FR	0	–	–	0	0	(4.3)	–	0	0	(25.0)	–	0	–	(50.0)
ES	0	–	–	(35.3)	0	(4.3)	–	0	0	0	–	(100)	–	0
PO	0	–	–	0	0	0	–	0	0	0	–	0	–	0
IA	0	–	–	0	0	(2.1)	–	0	0	0	–	0	–	(25.0)
HE	0	–	–	0	0	0	–	0	0	0	–	0	–	0
AU	0	–	–	0	0	0	–	0	0	0	–	0	–	0
CS	0	–	–	0	0	(4.3)	–	0	0	0	–	0	–	0
HG	0	–	–	0	0	0	–	0	0	0	–	0	–	0
RO	0	–	–	0	0	0	–	0	0	0	–	0	–	0
BG	0	–	–	0	0	(4.3)	–	0	0	0	–	0	–	0
YG	0	–	–	0	0	(10.6)	–	0	0	0	–	0	–	0
GR	0	–	–	(5.9)	0	(8.5)	–	0	0	0	–	0	–	0
TU	0	–	–	0	0	(10.6)	–	0	0	0	–	0	–	0
CY	0	–	–	0	0	0	–	0	0	0	–	0	–	0
ML	0	–	–	0	0	0	–	0	0	0	–	0	–	0
SY	0	–	–	0	0	(6.4)	–	0	0	0	–	0	–	0
LE	0	–	–	0	0	(4.3)	–	0	0	0	–	0	–	0
IL	0	–	–	0	0	0	–	0	0	0	–	0	–	0
ME	0	–	–	0	0	0	–	0	0	0	–	0	–	0
EG	0	–	–	0	0	0	–	0	0	0	–	0	–	0
LT	0	–	–	0	0	0	–	0	0	0	–	0	–	0
TO	0	–	–	0	0	0	–	0	0	0	–	0	–	0
AG	0	–	–	0	0	0	–	0	0	0	–	0	–	0
MA	0	–	–	0	0	0	–	0	0	0	–	0	–	0
SA	0	–	–	0	0	(4.3)	–	0	0	0	–	0	–	0
TOTAL No.	9	–	–	17	4	47	–	13	24	8	–	5	–	4

Note: No data available for Poland, Czechoslovakia or Hungary.

TABLE 7.2. BUZZARD: Indices of birds taken before 1980 and from 1980 onwards for each country of recovery.

	Index (all methods)[a]		% hunted[b]		Total recoveries[c]		Shooting Index[a]		Trapping Index[a]		G test[d]
	-1980	1980+	-1980	1980+	-1980	1980+	-1980	1980+	-1980	1980+	
GB	14.1	7.6	11.6	6.3	225	143	9.7	6.7	3.8	0.8	-
CI	-	-	-	-	-	-	-	-	-	-	-
ER	-	-	-	-	-	-	-	-	-	-	-
NO	(0)	-	0	-	5	-	(0)	-	(0)	-	-
SV	11.3	5.5	7.6	3.4	158	117	10.4	0	0.9	5.5	-
DK	46.3	11.9***	20.9	5.4	364	186	42.7	10.7	3.7	1.2	-
SF	37.8	6.5***	31.8	5.1	107	117	32.2	6.5	1.1	0	-
SU	73.3	24.4***	73.3	23.3	116	43	64.7	22.0	2.6	2.4	-
PL	40.0	.0*	38.5	0	26	11	28.0	0	8.0	0	-
DD	22.8	6.3	20.5	5.3	512	19	13.7	0	8.7	6.3	-
DF	25.6	6.9***	22.5	5.1	1198	293	22.2	5.1	3.2	1.8	-
NL	10.1	3.9**	8.5	2.9	295	556	4.9	2.6	4.9	1.2	-
BL	44.6	12.5***	37.6	9.1	242	143	23.0	8.7	15.2	3.9	-
KN	21.4	(0)	17.7	0	17	5	21.4	(0)	0	(0)	-
FR	55.3	5.8***	49.4	4.8	585	126	22.6	4.8	7.5	0	-
ES	60.0	27.7	54.6	26.0	11	50	40.0	17.0	0	6.4	-
PO	(100)	-	100	-	2	-	(100)	-	(0)	-	-
IA	60.0	(33.3)	60.0	33.3	15	3	33.3	(33.3)	0	(0)	-
HE	3.3	1.4	2.7	1.0	148	102	1.7	1.4	0.8	0	-
AU	50.0	(0)	43.3	0	30	6	34.6	(0)	15.4	(0)	-
CS	79.4	15.4***	75.3	12.5	68	16	61.9	15.4	1.6	0	-
HG	(100)	(0)	100	0	1	7	(100)	(0)	(0)	(0)	-
RO	(33.3)	(0)	33.3	0	3	2	(33.3)	(0)	(0)	(0)	-
BG	(25.0)	(50.0)	25.0	50.0	8	4	(12.5)	(50.0)	(0)	(0)	-
YG	(57.1)	41.7	57.1	38.5	7	13	(57.1)	41.7	(0)	0	-
GR	(66.7)	(71.4)	66.7	71.4	3	7	(66.7)	(57.1)	(0)	(0)	-
TU	(60.0)	45.5	60.0	45.5	5	11	(60.0)	(36.4)	(0)	(0)	-
CY	-	-	-	-	-	-	-	-	-	-	-
ML	-	(0)	-	0	-	1	-	(0)	-	(0)	-
SY	(60.0)	(75.0)	60.0	75.0	5	4	(40.0)	(75.0)	(0)	(0)	-
LE	80.0	(100)	80.0	100	10	2	70.0	(100)	0	(0)	-
IL	(0)	(0)	0	0	3	1	(0)	(0)	(0)	(0)	-
ME	(50.0)	(0)	50.0	0	2	2	(50.0)	(0)	(0)	(0)	-
EG	-	(0)	-	0	-	2	-	(0)	-	(0)	-
LT	-	-	-	-	-	-	-	-	-	-	-
TO	(0)	-	0	-	1	-	(0)	-	(0)	-	-
AG	-	-	-	-	-	-	-	-	-	-	-
MA	(0)	-	0	-	1	-	(0)	-	(0)	-	-
SA	(42.9)	(33.3)	37.5	33.3	8	6	(28.6)	(16.7)	(0)	(16.7)	-

[a] See chapter 2 (methods) for derivation of indices. Indices derived from less than 10 recoveries are indicated within parentheses. Fisher's exact tests (Sokal & Rohlf 1981) were used to compare the proportions taken in each period. Significance levels (*<0.05; ** <0.01; *** <0.001) of the tests are indicated in column 1980+. Tests were carried out on all pairs except where indices were based on less than 10 recoveries.

[b] Percentage of all recoveries other than those excluded on the basis of poor quality data (see chapter 2) taken by shooting and trapping.

[c] Total number of recoveries other than those excluded on the basis of poor quality data.

[d] G test (Sokal & Rohlf 1981) comparison between periods of the proportions of birds taken according to the classes shot, trapped, and shot or trapped. Significance levels of these comparisons are indicated as above. 'NS' indicates non-significant results where tests were carried out. Comparisons were not made where the expected frequency in any cell was less than 10.

Table.7.3. Buzzard : Indices of birds taken for each breeding population (across all years).

Breeding Population	Index of birds taken	Sample size
UK United Kingdom	11.7	300
CI Channel Islands	–	–
NO Norway	–	–
SV Sweden	10.8	288
DK Denmark	58.0	91
SF Finland	36.8	551
SU USSR (Lithuania only)	–	–
PL Poland	–	–
DD East Germany	40.8	669
DF West Germany	33.9	1130
NL Holland	7.7	597
BL Belgium	20.5	132
FR France	6.1	99
ES Spain	10.0	30
IA Italy	0	1
HE Switzerland	5.5	110
CJ Czechoslovakia	–	–
HG Hungary	–	–

Table 7.4   Regression analysis of temporal trends in the indices of Buzzards taken.

Country of recovery	Intercept	Slope	t	P
Belgium	192.8	-2.26	-5.94	**
France	223.5	-2.73	-7.55	***
Major	203.5	-2.39	-6.56	***
Other	113.6	-1.31	-8.29	***
All	140.0	-1.64	-8.17	***

All regressions used a weighted technique where each 5-year index was weighted by the square root of the sample size.

Countries where 10 or more recoveries occurred in each year after 1950 were analysed. Data from the period before 1950 were not included in the analysis.

Major countries are those with a tradition of taking substantial numbers of birds that use western migration routes.
(i.e. BL, FR, ES, PO, IA, NA).

Significance levels indicated are: NS Not significant; * $P<0.05$; ** $P<0.01$; *** $P<0.001$.
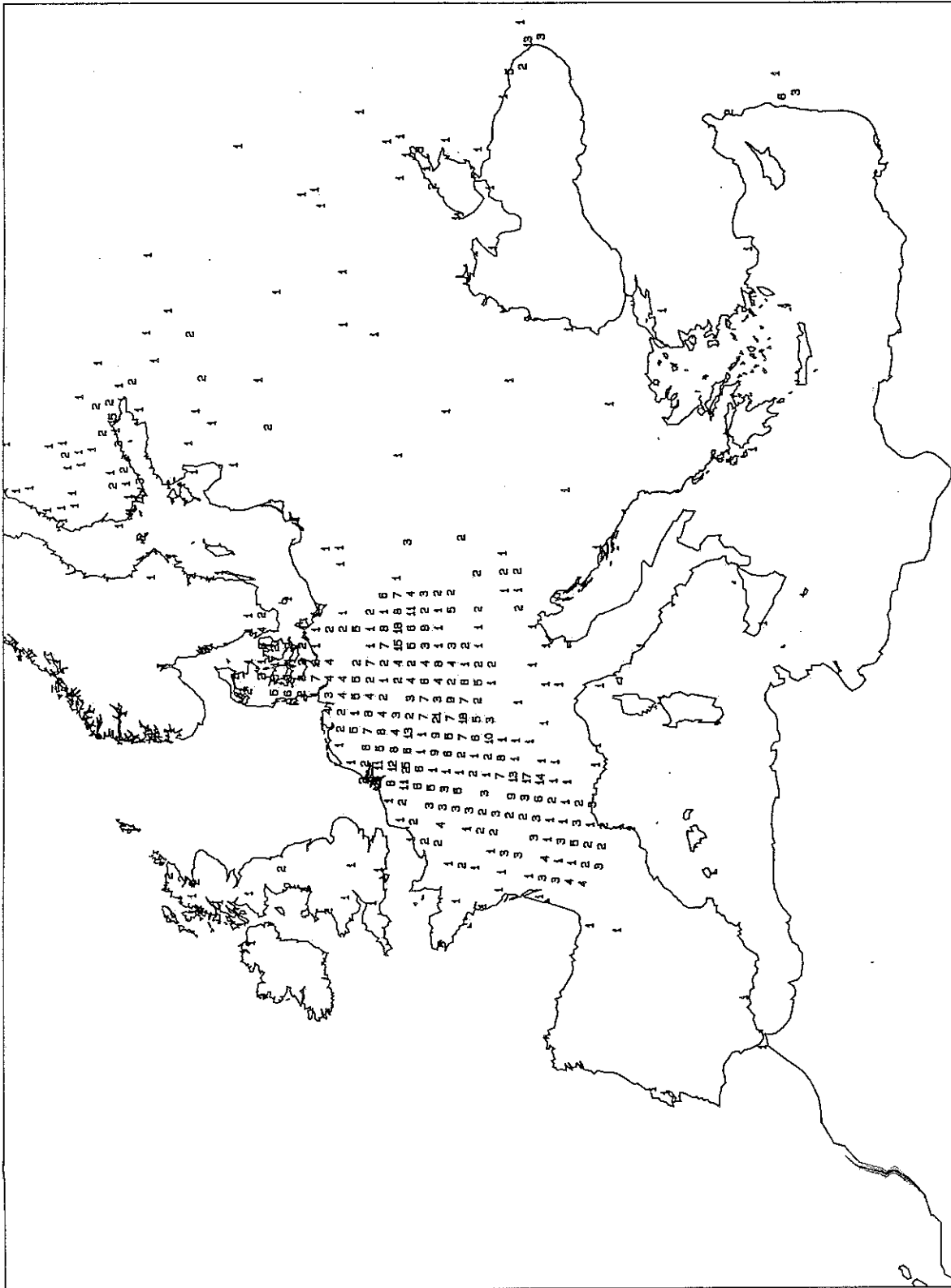
Figure 7.1a   Total numbers of Buzzard ringing recoveries resulting from birds taken before 1980 in each 30' by 60' grid square. ** Indicates numbers greater than 99.   7 recoveries were outside the limits of the map.
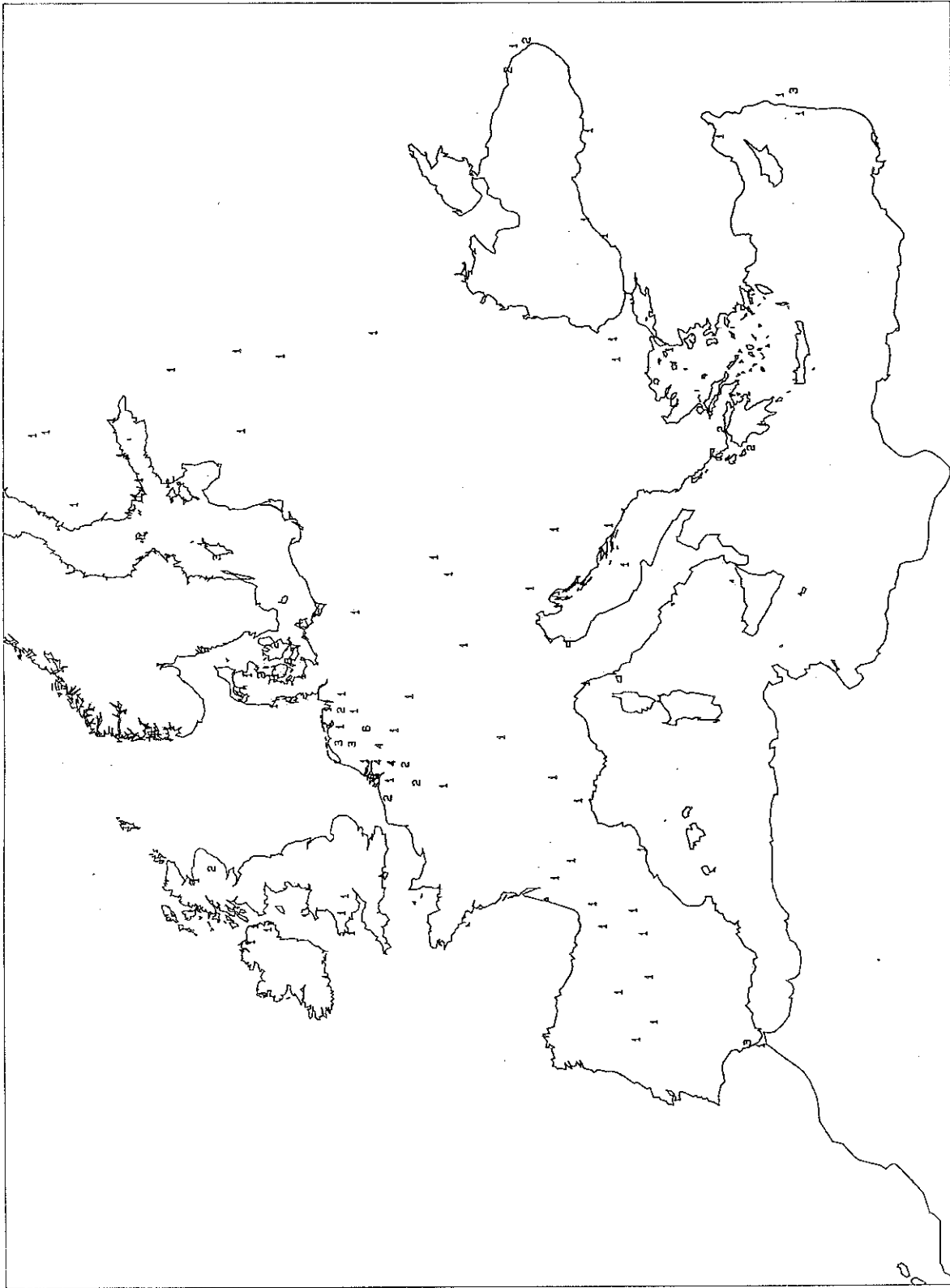
Figure 7.1b Total numbers of Buzzard ringing recoveries resulting from birds taken from 1980 onwards in each 3o' by 60' grid square. ** Indicates numbers greater than 99. 3 recoveries were outside the limits of the map.
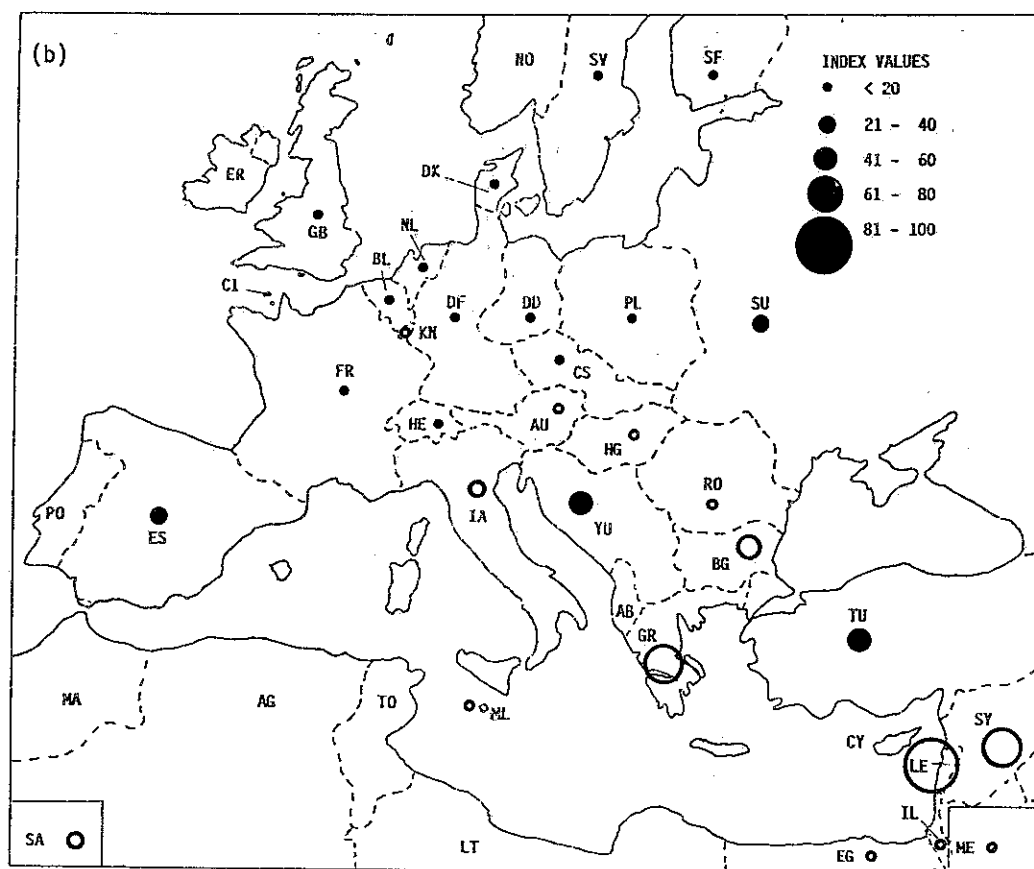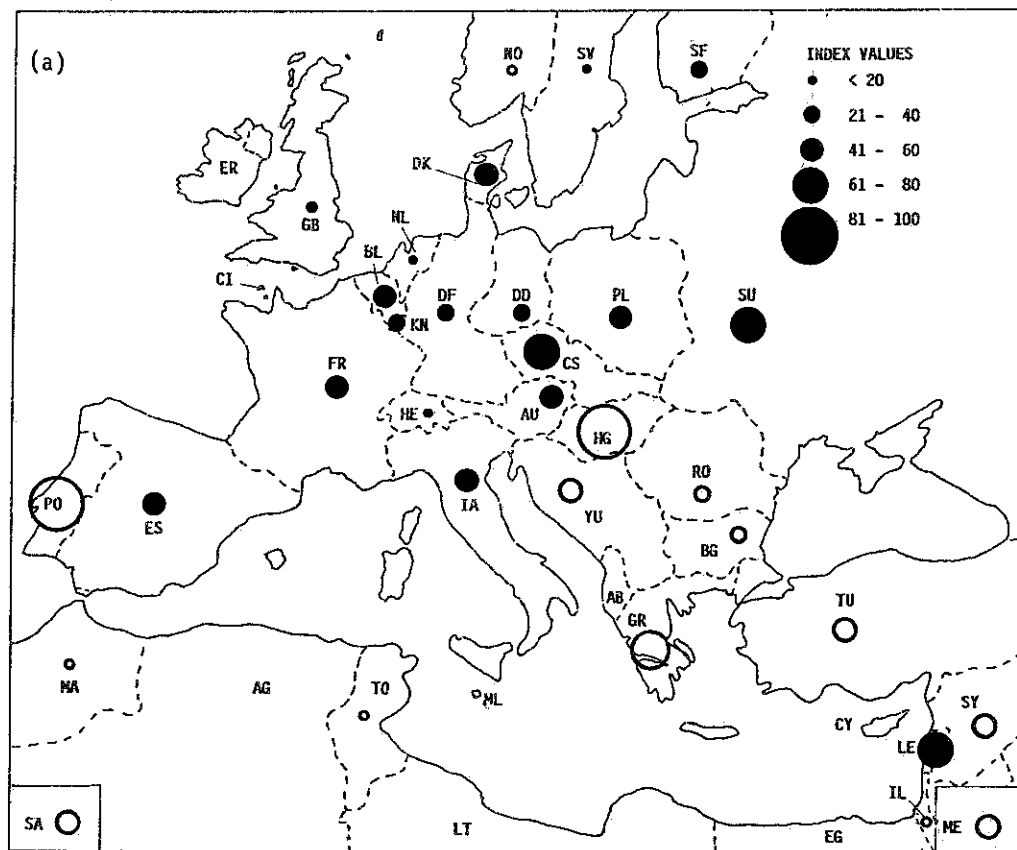
Figure 7.2 Geographical variation in the indices of Buzzard taken for each country of recovery in the period before 1980 (a) and from 1980 onwards (b). Solid circles indicate values derived from more than 10 recoveries and open circles indicate those derived from less than 10. Country codes are indicated in Table 2,4 of the Methods.
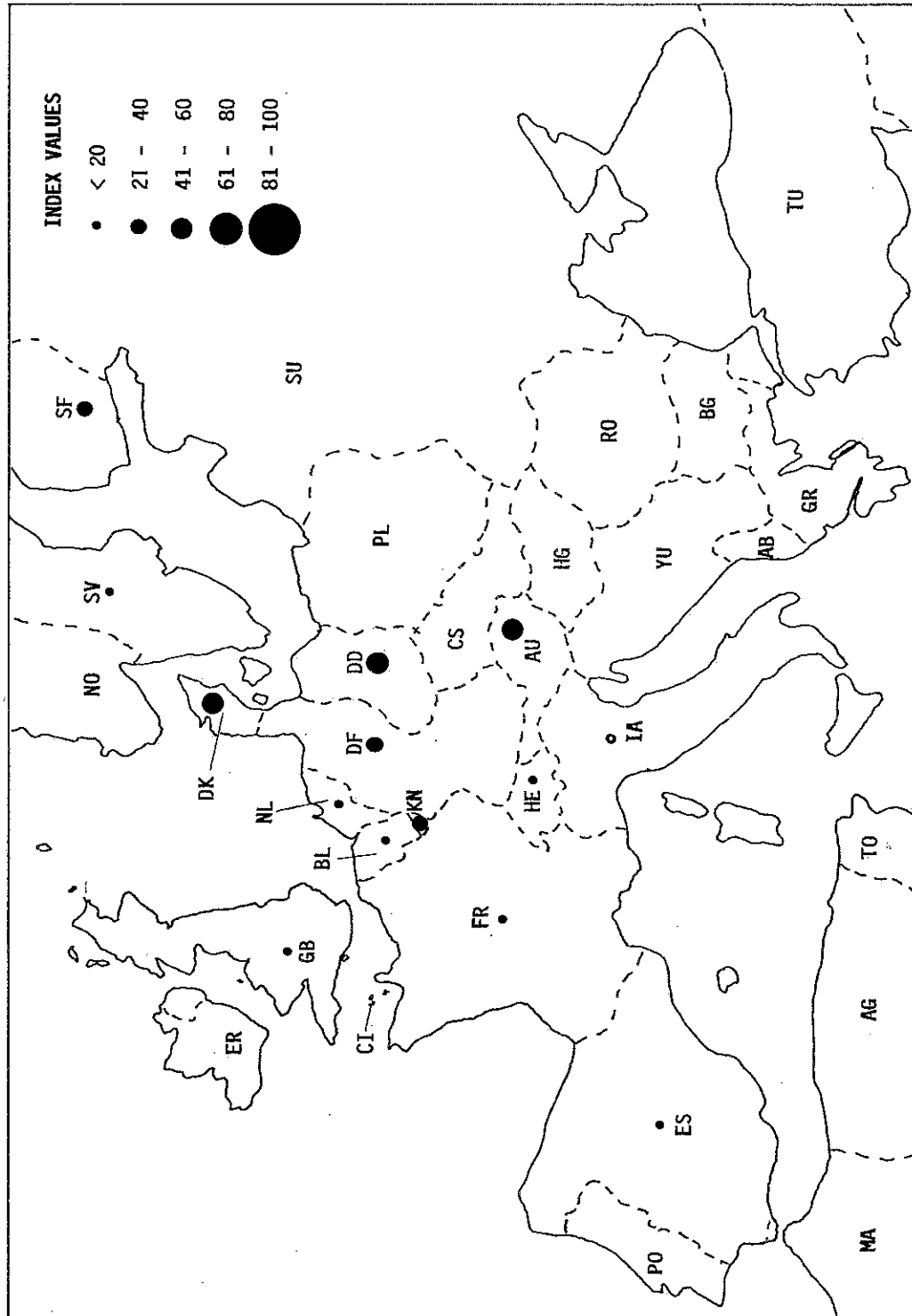
Figure 7.3 Geographical variation in the indices of Buzzard taken over all years for each breeding population. Solid circles indicate values derived from more than 10 recoveries and open circles indicate those derived from less than 10. Country codes are indicated in Table 2.4 of the Methods.

Belgium

France

Spain

Italy
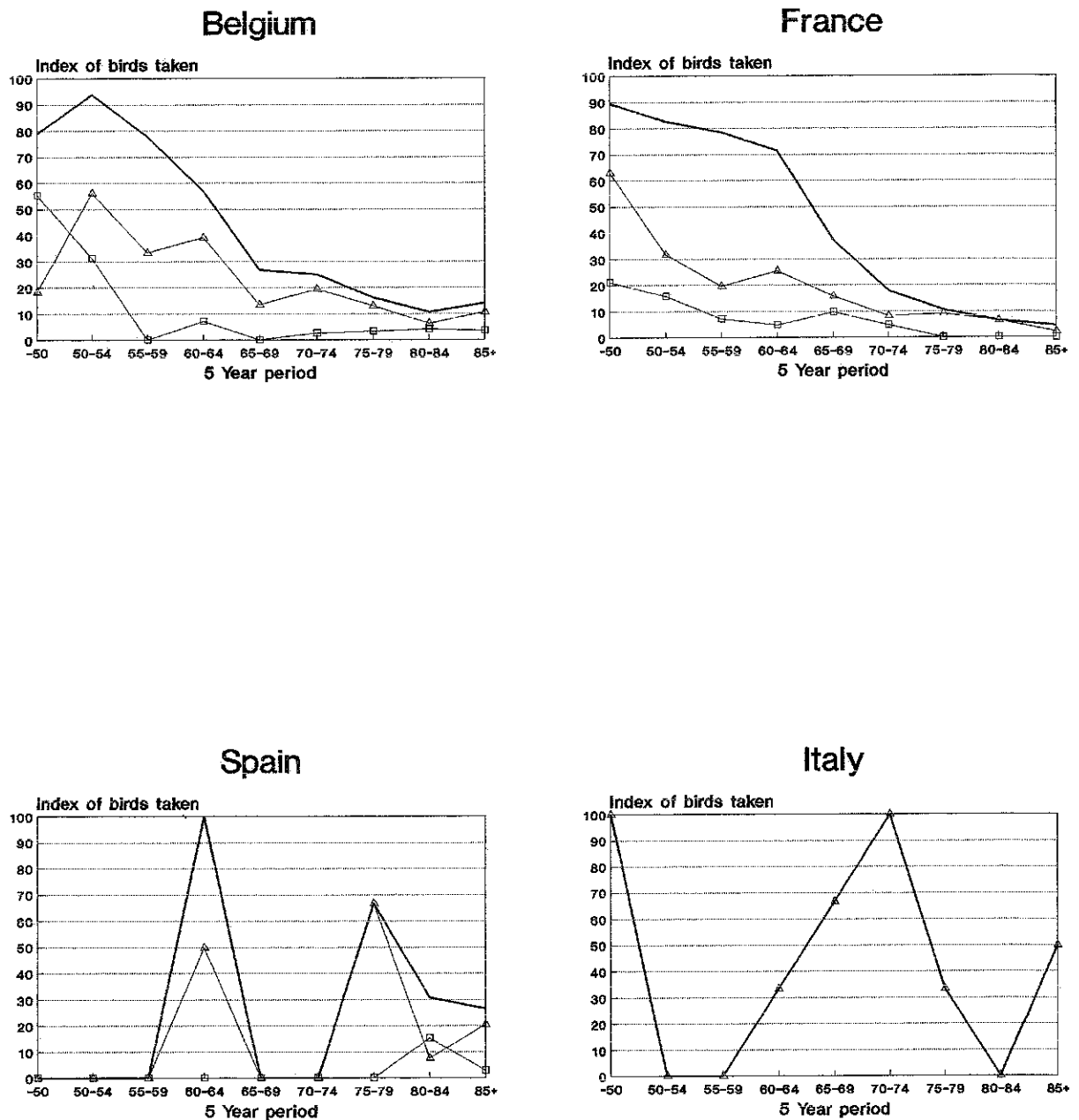
Figure 7.4 Trends in 5-yearly indices of Buzzard taken in individual countries with high overall indices and sufficient recoveries for analysis.   The bold line without symbols indicates overall index values, triangles indicate index values based on birds reported as shot and squares indicate index values based on birds reported as trapped. The periods -50 and 85+ refer to all recoveries before 1950 and from 1985 onwards respectively.

BL,ES,FR,IA

Others
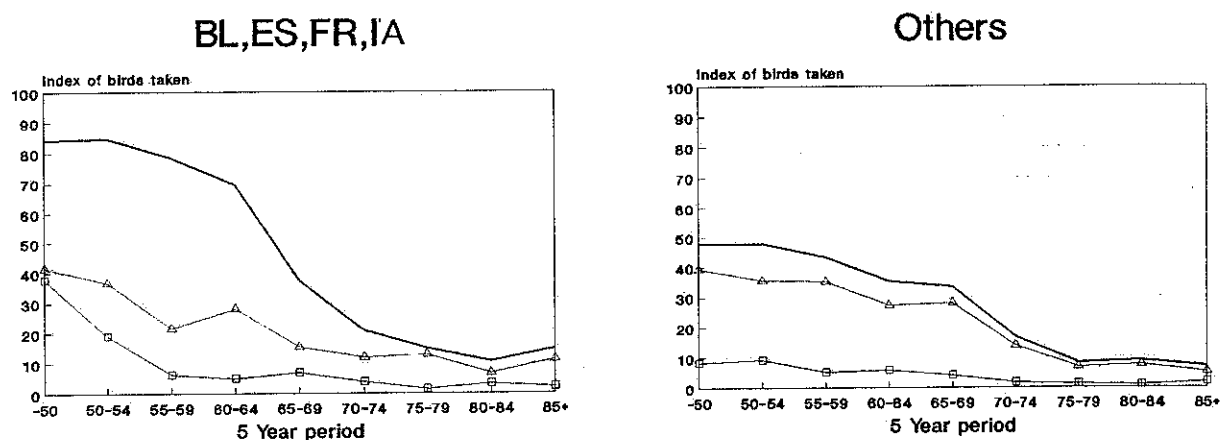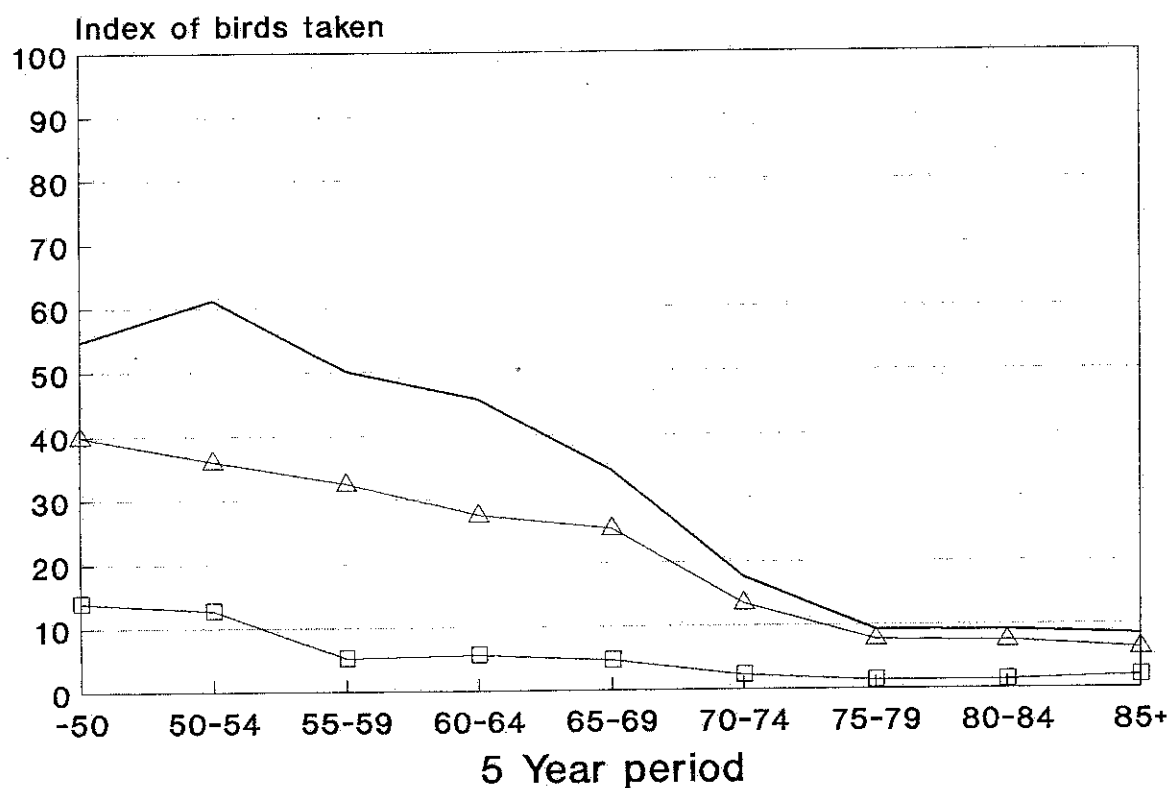
All countries

Figure 7.5 Trends in combined 5-yearly indices of Buzzard
taken in: a) countries, for which data for this species were available,
with a tradition of taking substantial numbers of migratory birds on the
western European flyways (ie BL, ES, FR, IA),
b) other countries and c) all countries. The bold line with symbols
indicates overall index values, triangles indicate values based on birds
reported as shot and squares indicate index values based on birds reported
as trapped. The periods -50 and 85+ refer to all recoveries before 1950
and from 1985 onwards respectively.

Belgium

France

Spain

Italy
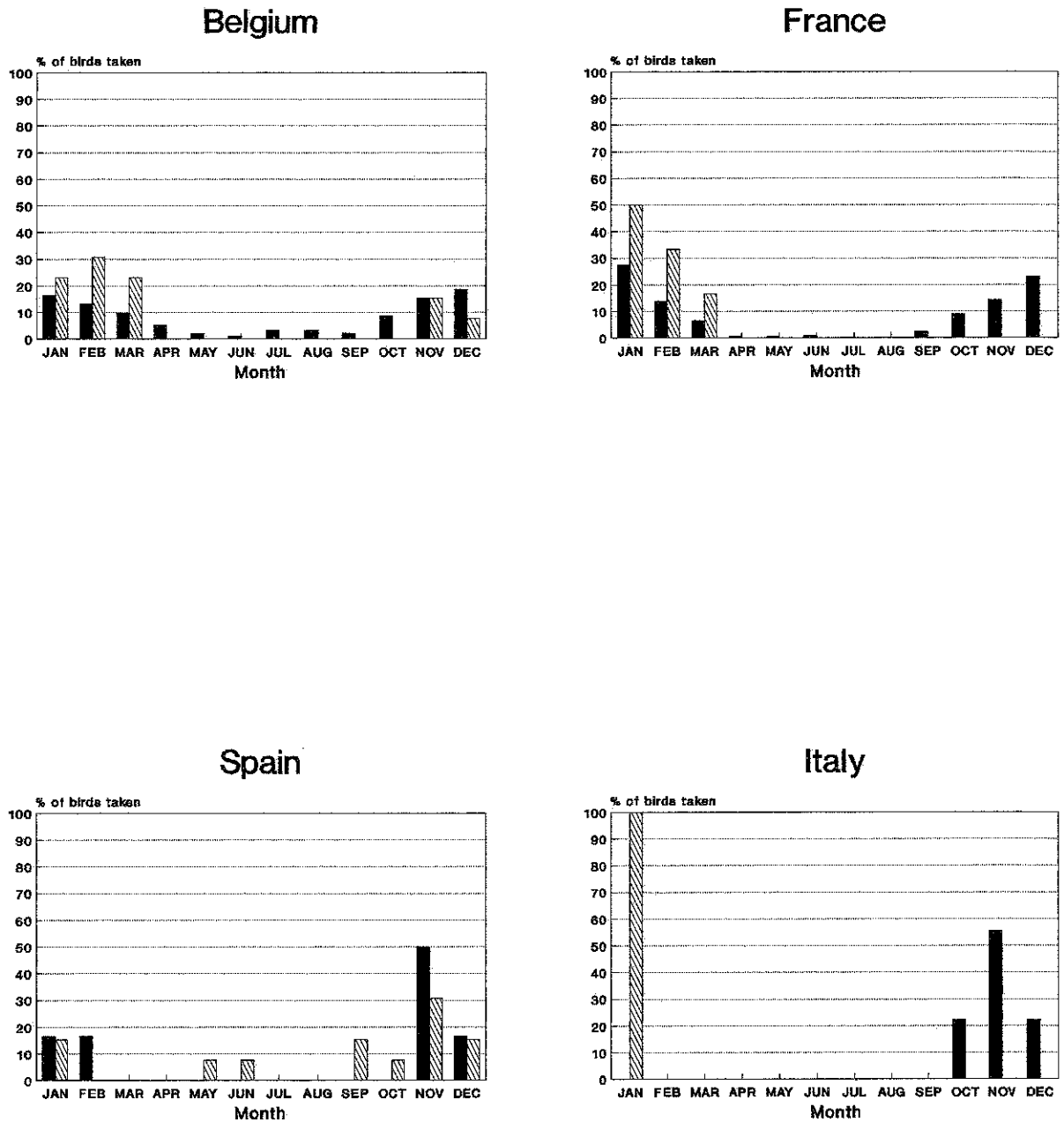
Figure 7.6 Monthly percentages of total Buzzard taken in individual countries with high overall indices and sufficient recoveries for analysis. Solid bars indicate birds from the period before 1980 and hatched bars indicate birds taken from 1980 onwards.

8. SKYLARK (ALAUDA ARVENSIS)

8.1 Range

The Skylark breeds throughout Europe except in northernmost Finland and the Soviet Union north of the Arctic circle (Harrison 1982). The species is a summer visitor to northern Scandinavia and areas from Czechoslovakia and Poland eastward. Skylarks are also resident in north-west Africa and Asia Minor. Some birds winter south of the species' breeding range, from North Africa to the Middle East but most southward movements in autumn are within Europe.

8.2 Population trends

Declines in Skylark numbers during the 1980's have been reported from the United Kingdom,Sweden, Denmark, the Netherlands, Switzerland, France and central Europe (Marchant et al. 1990, Sharrock and Hilden 1983, Hustings 1988, Cramp and Simmons 1988, Schlapfer 1988). This has been attributed to changes in farming practices.

8.3 Migration

Skylarks in north and central Europe are predominantly migratory. This tendency decreases from north to south. The autumn migration routes of European Skylarks typically run in a south-westerly direction, most wintering in western France and Iberia (Cramp and Simmons 1988). Many birds from North-eastern Europe and the U.S.S.R. have also been recovered on the western seaboard. This indicates that a proportion of Skylarks from these areas initially move due west (Spaepen and Cautheren 1962, 1968). Skylarks from the southern U.S.S.R., Czechoslovakia and Hungary tend to migrate in a south-westerly direction to Italy and south-east France. Many Skylarks winter in north-west Africa. The majority of these are probably of Iberian origin (Cramp and Simmons 1988). Skylarks in the United Kingdom and Ireland are mainly sedentary.

8.4 Status

Within the E.C. taking of Skylarks is permitted in France, between September and February, and in Italy and Greece between September and March (Bertelsen and Simonsen 1989). The species is fully protected in all other E.C. countries. Outwith the E.C., Woldhek (1979) reported that that Skylarks may be taken legally in Malta, Cyprus, Lebanon, Israel, Egypt and Tunisia.

8.5 Geographical variation in the taking of Skylarks

Prior to 1980 the highest indices of Skylarks taken in Europe were those for France, Spain, Portugal and Italy, though the last two were based on samples of less than 10 recoveries (Table 8.2). The

Soviet Union and East Germany also had relatively high index values. The majority of recoveries of birds taken during this period came from France (72%).

The only countries from which 10 or more Skylark recoveries have been obtained since 1980 are the United Kingdom, Denmark, The Netherlands, France and Spain. Of these, France had the highest index of birds taken and accounted for 91% of taken recoveries during this period.

The major concentration of recoveries of taken Skylarks were in south-western France and northern Spain (Fig. 8.1a,b). In France the principal Departments involved were Basses-Pyrenees, Charente-Maritime, Gironde and Landes (Appendix 3.1). The provinces of Guipuzcoa and Vizcaya contributed the greatest number of taken recoveries in Spain. No recoveries were obtained from the eastern Mediterranean.

8.6 Temporal variation in the taking of Skylarks

Indices of Skylarks taken from 1980 onwards were generally lower than those for the earlier period in countries for which comparative data were available (Table 8.2). However, increases in index value occurred in France, West Germany and the Soviet Union. In France and West Germany these differences were statistically significant, though for West Germany the sample size since 1980 was very small.

Indices of Skylarks taken for five-year periods showed an overall increasing trend in France, a decline in Belgium and no strong trend in Spain (Fig. 8.4). Regression of index value on year failed to reveal a significant relationship in any individual country or combination of countries (Table 8.3, Fig. 8.5).

Analysis of the percentage of taken Skylarks recovered in each month in Belgium, France and Spain showed that few recoveries have occurred outwith currently or previously designated open seasons i.e. September to March. Most were taken between October and November (Fig. 8.6).

8.7 Methods used to take Skylarks

Prior to 1980 recoveries of taken Skylarks comprised 28% trapped, 34% shot and 38% for which the method of taking was not specified. Since 1980 there has been a marked decline in the importance of trapping with only 11% of Skylarks taken being trapped, while 72% were shot. Only in France was there a significant change in the relative proportions of Skylarks taken by each method (Table 8.2).

TABLE 8.1a The distribution of Skylarks recovered due to shooting and trapping before 1980 in relation to their area of origin. The percentage of taken birds recovered in each country is shown for each national ringing scheme. Percentages within parentheses are based on less than ten recoveries.

Country of recovery	UK	CI	NO	SV	DK	SF	DD	DF	NL	BL	FR	ES	IA	HE
GB	(88.9)	–	–	0	0	0	0	0	0	0	0	–	–	0
CI	0	–	–	0	0	0	0	0	0	0	0	–	–	0
ER	0	–	–	0	0	0	0	0	0	0	0	–	–	0
SV	0	–	–	0	0	0	0	0	0	0	0	–	–	0
DK	0	–	–	0	0	0	0	0	(5.0)	(0.8)	0	–	–	0
SF	0	–	–	0	0	0	0	0	0	0	0	–	–	0
SU	0	–	–	0	0	0	0	0	0	(0.8)	0	–	–	0
PL	0	–	–	0	0	0	0	0	0	0	0	–	–	0
DD	0	–	–	0	0	0	(14.3)	0	0	0	0	–	–	0
DF	0	–	–	0	0	0	0	(3.2)	0	0	0	–	–	0
NL	0	–	–	0	0	0	0	0	(15.0)	(0.4)	0	–	–	0
BL	0	–	–	0	0	0	(7.1)	(9.7)	(10.0)	15.0	0	–	–	0
KN	0	–	–	0	0	0	0	0	0	0	0	–	–	0
FR	(11.1)	–	–	(100)	(100)	86.7	(57.1)	80.7	60.0	69.6	87.0	–	–	81.3•
ES	0	–	–	0	0	0	(14.3)	(6.5)	(5.0)	11.7	(9.3)	–	–	(6.3)
PO	0	–	–	0	0	0	0	0	0	(1.3)	(1.9)	–	–	0
IA	0	–	–	0	0	(13.3)	(7.1)	0	0	(0.4)	0	–	–	(6.3)
HE	0	–	–	0	0	0	0	0	0	0	0	–	–	(6.3)
AU	0	–	–	0	0	0	0	0	0	0	0	–	–	0
CS	0	–	–	0	0	0	0	0	0	0	0	–	–	0
HG	0	–	–	0	0	0	0	0	0	0	0	–	–	0
RO	0	–	–	0	0	0	0	0	0	0	0	–	–	0
BG	0	–	–	0	0	0	0	0	0	0	0	–	–	0
YG	0	–	–	0	0	0	0	0	0	0	0	–	–	0
GR	0	–	–	0	0	0	0	0	0	0	0	–	–	0
TU	0	–	–	0	0	0	0	0	0	0	0	–	–	0
CY	0	–	–	0	0	0	0	0	0	0	0	–	–	0
ML	0	–	–	0	0	0	0	0	0	0	0	–	–	0
SY	0	–	–	0	0	0	0	0	0	0	0	–	–	0
LE	0	–	–	0	0	0	0	0	0	0	0	–	–	0
IL	0	–	–	0	0	0	0	0	0	0	0	–	–	0
ME	0	–	–	0	0	0	0	0	0	0	0	–	–	0
EG	0	–	–	0	0	0	0	0	0	0	0	–	–	0
LT	0	–	–	0	0	0	0	0	0	0	0	–	–	0
TO	0	–	–	0	0	0	0	0	0	0	0	–	–	0
AG	0	–	–	0	0	0	0	0	0	0	0	–	–	0
MA	0	–	–	0	0	0	0	0	(5.0)	0	(1.9)	–	–	0
SA	0	–	–	0	0	0	0	0	0	0	0	–	–	0
TOTAL No.	9	–	–	2	1	15	14	31	20	240	54	–	–	16

Note: No data available for Poland, Czechoslovakia or Hungary.

TABLE. 8.1b The distribution of Skylarks recovered due to shooting and trapping from 1980 onwards in relation to their area of origin. The percentage of taken birds recovered in each country is shown for each national ringing scheme. Percentages within parentheses are based on less than ten recoveries.

Country of recovery	Country of ringing													
	UK	CI	NO	SV	DK	SF	DD	DF	NL	BL	FR	ES	IA	HE
GB	(100)	–	–	–	0	0	–	0	0	0	0	–	–	0
CI	0	–	–	–	0	0	–	0	0	0	0	–	–	0
ER	0	–	–	–	0	0	–	0	0	0	0	–	–	0
NO	0	–	–	–	0	0	–	0	0	0	0	–	–	0
SV	0	–	–	–	0	0	–	0	0	0	0	–	–	0
DK	0	–	–	–	0	0	–	0	0	0	0	–	–	0
SF	0	–	–	–	0	0	–	0	0	0	0	–	–	0
SU	0	–	–	–	0	0	–	0	0	(0.7)	0	–	–	0
PL	0	–	–	–	0	0	–	0	0	0	0	–	–	0
DD	0	–	–	–	0	0	–	0	0	0	0	–	–	0
DF	0	–	–	–	0	0	–	(100)	0	0	0	–	–	0
NL	0	–	–	–	0	0	–	0	0	0	0	–	–	0
BL	0	–	–	–	0	0	–	0	(14.3)	0	0	–	–	0
KN	0	–	–	–	0	0	–	0	0	0	0	–	–	0
FR	0	–	–	–	(100)	(100)	–	0	(71.4)	93.6	(100)	–	–	(100)
ES	0	–	–	–	0	0	–	0	0	(4.3)	0	–	–	0
PO	0	–	–	–	0	0	–	0	(14.3)	(1.4)	0	–	–	0
IA	0	–	–	–	0	0	–	0	0	0	0	–	–	0
HE	0	–	–	–	0	0	–	0	0	0	0	–	–	0
AU	0	–	–	–	0	0	–	0	0	0	0	–	–	0
CS	0	–	–	–	0	0	–	0	0	0	0	–	–	0
HG	0	–	–	–	0	0	–	0	0	0	0	–	–	0
RO	0	–	–	–	0	0	–	0	0	0	0	–	–	0
BG	0	–	–	–	0	0	–	0	0	0	0	–	–	0
YG	0	–	–	–	0	0	–	0	0	0	0	–	–	0
GR	0	–	–	–	0	0	–	0	0	0	0	–	–	0
TU	0	–	–	–	0	0	–	0	0	0	0	–	–	0
CY	0	–	–	–	0	0	–	0	0	0	0	–	–	0
ML	0	–	–	–	0	0	–	0	0	0	0	–	–	0
SY	0	–	–	–	0	0	–	0	0	0	0	–	–	0
LE	0	–	–	–	0	0	–	0	0	0	0	–	–	0
IL	0	–	–	–	0	0	–	0	0	0	0	–	–	0
ME	0	–	–	–	0	0	–	0	0	0	0	–	–	0
EG	0	–	–	–	0	0	–	0	0	0	0	–	–	0
LT	0	–	–	–	0	0	–	0	0	0	0	–	–	0
TO	0	–	–	–	0	0	–	0	0	0	0	–	–	0
AG	0	–	–	–	0	0	–	0	0	0	0	–	–	0
MA	0	–	–	–	0	0	–	0	0	0	0	–	–	0
SA	0	–	–	–	0	0	–	0	0	0	0	–	–	0
TOTAL No.	1	–	–	–	1	1	–	2	7	140	2	–	–	6

Note: No data available for Poland, Czechoslovakia or Hungary.

TABLE 8.2. Skylark: Indices of birds taken before 1980 and from 1980 onwards for each country of recovery.

	Index (all methods)[a]		% hunted[b]		Total recoveries[c]		Shooting Index[a]		Trapping Index[a]		G test[d]
	-1980	1980+	-1980	1980+	-1980	1980+	-1980	1980+	-1980	1980+	
GB	7.6	4.8	4.9	3.3	143	30	4.4	4.8	3.3	0	-
CI	(0)	-	0	0	2	1	(0)	-	(0)	-	-
ER	-	-	-	-	-	-	-	-	-	-	-
NO	(0)	-	0	-	2	0	(0)	-	(0)	-	-
SV	(0)	(0)	0	0	6	11	(0)	(0)	(0)	(0)	-
DK	10.7	0	5.7	0	53	18	3.6	0	0	0	-
SF	0	(0)	0	0	35	4	0	(0)	0	(0)	-
SU	25.0	(100)	22.2	100	9	1	12.5	(0)	12.5	(100)	-
PL	-	-	0	-	1	-	-	-	-	-	-
DD	(33.3)	-	28.6	0	7	1	(33.3)	-	(0)	-	-
DF	3.2	(66.7)*	1.0	33.3	101	6	3.2	(0)	0	(66.7)	-
NL	7.0	0	3.8	0	105	120	0	0	7.0	0	-
BL	57.5	(25.0)	19.8	0.9	212	108	5.5	(0)	48.0	(25.0)	-
KN	-	-	-	-	-	-	-	-	-	-	-
FR	65.2	81.1***	62.6	75.3	462	194	22.4	60.0	12.6	6.7	***
ES	69.6	60.0	68.4	60.0	57	10	37.5	60.0	16.1	0	-
PO	(80.0)	(60.0)	80.0	60.0	5	5	(20.0)	(20.0)	(20.0)	(40.0)	-
IA	(71.4)	-	71.4	-	7	-	(28.6)	-	(0)	-	-
HE	(20.0)	-	16.7	-	6	-	(0)	-	(20.0)	-	-
AU	-	-	-	-	-	-	-	-	-	-	-
CS	-	(0)	-	0	-	1	-	(0)	-	(0)	-
HG	-	-	-	-	-	-	-	-	-	-	-
RO	-	-	-	-	-	-	-	-	-	-	-
BG	-	-	-	-	-	-	-	-	-	-	-
YG	-	-	-	-	-	-	-	-	-	-	-
GR	-	-	-	-	-	-	-	-	-	-	-
TU	-	-	-	-	-	-	-	-	-	-	-
CY	-	-	-	-	-	-	-	-	-	-	-
ML	-	-	-	-	-	-	-	-	-	-	-
SY	-	-	-	-	-	-	-	-	-	-	-
LE	-	-	-	-	-	-	-	-	-	-	-
IL	-	-	-	-	-	-	-	-	-	-	-
ME	-	-	-	-	-	-	-	-	-	-	-
EG	-	-	-	-	-	-	-	-	-	-	-
LT	-	-	-	-	-	-	-	-	-	-	-
TO	-	-	-	-	-	-	-	-	-	-	-
AG	-	-	-	-	-	-	-	-	-	-	-
MA	(100)	-	100	-	2	-	(0)	-	(50.0)	-	-
SA	-	-	-	-	-	-	-	-	-	-	-

[a] See chapter 2 (methods) for derivation of indices. Indices derived from less than 10 recoveries are indicated within parentheses. Fisher's exact tests (Sokal & Rohlf 1981) were used to compare the proportions taken in each period. Significance levels (*<0.05; ** <0.01; *** <0.001) of the tests are indicated in column 1980+. Tests were carried out on all pairs except where indices were based on less than 10 recoveries.

[b] Percentage of all recoveries other than those excluded on the basis of poor quality data (see chapter 2) taken by shooting and trapping.

[c] Total number of recoveries other than those excluded on the basis of poor quality data.

[d] G test (Sokal & Rohlf 1981) comparison between periods of the proportions of birds taken according to the classes shot, trapped, and shot or trapped. Significance levels of these comparisons are indicated as above. 'NS' indicates non-significant results where tests were carried out. Comparisons were not made where the expected frequency in any cell was less than 10.

Table.8.3. Skylark   :   Indices of birds taken for each breeding population (across all years).

Breeding Population		Index of birds taken	Sample size
UK	United Kingdom	10.6	66
CI	Channel Islands	-	-
NO	Norway	-	-
SV	Sweden	40.0	5
DK	Denmark	16.7	6
SF	Finland	36.6	41
SU	USSR (Lithuania only)	-	-
PL	Poland	-	-
DD	East Germany	88.9	9
DF	West Germany	50.0	50
NL	Holland	20.0	25
BL	Belgium	79.4	34
FR	France	11.1	9
ES	Spain	-	-
IA	Italy	-	-
HE	Switzerland	25.0	4
CJ	Czechoslovakia	-	-
HG	Hungary	-	-

Table 8.4   Regression analysis of temporal trends in the indices of Skylarks taken.

Country of recovery	Intercept	Slope	t	P
Major	23.7	0.62	1.45	ns
Other	13.5	-0.05	-0.25	ns
All	6.0	0.63	1.78	ns

All regressions used a weighted technique where each 5-year index was weighted by the square root of the sample size.

Countries where 10 or more recoveries occurred in each year after 1950 were analysed. Data from the period before 1950 were not included in the analysis.

Major countries are those with a tradition of taking substantial numbers of birds that use western migration routes.
(i.e. BL, FR, ES, PO, IA, NA).

Significance levels indicated are: NS Not significant; * P<0.05; ** P<0.01; *** P<0.001.

Figure 8.1a Total numbers of Skylark ringing recoveries resulting from birds taken before 1980 in each 30' by 60' grid square. ** Indicates numbers greater than 99. 2 recoveries were outside the limits of the map.

Figure 8.1b   Total numbers of Skylark ringing recoveries from birds taken from 1980 onwards
in each 30' by 60' grid square.   ** Indicates numbers greater than 99.   1 recovery   was outside
the limits of the map.
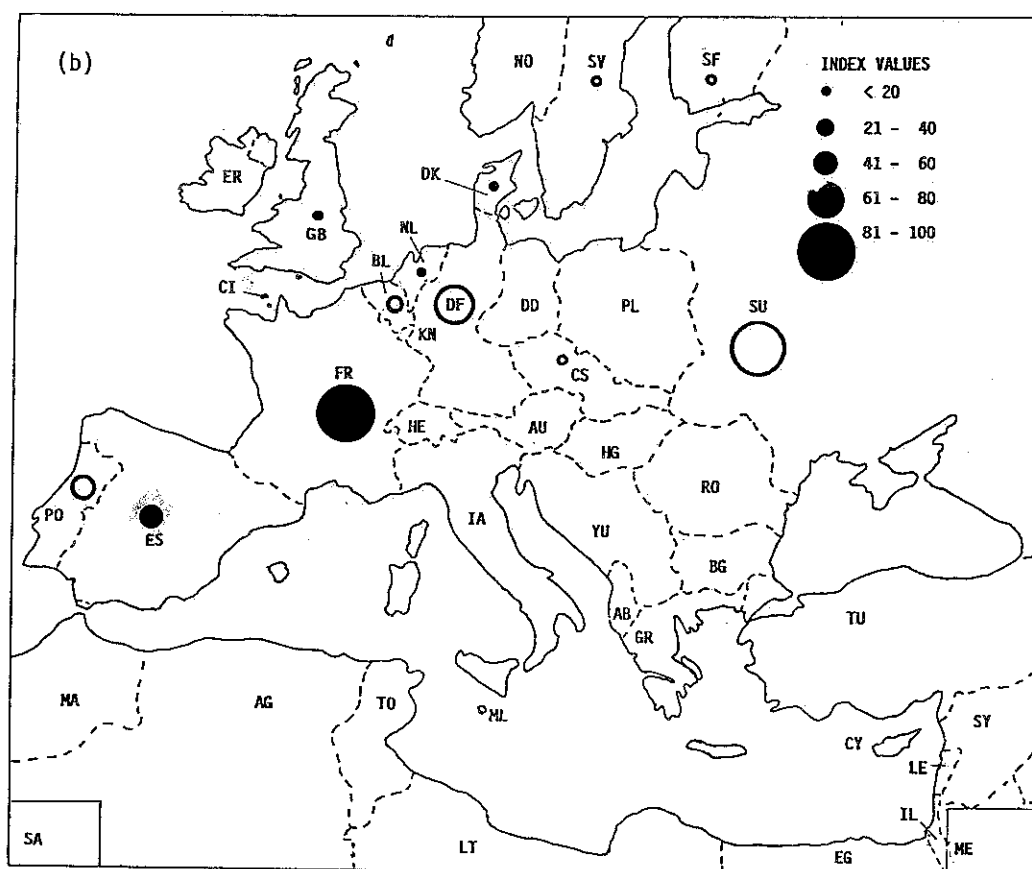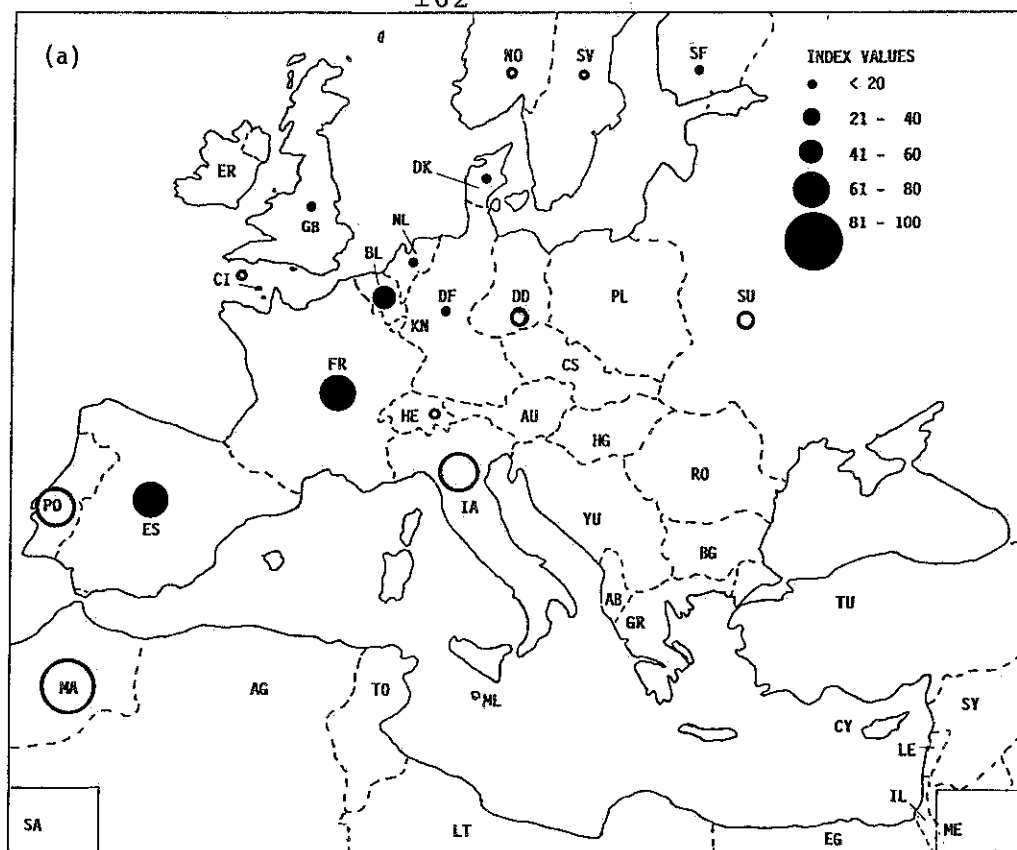
Figure 8.2 Geographical variation in the indices of Skylark
taken for each country of recovery in the period before 1980 (a) and from
1980 onwards (b). Solid circles indicate values derived from more than 10
recoveries and open circles indicate those derived from less than 10.
Country codes are indicated in Table 2.4 of the Methods.
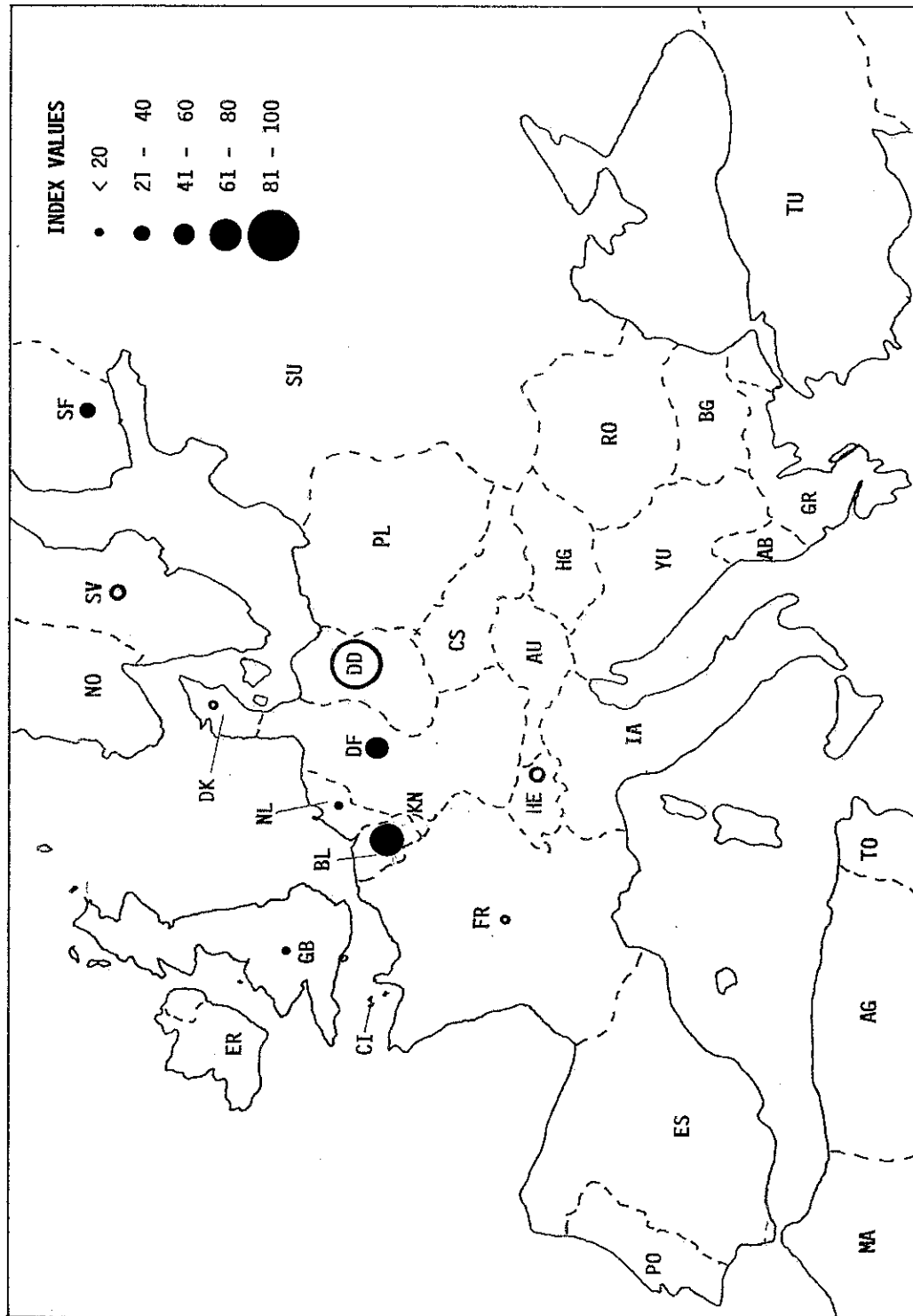
Figure 8.3 Geographical variation in the indices of Skylark taken over all years for each breeding population. Solid circles indicate values derived from more than 10 recoveries and open circles indicate those derived from less than 10. Country codes are indicated in Table 2.4 of the Methods.

Belgium

France

Spain
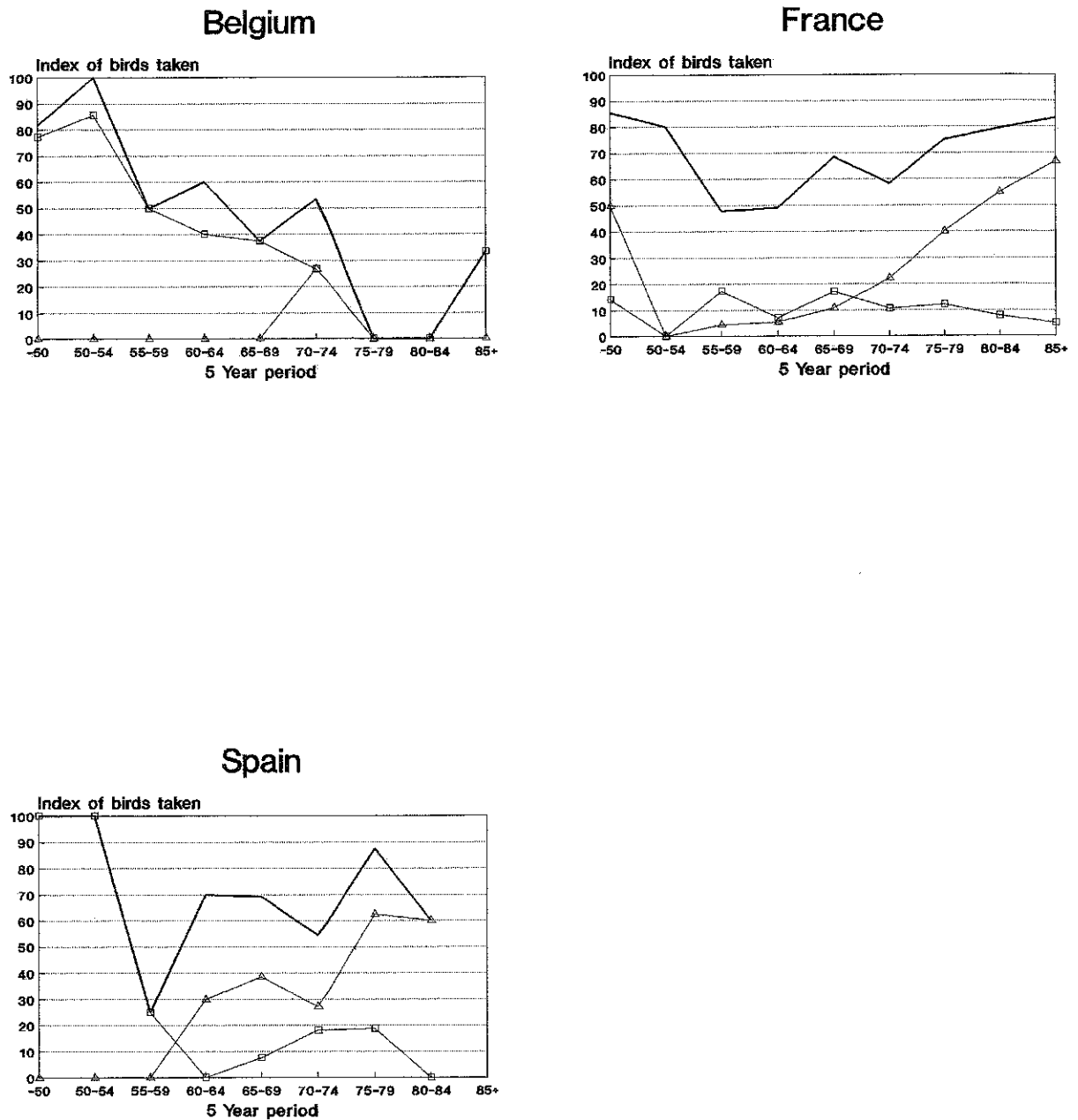
Figure 8.4   Trends in 5-yearly indices of Skylark taken in individual countries with high overall indices and sufficient recoveries for analysis.   The bold line without symbols indicates overall index values, triangles indicate index values based on birds reported as shot and squares indicate index values based on birds reported as trapped. The periods -50 and 85+ refer to all recoveries before 1950 and from 1985 onwards respectively.

BL,ES,FR

Index of birds taken

Others

Index of birds taken

All countries

Index of birds taken

5 Year period
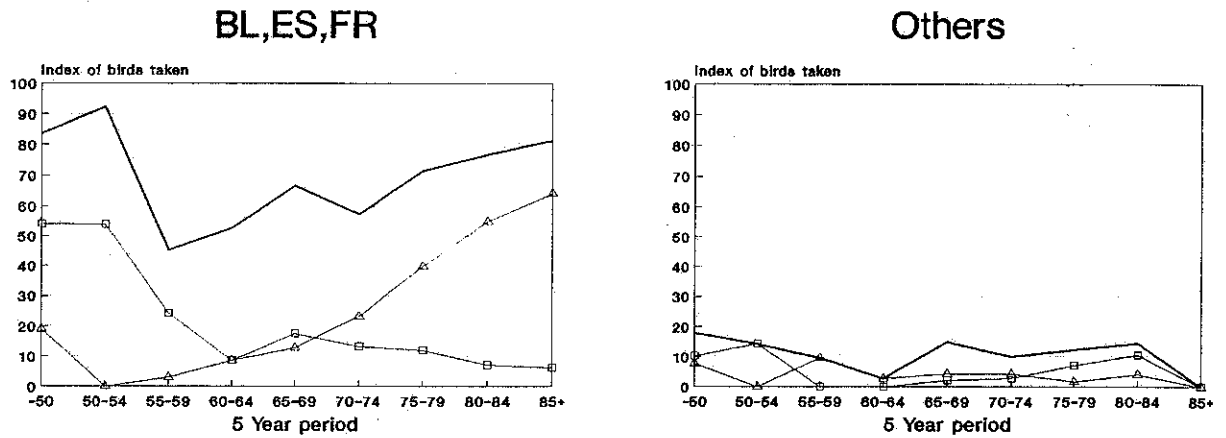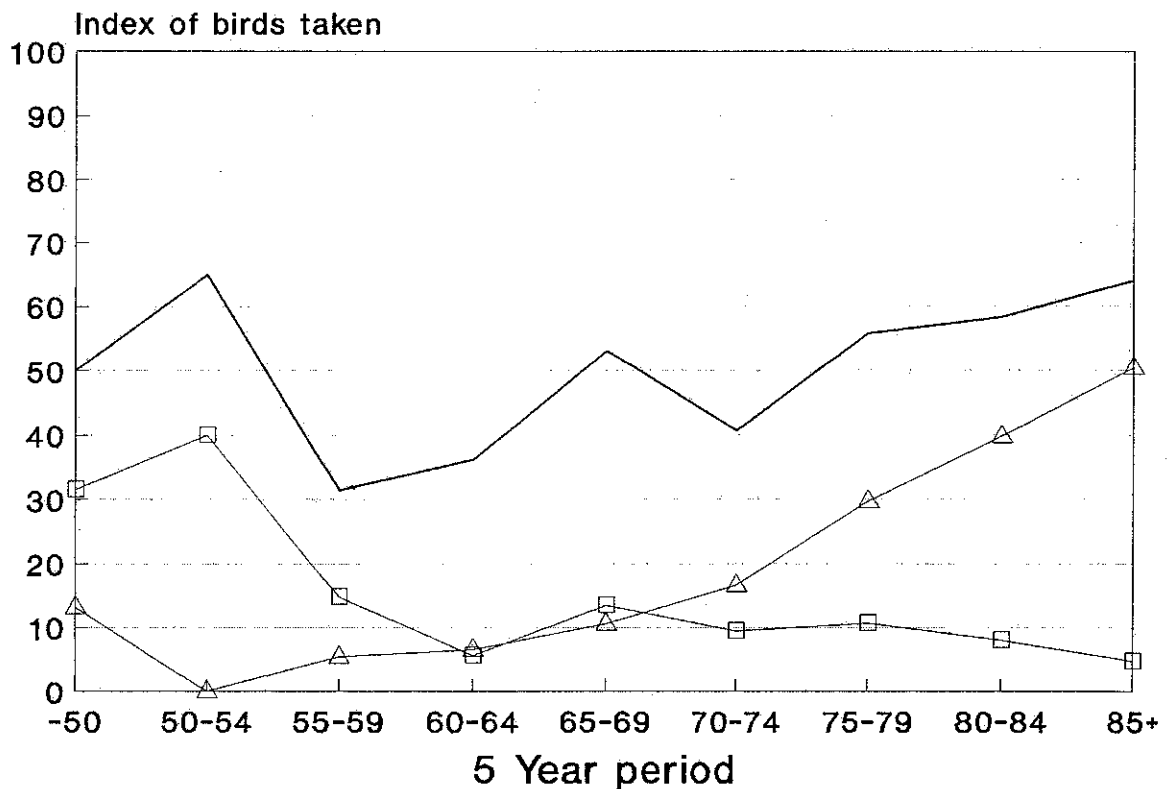
Figure 8.5   Trends in combined 5-yearly indices of Skylark
taken in: a) countries, for which data for this species were available,
with a tradition of taking substantial numbers of migratory birds on the
western European flyways (ie BL, ES, FR),
b) other countries and c) all countries.   The bold line with symbols
indicates overall index values, triangles indicate values based on birds
reported as shot and squares indicate index values based on birds reported
as trapped.   The periods -50 and 85+ refer to all recoveries before 1950
and from 1985 onwards respectively.

Belgium

% of birds taken

France

% of birds taken

Spain
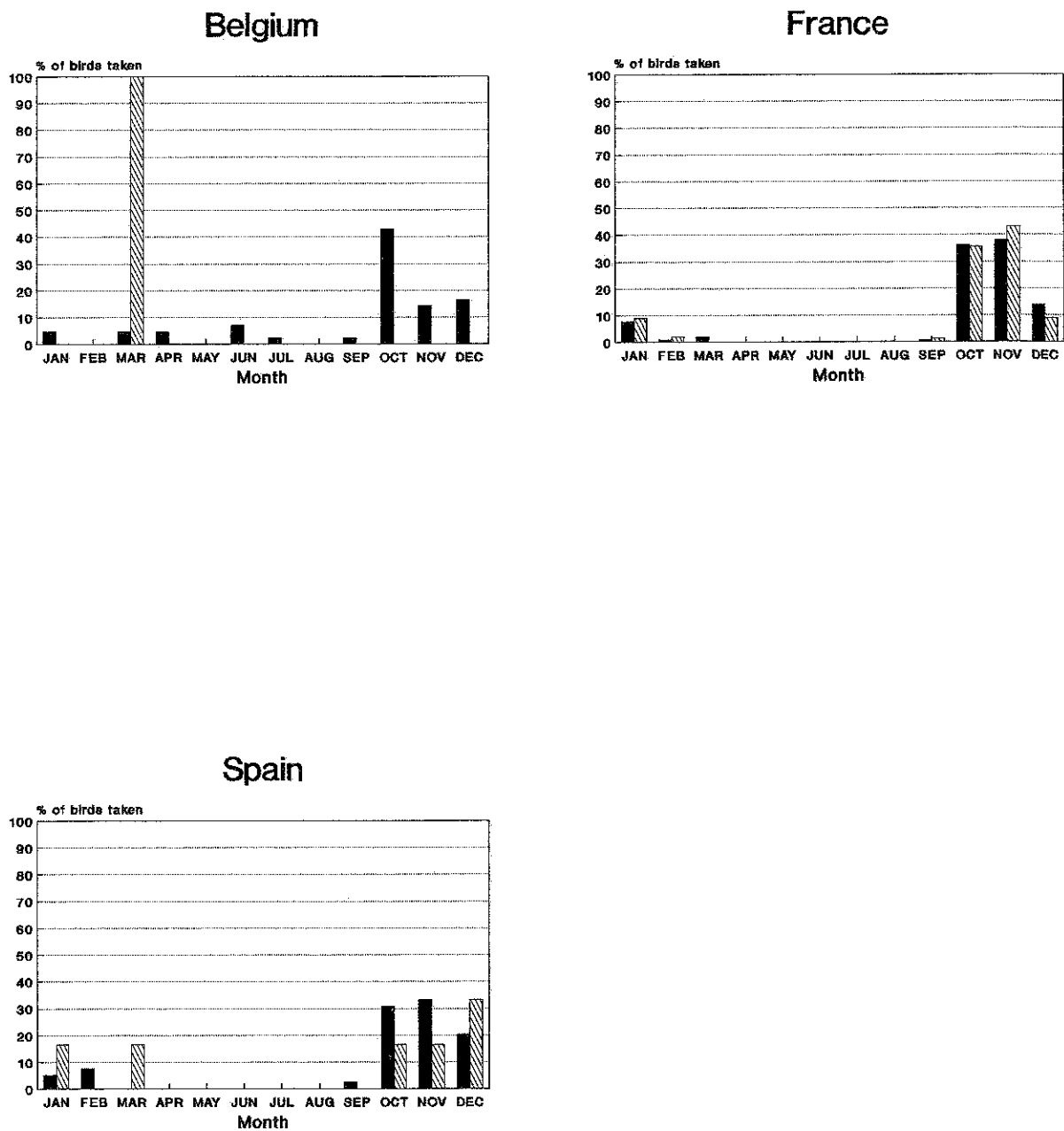
% of birds taken

Figure 8 .6   Monthly percentages of total   Skylark taken in individual countries with high overall indices and sufficient recoveries for analysis.   Solid bars indicate birds from the period before 1980 and hatched bars indicate birds taken from 1980 onwards.

9. MEADOW PIPIT (ANTHUS PRATENSIS)

9.1 Range

The Meadow Pipit breeds from northernmost Europe south to central France and the mountainous regions of Italy and Yugoslavia (Harrison 1982). Scandinavian populations and those to the east of Germany and the Alpine countries are wholly migratory. The wintering range of the Meadow Pipit extends into Iberia, lowland Italy, the Balkans, the Middle East and North Africa.

9.2 Population trends

Trends throughout Europe are inconsistent and few quantitative data exist. The United Kingdom population has declined during the 1980s, probably as a result of agricultural changes (Marchant et al. 1990). In France, however, new areas have been colonized in the south of the country (Isenmann 1987).

9.3 Migration

Most Meadow Pipits breeding in north-west Europe and Scandinavia winter in southern France, Spain, Portugal and Morocco (Table 9.1), though some move farther east to Italy and may enter Africa through Tunisia or Algeria (Cramp and Simmons 1988). Scandinavian birds may winter in the British Isles which are vacated by up to 80% of their breeding population in autumn (Lack 1986). There is little information on the migratory routes of eastern European Meadow Pipits. Evidence of both south-westerly and south-easterly movements from this region has been found but it is not known if there is a consistent divergence of routes between populations (Cramp and Simmons 1988).

9.4 Status

The Meadow Pipit is fully protected in all E.C. countries, though protection in Italy came into force as recently as 1982 (Bertelson and Simonsen 1989, Massa anad Bottoni 1989). The species is also protected in all non-E.C. Mediterranean countries for which information was available except Cyprus (Woldhek 1979).

9.5 Geographical variation in the taking of Meadow Pipits

Prior to 1980 the highest indices of Meadow Pipits taken, in countries with substantial numbers of recoveries, occurred in the species major wintering areas i.e. Belgium, France, Iberia, Italy and North Africa (Table 9.2). Index values for countries to the north of these regions were generally low and recoveries, other than in the United Kingdom, were few. During this period Spain provided 50% of all recoveries of taken Meadow Pipits. Other major contributions were made by France (19%) and Portugal (11%).

The pattern of index values for the period from 1980 onwards was similar. The highest index was that for Spain, which also contributed 59% of all taken recoveries. Morocco (15%) and France (12%) were the only other countries providing 10% or more of the total. No recoveries of Meadow Pipits due to shooting or trapping were obtained during this period from any country north or east of West Germany and no birds were reported as being taken in the eastern Mediterranean before or after 1980.

Most recoveries of Meadow Pipits taken in France have come from the south-west, particularly from the Departments of Basses-Pyrenees, Gironde and Landes. The taking of Meadow Pipits in Spain was concentrated in the north and the south-west, notably in the provinces of Sevilla, Cordoba, Cadiz, Guipuzcoa and Vizcaya. The greatest number of Meadow Pipits taken in Portugal have been recovered in the provinces of Beira Litoral and Estremadura (Fig. 9.1a,b).

Amongst breeding populations of Meadow Pipits with at least 10 recoveries there is relatively little variation in the index of birds taken (Table 9.3). Index values generally range between 40 and 60, the lowest being found in the north-west (Fig. 9.3). The high value of the French index, despite a small sample-size, probably reflects the high numbers of Meadow Pipits taken locally and in Spain.

9.6 Temporal variation in the taking of Meadow Pipits

The indices of Meadow Pipits taken since 1980 were lower than those for the earlier period in all countries for which comparative data were available (Table 9.2). The difference was statistically significant in Belgium, France, Spain and Italy.

Index values for five-year periods showed a decreasing trend with time in all countries and groups of countries analyzed (Fig. 9.4, Fig. 9.5). Regression of index on year revealed significant inverse relationships for France, Portugal and the combined data of the countries in which the taking of Meadow Pipits is most severe.

Analysis of the percentage of taken Meadow Pipits recovered in each month in Belgium, France, Spain, Portugal, Italy and North Africa showed that most were taken between October and February, particularly in October and November (Fig. 9.6). Only in North Africa was a substantial proportion of birds taken during the return migration in spring.

9.7 Methods used to take Meadow Pipits

Since 1980 most Meadow Pipits, at least 53% of the total, have been taken by trapping. During the same period 28% were known to have been shot, the method used to take the remainder not being specified. Trapping has probably always been the predominant means of taking Meadow Pipits but prior to 1980 more taken recoveries were reported as shot (39%) than trapped (36%). The large proportion of recoveries in which the method of taking was not precisely recorded during this period probably consisted mainly of trapped birds. There was a significant increase in the proportion of birds trapped relative to those shot in France during the period from 1980 onwards. In Spain, however, there was a significant change in the opposite direction.

TABLE 9.1a The distribution of Meadow Pipit recoveries due to shooting and trapping before 1980 in relation to their area of origin. The percentage of taken birds recovered in each country is shown for each national ringing scheme. Percentages within parentheses are based on less than ten recoveries.

Country of recovery	Country of ringing													
	UK	CI	NO	SV	DK	SF	DD	DF	NL	BL	FR	ES	IA	HE
GB	(3.6)	0	–	0	0	0	0	0	0	0	0	–	–	0
CI	0	0	–	0	0	0	0	0	0	0	0	–	–	0
ER	0	0	–	0	0	0	0	0	0	0	0	–	–	0
NO	0	0	–	0	0	0	0	0	0.8	(0.5)	0	–	–	0
SV	0	0	–	0	0	0	0	0	0	0	0	–	–	0
DK	0	0	–	0	0	0	0	(1.5)	0	0	0	–	–	0
SF	0	0	–	0	0	0	0	0	0	0	0	–	–	0
SU	0	0	–	0	0	0	0	0	0	0	0	–	–	(4.0)
PL	0	0	–	0	0	0	0	0	0	(0.3)	0	–	–	0
DD	0	0	–	0	0	0	0	0	0	0	0	–	–	0
DF	0	0	–	0	0	0	0	(7.6)	0	0	0	–	–	0
NL	0	0	–	0	0	0	0	(1.5)	0	0	0	–	–	0
BL	0	0	–	0	0	0	0	(7.6)	(2.5)	12.0	0	–	–	0
KN	0	0	–	0	0	0	0	0	0	0	0	–	–	0
FR	22.8	0	–	(33.3)	(71.4)	(10.3)	(33.3)	(12.1)	18.2	17.9	(36.4)	–	–	(16.0)
ES	44.7	(100)		(33.3)	(14.3)	30.8	(66.7)	39.4	56.2	56.8	50.0	–	–	(24.0)
PO	21.8	0	–	0	0	(5.1)	0	24.2	8.3	6.0	(4.6)	–	–	0
IA	(3.6)	0	–	0	0	51.3	0	(4.6)	(3.3)	3.0	0	–	–	44.0
HE	0	0	–	0	0	0	0	0	0	0	0	–	–	0
AU	0	0	–	0	0	0	0	0	0	0	0	–	–	0
CS	0	0	–	0	0	0	0	0	0	0	0	–	–	0
HG	0	0	–	0	0	0	0	0	0	0	0	–	–	0
RO	0	0	–	0	0	0	0	0	0	0	0	–	–	0
BG	0	0	–	0	0	0	0	0	0	0	0	–	–	0
YG	0	0	–	0	0	0	0	0	0	0	0	–	–	0
GR	0	0	–	0	0	0	0	0	0	0	0	–	–	0
TU	0	0	–	0	0	0	0	0	0	0	0	–	–	0
CY	0	0	–	0	0	0	0	0	0	0	0	–	–	0
ML	0	0	–	0	0	0	0	0	0	0	0	–	–	0
SY	0	0	–	0	0	0	0	0	0	0	0	–	–	0
LE	0	0	–	0	0	0	0	0	0	0	0	–	–	0
IL	0	0	–	0	0	0	0	0	0	0	0	–	–	0
ME	0	0	–	0	0	0	0	0	0	0	0	–	–	0
EG	0	0	–	0	0	0	0	0	0	0	0	–	–	0
LT	0	0	–	0	0	0	0	0	0	0	0	–	–	0
TO	0	0	–	0	0	0	0	0	0	0	0	–	–	0
AG	(1.0)	0	–	(33.3)	0	(2.6)	0	0	(0.8)	(0.3)	0	–	–	(12.0)
MA	(2.5)	0	–	0	(14.3)	0	0	(1.5)	9.9	3.3	(4.6)	–	–	0
SA	0	0	–	0	0	0	0	0	0	0	0	–	–	0
TOTAL No.	197	1	–	3	7	39	3	66	121	368	22	–	–	25

Note: No data available for Poland, Czechoslovakia or Hungary.

TABLE 9.1b The distribution of Meadow Pipit recoveries due to shooting and trapping from 1980 onwards in relation to their area of origin. The percentage of taken birds recovered in each country is shown for each national ringing scheme. Percentages within parentheses are based on less than ten recoveries.

Country of recovery	UK	CI	NO	SV	DK	SF	DD	DF	NL	BL	FR	ES	IA	HE
GB	0	–	–	0	–	0	–	0	0	0	–	0	–	0
CI	0	–	–	0	–	0	–	0	0	0	–	0	–	0
ER	0	–	–	0	–	0	–	0	0	0	–	0	–	0
NO	0	–	–	0	–	0	–	0	0	0	–	0	–	0
SV	0	–	–	0	–	0	–	0	0	0	–	0	–	0
DK	0	–	–	0	–	0	–	0	0	0	–	0	–	0
SF	0	–	–	0	–	0	–	0	0	0	–	0	–	0
SU	0	–	–	0	–	0	–	0	0	0	–	0	–	0
PL	0	–	–	0	–	0	–	0	0	0	–	0	–	0
DD	0	–	–	0	–	0	–	0	0	0	–	0	–	0
DF	0	–	–	0	–	0	–	(100)	0	(0.5)	–	0	–	0
NL	0	–	–	0	–	0	–	0	0	0	–	0	–	0
BL	0	–	–	0	–	0	–	0	(4.2)	(0.5)	–	0	–	0
KN	0	–	–	0	–	0	–	0	0	0	–	0	–	0
FR	(11.1)	–	–	(14.3)	–	(16.7)	–	0	(29.2)	10.6	–	0	–	0
ES	40.7	–	–	(42.9)	–	(16.7)	–	0	45.8	64.7	–	(80.0)	–	(100)
PO	(22.2)	–	–	0	–	0	–	0	(12.5)	7.3	–	0	–	0
IA	0	–	–	0	–	(66.7)	–	0	0	0	–	0	–	0
HE	0	–	–	0	–	0	–	0	0	0	–	0	–	0
AU	0	–	–	0	–	0	–	0	0	0	–	0	–	0
CS	0	–	–	0	–	0	–	0	0	0	–	0	–	0
HG	0	–	–	0	–	0	–	0	0	0	–	0	–	0
RO	0	–	–	0	–	0	–	0	0	0	–	0	.–	0
BG	0	–	–	0	–	0	–	0	0	0	–	0	–	0
YG	0	–	–	0	–	0	–	0	0	0	–	0	–	0
GR	0	–	–	0	–	0	–	0	0	0	–	0	–	0
TU	0	–	–	0	–	0	–	0	0	0	–	0	–	0
CY	0	–	–	0	–	0	–	0	0	0	–	0	–	0
ML	0	–	–	0	–	0	–	0	0	0	–	0	–	0
SY	0	–	–	0	–	0	–	0	0	0	–	0	–	0
LE	0	–	–	0	–	0	–	0	0	0	–	0	–	0
IL	0	–	–	0	–	0	–	0	0	0	–	0	–	0
ME	0	–	–	0	–	0	–	0	0	0	–	0	–	0
EG	0	–	–	0	–	0	–	0	0	0	–	0	–	0
LT	0	–	–	0	–	0	–	0	0	0	–	0	–	0
TO	0	–	–	0	–	0	–	0	0	0	–	0	–	0
AG	0	–	–	(28.6)	–	0	–	0	(4.2)	(0.5)	–	0	–	0
MA	(25.9)	–	–	(14.3)	–	0	–	0	(4.2)	(15.6)	–	(20.0)	–	0
SA	0	–	–	0	–	0	–	0	0	0	–	0	–	0
TOTAL No.	27	–	–	7	–	6	–	2	24	218	–	5	–	1

Note: No data available for Poland, Czechoslovakia or Hungary.

TABLE.9.2   Meadow Pipit: Indices of birds taken before 1980 and from 1980 onwards for each   country of recovery.

	Index (all methods)[a]		% hunted[b]		Total recoveries[c]		Shooting Index[a]		Trapping Index[a]		G test[d]
	-1980	1980+	-1980	1980+	-1980	1980+	-1980	1980+	-1980	1980+	
GB	4.1	0	2.8	0	252	80	1.7	0	2.3	0	
CI	(0)	-	0	-	7	-	(0)	-	0	-	
ER	(0)	(0)	0	0	7	3	(0)	(0)	(0)	(0)	
NO	25.0	(0)	23.1	0	13	13	16.7	(0)	8.3	(0)	
SV	(0)	(0)	0	0	4	18	(0)	(0)	(0)	(0)	
DK	12.5	(0)	3.3	0	30	34	(0)	(0)	(12.5)	(0)	
SF	0	(0)	0	0	12	11	(0)	(0)	(0)	(0)	
SU	(100.0)	(0)	100.0	0	1	2	(100.0)	(0)	(0)	(0)	
PL	(100.0)	-	100.0	-	1	-	(0)	-	(100.0)	-	
DD	(0)	(0)	0	0	3	2	(0)	(0)	(0)	(0)	
DF	17.9	30.0	13.9	16.7	36	18	14.3	0	3.6	30.0	
NL	2.9	0	0.5	0	191	135	0	0	2.9	0	
BL	56.5	15.4 **	15.9	0.3	327	711	1.1	0	53.3	15.4	
KN	-	-	-	-	-	-	-	-	-	-	
FR	48.3	29.7***	43.3	18.6	386	188	9.8	11.9	22.0	13.6	*
ES	81.7	61.0***	79.2	53.3	542	323	40.2	17.4	23.4	33.0	***
PO	65.8	55.6	64.0	55.6	150	45	30.8	33.3	22.6	11.1	NS
IA	100.0	50.0***	95.0	50.0	60	12	45.6	16.7	10.5	0	
HE	-	(0)	0	0	5	2	-	(0)	-	(0)	
AU	-	-	-	-	-	-	-	-	-	-	
CS	-	-	-	-	-	-	-	-	-	-	
HG	-	-	-	-	-	-	-	-	-	-	
RO	-	-	-	-	-	-	-	-	-	-	
BG	-	-	-	-	-	-	-	-	-	-	
YG	-	-	-	-	-	-	-	-	-	-	
GR	-	-	-	-	-	-	-	-	-	-	
TU	-	-	-	-	-	-	-	-	-	-	
CY	-	-	-	-	-	-	-	-	-	-	
ML	-	-	-	-	-	-	-	-	-	-	
SY	-	-	-	-	-	-	-	-	-	-	
LE	-	-	-	-	-	-	-	-	-	-	
IL	-	-	-	-	-	-	-	-	-	-	
ME	-	-	-	-	-	-	-	-	-	-	
EG	-	-	-	-	-	-	-	-	-	-	
LT	-	-	-	-	-	-	-	-	-	-	
TO	100.0	-	100.0	-	1	-	0	-	0	-	
AG	71.4	(50.0)	71.4	50.0	14	8	14.3	(0)	35.7	(37.5)	
MA	66.7	57.9	64.0	55.7	50	79	22.9	2.6	20.8	42.1	***
SA	-	-	-	-	-	-	-	-	-	-	

a   See chapter 2 (methods) for derivation of indices.   Indices derived from less than 10 recoveries are indicated within parentheses.   Fisher's exact tests (Sokal & Rohlf 1981) were used to compare the proportions taken in each period.   Significance levels (*<0.05; ** <0.01; *** <0.001) of the tests are indicated in column 1980+. Tests were carried out on all pairs except where indices were based on less than 10 recoveries.

b   Percentage of all recoveries other than those excluded on the basis of poor quality data (see chapter 2) taken by shooting and trapping.

c   Total number of recoveries other than those excluded on the basis of poor quality data.

d   G test (Sokal & Rohlf 1981) comparison between periods of the proportions of birds taken according to the classes shot, trapped, and shot or trapped.   Significance levels of these comparisons are indicated as above.   'NS' indicates non-significant results where tests were carried out.   Comparisons were not made where the expected frequency in any cell was less than 10.

Table.9.3. Meadow Pipit: Indices of birds taken for each breeding population (across all years).

Breeding Population		Index of birds taken	Sample size
UK	United Kingdom	46.2	249
CI	Channel Islands	0	1
NO	Norway	-	-
SV	Sweden	36.4	11
DK	Denmark	28.6	7
SF	Finland	45.8	48
SU	USSR (Lithuania only)	-	-
PL	Poland	-	-
DD	East Germany	60.0	5
DF	West Germany	58.3	72
NL	Holland	40.7	27
BL	Belgium	41.7	48
FR	France	62.5	8
ES	Spain	-	-
IA	Italy	-	-
HE	Switzerland	100	1
CS	Czechoslovakia	-	-
HG	Hungary	-	-

Table 9.4   Regression analysis of temporal trends in the indices
of Meadow Pipits taken.

Country of recovery	Intercept	Slope	t	P
France	105.1	-0.92	-5.35	**
Portugal	98.7	-0.53	-3.90	**
Spain	119.5	-0.62	-1.70	ns
Major	104.2	-0.59	-2.83	*
Other	0.9	0.07	0.41	ns
All	71.5	-0.27	-1.00	ns

All regressions used a weighted technique where each 5-year index
was weighted by the square root of the sample size.

Countries where 10 or more recoveries occurred in each year after
1950 were analysed.   Data from the period before 1950 were not
included in the analysis.

Major countries are those with a tradition of taking substantial
numbers of birds that use western migration routes.
(i.e. BL, FR, ES, PO, IA, NA).

Significance levels indicated are: NS Not significant; * $P<0.05$;
** $P<0.01$; *** $P<0.001$.
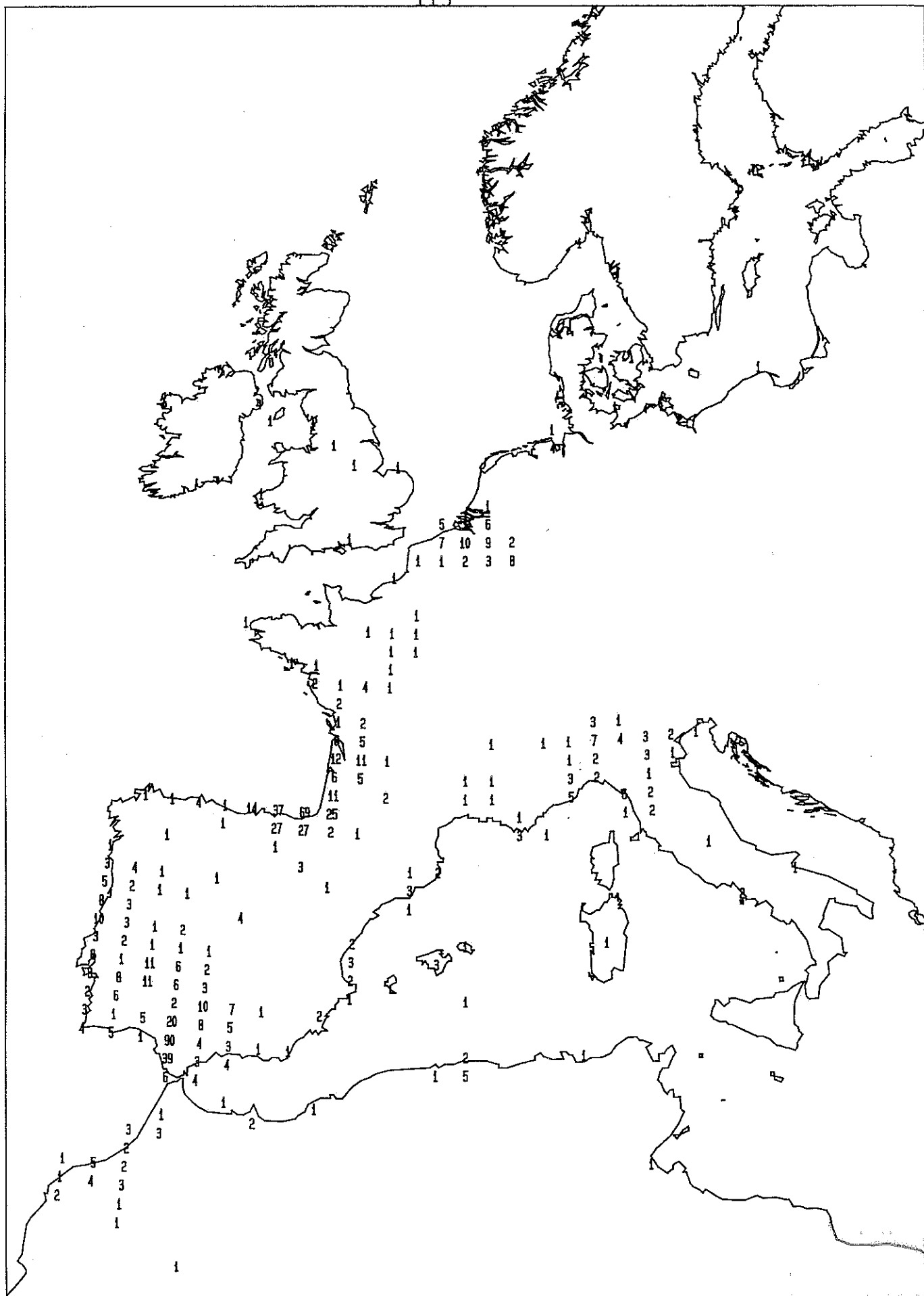
Figure 9.1a Total numbers of Meadow Pipit ringing recoveries resulting from birds taken before 1980 in each 30' by 60' grid square. ** Indicates numbers greater than 99. 1 recovery was outside the limits of the map.

Figure 9.1b   Total numbers of Meadow Pipit ringing recoveries from birds taken from 1980 onwards
in each 30' by 60' grid square.   ** Indicates numbers greater than 99. 0 recoveries were outside
the limits of the map.
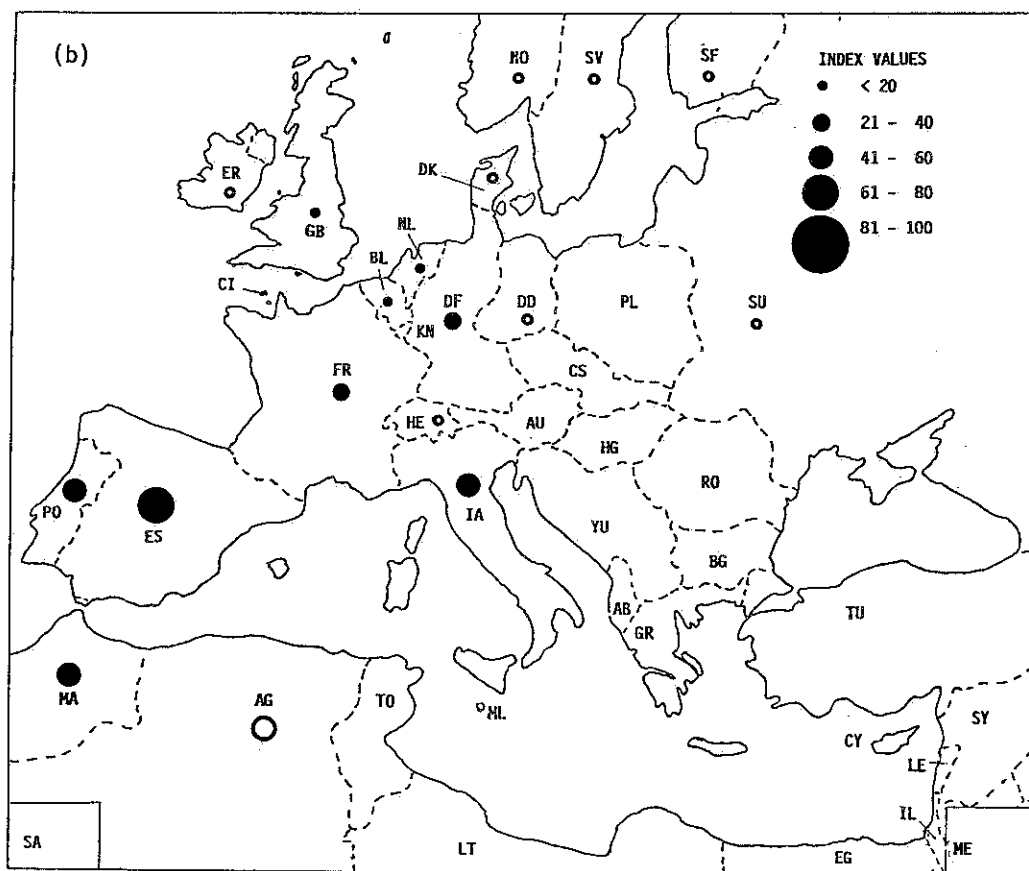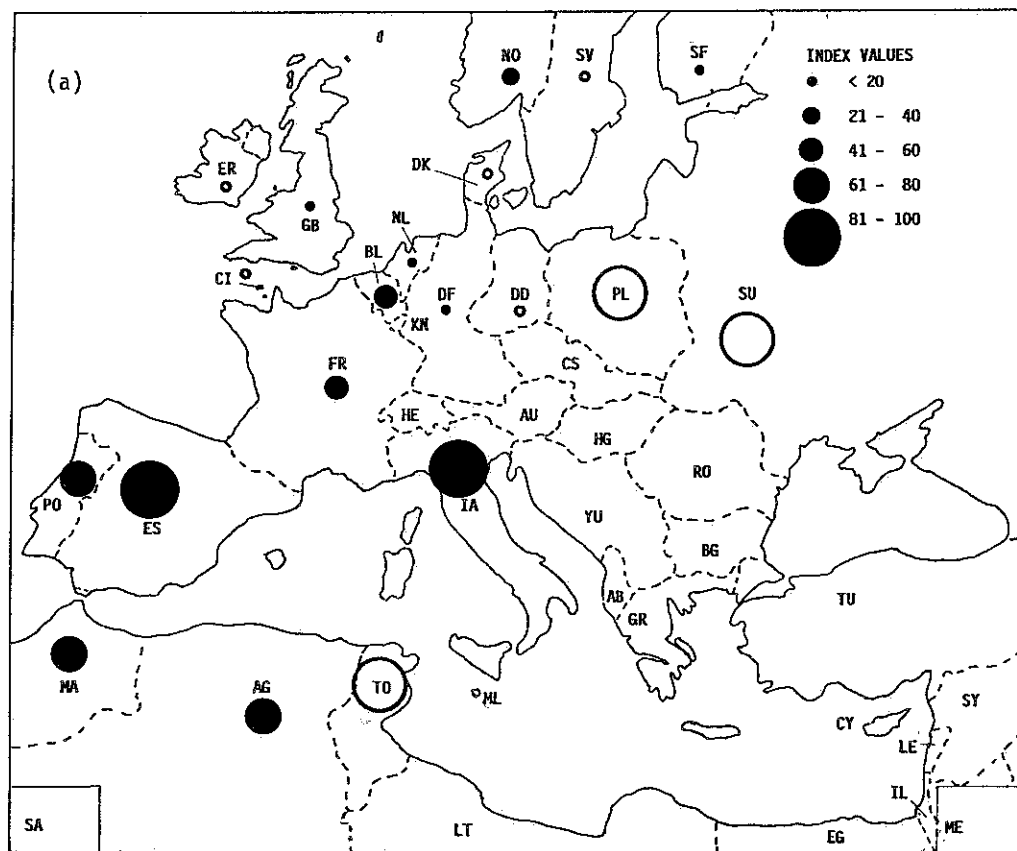
Figure 9.2 Geographical variation in the indices of Meadow Pipit
taken for each country of recovery in the period before 1980 (a) and from
1980 onwards (b).   Solid circles indicate values derived from more than 10
recoveries and open circles indicate those derived from less than 10.
Country codes are indicated in Table 2.4 of the Methods.
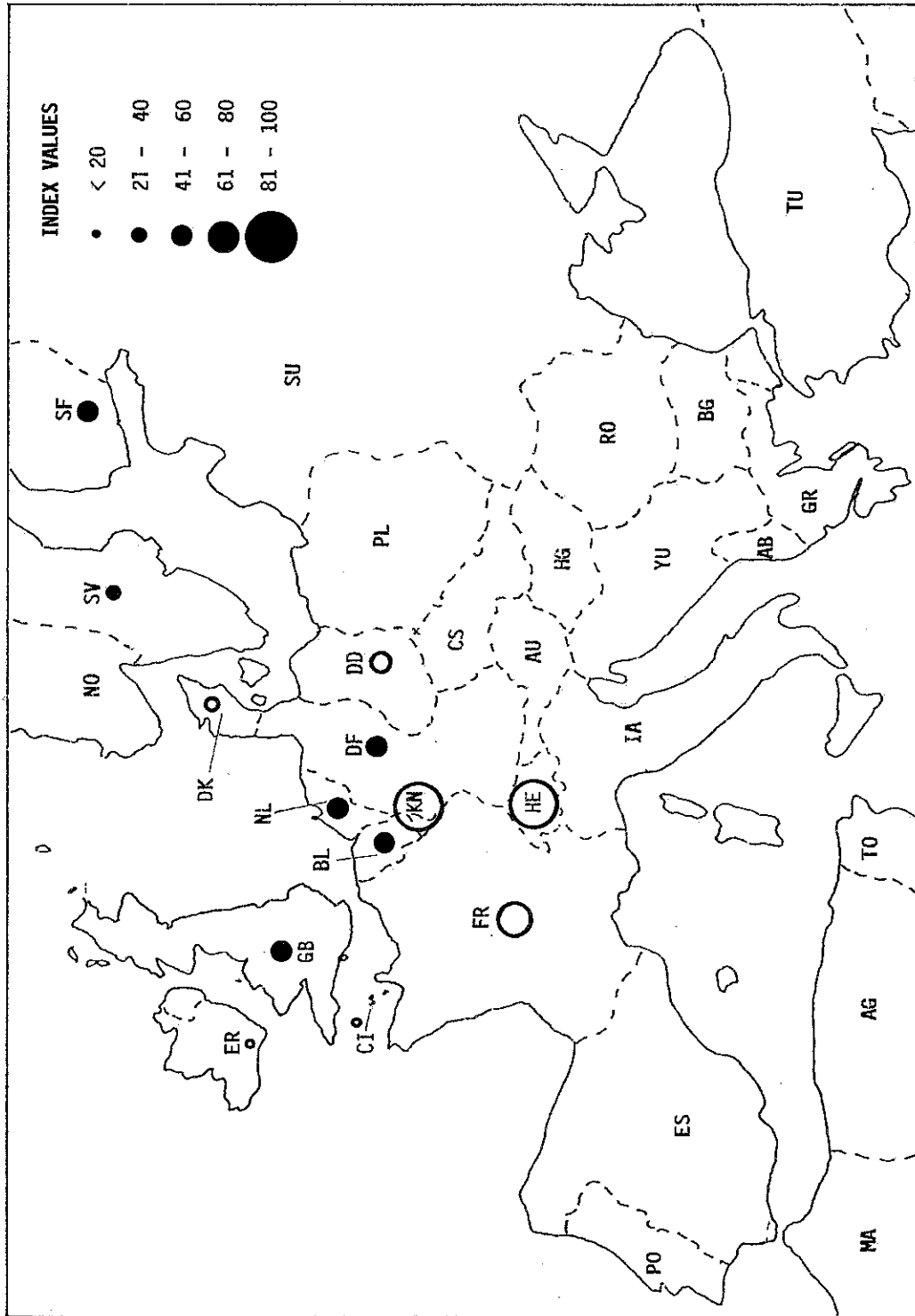
Figure 9.3 Geographical variation in the indices of Meadow Pipit taken over all years for each breeding population. Solid circles indicate values derived from more than 10 recoveries and open circles indicate those derived from less than 10. Country codes are indicated in Table 2.4 of the Methods.

Belgium

Index of birds taken

5 Year period

France

Index of birds taken

5 Year period

Portugal

Index of birds taken

5 Year period

Spain

Index of birds taken

5 Year period

North Africa

Index of birds taken

5 Year period

Italy

Index of birds taken

5 Year period
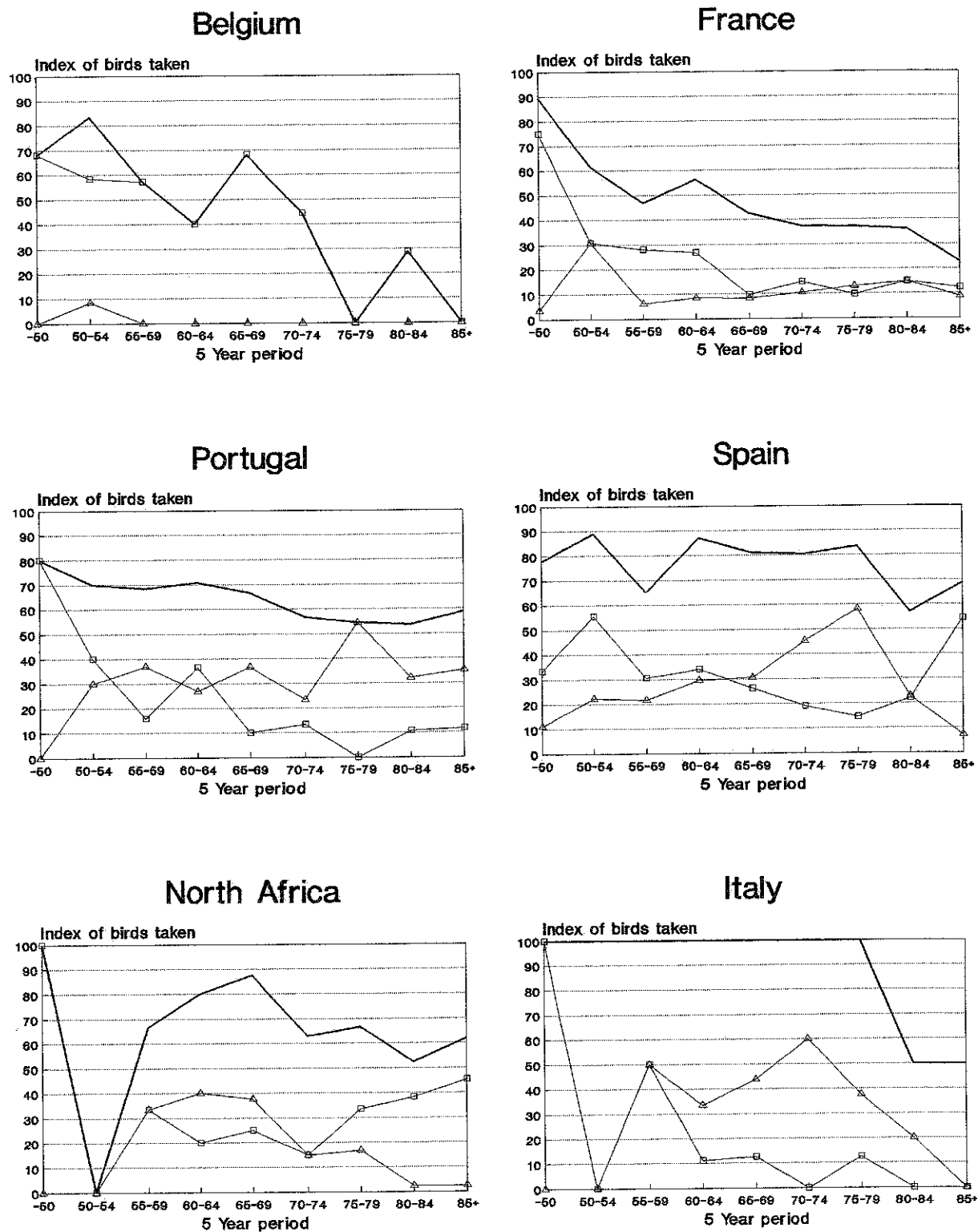
Figure 9.4   Trends in 5-yearly indices of Meadow Pipit taken in individual countries with high overall indices and sufficient recoveries for analysis.   The bold line without symbols indicates overall index values, triangles indicate index values based on birds reported as shot and squares indicate index values based on birds reported as trapped. The periods -50 and 85+ refer to all recoveries before 1950 and from 1985 onwards respectively.

BL,ES,FR,IA,NA,PO

Index of birds taken

Others

Index of birds taken

All countries

Index of birds taken
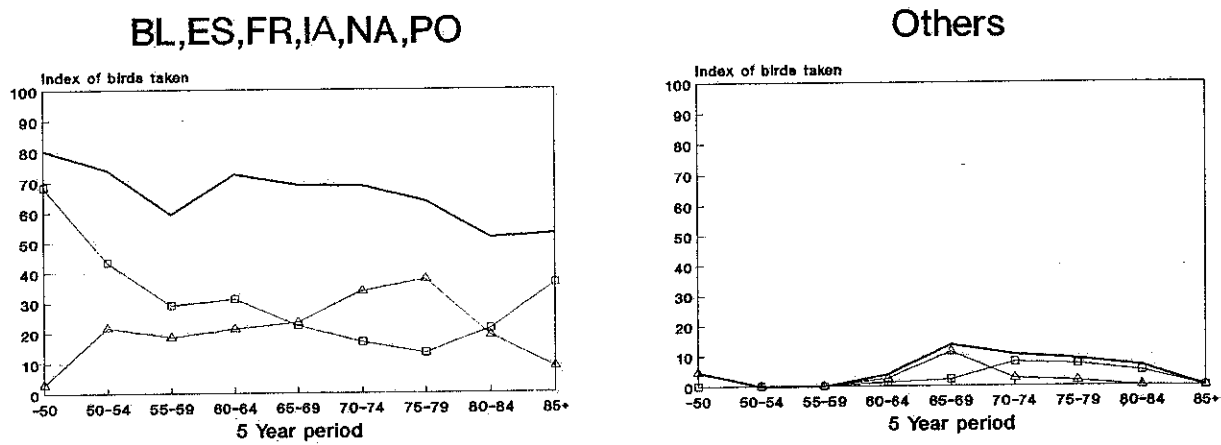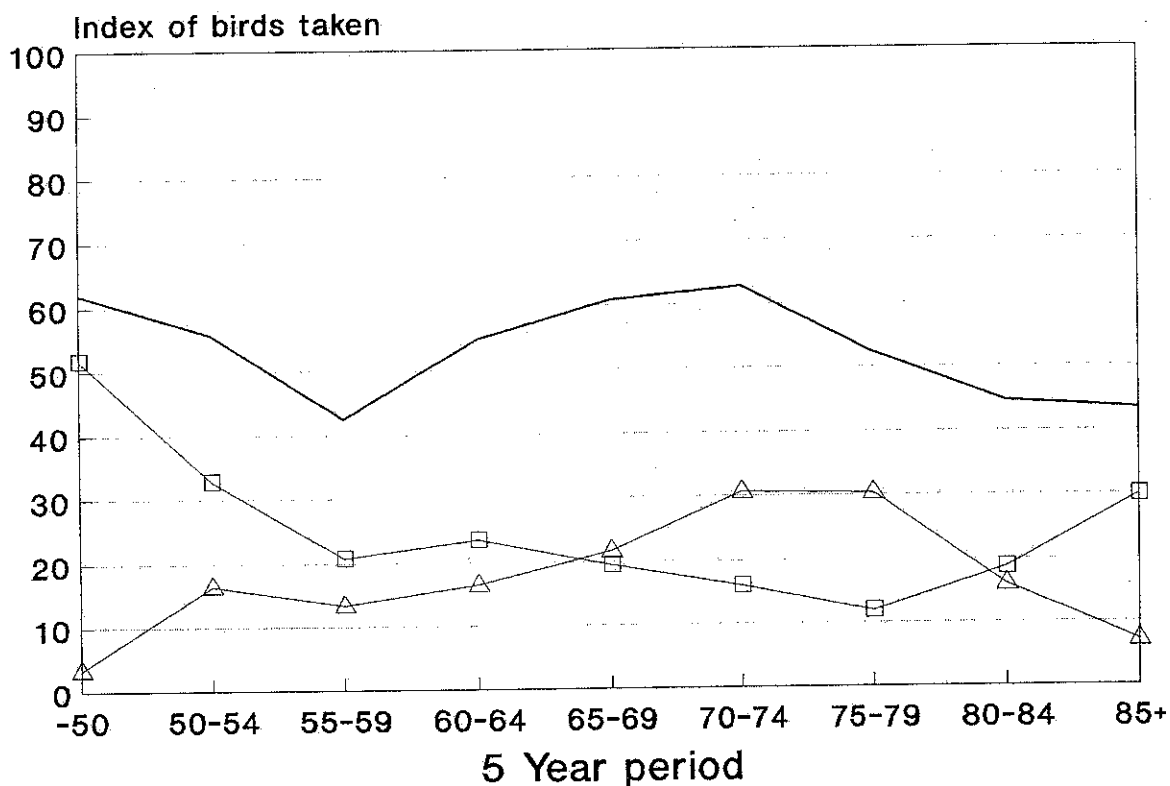
Figure 9.5. Trends in combined 5-yearly indices of Meadow Pipit
taken in: a) countries, for which data for this species were available,
with a tradition of taking substantial numbers of migratory birds on the
western European flyways (ie BL, ES, FR, IA, NA, PO),
b) other countries and c) all countries. The bold line with symbols
indicates overall index values, triangles indicate values based on birds
reported as shot and squares indicate index values based on birds reported
as trapped. The periods -50 and 85+ refer to all recoveries before 1950
and from 1985 onwards respectively.

Belgium

% of birds taken

France

% of birds taken

Portugal

% of birds taken

Spain

% of birds taken

North Africa

% of birds taken

Italy
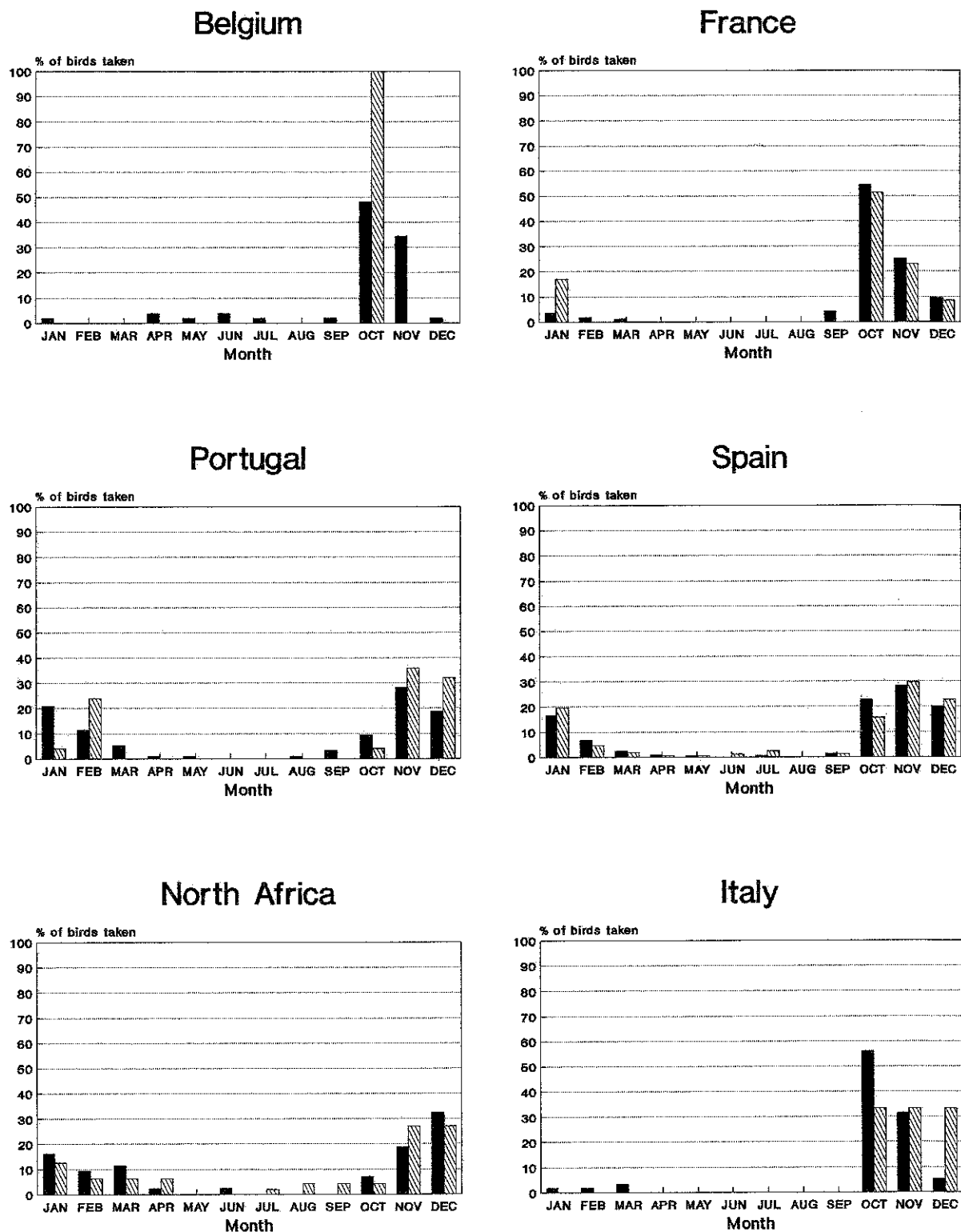
% of birds taken

Figure 9.6   Monthly percentages of total Meadow Pipit taken in individual countries with
high overall indices and sufficient recoveries for analysis. Solid bars indicate birds
from the period before 1980 and hatched bars indicate birds taken from 1980 onwards.

10. ROBIN (ERITHACUS RUBECULA)

10.1 Range

The Robin breeds throughout most of Europe, only being absent from the northern most parts and mountain ranges of Fennoscandia, hot and arid areas of the Meditteranean coastline and isolated tracts of unsuitable habitat (Cramp et al. 1988). Breeding also extends throughout western USSR to the edge of the West Siberian Plain and along the southern and eastern coasts of the Black Sea. There is also a resident population in the mountains of North Africa.

10.2 Population trends

European populations appear to have beeen mostly stable, although fluctuations are apparent in resident populations after severe winters (Marchant et al. 1990). An increase in recent decades has however been recorded in Finland whilst Danish populations decreased between 1978 and 1982 (Cramp et al. 1988).

10.3 Migration

British and Irish populations (melophilus) are mostly resident, although some birds migrate into France and south to Iberia (Mead 1984). Mainland European populations (rubecula) vary in migratory behaviour. Belgian birds are only partially migratory with approximately 50% moving and this proportion is lower in the south (Verheyen 1956). However, northern populations in Fennoscandia, USSR, Poland, West and East Germany are totally migratory, with the exception of a few birds remaining on the Swedish coastline (Saurola 1983, Cramp et al. 1988). Wintering ranges of Fennoscandian birds are known to extend from Germany southwest to France, Iberia and North Africa (Erard 1966; Saurola 1983; Mead 1984). First arrivals in wintering areas in Iberia and North Africa occur in early to mid-september with the peak in October (Cramp et al. 1988). Birds from eastern Fennoscandia winter further east than those from the west (Errard 1966) with birds from Finland showing a wintering range centered on southern France and extending into Italy and Yugoslavia and south to Algeria (Saurola 1985). West European populations are known to winter in the same geographical areas as Scandanavian birds (Errard 1966). The migration route and wintering areas of USSR breeding populations are poorly known, but are likely to be east of Fenno-Scandian birds (Cramp et al. 1988).

10.4 Status

Robins are fully protected in all E.C. countries and all non-E.C. Mediterranean countries for which information is available (Woldhek 1979).

10.5 Geographical variation in the taking of Robins

The geographical spread of ringing recoveries of Robins due to shooting and trapping is shown in Fig. 10.1 for the period up to 1980 (a) and from 1980 onwards (b). Over the early period there was a large spread of recoveries, including Finland, Britain, Netherlands, Belgium, France, Spain, Portugal, Italy and North Africa. However, concentrations of recoveries are more restricted to Belgium, the Pyrenees region of south west France and northern Spain, northern Portugal, northern Italy, Corsica, the Spanish Mediterranean coastline, Majorca, southern Spain and Algeria. Isolated high numbers also occur in Britain and on the Finnish coast. However, these numbers probably reflect high ringing effort and reporting rates (see indices below).

Recoveries in the period from 1980 onwards are sparse throughout most of the region, although concentrations are still evident in Majorca, southern Spain, Morocco, Algeria and to a lesser extent northern Italy.

Table 10.1 shows the percentage of taken birds accounted for by each country (of finding) for each country of ringing, for both analysis periods. These figures reflect both the extent of taking birds by individual countries and in the case of northern migratory populations their migration routes. Thus Spain accounts for a high percentage of Robins taken from those ringed in Norway, Sweden, Denmark, Poland, East and West Germany and Switzerland. Similarly, France and Portugal account for moderate proportions of the birds taken from these countries. However, more easterly ringed birds from Finland and Czechoslovakia are also taken in large proportions in Italy. Algeria also accounts for moderate proportions of the birds taken for several countries, but particularly those with the most northerly and easterly breeding populations.

Most of the birds taken from those ringed in Britain, Netherlands, Belgium and France are taken in the country of ringing reflecting the resident or semi-resident behaviour of the species in these countries.

The period after 1980 shows a similar pattern of recoveries (Table 10.1b) to the pre-1980 period, although the proportion of taken birds recovered in Italy has decreased while the proportion accounted for by Algeria has increased greatly.

Comparison of the indices of taking Robins before 1980 and afterwards (Table 10.2 and Fig. 10.2) indicate consistently low values over most of northern and central Europe over both analysis periods. Indices between 21 and 40 were recorded for Belgium, France and Poland, although these decreased to below 20 for the later period. Similarly, Italy, Yugoslavia, USSR, Greece and Turkey initially showed moderate index values (41-60) which have now decreased. The main areas where Robins have and still are being taken are Iberia and North Africa (see Appendix 5.5 for departmental indices).

Amongst breeding populations of Robins there are large differences in the index of birds taken (Fig. 10.3 and Table 10.3) reflecting the differences in migratory habit and the resulting differences in shooting and trapping pressure to which they are exposed. Although the indices range from 0 to 80 the sample sizes are small for some populations and a more reliable range would be from 5.4 (United Kingdom) to 61.0 (Czechoslovakia).

10.6 Temporal variation in the taking of Robins

With the exception of East Germany, Portugal and Algeria, the indices of Robins taken from 1980 onwards were lower than for the period before 1980 for all countries (of recovery) for which comparative data derived from 10 or more recoveries in each period are available (Table 10.2). Of these, the decreases were statistically significant for Britian, USSR, West Germany, Netherlands, Belgium, France and Italy. Similarly, the index values of the 5-yearly periods show significant linear decreases with time for Belgium, France, Spain and Italy (Fig. 10.4, Table 10.4). An upward trend is apparent for North Africa, although this appears to have peaked in the late 1970s and the increase is not significant (Table 10.3). Overall, there has been a significant decrease in indices of birds taken from the major countries taking Robins and all countries combined (Fig. 10.5 and Table 10.4). The indices for countries other than the major hunting countries showed little variation over the study period.

Analysis of the percentage of birds taken in each month over both periods (Fig. 10.6) indicates that most were taken between October and March, with peak numbers taken in October in countries other than North Africa. Presumbly these trends reflect the general hunting season activity (for quarry species) and the timing of migratory movements by Robins. The monthly pattern of taking Robins were similar in the two analysis periods.

10.7 Methods used to take Robins

Over both periods of the analysis, trapping has accounted for most of the Robins taken in most countries (Table 10.2). Furthermore, there has been significant increases in the proportion trapped in Spain, Algeria and Morocco. Only France and Portugal take more Robins by shooting than trapping and both countries have shown significant increases between the two analysis periods in the proportion trapped. Belgium is unique (amongst countries with more than 10 recoveries) in that all taken Robins recovered there have been trapped.

TABLE 10.1a The distribution of Robin recoveries due to shooting and trapping before 1980 in relation to their area of origin. The percentage of taken birds recovered in each country is shown for each national ringing scheme. Percentages within parentheses are based on less than ten recoveries.

Country of recovery				Country of ringing					
	UK	CI	NO	SV	DK	SF	PL	DD	DF
GB	74.7	0	0	0	0	0	0	0	0
CI	0	0	0	0	0	0	0	0	0
ER	0	0	0	0	0	0	0	0	0
NO	0	0	0	0.4	0	0	0	0	0.3
SV	0	0	0	0.4	0	0	0	0	0.9
DK	0	0	2.5	0	1.6	0.3	0.7	0	0.6
SF	0	0	0	0	0	23.9	0.3	1.1	0.3
SU	0	0	0	0.4	1.6	0.9	1.0	1.1	0
PL	0	0	0	0.4	0	0	0.3	1.1	0.3
DD	0	0	0	0.4	0	0	2.0	7.5	0
DF	0.5	0	2.5	0	0	1.2	2.0	2.1	12.4
NL	1.0	0	2.5	0.4	0	0	0.3	0	2.0
BL	1.0	0	2.5	0.8	0	0.9	0.7	2.1	3.5
KN	0	0	0	0	0	0	0	0	0
FR	4.5	(100)	20.0	13.8	6.6	5.4	12.2	15.0	13.3
ES	13.4	0	52.5	53.0	52.5	26.9	48.0	52.7	33.5
PO	3.0	0	10.0	4.0	9.8	1.8	3.3	7.5	9.5
IA	0.5	0	0	8.9	11.5	16.8	13.2	7.5	5.2
HE	0	0	0	0	0	0	0	0	0
AU	0	0	0	0	0	0.3	0	0	0
CS	0	0	0	0.4	0	0	0.3	0	0
HG	0	0	0	0	0	0	0	0	0
RO	0	0	0	0	0	0	0.3	0	0
BG	0	0	0	0	0	0	0	0	0
YG	0	0	0	1.2	0	1.5	0	0	0
GR	0	0	2.5	0.8	1.6	2.1	0.7	0	0
TU	0	0	0	0.4	0	1.5	0	0	0
CY	0	0	0	0	0	0.6	0	0	0
ML	0	0	0	0	0	0	0	0	0
SY	0	0	0	0	0	0	0	0	0
LE	0	0	0	0	0	0.3	0	0	0
IL	0	0	0	0	0	0	0	0	0
ME	0	0	0	0	0	0	0	0	0
EG	0	0	0	0	0	0	0	0	0
LT	0	0	0	0	0	0	0	0	0
TO	0	0	0	0	1.6	0.6	0.3	0	0
AG	1.5	0	5.0	10.1	11.5	13.2	11.2	1.1	10.7
MA	0	0	0	4.0	1.6	1.8	3.3	1.1	13.5
SA	0	0	0	0	0	0	0	0	0
TOTAL RECOVERIES	202	1	40	247	61	334	304	93	346

TABLE 10.1a contd. The distribution of Robin recoveries due to shooting and trapping before 1980 in relation to their area of origin. The percentage of taken birds recovered in each country is shown for each national ringing scheme. Percentages within parentheses are based on less than ten recoveries.

Country of recovery	Country of ringing							
	NL	BL	FR	ES	IA	HE	CS	HG
GB	1.7	0	0	0	0	0	0	0
CI	0	0	0	0	0	0	0	0
ER	0	0	0	0	0	0	0	0
NO	0	0	0	0	0	0	0	0
SV	1.7	0	0	0	0	0	0	0
DK	0	0	0	0	0	0	0	0
SF	0	0	0	0	0	0	0	0
SU	0	0	0	0	0	0	0	0
PL	0	0	0	0	0	0	0	0
DD	0	0	0.8	0	0	0	0	0
DF	1.7	0	0	0	0	0	0	0
NL	43.9	2.3	0	0	0	0	0	0
BL	0	58.0	0	0	0	0	0	0
KN	0	0	0	0	0	0	0	0
FR	3.5	6.9	44.5	0	3.0	11.3	24.6	0
ES	33.3	23.0	32.0	0	27.3	66.9	27.5	0
PO	7.0	6.9	5.5	0	0	1.4	5.8	0
IA	0	1.1	0	0	57.6	5.6	36.2	0
HE	0	0	0	0	0	2.1	0	0
AU	0	0	0	0	3.0	0	0	0
CS	0	0	0	0	0	0.7	1.4	0
HG	0	0	0	0	0	0	0	0
RO	0	0	0	0	0	0	0	0
BG	0	0	0	0	0	0	0	0
YG	0	0	0	0	0	0	1.4	0
GR	0	0	0	0	0	0	0	0
TU	0	0	0	0	0	0	0	0
CY	0	0	0	0	0	0	0	0
ML	0	0	0	0	0	0	0	0
SY	0	0	0	0	0	0	0	0
IE	0	0	0	0	0	0	0	0
IL	0	0	0	0	0	0	0	0
ME	0	0	0	0	0	0	0	0
EG	0	0	0	0	0	0	0	0
LT	0	0	0	0	0	0	0	0
TO	0	0	0.8	0	0	0	0	0
AG	1.7	0.6	10.9	0	9.1	10.6	2.9	0
MA	5.3	1.1	5.5	0	0	1.4	0	0
SA	0	0	0	0	0	0	0	0
TOTAL RECOVERIES	57	174	128	0	33	142	69	0

TABLE 10.1b The distribution of Robin recoveries due to shooting and trapping from 1980 onwards in relation to their area of origin. The percentage of taken birds recovered in each country is shown for each national ringing scheme. Percentages within parentheses are based on less than ten recoveries.

Country of recovery	UK	CI	NO	SV	DK	SF	PL	DD	DF
GB	50.0	0	0	0	0	0	0	0	0
CI	0	0	0	0	0	0	0	0	0
ER	0	0	0	0	0	0	0	0	0
NO	0	0	0	0	0	0	0	0	0
SV	0	0	0	0	0	0	0	0	0
DK	0	0	0	0	0	1.3	0	0	0
SF	0	0	0	0	0	19.7	0	0	0
SU	0	0	0	0	0	0	0	0	0
PL	0	0	0	1.3	0	0	0	0	0
DD	0	0	0	1.3	0	0	2.9	0	2.8
DF	0	0	0	0	3.7	0	0	0	0
NL	0	0	0	0	0	0	0	0	0
BL	10.0	0	0	0	0	0	0	0	0
KN	0	0	0	0	0	0	0	0	0
FR	0	0	29.2	1.3	2.8	3.9	8.6	0	2.8
ES	30.0	0	25.0	27.0	16.7	19.7	48.6	0	16.7
PO	10.0	0	33.3	0	5.6	0	2.9	0	5.6
IA	0	0	0	5.4	2.8	3.9	20.0	0	2.8
HE	0	0	0	0	0	0	0	0	0
AU	0	0	0	0	0	0	0	0	0
CS	0	0	0	0	0	1.3	0	0	0
HG	0	0	0	0	0	0	0	0	0
RO	0	0	0	0	0	0	0	0	0
BG	0	0	0	0	0	0	0	0	0
YG	0	0	0	1.3	0	1.3	0	0	0
GR	0	0	0	1.3	0	1.3	0	0	0
TU	0	0	4.2	1.3	0	0	0	0	0
CY	0	0	0	0	0	0	0	0	0
ML	0	0	0	0	0	0	0	0	0
SY	0	0	0	0	0	0	0	0	0
IE	0	0	0	0	0	0	0	0	0
IL	0	0	0	0	0	0	0	0	0
ME	0	0	0	0	0	0	0	0	0
EG	0	0	0	0	0	0	0	0	0
IT	0	0	0	0	0	0	0	0	0
TO	0	0	0	1.3	0	2.6	2.9	0	0
AG	0	0	8.3	47.3	25.9	36.8	11.4	0	61.1
MA	0	0	0	10.8	5.6	7.9	0	0	5.6
SA	0	0	0	0	0	0	0	0	0
TOTAL RECOVERIES	10	0	24	74	27	76	35	0	36

TABLE 10.1b contd. The distribution of Robin recoveries due to shooting and trapping from 1980 onwards in relation to their area of origin. The percentage of taken birds recovered in each country is shown for each national ringing scheme. Percentages within parentheses are based on less than ten recoveries.

Country of recovery	Country of ringing							
	NL	BL	FR	ES	IA	HE	CS	HG
GB	0	0	0	0	0	0	0	0
CI	0	0	0	0	0	0	0	0
ER	0	0	0	0	0	0	0	0
NO	0	0	0	0	0	0	0	0
SV	0	0	0	0	0	0	0	0
DK	0	2.8	0	0	0	0	0	0
SF	0	0	0	0	0	0	0	0
SU	0	0	0	0	1.9	0	0	0
PL	0	0	0	0	0	0	0	0
DD	0	0	0	0	0	0	0	0
DF	0	0	0	0	0	0	0	0
NL	0	0	0	0	0	0	0	0
BL	0	19.4	0	0	0	0	0	0
KN	0	0	0	0	0	0	0	0
FR	0	0	(22.2)	0	1.9	0	15.0	0
ES	(60.0)	36.1	(44.4)	57.1	0	26.7	40.0	(20.0)
PO	0	13.9	0	2.9	1.9	0	5.0	0
IA	0	0	0	0	9.4	6.7	5.0	(60.0)
HE	0	0	0	0	1.9	0	0	0
AU	0	0	0	0	0	0	0	0
CS	0	0	0	0	0	0	0	0
HG	0	0	0	0	0	0	0	0
RO	0	0	0	0	0	0	0	0
BG	0	0	0	0	0	0	0	0
YG	0	0	0	0	0	0	0	0
GR	0	0	0	0	0	0	0	0
TU	0	0	0	0	0	0	0	0
CY	0	2.8	0	0	0	0	0	0
ML	0	0	0	0	0	0	0	0
SY	0	0	0	0	0	0	0	0
IE	0	0	0	0	0	0	0	0
IL	0	0	0	0	0	0	0	0
ME	0	0	0	0	0	0	0	0
EG	0	0	0	0	0	0	0	0
IT	0	0	0	0	0	0	0	0
TO	0	0	0	0	1.9	0	0	0
AG	0	11.1	0	25.7	71.7	66.7	35.0	(20.0)
MA	(40.0)	13.9	(33.3)	14.3	9.4	0	0	0
SA	0	0	0	0	0	0	0	0
TOTAL RECOVERIES	5	36	9	35	53	15	20	5

TABLE.10.2 Robin: Indices of birds taken before 1980 and from 1980 onwards for each country of recovery.

	Index (all methods)[a]		% hunted[b]		Total recoveries[c]		Shooting Index[a]		Trapping Index[a]		G test[d]
	-1980	1980+	-1980	1980+	-1980	1980+	-1980	1980+	-1980	1980+	
GB	5.3	0.6***	3.1	0.3	4959	1842	0.8	0.4	4.3	0.2	-
CI	0.0	0.0	0.0	0.0	51	41	0.0	0.0	0.0	0.0	-
ER	17.4	0.0	10.8	0.0	37	19	0.0	0.0	17.4	0.0	-
NO	4.2	0.0	2.0	0.0	101	55	2.1	0.0	2.1	0.0	-
SV	8.0	0.0	3.4	0.0	203	138	1.1	0.0	6.9	0.0	-
DK	6.8	3.6	1.6	1.2	310	172	2.7	0.0	4.0	3.6	-
SF	17.5	14.3	1.4	0.3	5842	4229	0.0	0.0	17.5	14.3	-
SU	50.0	7.1*	31.0	2.2	29	45	11.1	0.0	33.3	7.1	-
PL	21.0	(25.0)	5.7	3.7	70	27	0.0	(0.0)	21.0	(25.0)	-
DD	18.3	25.0	11.7	11.1	128	27	0.0	0.0	18.3	25.0	-
DF	17.5	2.6***	12.0	1.3	485	153	0.3	1.3	16.6	1.3	-
NL	16.5	0.0***	10.3	0.0	399	196	0.4	0.0	15.3	0.0	-
BL	39.2	12.5***	22.8	4.6	549	172	0.6	0	37.6	12.5	-
KN	-	(0.0)	(0.0)	(0.0)	1	2	-	(0.0)	-	0.0	-
FR	21.3	8.5***	15.8	5.0	1768	440	1.6	4.6	11.9	2.3	***
ES	73.3	70.4	69.7	35.1	1203	373	22.0	22.6	26.3	42.5	***
PO	66.5	74.1	62.0	64.5	179	31	26.3	44.4	23.3	29.6	**
IA	59.9	36.5***	52.0	11.5	400	234	19.0	8.1	24.5	21.6	NS
HE	3.1	7.7	0.4	2.9	749	34	0.0	(0.0)	3.1	(7.7)	-
AU	20.0	(0.0)	15.4	(0.0)	13	8	0.0	(0.0)	20.0	(0.0)	-
CS	(33.3)	(16.7)	21.4	10.0	14	10	(0.0)	(0.0)	(33.3)	(16.7)	-
HG	(33.3)	-	(33.3)	(0.0)	3	3	(0.0)	-	(33.3)	-	-
RO	(100.0)	-	(100.0)	-	1	0	(0.0)	-	(100)	-	-
BG	(0.0)	-	(0.0)	-	1	0	(0.0)	-	(0)	-	-
YG	47.6	(25.0)	41.7	20.0	24	10	14.3	(0.0)	28.6	(25.0)	-
GR	50.0	(37.5)	44.8	(37.5)	29	8	15.4	(37.5)	11.5	(0.0)	-
TU	54.5	(40.0)	54.5	(40.0)	11	5	27.3	(0.0)	18.2	(40.0)	-
CY	(66.7)	(100.0)	(66.7)	(100.0)	3	1	33.3	(0.0)	(0.0)	(100)	-
ML	-	-	(0.0)	(0.0)	1	1	-	-	-	-	-
SY	-	(0.0)	-	(0.0)	0	1	-	-	(0.0)	(0.0)	-
LE	(100.0)	-	(100.0)	-	1	-	(0.0)	-	(100)	-	-
IL	-	-	-	-	0	-	-	-	-	-	-
ME	-	-	-	-	0	-	-	-	-	-	-
EG	-	-	-	-	0	-	-	-	-	-	-
LT	-	-	-	-	0	-	-	-	-	-	-
TO	35.7	(62.5)	31.2	(55.6)	16	9	7.1	(0.0)	21.4	(62.5)	-
AG	73.7	81.2	67.0	63.5	285	266	5.0	2.9	47.1	68.7	***
MA	69.0	63.2	62.5	53.7	96	80	4.6	7.3	42.5	48.5	*
SA	-	-	-	-	-	-	-	-	-	-	-

[a] See chapter 2 (methods) for derivation of indices. Indices derived from less than 10 recoveries are indicated within parentheses. Fisher's exact tests (Sokal & Rohlf 1981) were used to compare the proportions taken in each period. Significance levels (*<0.05; ** <0.01; *** <0.001) of the tests are indicated in column 1980+. Tests were carried out on all pairs except where indices were based on less than 10 recoveries.

[b] Percentage of all recoveries other than those excluded on the basis of poor quality data (see chapter 2) taken by shooting and trapping.

[c] Total number of recoveries other than those excluded on the basis of poor quality data.

[d] G test (Sokal & Rohlf 1981) comparison between periods of the proportions of birds taken according to the classes shot, trapped, and shot or trapped. Significance levels of these comparisons are indicated as above. 'NS' indicates non-significant results where tests were carried out. Comparisons were not made where the expected frequency in any cell was less than 10.

Table.10.3. Robin   :   Indices of birds taken for each breeding
population (across all years).

Breeding Population	Index of birds taken	Sample size
UK United Kingdom	5.4	1769
CI Channel Islands	0.0	19
NO Norway	29.7	111
SV Sweden	39.0	254
DK Denmark	29.2	106
SF Finland	31.7	558
SU USSR (Lithuania only)	0.0	1
PL Poland	52.0	98
DD East Germany	50.0	92
DF West Germany	39.3	298
NL Holland	13.6	59
BL Belgium	33.8	198
FR France	18.8	170
ES Spain	80.0	10
IA Italy	25.0	4
HE Switzerland	36.2	69
CJ Czechoslovakia	61.0	77
HG Hungary	40.0	5

Table 10.4   Regression analysis of temporal trends in the indices of Robins taken.

Country of recovery	Intercept	Slope	t	P
Belgium	178.0	-2.15	-4.26	**
France	101.0	-1.21	-4.99	**
Portugal	58.7	0.117	0.314	NS
Spain	96.0	-0.346	-3.24	*
North Africa	1.47	0.951	2.36	NS
Italy	123.0	-1.01	-3.23	*
Major countries	82.8	-0.483	-3.27	*
Othe countries	19.4	-0.172	-1.85	NS
All countries	51.8	-0.370	-4.15	**

All regressions used a weighted technique where each 5-year index was weighted by the square root of the sample size.

Countries where 10 or more recoveries occurred in each year after 1950 were analysed. Data from the period before 1950 were not included in the analysis.

Major countries are those with a tradition of taking substantial numbers of birds that use western migration routes. (i.e. BL, FR, ES, PO, IA, NA).

Significance levels indicated are: NS Not significant; * P<0.05; ** P<0.01; *** P<0.001.
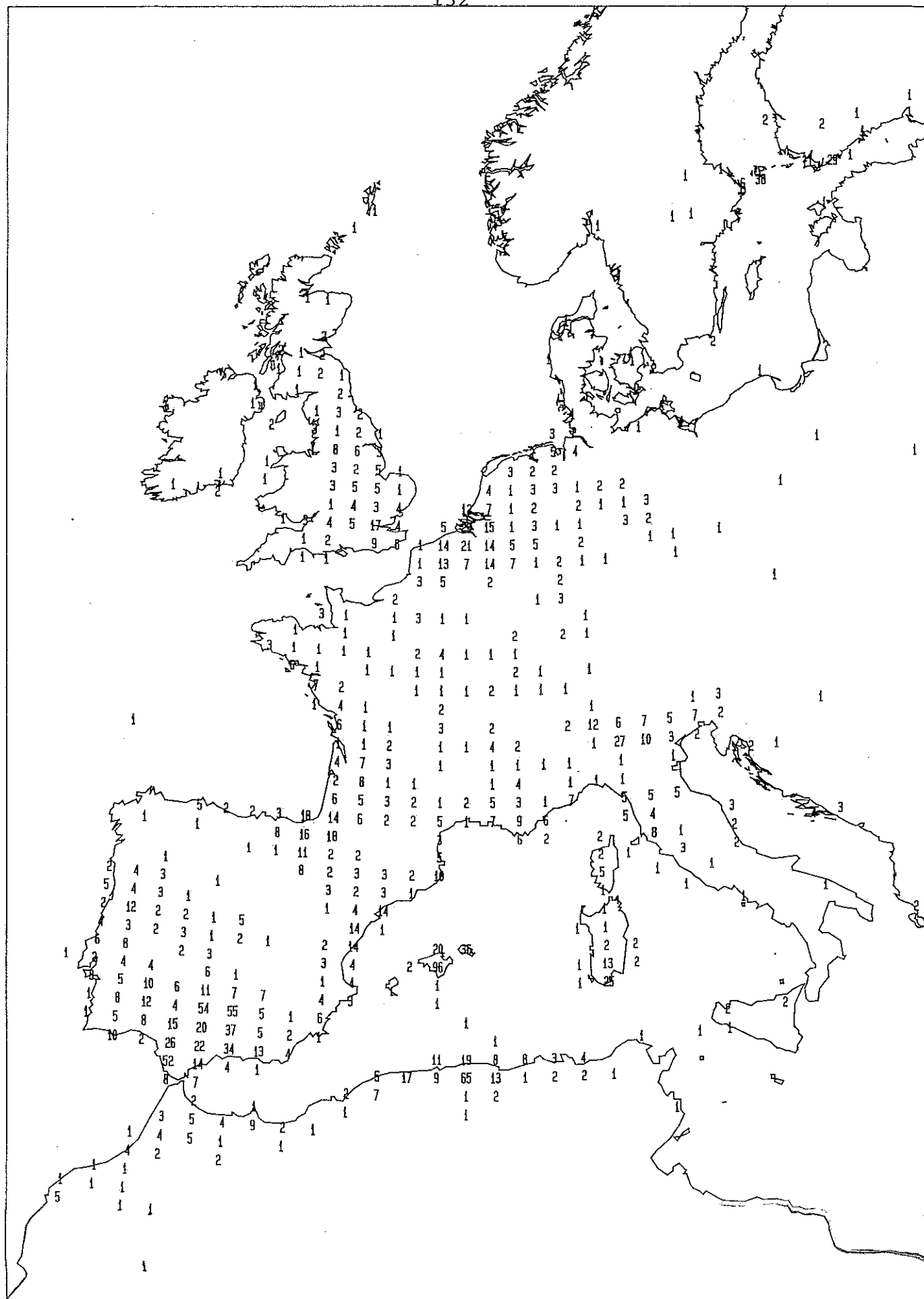
Figure 10.1a   Total numbers of Robin ringing recoveries resulting from birds taken before 1980 in each 30' by 60' grid square.   ** Indicates numbers greater than 99.   22 recoveries were outside the limits of the map.
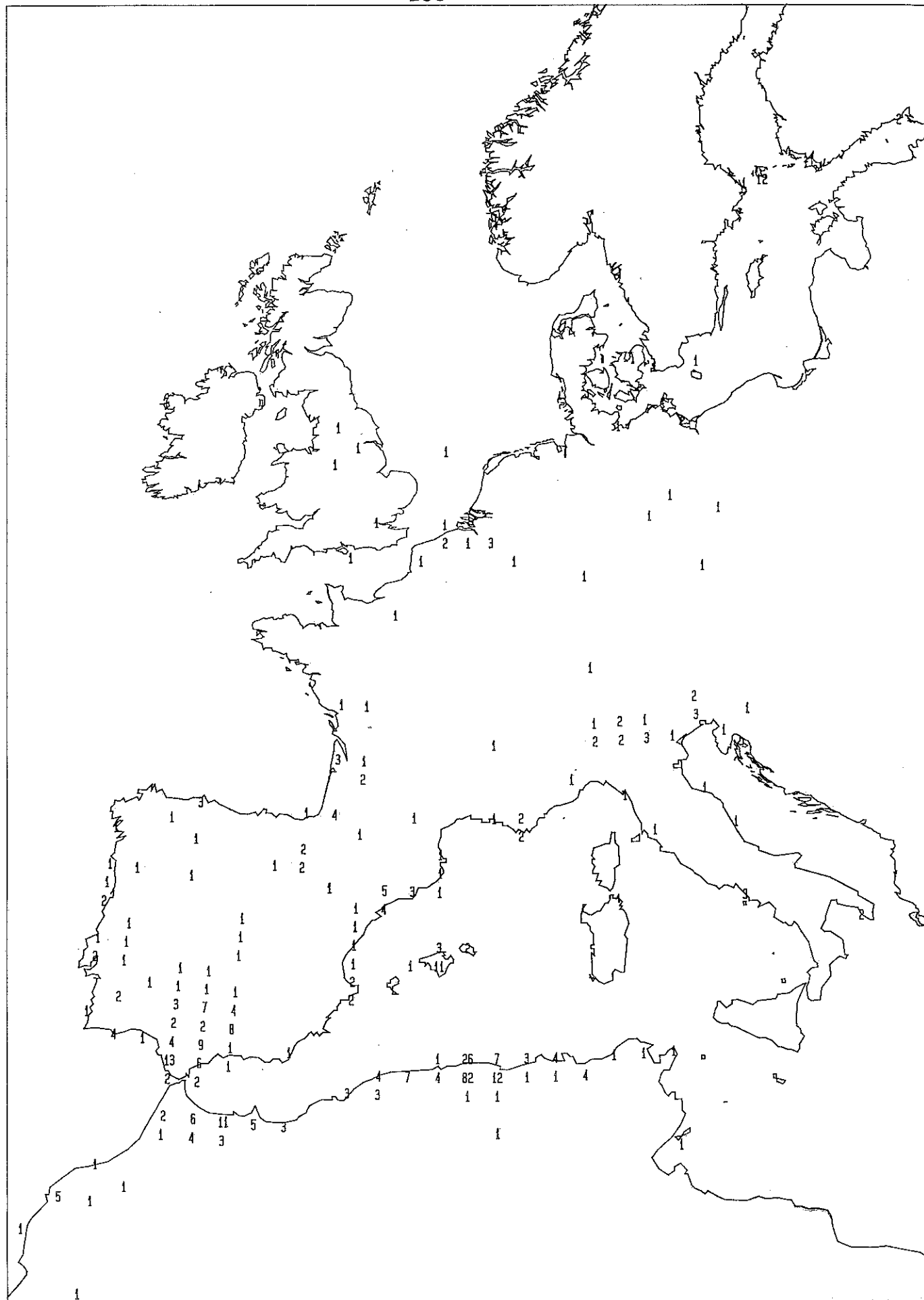
Figure 10.1b   Total numbers of Robin ringing recoveries from birds taken from 1980 onwards in each 30' by 60' grid square.   ** Indicates numbers greater than 99.   7 recoveries were outside the limits of the map.
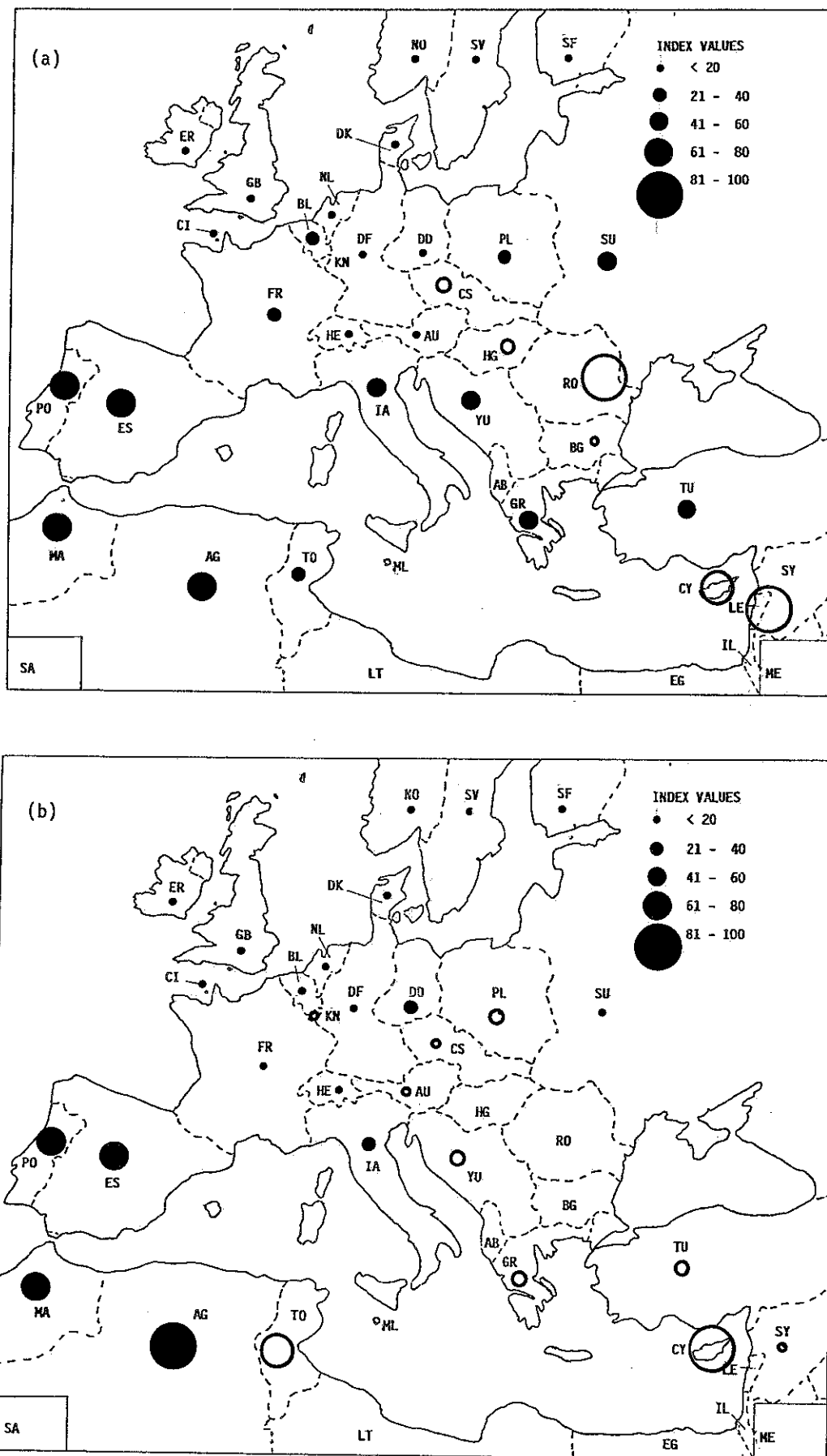
Figure 10.2 Geographical variation in the indices of Robin
taken for each country of recovery in the period before 1980 (a) and from
1980 onwards (b). Solid circles indicate values derived from more than 10
recoveries and open circles indicate those derived from less than 10.
Country codes are indicated in Table 2.4 of the Methods.
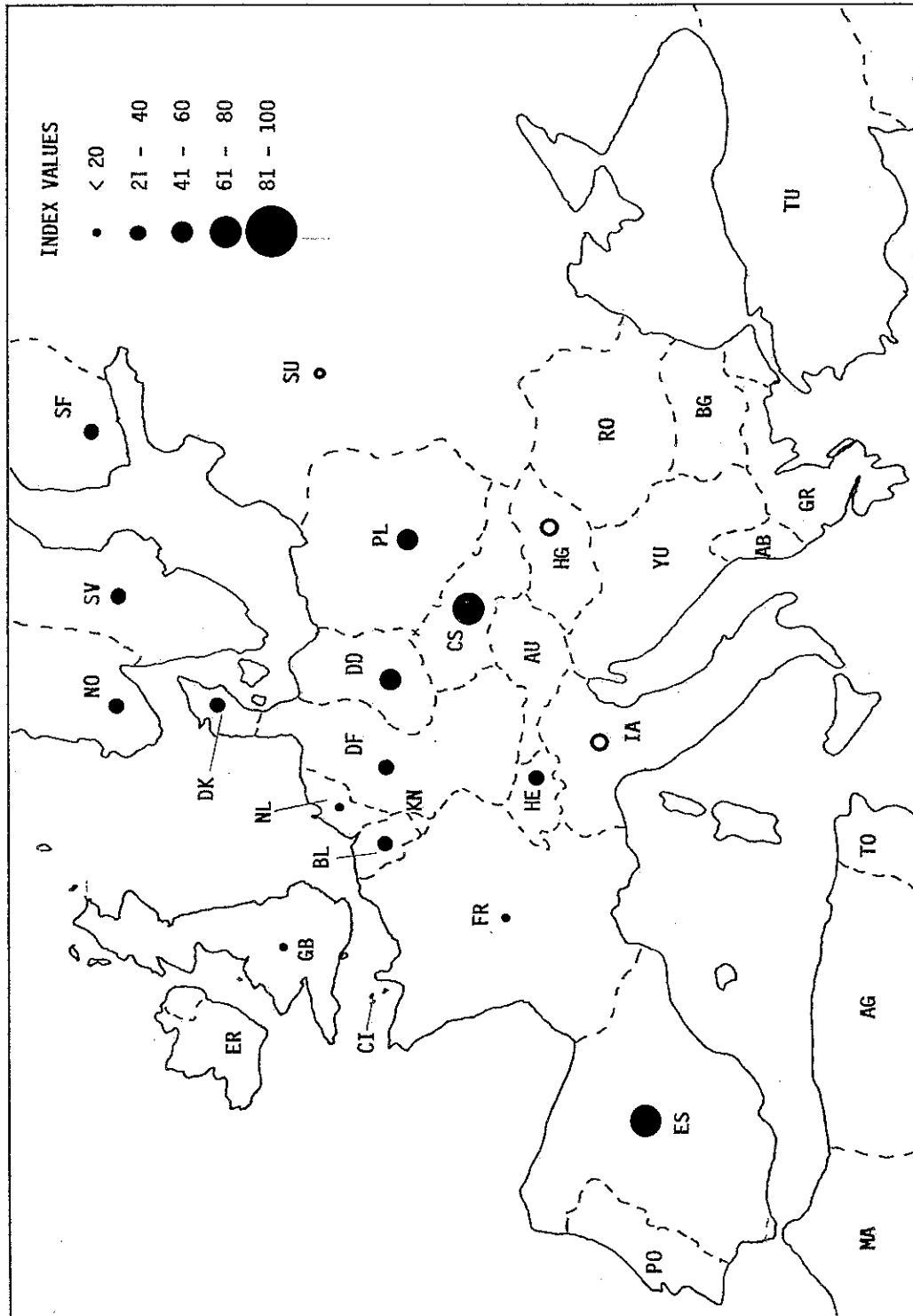
Figure 10.3 Geographical variation in the indices of Robin taken over all years for each breeding population. Solid circles indicate values derived from more than 10 recoveries and open circles indicate those derived from less than 10. Country codes are indicated in Table 2.4 of the Methods.

Belgium

Index of birds taken

France

Index of birds taken

Portugal

Index of birds taken

Spain

Index of birds taken

North Africa

Index of birds taken

Italy

Index of birds taken
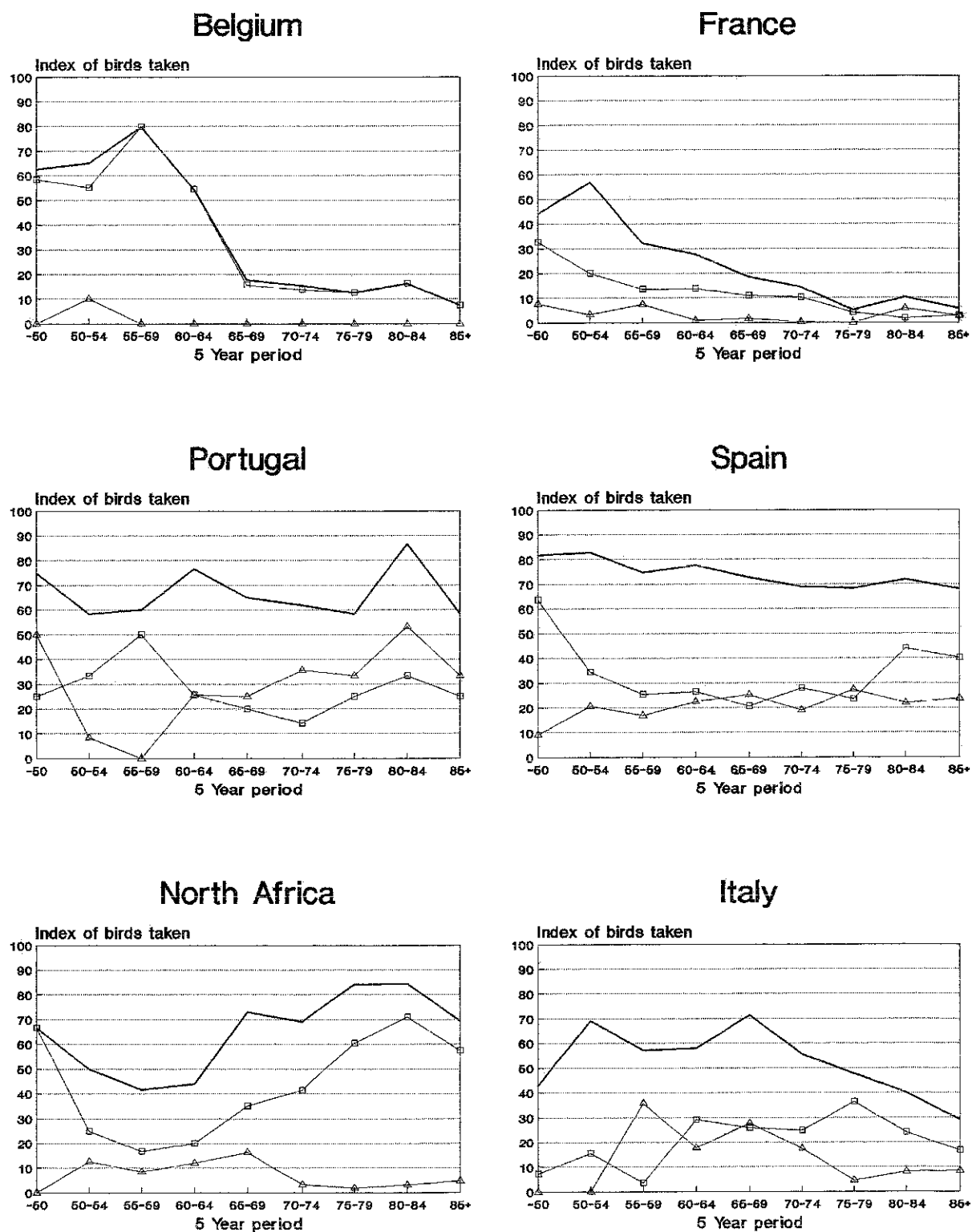
Figure 10.4   Trends in 5-yearly indices of Robin taken in individual countries
with high overall indices and sufficient recoveries for analysis.   The bold line without
symbols indicates overall index values, triangles indicate index values based on birds
reported as shot and squares indicate index values based on birds reported as trapped.
The periods -50 and 85+ refer to all recoveries before 1950 and from 1985 onwards
respectively.

BL,ES,FR,IA,NA,PO

Index of birds taken

5 Year period

Others

Index of birds taken

5 Year period

All countries

Index of birds taken

5 Year period
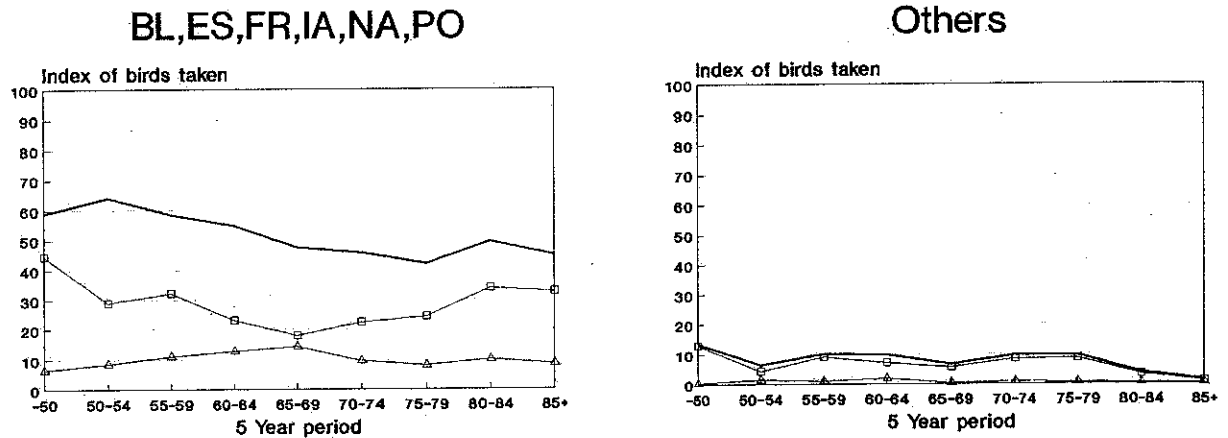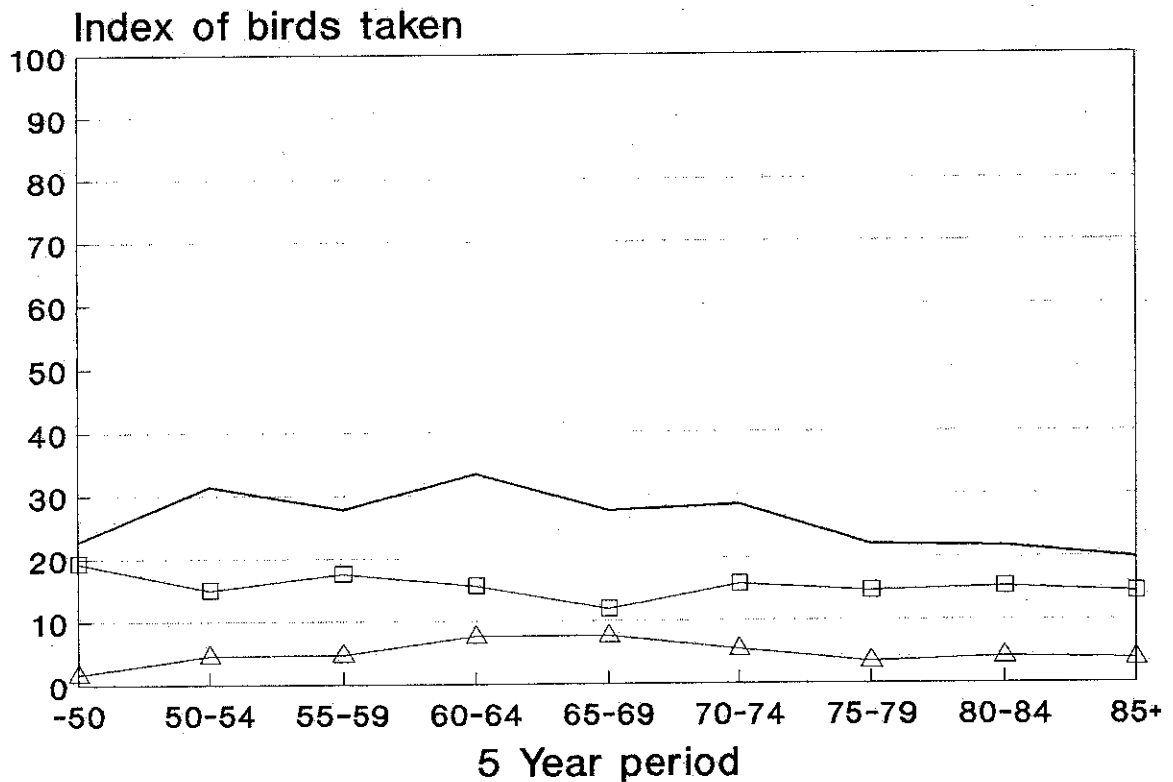
Figure 10.5 Trends in combined 5-yearly indices of Robin
taken in: a) countries, for which data for this species were available,
with a tradition of taking substantial numbers of migratory birds on the
western European flyways (ie BL, ES, FR, IA, NA. PO),
b) other countries and c) all countries. The bold line with symbols
indicates overall index values, triangles indicate values based on birds
reported as shot and squares indicate index values based on birds reported
as trapped. The periods -50 and 85+ refer to all recoveries before 1950
and from 1985 onwards respectively.

Belgium

% of total birds taken

France

% of total birds taken

Portugal

% of total birds taken

Spain

% of total birds taken

North Africa

% of total birds taken

Italy

% of total birds taken
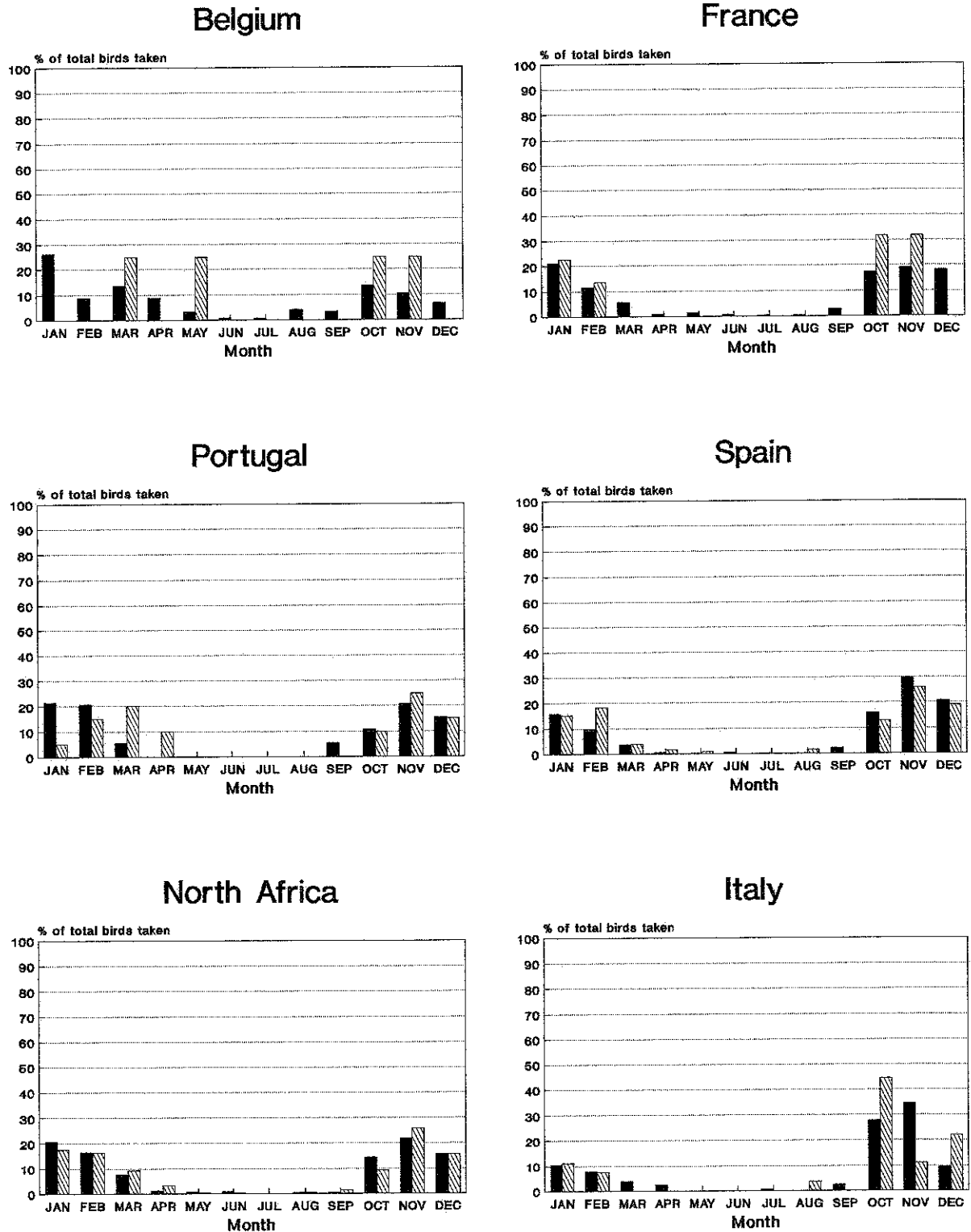
Figure 10.6   Monthly percentages of total   Robin taken in individual countries with high overall indices and sufficient recoveries for analysis.   Solid bars indicate birds from the period before 1980 and hatched bars indicate birds taken from 1980 onwards.

11. REDSTART (PHOENICURUS PHOENICURUS)

11.1 Range

The Redstart is a summer visitor throughout its European range. It is a very widespread breeding species being absent only from Ireland, the western Balkans and the Mediterranean islands other than Sicily (Harrison 1982). The Redstarts that breed in Europe winter in Africa, mainly in the Sahel zone on the southern fringe of the Sahara.

11.2 Population trends

The Redstart declined throughout Europe in the late 1960s, probably as a result of drought conditions on the Sahel wintering grounds. Recovery has been fairly rapid in the United Kingdom but much slower in continental Europe (Hilden and Sharrock 1982, Cramp and Simmons 1988, Marchant et al. 1990). Scandinavian populations have increased in recent years (Hustings 1988, Vaisanen et al. 1989).

11.3 Migration

The migration of Redstarts from Europe in autumn is, for the majority of birds, a south-westerly movement with populations from western and central areas and Scandinavia all passing through Iberia into North Africa (Zink 1981). There is evidence that some Finnish Redstarts take a more easterly route through Italy and the Balkans. There have also been several recoveries of birds from the eastern Baltic and Poland in Italy (Cramp and Simmons 1988). The return migration in spring can bring very large concentrations of Redstarts to north-west Africa.

11.4 Status

The Redstart is fully protected in all E.C. countries and in all non-E.C. Mediterranean countries for which information was available except Malta and Cyprus (Bertelsen and Simonsen 1989, Woldhek 1979).

11.5 Geographical variation in the taking of Redstarts

Prior to 1980 most of the highest indices of Redstarts taken, amongst countries with at least 10 recoveries, were found on both sides of the major Mediterranean crossing-point on the south-west European migration route in Iberia and North Africa (Table 11.2). The largest index of all, however, was that for Italy. Indices for countries north of the Alps were generally low, while those from the eastern Mediterranean were extremely high but based on very small sample-sizes. The greatest proportion of recoveries of birds taken during this period (41%) came from Spain. Morocco (12%) and Portugal (11%) were the other major contributing countries.

In the period from 1980 onwards the highest indices were again found on both sides of the western Mediterranean. The index for Morocco was the highest for any country and was based on 61% of all recoveries of Redstarts taken since 1980. Spain contributed 14% of the total over the same period. To the north of the Mediterranean only Finland produced any recoveries of taken Redstarts but the resultant index remained very low. No recoveries of taken birds were obtained from the eastern Mediterranean during this period.

Recoveries of Redstarts taken in Spain have come mainly from the north and south-west of the country, particularly from the provinces of Navarra, Cordoba, Cadiz, Granada and Jaen. Italian recoveries have mainly been taken in the north (Fig. 11.1a,b).

The indices of birds taken for European breeding populations of Redstarts are generally similar, having an approximate range of 25-35 (Table 11.3, Fig. 11.3). There are no strong regional patterns. Danish birds have the lowest index while British and French populations have the highest. Such differences are difficult to interpret as all western European Redstart populations appear to follow similar migration routes.

11.6 Temporal variation in the taking of Redstarts

From 1980 onwards the index values for most countries were lower than in the previous period, though not significantly. The exceptions were Morocco and Algeria which both had increased indices but, again, the difference was not significant.

Trends in indices of birds taken were examined for Belgium, France, Spain, Portugal, Italy and North Africa. In all but Spain the trend was downward (Fig. 11.4). Regression of index on year failed to reveal a significant relationship for all countries combined or major countries combined. Combination of data for minor countries did produce a significant inverse relationship, however (Table 11.4, Fig. 11.5).

Analysis of the percentage of recoveries of taken Redstarts in each month in the six areas listed above showed that, outwith North Africa, most are taken during autumn migration between August and November, particularly in September and October. In North Africa slightly more Redstarts are taken in spring than in autumn with April and May being the most important months (Table 11.6).

11.7 Methods used to take Redstarts

Redstarts are predominantly taken by trapping. Prior to 1980 65% of recoveries of taken Redstarts could be classified by method used. This figure comprised 47% trapped and 18% shot. Since 1980 72% of all taken recoveries have been classified as trapped and only 4% as shot. In Morocco there was a significant increase in the proportion of Redstarts trapped relative to those shot in the latter period. No significant changes in method were found in any other country.

TABLE 11.1a The distribution of Redstart recoveries due to shooting and trapping before 1980 in relation to their area of origin. The percentage of taken birds recovered in each country is shown for each national ringing scheme. Percentages within parentheses are based on less than ten recoveries.

Country of recovery	UK	CI	NO	SV	DK	SF	DD	DF	NL	BL	FR	ES	IA	HE
GB	(1.4)	–	–	0	0	0	0	0	0	0	0	–	–	0
CI	0	–	–	0	0	0	0	0	0	0	0	–	–	0
ER	0	–	–	0	0	0	0	0	0	0	0	–	–	0
NO	0	–	–	0	0	0	0	(1.7)	0	0	0	–	–	0
SV	0	–	–	0	0	0	(1.3)	(1.1)	0	0	0	–	–	0
DK	0	–	–	0	(15.4)	0	0	0	0	0	0	–	–	0
SF	0	–	–	0	0	(3.8)	0	(1.1)	0	0	0	–	–	0
SU	0	–	–	0	0	(1.3)	0	(0.6)	0	0	0	–	–	0
PL	0	–	–	0	0	0	0	0	0	0	0	–	–	0
DD	0	–	–	0	0	(1.3)	28.0	(0.6)	0	0	0	–	–	0
DF	(1.4)	–	–	0	0·	(1.3)	(2.7)	15.2	0	0	(2.0)	–	–	0
NL	0	–	–	0	0	0	0	0	(23.7)	0	0	–	–	0
BL	0	–	–	0	0	(1.3)	(2.7)	(2.3)	0	(23.1)	(2.0)	–	–	0
KN	0	–	–	0	0	0	0	0	0	0	0	–	–	0
FR	(6.9)	–	–	0	0	3.8	(5.3)	7.3	(7.9)	(7.7)	22.0	–	–	(4.0)
ES	50.7	–	–	(33.3)	(46.2)	39.2	30.7	42.1	31.6	43.6	40.0	–	–	60.0
PO	23.3	–	–	0	0	(2.5)	(10.7)	15.7	(10.5)	(10.3)	(2.0)	–	–	0
IA	(1.4)	–	–	0	0	19.0	(8.0)	(2.3)	0	0	(2.0)	–	–	(12.0)
HE	0	–	–	0	0	0	0	0	0	0	0	–	–	0
AU	0	–	–	0	0	0	0	0	0	0	0	–	–	0
CS	0	–	–	0	0	0	0	0	0	0	0	–	–	0
HG	0	–	–	0	0	0	0	0	0	0	0	–	–	0
RO	0	–	–	0	0	0	0	0	0	0	0	–	–	0
BG	0	–	–	0	0	0	0	0	0	0	0	–	–	0
YG	0	–	–	0	0	(1.3)	0	0	0	0	0	–	–	0
GR	0	–	–	0	0	0	0	(0.6)	0	0	0	–	–	0
TU	0	–	–	0	0	0	0	0	0	0	0	–	–	0
CY	0	–	–	0	0	0	0	0	0	0	0	–	–	0
ML	0	–	–	0	0	0	0	0	0	0	0	–	–	0
SY	0	–	–	0	0	0	0	0	0	0	0	–	–	0
LE	0	–	–	0	0	(1.3)	0	0	0	0	0	–	–	0
IL	0	–	–	0	0	0	0	0	0	0	0	–	–	0
ME	0	–	–	0	0	(1.3)	0	0	0	0	0	–	–	0
EG	0	–	–	0	0	0	0	0	0	0	0	–	–	0
LT	(1.4)	–	–	0	0	0	0	0	0	0	(2.0)	–	–	0
TO	0	–	–	0	0	(5.1)	(1.3)	(0.6)	0	0	0	–	–	0
AG	(5.5)	–	–	0	(7.7)	(6.3)	(1.3)	(1.7)	(2.6)	(2.6)	(6.0)	–	–	(12.0)
MA	(8.2)	–	–	(33.3)	(30.8)	(11.4)	(8.0)	6.7	(23.7)	(12.8)	20.0	–	–	(12.0)
SA	0	–	–	(33.3)	0	0	0	(0.6)	0	0	(2.0)	–	–	0
TOTAL No.	73	–	–	12	13	79	75	178	38	39	50	–	–	25

Note: No data available for Poland, Czechoslovakia or Hungary.

TABLE. 11.1b The distribution of Redstart recoveries due to shooting and trapping from 1980 onwards in relation to their area of origin. The percentage of taken birds recovered in each country is shown for each national ringing scheme. Percentages within parentheses are based on less than ten recoveries.

Country of recovery	Country of ringing													
	UK	CI	NO	SV	DK	SF	DD	DF	NL	BL	FR	ES	IA	HE
GB	0	–	–	0	0	0	0	0	0	0	0	0	0	0
CI	0	–	–	0	0	0	0	0	0	0	0	0	0	0
ER	0	–	–	0	0	0	0	0	0	0	0	0	0	0
NO	0	–	–	0	0	0	0	0	0	0	0	0	0	0
SV	0	–	–	0	0	0	0	0	0	0	0	0	0	0
DK	0	–	–	0	0.	0	0	0	0	0	0	0	0	0
SF	0	–	–	0	0	(8.7)	0	(16.7)	0	0	0	0	0	0
SU	0	–	–	0	0	0	0	0	0	0	0	0	0	0
PL	0	–	–	0	0	0	0	0	0	0	0	0	0	0
DD	0	–	–	0	0	0	0	0	0	0	0	0	0	0
DF	0	–	–	0	0	0	0	0	0	0	0	0	0	0
NL	0	–	–	0	0	0	0	0	0	0	0	0	0	0
BL	0	–	–	0	0	0	0	0	0	0	0	0	0	0
KN	0	–	–	0	0	0	0	0	0	0	0	0	0	0
FR	0	–	–	0	0	0	0	0	0	0	0	0	0	0
ES	(20.0)	–	–	(22.2)	0	(4.4)	(100)	(16.7)	(50.0)	0	0	0	0	0
PO	(13.3)	–	–	0	0	0	0	0	0	0	0	0	0	0
IA	0	–	–	0	0	(4.4)	0	0	0	0	0	0	0	0
HE	0	–	–	0	0	0	0	0	0	0	0	0	0	0
AU	0	–	–	0	0	0	0	0	0	0	0	0	0	0
CS	0	–	–	0	0	0	0	0	0	0	0	0	0	0
HG	0	–	–	0	0	0	0	0	0	0	0	0	0	0
RO	0	–	–	0	0	0	0	0	0	0	0	0	0	0
BG	0	–	–	0	0	0	0	0	0	0	0	0	0	0
YG	0	–	–	0	0	0	0	0	0	0	0	0	0	0
GR	0	–	–	0	0	0	0	0	0	0	0	0	0	0
TU	0	–	–	0	0	0	0	0	0	0	0	0	0	0
CY	0	–	–	0	0	0	0	0	0	0	0	0	0	0
ML	0	–	–	0	0	0	0	0	0	0	0	0	0	0
SY	0	–	–	0	0	0	0	0	0	0	0	0	0	0
LE	0	–	–	0	0	0	0	0	0	0	0	0	0	0
IL	0	–	–	0	0	0	0	0	0	0	0	0	0	0
ME	0	–	–	0	0	0	0	0	0	0	0	0	0	0
EG	0	–	–	0	0	0	0	0	0	0	0	0	0	0
LT	0	–	–	0	0	0	0	0	0	0	0	0	0	0
TO	0	–	–	0	0	(17.4)	0	0	0	0	0	0	0	0
AG	0	–	–	0	(100)	(17.4)	0	0	0	0	0	(100)	0	0
MA	66.7	–	–	(77.8)	0	47.8	0	(66.7)	(50.0)	(100)	(100)	0	(100)	(100)
SA	0	–	–	0	0	–	0	0	0	0	0	0	0	0
TOTAL No.	15	–	–	9	1	23	1	6	4	1	3	2	1	2

Note: No data available for Poland, Czechoslovakia or Hungary.

TABLE.11.2. Redstart: Indices of birds taken before 1980 and from 1980 onwards for each country of recovery.

	Index (all methods)[a]		% hunted[b]		Total recoveries[c]		Shooting Index[a]		Trapping Index[a]		G test[d]
	-1980	1980+	-1980	1980+	-1980	1980+	-1980	1980+	-1980	1980+	
GB	2.5	0	1.1	0	93	42	0	0	2.5	0	
CI	(0)	-	0	-	4	-	(0)	-	(0)	-	
ER	-	-	-	-	-	-	-	-	-	-	
NO	15.0	(0)	9.7	0	31	4	5.0	(0)	10.0	(0)	
SV	9.7	0	6.8	0	44	43	0	0	9.7	0	
DK	11.8	0	2.9	0	69	18	11.8	0	0	0	
SF	5.2	6.5	3.6	3.4	138	88	0	0	5.2	6.5	
SU	(37.5)	(0)	27.3	0	11	3	(12.5)	(0)	(12.5)	(0)	
PL	(0)	(0)	0	0	6	4	(0)	(0)	(0)	(0)	
DD	11.9	(0)	10.8	0	213	3	0	(0)	11.9	(0)	
DF	10.2	0	8.1	0	395	20	0.6	0	9.3	0	
NL	10.3	0	7.8	0	116	29	0	0	8.1	0	
BL	27.9	(0)	14.2	0	120	21	0	(0)	21.3	(0)	
KN	(0)	-	0	-	3	-	(0)	-	(0)	-	
FR	28.9	0	21.7	0	198	16	2.7	0	7.4	0	
ES	75.2	66.7	72.2	55.6	335	18	18.0	0	25.5	60.0	
PO	69.6	(66.7)	66.0	66.7	97	3	13.0	(33.3)	38.0	(33.3)	
IA	82.1	(50.0)	82.1	33.3	39	3	18.0	(0)	18.0	(0)	
HE	0	-	0	-	50	-	0	-	0	-	
AU	(0)	(0)	0	0	9	1	(0)	(0)	(0)	(0)	
CS	(0)	-	0	-	6	-	(0)	-	(0)	-	
HG	(0)	-	0	-	1	-	(0)	-	(0)	-	
RO	-	-	-	-	-	-	-	-	-	-	
BG	-	-	-	-	-	-	-	-	-	-	
YG	(100)	-	100.0	-	1	-	(0)	-	(100.0)	-	
GR	(100)	-	100.0	-	2	-	(100.0)	-	(0)	-	
TU	-	-	-	-	-	-	-	-	-	-	
CY	-	-	-	-	-	-	-	-	-	-	
ML	-	-	-	-	-	-	-	-	-	-	
SY	-	-	-	-	-	-	-	-	-	-	
LE	(100)	-	100.0	-	1	-	(100.0)	-	(0)	-	
IL	-	-	-	-	-	-	-	-	-	-	
ME	(100)	-	100.0	-	1	-	(0)	-	(0)	-	
EG	-	-	-	-	-	-	-	-	-	-	
LT	(66.7)	-	66.7	-	3	-	(0)	-	(33.3)	-	
TO	68.8	(80.0)	55.0	80.0	20	5	6.3	(0)	31.3	(60.0)	
AG	66.7	58.3	57.9	53.9	38	13	6.1	0	42.4	33.3	
MA	60.9	73.7	57.4	66.7	122	63	10.4	3.5	31.3	52.6	*
SA	(75.0)	-	75.0	-	4	-	(25.0)	-	(0)	-	

[a]   See chapter 2 (methods) for derivation of indices. Indices derived from less than 10 recoveries are indicated within parentheses.   Fisher's exact tests (Sokal & Rohlf 1981) were used to compare the proportions taken in each period. Significance levels ($* < 0.05$; $** < 0.01$; $*** < 0.001$) of the tests are indicated in column 1980+. Tests were carried out on all pairs except where indices were based on less than 10 recoveries.

[b]   Percentage of all recoveries other than those excluded on the basis of poor quality data (see chapter 2) taken by shooting and trapping.

[c]   Total number of recoveries other than those excluded on the basis of poor quality data.

[d]   G test (Sokal & Rohlf 1981) comparison between periods of the proportions of birds taken according to the classes shot, trapped, and shot or trapped. Significance levels of these comparisons are indicated as above. 'NS' indicates non-significant results where tests were carried out. Comparisons were not made where the expected frequency in any cell was less than 10.

Table.11.3. Redstart : Indices of birds taken for each breeding population (across all years).

Breeding Population		Index of birds taken	Sample size
UK	United Kingdom	44.4	124
CI	Channel Islands	-	-
NO	Norway	-	-
SV	Sweden	34.7	49
DK	Denmark	17.1	35
SF	Finland	32.1	237
SU	USSR (Lithuania only)	-	-
PL	Poland	-	-
DD	East Germany	27.0	252
DF	West Germany	30.2	454
NL	Holland	25.7	136
BL	Belgium	28.2	103
FR	France	42.3	97
ES	Spain	0	2
IA	Italy	-	-
HE	Switzerland	28.6	70
CJ	Czechoslovakia	-	-
HG	Hungary	-	-

Table 11.4 Regression analysis of temporal trends in the indices of Redstarts taken.

Country of recovery	Intercept	Slope	t	P
Major	65.9	-0.09	-0.67	ns
Other	28.1	-0.32	-5.00	**
All	50.2	-0.25	-1.12	ns

All regressions used a weighted technique where each 5-year index was weighted by the square root of the sample size.

Countries where 10 or more recoveries occurred in each year after 1950 were analysed. Data from the period before 1950 were not included in the analysis.

Major countries are those with a tradition of taking substantial numbers of birds that use western migration routes.
(i.e. BL, FR, ES, PO, IA, NA).

Significance levels indicated are: NS Not significant; * P<0.05; ** P<0.01; *** P<0.001.

Figure 11.1a Total numbers of Redstart ringing recoveries resulting from birds taken before 1980 in each 30' by 60' grid square. ** Indicates numbers greater than 99. 10 recoveries were outside the limits of the map.
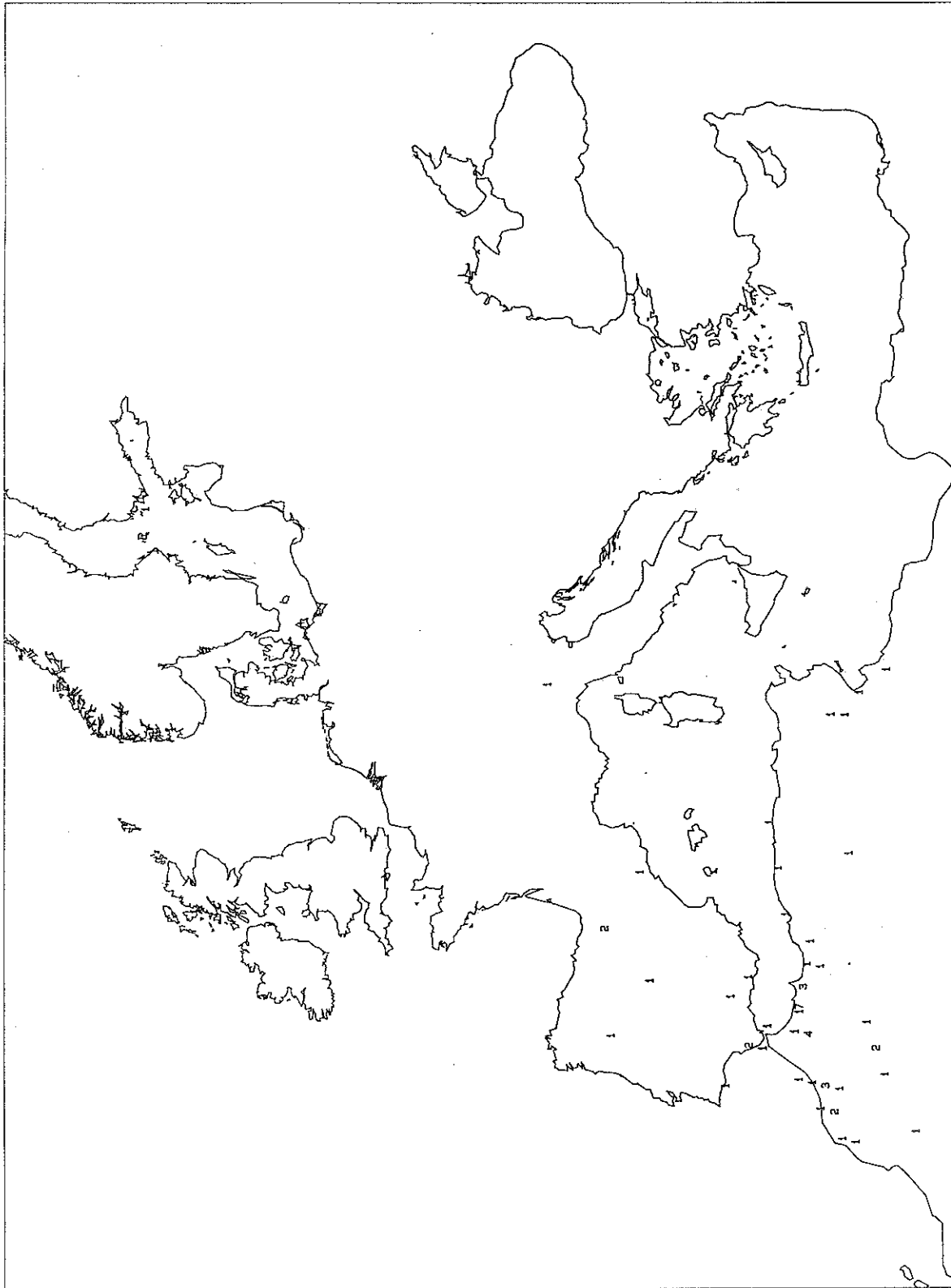
Figure 11.1b Total numbers of Redstart ringing recoveries resulting from birds taken from 1980 onwards in each 30' by 60' grid square. ** Indicates numbers greater than 99. 2 recoveries were outside the limits of the map.
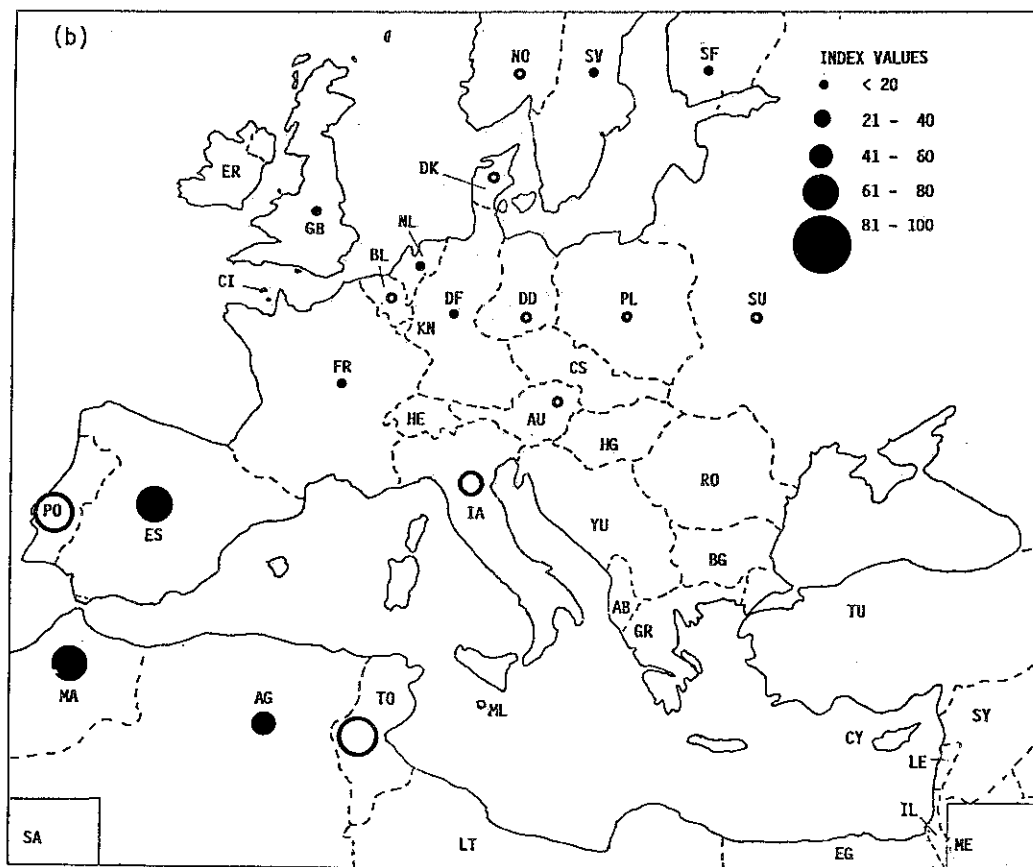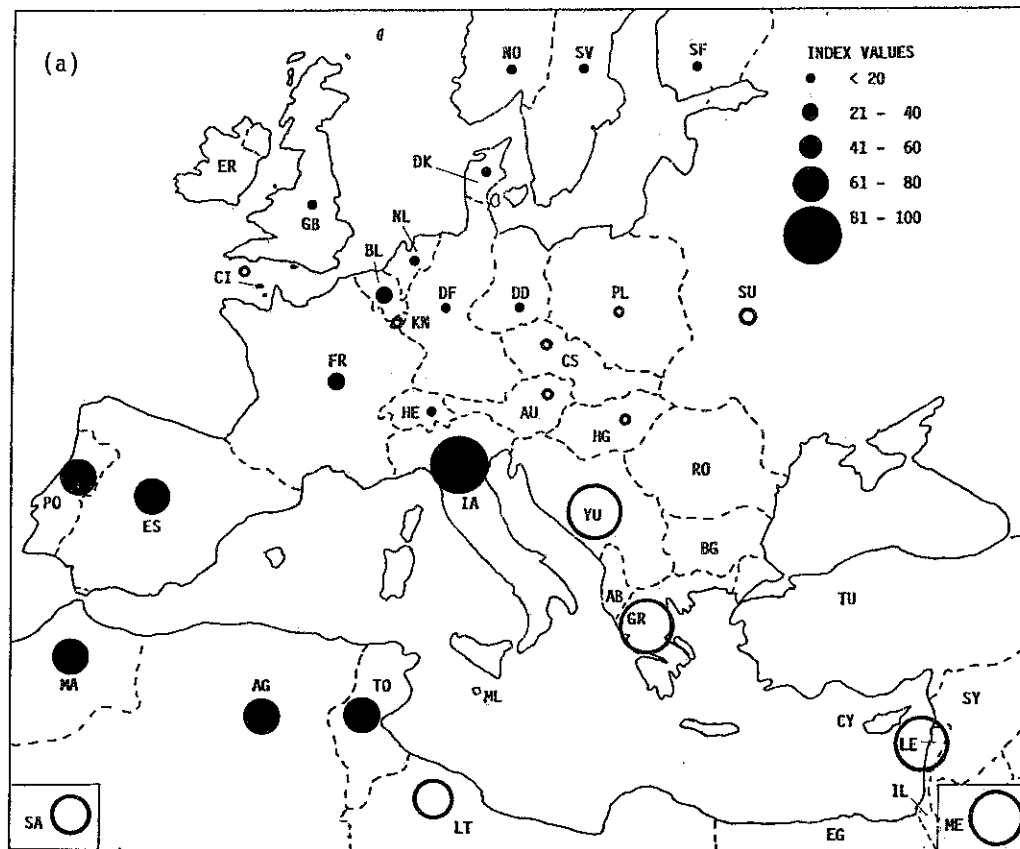
Figure 11.2 Geographical variation in the indices of Redstart
taken for each country of recovery in the period before 1980 (a) and from
1980 onwards (b). Solid circles indicate values derived from more than 10
recoveries and open circles indicate those derived from less than 10.
Country codes are indicated in Table 2,4 of the Methods.
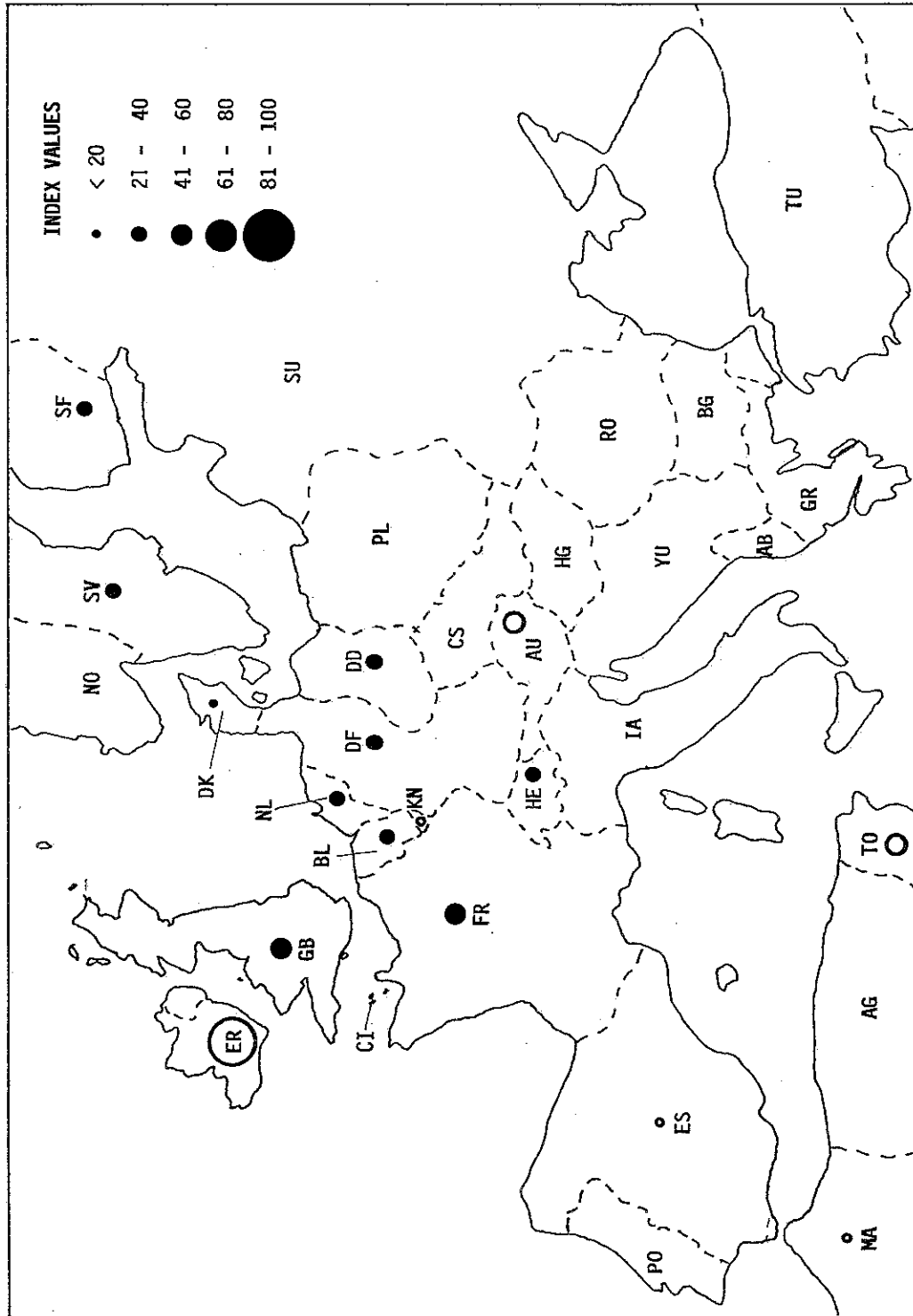
Figure 11.3 Geographical variation in the indices of Redstart taken over all years for each breeding population. Solid circles indicate values derived from more than 10 recoveries and open circles indicate those derived from less than 10.   Country codes are indicated in Table 2.4 of the Methods.

Belgium

Index of birds taken

5 Year period

France

Index of birds taken

5 Year period

Portugal

Index of birds taken

5 Year period

Spain

Index of birds taken

5 Year period

North Africa

Index of birds taken

5 Year period

Italy

Index of birds taken

5 Year period
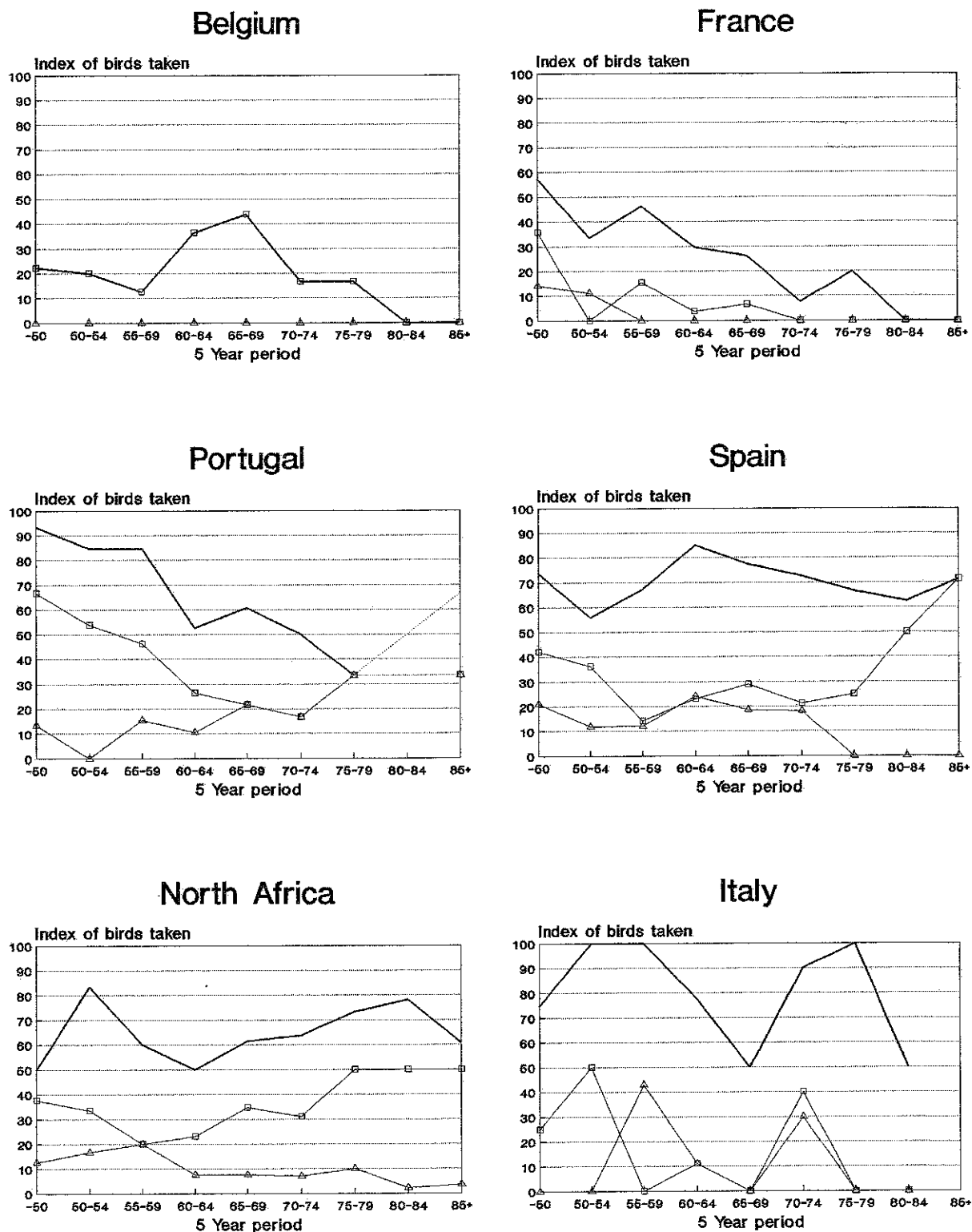
Figure 11.4   Trends in 5-yearly indices of Redstart taken in individual countries
with high overall indices and sufficient recoveries for analysis.   The bold line without
symbols indicates overall index values, triangles indicate index values based on birds
reported as shot and squares indicate index values based on birds reported as trapped.
The periods -50 and 85+ refer to all recoveries before 1950 and from 1985 onwards
respectively.

BL,ES,FR,IA,NA,PO

Others
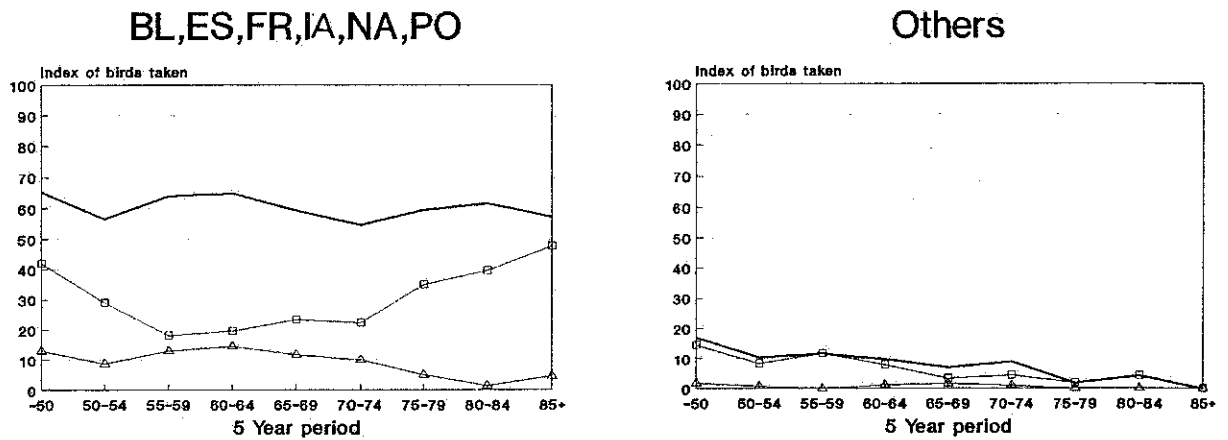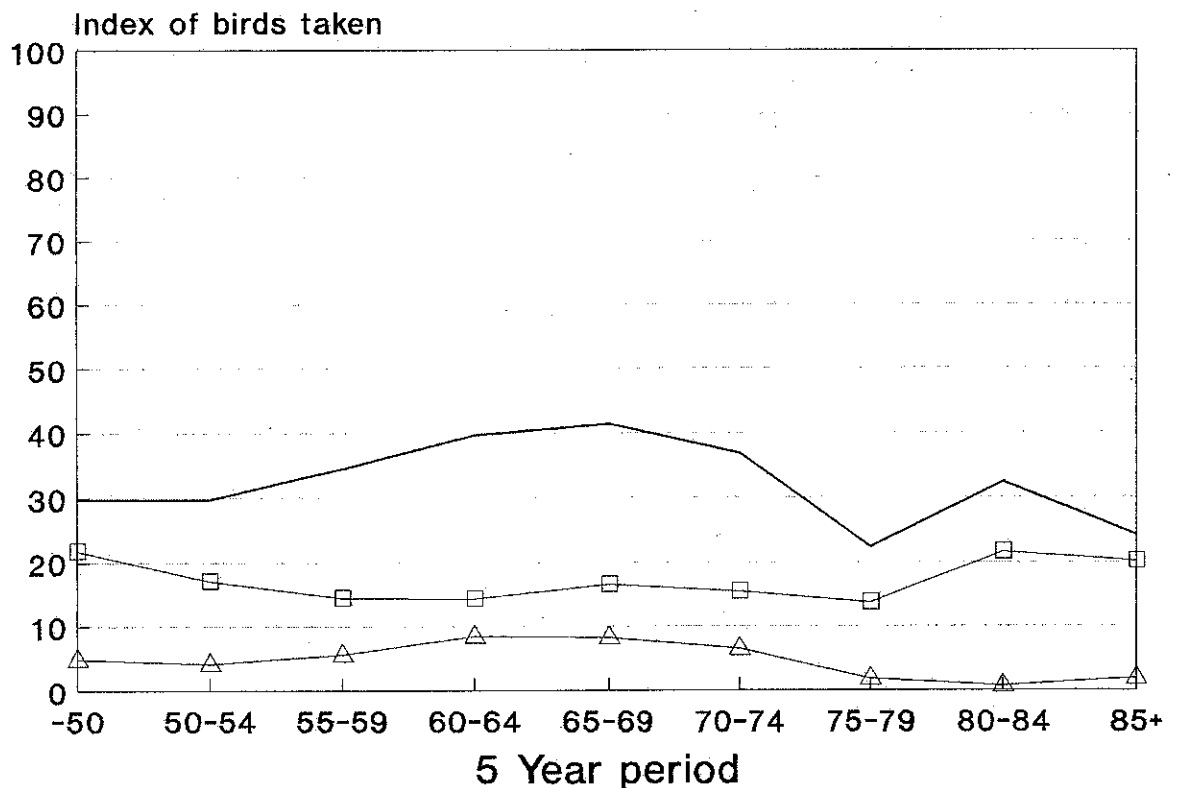
All countries

Figure 11.5 Trends in combined 5-yearly indices of Restart
taken in: a) countries, for which data for this species were available,
with a tradition of taking substantial numbers of migratory birds on the
western European flyways (ie BL, ES, FR, IA, NA. PO),
b) other countries and c) all countries. The bold line with symbols
indicates overall index values, triangles indicate values based on birds
reported as shot and squares indicate index values based on birds reported
as trapped. The periods -50 and 85+ refer to all recoveries before 1950
and from 1985 onwards respectively.

Belgium

% of birds taken

100
90
80
70
60
50
40
30
20
10
0

JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
Month

France

% of birds taken

100
90
80
70
60
50
40
30
20
10
0

JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
Month

Portugal

% of birds taken

100
90
80
70
60
50
40
30
20
10
0

JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
Month

Spain

% of birds taken

100
90
80
70
60
50
40
30
20
10
0

JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
Month

North Africa

% of birds taken

100
90
80
70
60
50
40
30
20
10
0

JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
Month

Italy

% of birds taken

100
90
80
70
60
50
40
30
20
10
0

JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
Month
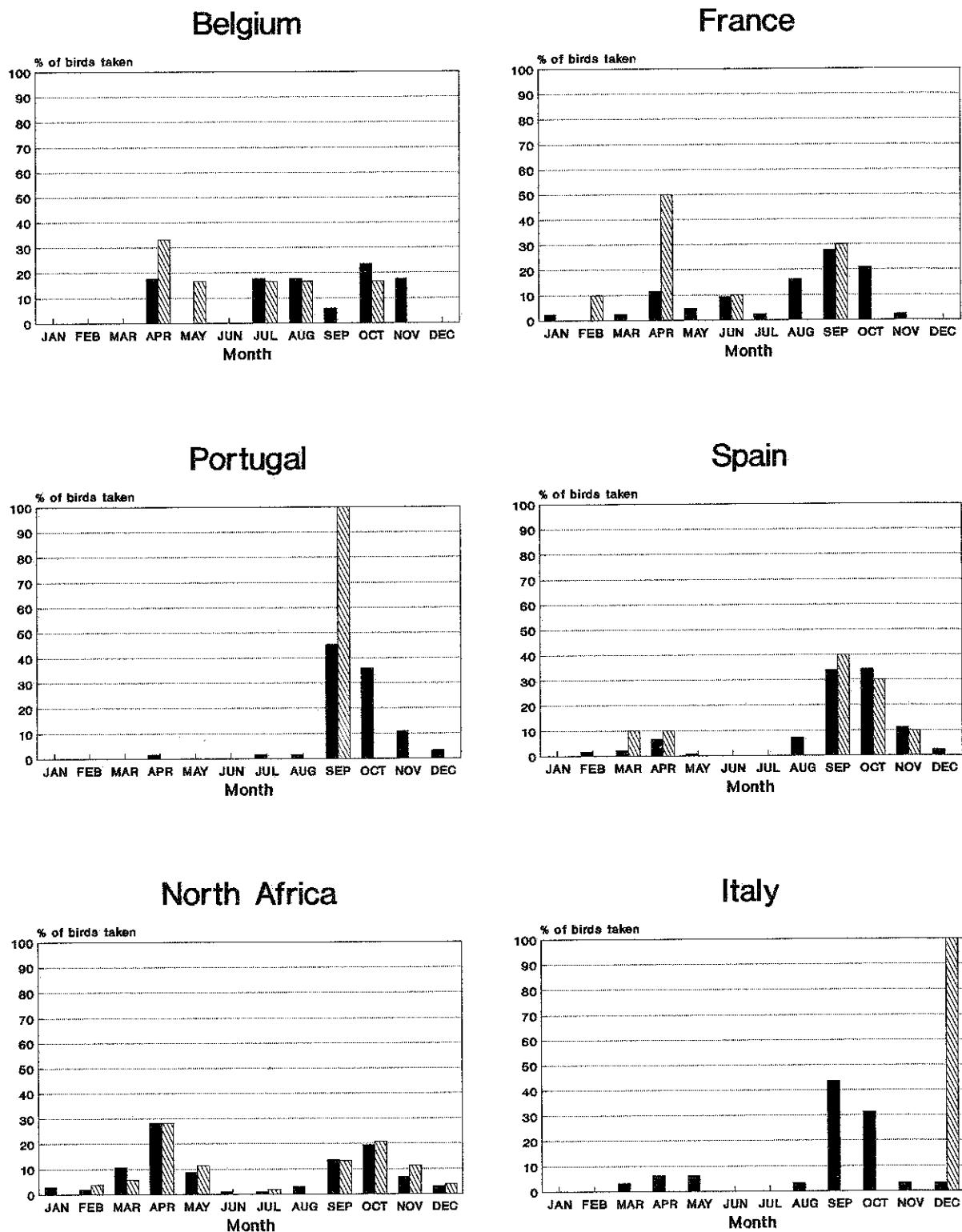
Figure 11.6   Monthly percentages of total   Redstart taken in individual countries with high overall indices and sufficient recoveries for analysis.   Solid bars indicate birds from the period before 1980 and hatched bars indicate birds taken from 1980 onwards.

12. WHEATEAR (OENANTHE OENANTHE)

12.1 Range

The Wheatear occurs in Europe only as a summer visitor. It is one of the earliest migrants to arrive in spring and has an extensive breeding range including every European country and extending from northernmost Scandinavia to the Mediterranean. The species is most numerous in the north and east. Wheatears winter in Africa, mostly south of the Sahara.

12.2 Population trends

A decline in Wheatear numbers has been reported from many parts of northern and central Europe (Cramp and Simmons 1988). This trend is not ubiquitous, however. Numbers have increased since the 1970s in northern parts of the British Isles (Marchant et al. 1990) and numbers in Sweden appear to fluctuate within relatively stable limits (Hustings 1988).

12.3 Migration

The autumn migration of the Wheatear towards Africa is predominantly a south-westerly movement for all European populations (Cramp and Simmons 1988). As a result of this, large numbers of Wheatears from north-west and central Europe and Scandinavia are channelled through France and Iberia, though some may take a slightly more easterly route through Italy (Zink 1973). The most easterly populations also have a strong westerly component to their migration route and, consequentially, Wheatears tend to cross the Mediterranean along a broad front rather than at a small number of narrow points (Moreau 1961). Some Wheatears initially migrate in a south-easterly direction. These are birds from the British Isles, Iceland and Greenland which, on reaching the west coast of the continent, join the main migration stream through France and Spain (Cramp and Simmons 1988).

12.4 Status

The Wheatear is fully protected in all E.C. countries (Bertelsen and Simonsen 1989). Woldhek (1979) found taking of Wheatears to be permitted only in Malta and Cyprus among non-E.C. Mediterranean countries.

12.5 Geographical variation in the taking of Wheatears

In the period before 1980 the highest indices of Wheatears taken occurred, as might be expected, in the areas receiving the greatest numbers of Wheatears on passage: south-west Europe and North Africa (Table 12.2). The index values for Italy, Spain, Portugal, Algeria and Morocco were all greater than 70, that for Italy being the highest. The index for France was of intermediate value between those of Iberia and the generally much lower indices

of more northerly countries. There was very little data from the eastern Mediterranean. During this period Spain provided 25% of all recoveries of taken Wheatears. In addition, France, Morocco and Italy all contributed more than 10% of the total.

The relative magnitude of the various countries' indices was similar from 1980 onwards. In this period Morocco provided the majority of taken recoveries (57%) with Spain and Algeria providing 17% and 14% respectively but in most countries sample sizes were very small.

Within Europe most recoveries of taken Wheatears have come from the western end of the Pyrenees, south-west Spain and north-east Italy (Fig. 12.1a,b).

The indices of birds taken for most European Wheatear populations with at least 10 recoveries are moderately high at around 40-60 in most cases (Table 12.3, Fig. 12.3). The index values of north-western populations (United Kingdom, Belgium, Netherlands) are, on average, higher than those of more easterly breeding birds (Germany, Finland). It is possible that this could be because of subtle differences in migration route.

12.6 Temporal variation in the taking of Wheatears

Although the index of Wheatears taken was lower from 1980 onwards than in the earlier period for most countries sample-sizes tended to be very small and none of the reductions was significant (Table 12.2). Similarly, regression of index on year failed to show any relationship between index value and year in those countries where most Wheatears were taken (Fig. 12.4, Fig. 12.5). When these were excluded from the analysis, however, a significant negative relationship was revealed (Table 12.4). This suggests that, away from south-west Europe and North Africa, the taking of Wheatears has declined over the last 40 years.

Analysis of the percentage of taken Wheatears recovered in each month in France, Spain, Italy and North Africa showed that, in southern Europe, most are taken during autumn migration between August and October, while in North Africa approximately equal numbers of birds are taken in spring and autumn. April and May are the two most important months in spring (Fig. 12.6).

12.7 Methods used to take Wheatears

Most Wheatears are taken by trapping. Prior to 1980 62% of recoveries of taken Wheatears could be classified by method used. These comprised 37% trapped and 25% shot. Since 1980 the precision of reporting the method used to take birds has improved and during that period 83% of taken Wheatears were trapped and 14% were shot. No significant changes in the relative proportions of birds taken by each method between the two periods was found in any country.

TABLE 12.1a The distribution of Wheatears recovered due to shooting and trapping before 1980 in relation to their area of origin. The percentage of taken birds recovered in each country is shown for each national ringing scheme. Percentages within parentheses are based on less than ten recoveries.

Country of recovery	Country of ringing													
	UK	CI	NO	SV	DK	SF	DD	DF	NL	BL	FR	ES	IA	HE
GB	(1.6)	0	–	0	0	0	0	0	0	0	(20.0)	–	0	–
CI	0	0	–	0	0	0	0	0	0	0	0	–	0	–
ER	0	0	–	0	0	0	0	0	0	0	0	–	0	–
NO	0	0	–	0	0	0	0	0	0	0	0	–	0	–
SV	0	0	–	0	0	0	0	0	0	0	0	–	0	–
DK	0	0	–	0	0	(3.6)	0	0	0	0	0	–	0	–
SF	0	0	–	0	0	0	0	0	0	0	0	–	0	–
SU	0	0	–	0	0	0	0	0	0	0	0	–	0	–
PL	0	0	–	0	0	0	0	0	0	0	0	–	0	–
DD	0	0	–	0	0	0	(30.0)	0	0	0	0	–	0	–
DF	0	0	–	0	0	0	0	(33.3)	0	0	0	–	0	–
NL	0	0	–	0	0	0	0	0	0	0	0	–	0	–
BL	0	0	–	0	0	0	0	0	0	(14.3)	0	–	0	–
KN	0	0	–	0	0	0	0	(4.2)	0	0	0	–	0	–
FR	20.3	0	–	0	0	(14.3)	(50.0)	(29.2)	(33.3)	(14.3)	0	–	0	–
ES	37.5	(100)	–	0	(100)	(3.6)	(10.0)	(12.5)	(16.7)	(42.9)	(60.0)	–	0	–
PO	(10.9)	0	–	0	0	0	0	0	0	(14.3)	0	–	0	–
IA	0	0	–	(33.3)	0	50.0	(10.0)	(8.3)	0	0	0	–	0	–
HE	0	0	–	0	0	0	0	0	0	0	0	–	0	–
AU	0	0	–	0	0	0	0	0	0	0	0	–	0	–
CS	0	0	–	0	0	0	0	0	0	0	0	–	0	–
HG	0	0	–	0	0	0	0	0	0	0	0	–	0	–
RO	0	0	–	0	0	0	0	0	0	0	0	–	0	–
BG	0	0	–	0	0	0	0	0	0	0	0	–	0	–
YG	0	0	–	0	0	0	0	0	0	0	0	–	0	–
GR	0	0	–	(33.3)	0	0	0	0	0	0	0	–	0	–
TU	0	0	–	0	0	0	0	0	0	0	0	–	0	–
CY	0	0	–	0	0	0	0	0	0	0	0	–	0	–
ML	0	0	–	0	0	0	0	(4.2)	0	0	0	–	0	–
SY	0	0	–	0	0	0	0	0	0	0	0	–	0	–
LE	0	0	–	0	0	0	0	0	0	0	0	–	0	–
IL	0	0	–	0	0	0	0	0	0	0	0	–	0	–
ME	0	0	–	0	0	0	0	0	0	0	0	–	0	–
EG	0	0	–	0	0	0	0	0	0	0	0	–	0	–
LT	0	0	–	0	0	0	0	0	0	0	0	–	0	–
TO	0	0	–	0	0	(7.1)	0	0	0	0	0	–	0	–
AG	(3.1)	0	–	0	0	(14.3)	0	0	(16.7)	(14.3)	0	–	(100)	–
MA	26.6	0	–	(33.3)	0	(3.6)	0	(8.3)	(33.3)	0	(20.0)	–	0	–
SA	0	0	–	0	0	0	0	0	0	0	0	–	0	–
TOTAL No.	64	1	–	3	2	28	10	24	6	7	5	–	1	–

Note: No data available for Poland, Czechoslovakia or Hungary.

TABLE 12.1b The distribution of Wheatears recovered due to shooting and trapping from 1980 onwards in relation to their area of origin. The percentage taken birds recovered in each country is shown for each national ringing scheme. Percentages within parentheses are based on less than ten recoveries.

Country of recovery	UK	CI	NO	SV	DK	SF	DD	DF	NL	BL	FR	ES	IA	HE
GB	(4.2)	–	–	0	–	0	–	0	0	0	–	–	0	–
CI	0	–	–	0	–	0	–	0	0	0	–	–	0	–
ER	0	–	–	0	–	0	–	0	0	0	–	–	0	–
NO	0	–	–	0	–	0	–	0	0	0	–	–	0	–
SV	0	–	–	0	–	0	–	0	0	0	–	–	0	–
DK	0	–	–	0	–	0	–	0	0	0	–	–	0	–
SF	0	–	–	0	–	0	–	0	0	0	–	–	0	–
SU	0	–	–	0	–	0	–	0	0	0	–	–	0	–
PL	0	–	–	0	–	0	–	0	0	0	–	–	0	–
DD	0	–	–	0	–	0	–	0	0	0	–	–	0	–
DF	0	–	–	0	–	0	–	0	0	0	–	–	0	–
NL	0	–	–	0	–	0	–	0	0	0	–	–	0	–
BL	0	–	–	0	–	0	–	0	0	0	–	–	0	–
KN	0	–	–	0	–	0	–	0	0	0	–	–	0	–
FR	(4.2)	–	–	(50.0)	–	0	–	0	0	0	–	–	0	–
ES	(20.8)	–	–	0	–	0	–	0	(25.0)	0	–	–	0	–
PO	0	–	–	0	–	0	–	0	0	0	–	–	0	–
IA	0	–	–	0	–	0	–	0	0	0	–	–	(50.0)	–
HE	0	–	–	0	–	0	–	0	0	0	–	–	0	–
AU	0	–	–	0	–	0	–	0	0	0	–	–	0	–
CS	0	–	–	0	–	0	–	0	0	0	–	–	0	–
HG	0	–	–	0	–	0	–	0	0	0	–	–	0	–
RO	0	–	–	0	–	0	–	0	0	0	–	–	0	–
BG	0	–	–	0	–	0	–	0	0	0	–	–	0	–
YG	0	–	–	0	–	0	–	0	0	0	–	–	0	–
GR	0	–	–	0	–	0	–	0	0	0	–	–	0	–
TU	0	–	–	0	–	0	–	0	0	0	–	–	0	–
CY	0	–	–	0	–	0	–	0	0	0	–	–	0	–
ML	0	–	–	0	–	0	–	0	0	0	–	–	0	–
SY	0	–	–	0	–	0	–	0	0	0	–	–	0	–
LE	0	–	–	0	–	0	–	0	0	0	–	–	0	–
IL	0	–	–	0	–	0	–	0	0	0	–	–	0	–
ME	0	–	–	0	–	0	–	0	0	0	–	–	0	–
EG	0	–	–	0	–	0	–	0	0	0	–	–	0	–
LT	0	–	–	0	–	0	–	0	0	0	–	–	0	–
TO	0	–	–	0	–	0	–	0	0	0	–	–	0	–
AG	(8.3)	–	–	(50.0)	–	0	–	(100)	0	0	–	–	(50.0)	–
MA	62.5	–	–	0	–	(100)	–	0	(75.0)	(100)	–	–	0	–
SA	0	–	–	0	–	0	–	0	0	0	–	–	0	–
TOTAL No.	24	–	–	2	–	1	–	1	4	1	–	–	2	–

Note: No data available for Poland, Czechoslovakia or Hungary.

TABLE.12.2 WHEATEAR: Indices of birds taken before 1980 and from 1980 onwards for each country of recovery.

	Index (all methods)[a]		% hunted[b]		Total recoveries[c]		Shooting Index[a]		Trapping Index[a]		G test[d]
	-1980	1980+	-1980	1980+	-1980	1980+	-1980	1980+	-1980	1980+	
GB	3.9	4.8	2.8	2.3	71	39	0	0	1.9	(4.8)	-
CI	-	-	0	0	1	2	-	-	-	-	-
ER	-	-	-	-	-	-	-	-	-	-	-
NO	(0)	-	0	-	4	-	(0)	-	(0)	-	-
SV	0	(0)	0	0	8	2	0	(0)	0	(0)	-
DK	(33.3)	-	20.0	0	5	2	(0)	-	(0)	-	-
SF	(0)	(0)	0	0	54	16	(0)	(0)	(0)	(0)	-
SU	(0)	-	0	-	2	-	(0)	-	(0)	-	-
PL	-	-	-	-	-	-	-	-	-	-	-
DD	12.5	(0)	12.5	0	24	2	0	(0)	12.5	(0)	-
DF	23.5	-	20.0	-	40	-	0	-	25.3	-	-
NL	(0)	(0)	0	0	16	15	(0)	(0)	(0)	(0)	-
BL	(25.0)	-	7.1	0	14	1	(0)	-	(25.0)	-	-
KN	(100.0)	-	100	-	1	-	(0)	-	(100.0)	-	-
FR	49.2	(50.0)	43.2	50.0	74	4	21.5	(0)	4.6	(50.0)	-
ES	79.6	100	76.5	100.0	51	6	18.4	(66.7)	30.6	(33.3)	-
PO	80.0	-	80.0	-	10	-	20.0	-	30.0	-	-
IA	87.0	(100)	83.3	100	24	1	43.5	(0)	43.5	(100.0)	-
HE	-	-	0	-	1	-	-	-	-	-	-
AU	(0)	-	0	-	1	-	(0)	-	(0)	-	-
CS	(0)	-	0	-	1	-	(0)	-	(0)	-	-
HG	-	-	-	-	-	-	-	-	-	-	-
RO	-	-	-	-	-	-	-	-	-	-	-
BG	-	-	-	-	-	-	-	-	-	-	-
YG	-	-	-	-	-	-	-	-	-	-	-
GR	(100.0)	-	100.0	-	1	-	(100.0)	-	(0)	-	-
TU	-	-	-	-	-	-	-	-	-	-	-
CY	-	-	-	-	-	-	-	-	-	-	-
ML	(100.0)	-	100.0	-	1	-	(0)	-	(100.0)	-	-
SY	-	-	-	-	-	-	-	-	-	-	-
LE	-	-	-	-	-	-	-	-	-	-	-
IL	-	-	-	-	-	-	-	-	-	-	-
ME	-	-	-	-	-	-	-	-	-	-	-
EG	-	-	-	-	-	-	-	-	-	-	-
LT	-	-	-	-	-	-	-	-	-	-	-
TO	(66.7)	(0)	66.7	0	3	1	(0)	(0)	(0)	(0)	-
AG	75.0	(71.4)	75.0	71.4	12	7	0	(0)	33.3	(57.1)	-
MA	72.2	50.0	70.3	50.0	37	40	5.6	2.5	41.7	47.5	-
SA	-	-	-	-	-	-	-	-	-	-	-

[a]   See chapter 2 (methods) for derivation of indices. Indices derived from less than 10 recoveries are indicated within parentheses.   Fisher's exact tests (Sokal & Rohlf 1981) were used to compare the proportions taken in each period. Significance levels (*<0.05; ** <0.01; *** <0.001) of the tests are indicated in column 1980+. Tests were carried out on all pairs except where indices were based on less than 10 recoveries.

[b]   Percentage of all recoveries other than those excluded on the basis of poor quality data (see chapter 2) taken by shooting and trapping.

[c]   Total number of recoveries other than those excluded on the basis of poor quality data.

[d]   G test (Sokal & Rohlf 1981) comparison between periods of the proportions of birds taken according to the classes shot, trapped, and shot or trapped. Significance levels of these comparisons are indicated as above. 'NS' indicates non-significant results where tests were carried out. Comparisons were not made where the expected frequency in any cell was less than 10.

Table.12.3. Wheatear : Indices of birds taken for each breeding population (across all years).

Breeding Population		Index of birds taken	Sample size
UK	United Kingdom	43.3	178
CI	Channel Islands	-	-
NO	Norway	-	-
SV	Sweden	57.1	7
DK	Denmark	100	2
SF	Finland	33.3	78
SU	USSR (Lithuania only)	-	-
PL	Poland	-	-
DD	East Germany	26.7	30
DF	West Germany	32.0	50
NL	Holland	45.5	22
BL	Belgium	54.6	11
FR	France	33.3	6
ES	Spain	0	1
IA	Italy	60.0	5
HE	Switzerland	0	2
CJ	Czechoslovakia	-	-
HG	Hungary	-	-

Table 12.4 **Regression analysis of temporal trends in the indices of Wheatears taken.**

Country of recovery	Intercept	Slope	t	P
Major	76.7	-0.18	-0.40	ns
Other	37.6	-0.40	-2.83	*
All	40.9	-0.02	-0.08	ns

All regressions used a weighted technique where each 5-year index was weighted by the square root of the sample size.

Countries where 10 or more recoveries occurred in each year after 1950 were analysed. Data from the period before 1950 were not included in the analysis.

Major countries are those with a tradition of taking substantial numbers of birds that use western migration routes.
(i.e. BL, FR, ES, PO, IA, NA).

Significance levels indicated are: NS Not significant; * P<0.05; ** P<0.01; *** P<0.001.

Figure 12.1a   Total numbers of Wheatear ringing recoveries resulting from birds taken before 1980 in each 30' by 60' grid square.   ** Indicates numbers greater than 99.   3 recoveries were outside the limits of the map.

Figure 12.1b   Total numbers of Wheatear ringing recoveries from birds taken from 1980 onwards
in each 30' by 60' grid square.   ** Indicates numbers greater than 99.   1 recovery   was   outside
the limits of the map.
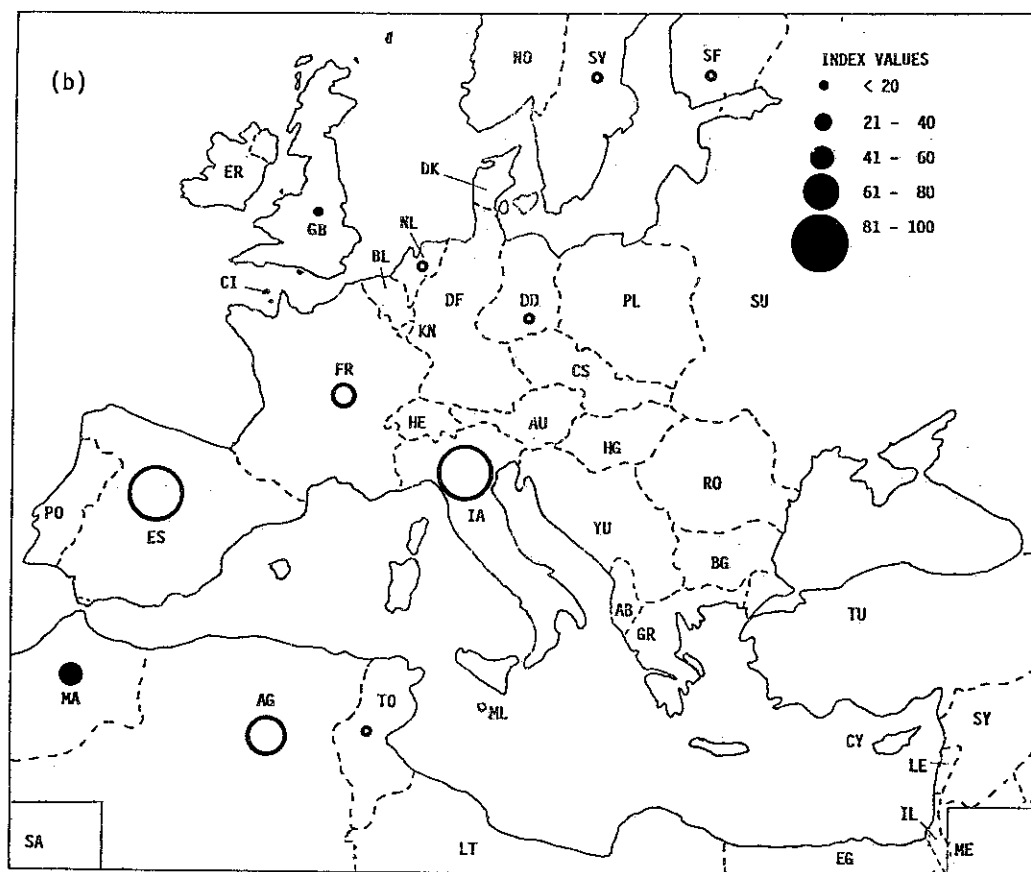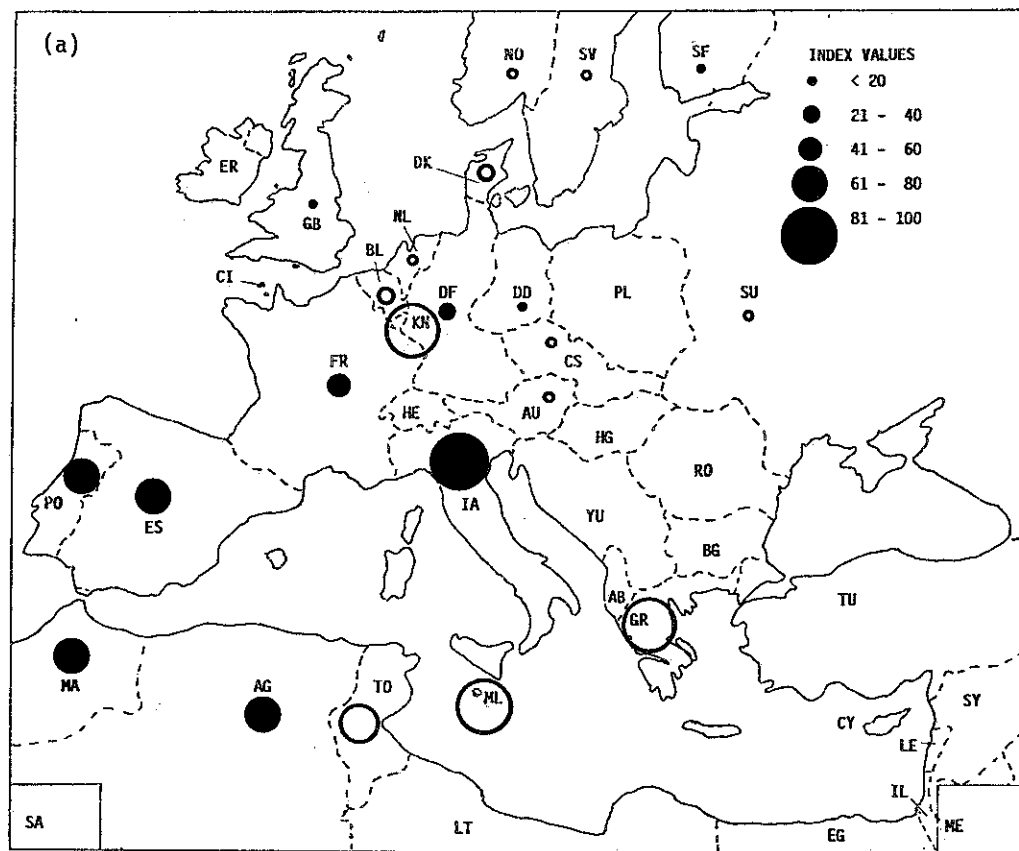
Figure 12.2 Geographical variation in the indices of Wheatear taken for each country of recovery in the period before 1980 (a) and from 1980 onwards (b). Solid circles indicate values derived from more than 10 recoveries and open circles indicate those derived from less than 10. Country codes are indicated in Table 2,4 of the Methods.
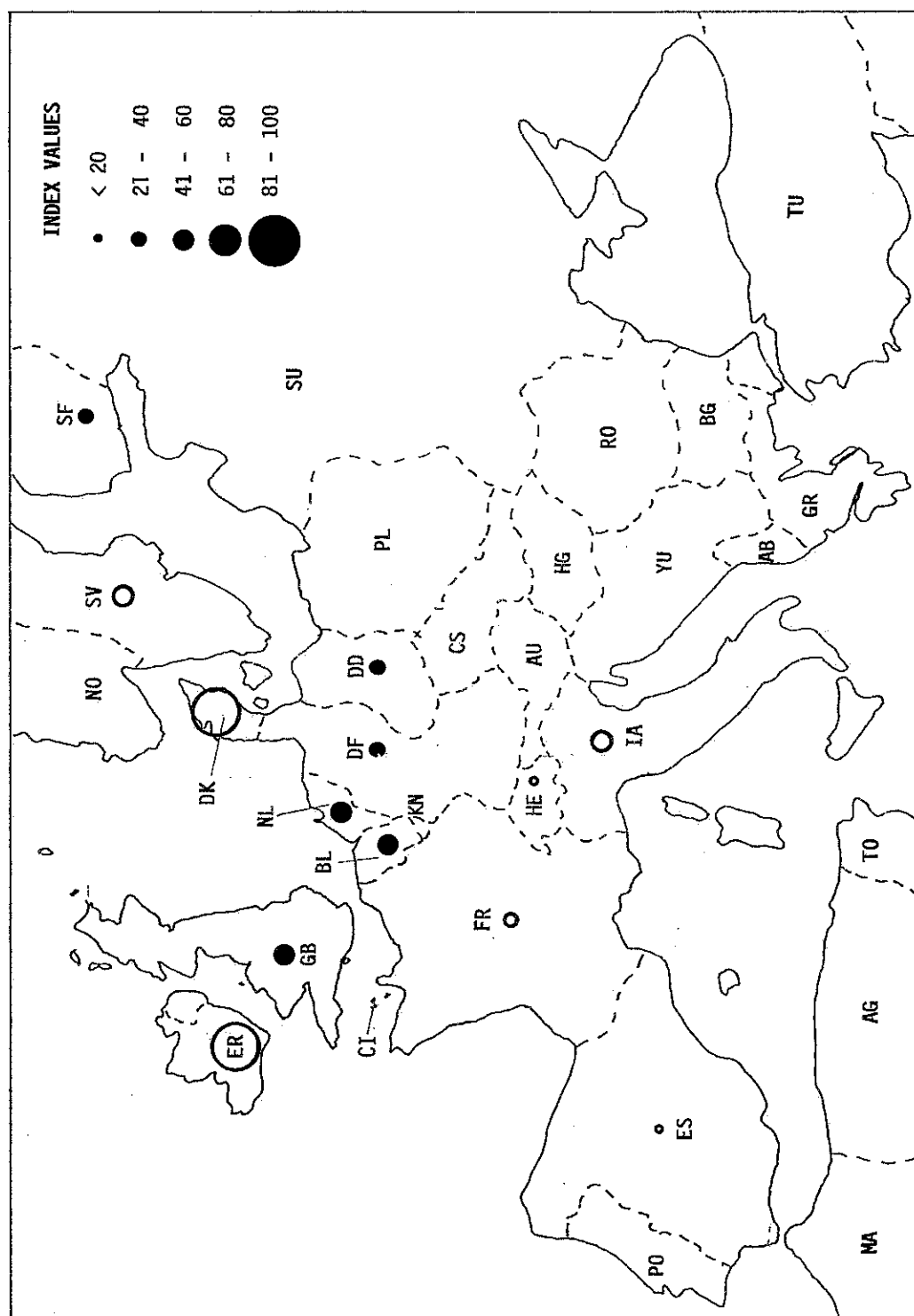
Figure 12.3 Geographical variation in the indices of Wheatear taken over all years for each breeding population. Solid circles indicate values derived from more than 10 recoveries and open circles indicate those derived from less than 10. Country codes are indicated in Table 2.4 of the Methods.

France

Spain

North Africa

Italy
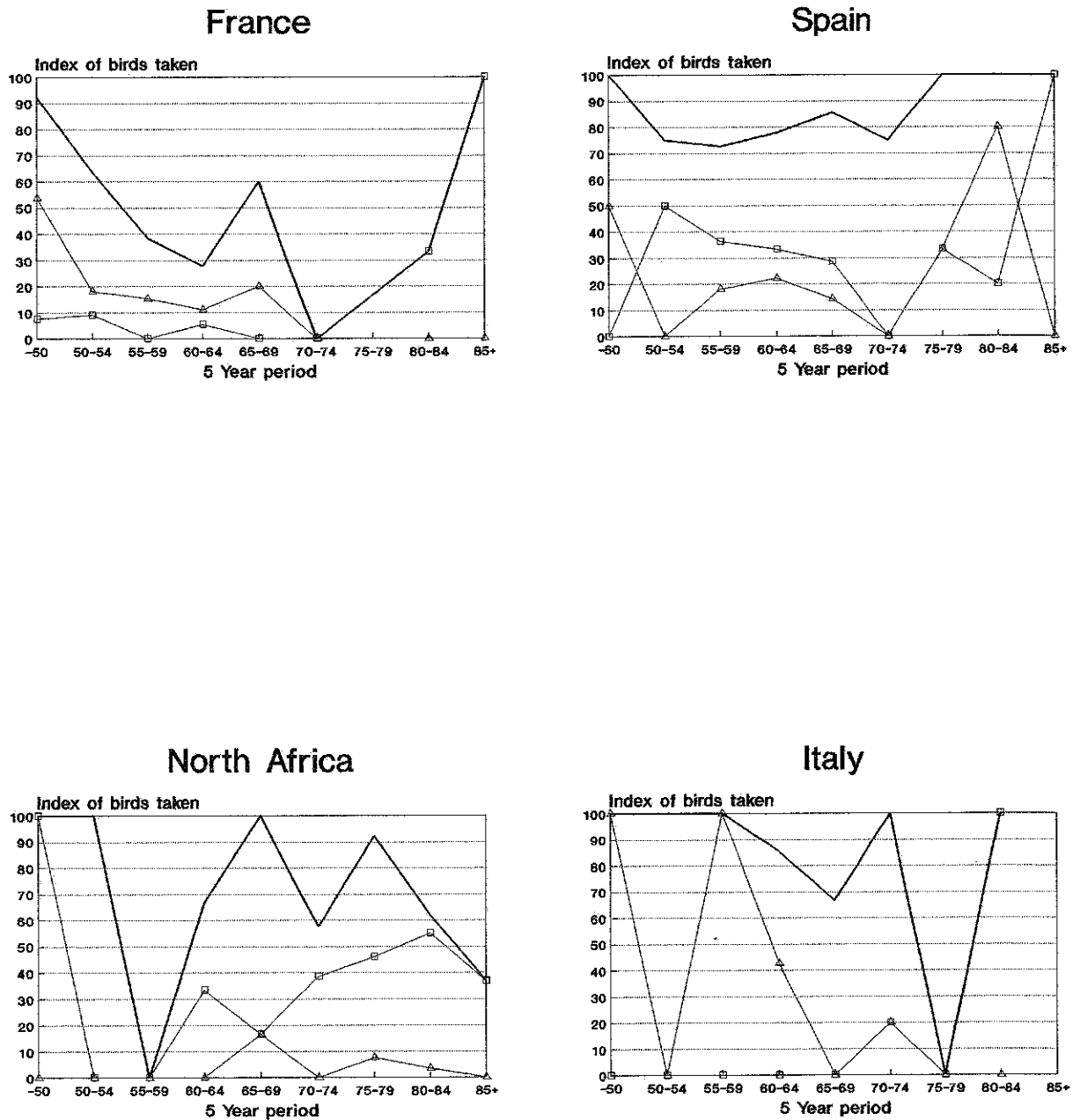
Figure 12.4   Trends in 5-yearly indices of Wheatear taken in individual countries
with high overall indices and sufficient recoveries for analysis.   The bold line without
symbols indicates overall index values, triangles indicate index values based on birds
reported as shot and squares indicate index values based on birds reported as trapped.
The periods -50 and 85+ refer to all recoveries before 1950 and from 1985 onwards
respectively.

ES,FR,IA,NA

Index of birds taken

5 Year period

Others

Index of birds taken

5 Year period

All countries

Index of birds taken

5 Year period
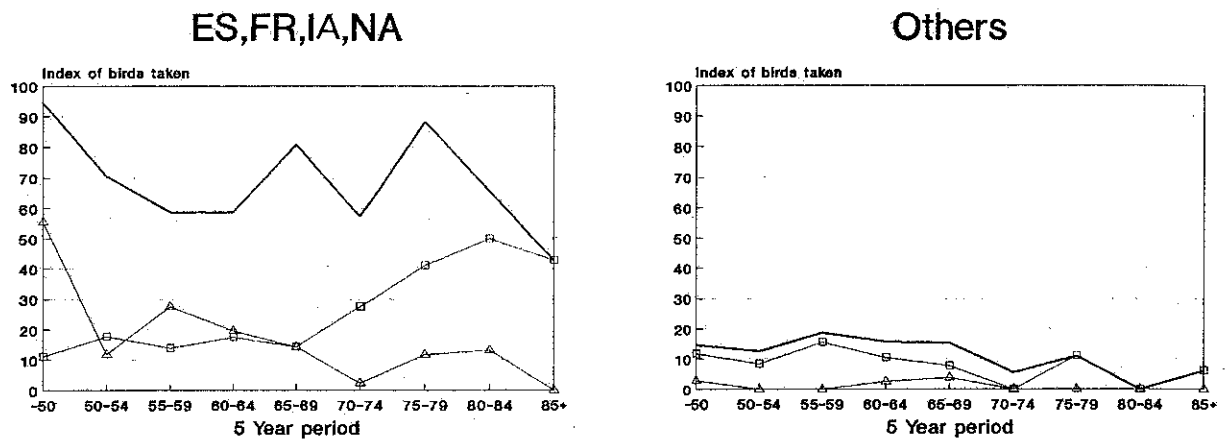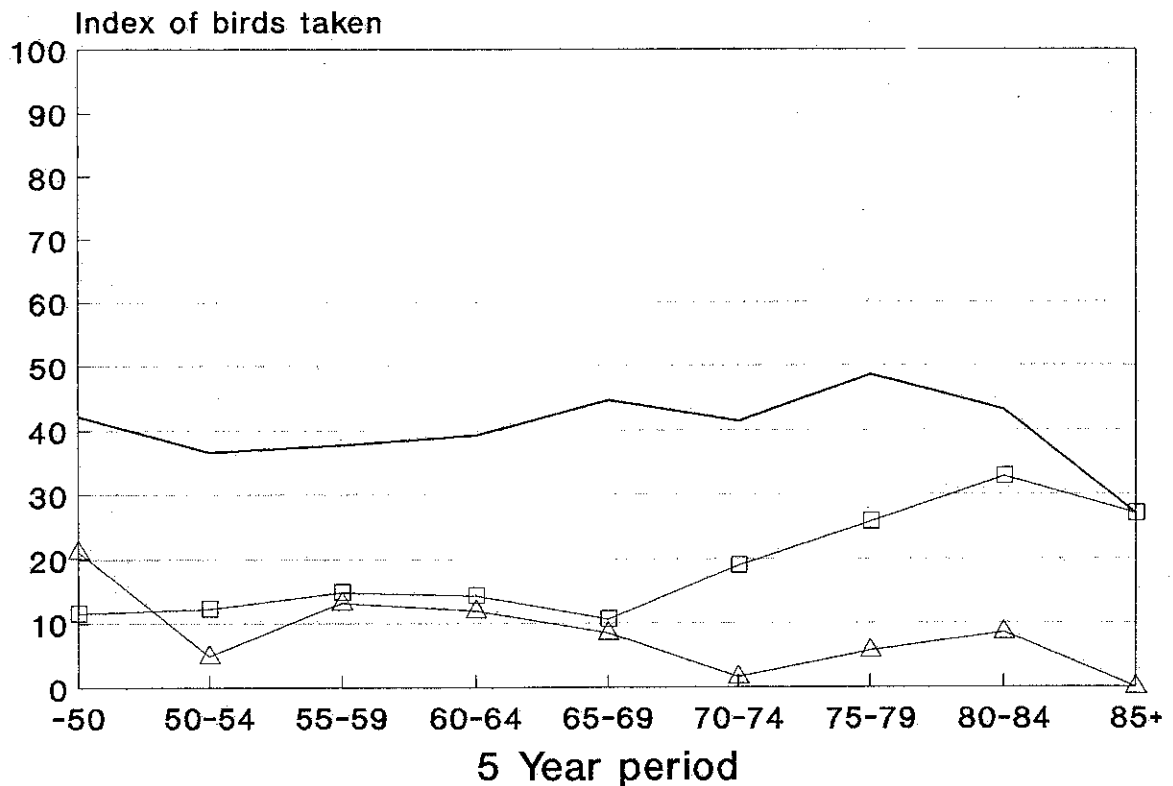
Figure   12.5   Trends in combined 5-yearly indices of Wheatear
taken in: a) countries, for which data for this species were available,
with a tradition of taking substantial numbers of migratory birds on the
western European flyways (ie   ES, FR, IA, NA),
b) other countries and c) all countries.   The bold line with symbols
indicates overall index values, triangles indicate values based on birds
reported as shot and squares indicate index values based on birds reported
as trapped.   The periods -50 and 85+ refer to all   recoveries before 1950
and from 1985 onwards respectively.

France

Spain

North Africa

Italy
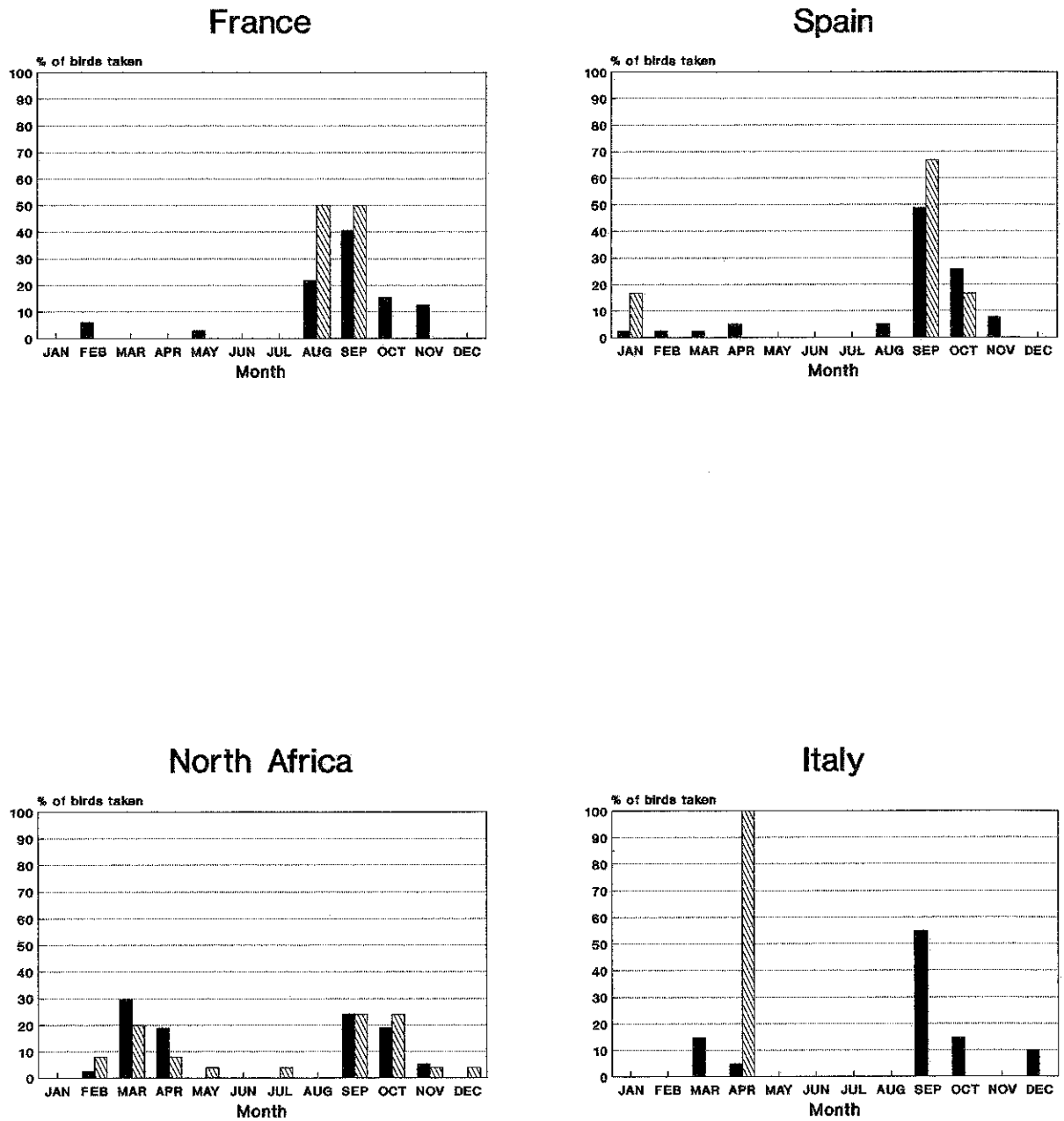
Figure 12.6 Monthly percentages of total Wheatear taken in individual countries with high overall indices and sufficient recoveries for analysis. Solid bars indicate birds from the period before 1980 and hatched bars indicate birds taken from 1980 onwards.

13. FIELDFARE (TURDUS PILARIS)

13.1 Range

The Fieldfare breeds in northern and central Europe, north of a line from the Alps to the Black Sea and eastward from the borders of France, Belgium and West Germany. There is also a very small breeding population in the United Kingdom. The species is present throughout the year within this range, except in central Scandinavia and northernmost U.S.S.R. (Harrison 1982). Most populations of Fieldfares winter to the south of their breeding areas and, during this period, the species' range extends to the Mediterranean and the Middle East. In exceptionally severe winters some Fieldfares may cross the Mediterranean into North Africa.

13.2 Population trends

The breeding range of the Fieldfare has expanded to the south and west during this century and numbers have increased in Poland and Czechoslovakia. A recent decline has been reported from the Soviet Baltic states, however (Cramp and Simmons 1988).

13.3 Migration

The migratory movements of most Fieldfare population are fairly well known (Ashmole 1962). In autumn, those from Finland and southern Sweden initially move west into Norway before turning south to winter in Germany, Belgium, France and northern Italy. Fieldfares from northern Scandinavia migrate in a predominantly south-westerly direction to the British Isles, south-west France and Iberia, while those from Germany, Poland and Switzerland winter in southern France and northern Italy. Populations from different breeding areas may mix on their wintering grounds (Ashmole 1962). The southern extent of the Fieldfare's winter range is influenced by the severity of climatic conditions. In most winters relatively few birds are found south of the Pyrenees and occurrence in North Africa is exceptional (Cramp and Simmons 1988).

13.4 Status

Within the E.C. taking of Fieldfares is permitted in France, Spain, Portugal and Italy, from September to February, and in Greece, from September to March (Bertelsen and Simonsen 1989). All other Mediterranean countries found by Woldhek (1979) to permit the taking of "Thrushes" in general (Malta, Cyprus, Lebanon, Tunisia ,Algeria) lie outwith the Fieldfare's normal winter range.

13.5 Geographical variation in the taking of Fieldfares

Prior to 1980, the highest indices of Fieldfares taken in countries providing at least 10 recoveries were found in France, Spain, Portugal, Italy, Czechoslovakia, Yugoslavia and Greece (Table 13.2). These all had index values of at least 80. Indices greater than 30 were also found in Belgium and the Scandinavian countries other than Sweden. France accounted for 50% of all recoveries of taken Fieldfares during this period. Italy (21%) and Finland (11%) were the only other countries to contribute 10% or more of the total.

In the period from 1980 onwards, few countries provided more than 10 recoveries. The highest indices of Fieldfares taken amongst these were for Italy (93.0), France (85.9) and Finland (33.3). Although based on small numbers of recoveries, the indices for Spain and Portugal remained high (Table 13.2). France (59%), Italy (19%) and Finland (18%) contributed the largest numbers of taken Fieldfares recovered in this period.

Recoveries of taken Fieldfares have been concentrated in south-western France, northern Italy and southern Finland (Fig. 13.1a,b). The largest numbers of recoveries of taken Fieldfares in Italy have come from the provinces of Bergamo, Brescia, Trento, Vicenza, Gorizia and Udine (Appendix 7.2). In France the Departments of Gironde, Basses-Alpes, Drome, Lozere, Gard, Herault and Vaucluse have provided a substantial proportion of recoveries (Appendix 7.3).

The indices of birds taken for all European breeding populations of Fieldfares are relatively high, being greater than 40 for all but the Danish population (Table 13.3, Fig. 13.3). The exceptionally high index value of 84.8 obtained for Swiss Fieldfares is undoubtedly due to the proximity of this population to the major hunting areas of northern Italy and southern France (Table 13.1).

13.6 Temporal variation in the taking of Fieldfares

Indices of Fieldfares taken from 1980 were generally little different from those for the earlier period. There were, however, statistically significant reductions in index values for Norway, Denmark and Belgium (Table 13.2). There were few recoveries from the eastern Mediterranean during this time.

Regression of index of Fieldfares taken in France on year revealed a significant positive relationship (Table 13.4). This was the only significant relationship found amongst the countries and combinations of countries analyzed (Fig. 13.4, Fig. 13.5).

Analysis of the percentage of taken Fieldfares recovered in each month showed the distribution to coincide largely with times of permitted hunting, most birds being taken between October and February (Table 13.6).

13.7 Methods used to take Fieldfares

Fieldfares are predominantly taken by shooting. Prior to 1980, 63% of the taken Fieldfares recovered were known to have been shot and only 7% trapped. The method used to take the remainder was not specified. From 1980 onwards 83% of taken recoveries were due to shooting and 2% to trapping. Shooting of Fieldfares in France increased significantly relative to trapping between the two periods. No significant change in the proportion of Fieldfares taken by each method was found in any other country (Table 13.2).

TABLE 13.1a The distribution of Fieldfares recovered due to shooting and trapping before 1980 in relation to their area of origin. The percentage of taken birds recovered in each country is shown for each national ringing scheme. Percentages within parentheses are based on less than ten recoveries.

Country of recovery	UK	CI	NO	SV	DK	SF	DD	DF	NL	BL	FR	ES	IA	HE
GB	(1.9)	0	(1.5)	0	0	(0.1)	0	(0.7)	0	0	0	–	–	0
CI	0	0	–	0	0	0	0	0	0	0	0	–	–	0
ER	0	0	(1.5)	0	0	0	0	0	0	0	0	–	–	0
NO	14.4	0	0	(2.8)	0	1.9	0	(4.1)	(17.1)	4.7	0	–	–	0
SV	(1.9)	0	0	(2.8)	0	0	0	0	0	(0.4)	0	–	–	0
DK	(1.3)	0	(1.5)	(5.6)	(35.3)	(0.4)	0	0	0	0	0	–	–	0
SF	13.8	0	(2.2)	0	(11.8)	16.6	0	(0.7)	(7.3)	9.4	0	–	–	0
SU	(1.3)	0	0	0	0	(0.6)	(14.3)	(2.7)	(2.4)	(1.1)	0	–	–	0
PL	0	0	0	0	0	(0.1)	0	(0.7)	0	0	0	–	–	0
DD	0	0	0	0	0	(0.1)	(14.3)	0	0	0	0	–	–	0
DF	0	0	0	0	0	(0.4)	0	0	0	0	(8.3)	–	–	0
NL	0	0	0	0	0	0	0	0	0	0	0	–	–	0
BL	(1.9)	0	11.8	(2.8)	0	3.7	0	0	(7.3)	0	(8.3)	–	–	0
KN	0	0	0	0	0	0	0	0	0	0	0	–	–	0
FR	35.6	0	(58.8)	55.6	(29.4)	40.1	(28.6)	60.5	41.5	54.4	(75.0)	–	–	89.5
ES	(3.8)	0	(6.6)	(2.8)	0	(0.7)	0	(0.7)	(4.9)	(0.7)	0	–	–	(0.6)
PO	(3.1)	0	(4.4)	(2.8)	(5.9)	(0.3)	0	0	0	(1.1)	0	–	–	0
IA	16.9	(100)	8.8	(25.0)	(17.7)	31.2	(42.9)	15.0	(17.1)	14.9	(8.3)	–	–	8.6
HE	0	0	0	0	0	(0.1)	0	(0.7)	0	0	0	–	–	(1.2)
AU	(0.6)	0	0	0	0	(0.3)	0	0	0	0	0	–	–	0
CS	0	0	(0.7)	0	0	(1.0)	0	0	0	0	0	–	–	0
HG	0	0	0	0	0	0	0	0	0	0	0	–	–	0
RO	0	0	0	0	0	(0.1)	0	0	0	0	0	–	–	0
BG	(0.6)	0	0	0	0	0	0	0	0	0	0	–	–	0
YG	(1.3)	0	0	0	0	(1.1)	0	0	0	(0.7)	0	–	–	0
GR	(1.3)	0	(0.7)	0	0	(0.7)	0	(1.4)	0	(0.4)	0	–	–	0
TU	(0.6)	0	(0.7)	0	0	(0.3)	0	(0.7)	(2.4)	(0.4)	0	–	–	0
CY	0	0	0	0	0	0	0	0	0	0	0	–	–	0
ML	0	0	0	0	0	0	0	0	0	0	0	–	–	0
SY	0	0	0	0	0	0	0	0	0	0	0	–	–	0
LE	0	0	0	0	0	0	0	0	0	0	0	–	–	0
IL	0	0	0	0	0	0	0	0	0	0	0	–	–	0
ME	0	0	0	0	0	0	0	0	0	0	0	–	–	0
EG	0	0	0	0	0	0	0	0	0	0	0	–	–	0
LT	0	0	0	0	0	0	0	0	0	0	0	–	–	0
TO	0	0	0	0	0	0	0	0	0	0	0	–	–	0
AG	0	0	0	0	0	0	0	0	0	0	0	–	–	0
MA	0	0	0	0	0	0	0	0	0	0	0	–	–	0
SA	0	0	0	0	0	0	0	0	0	0	0	–	–	0
TOTAL No.	160	1	136	36	17	721	7	147	41	276	12	–	–	162

Note: No data available for Poland, Czechoslovakia or Hungary.

TABLE 13.1b The distribution of Fieldfares recovered due to shooting and trapping from 1980 onwards in relation to thei area of origin. The percentage of taken birds recovered in each country is shown for each national ringing scheme. Percentages within parentheses are based on less than ten recoveries.

Country of recovery	Country of ringing													
	UK	CI	NO	SV	DK	SF	DD	DF	NL	BL	FR	ES	IA	HE
GB	0	0	0	0	–	0	–	0	0	0	–	0	0	0
CI	0	0	0	0	–	0	–	0	0	0	–	0	0	0
ER	0	0	0	0	–	0	–	0	0	0	–	0	0	0
NO	(10.9)	0	0	0	–	0	–	0	0	(1.7)	–	0	0	0
SV	(1.8)	0	0	0	–	0	–	0	0	(1.7)	–	0	0	0
DK	0	0	(3.2)	0	–	0	–	0	0	0	–	0	0	0
SF	(16.4)	0	(3.2)	0	–	37.8	–	0	(16.7)	(5.2)	–	0	0	0
SU	0	0	0	0	–	0	–	0	0	0	–	0	0	0
PL	0	0	0	0	–	0	–	0	0	0	–	0	0	0
DD	0	0	0	0	–	0	–	0	0	0	–	0	0	0
DF	0	0	0	0	–	0	–	0	0	0	–	0	0	0
NL	0	0	0	0	–	0	–	0	0	0	–	0	0	0
BL	0	0	0	0	–	0	–	0	0	(0.9)	–	0	0	0
KN	0	0	0	0	–	0	–	0	0	0	–	0	0	0
FR	52.7	(100)	77.4	63.2	–	40.4	–	(81.8)	(66.7)	80.2	–	(100)	(14.3)	81.3
ES	(1.8)	0	(3.2)	0	–	0	–	0	0	0	–	0	0	0
PO	(1.8)	0	0	0	–	0	–	0	0	0	–	0	0	0
IA	(14.6)	0	(12.9)	(36.8)	–	21.8	–	(18.2)	(16.7)	9.5	–	0	(85.7)	(18.7)
HE	0	0	0	0	–	0	–	0	0	0	–	0	0	0
AU	0	0	0	0	–	0	–	0	0	0	–	0	0	0
CS	0	0	0	0	–	0	–	0	0	0	–	0	0	0
HG	0	0	0	0	–	0	–	0	0	0	–	0	0	0
RO	0	0	0	0	–	0	–	0	0	0	–	0	0	0
BG	0	0	0	0	–	0	–	0	0	0	–	0	0	0
YG	0	0	0	0	–	0	–	0	0	0	–	0	0	0
GR	0	0	0	0	–	0	–	0	0	0	–	0	0	0
TU	0	0	0	0	–	0	–	0	0	(0.9)	–	0	0	0
CY	0	0	0	0	–	0	–	0	0	0	–	0	0	0
ML	0	0	0	0	–	0	–	0	0	0	–	0	0	0
SY	0	0	0	0	–	0	–	0	0	0	–	0	0	0
LE	0	0	0	0	–	0	–	0	0	0	–	0	0	0
IL	0	0	0	0	–	0	–	0	0	0	–	0	0	0
ME	0	0	0	0	–	0	–	0	0	0	–	0	0	0
EG	0	0	0	0	–	0	–	0	0	0	–	0	0	0
LT	0	0	0	0	–	0	–	0	0	0	–	0	0	0
TO	0	0	0	0	–	0	–	0	0	0	–	0	0	0
AG	0	0	0	0	–	0	–	0	0	0	–	0	0	0
MA	0	0	0	0	–	0	–	0	0	0	–	0	0	0
SA	0	0	0	0	–	0	–	0	0	0	–	0	0	0
TOTAL No.	55	1	31	19	–	156	–	11	12	116	–	1	7	16

Note: No data available for Poland, Czechoslovakia or Hungary.

TABLE.13.2 FIELDFARE: Indices of birds taken before 1980 and from 1980 onwards for each   country of recovery.

	Index (all methods)[a]		% hunted[b]		Total recoveries[c]		Shooting Index[a]		Trapping Index[a]		G test[d]
	-1980	1980+	-1980	1980+	-1980	1980+	-1980	1980+	-1980	1980+	
GB	4.5	0	3.4	0	205	76	2.6	0	1.9	0	-
CI	(0)	-	0	-	2	-	(0)	-	(0)	-	-
ER	(25.0)	(0)	22.2	0	9	14	(25.0)	(0)	(0)	(0)	-
NO	44.8	22.9*	36.4	16.7	176	48	30.1	22.9	9.1	0	-
SV	6.8	5.6	5.1	4.1	99	73	5.4	5.6	1.4	0	-
DK	36.4	6.3*	23.9	5.0	67	20	31.8	6.3	4.6	0	-
SF	32.0	33.3	25.7	20.8	689	371	30.0	32.9	0.5	0.4	-
SU	41.7	(0)	39.5	0	38	2	25.7	(0)	13.9	(0)	-
PL	13.3	(0)	13.3	0	15	4	6.7	(0)	0	(0)	-
DD	16.0	(0)	16.0	0	25	6	4.0	(0)	8.0	(0)	-
DF	14.0	0	12.0	0	133	21	9.7	0	4.4	0	-
NL	0	0	0	0	54	20	0	0	0	0	-
BL	60.4	8.3**	45.8	4.4	190	23	12.5	0	29.2	0	-
KN	-	-	-	-	-	-	-	-	-	-	-
FR	81.5	85.9	80.2	85.3	1080	300	47.9	76.1	1.7	0.3	***
ES	71.1	(100.0)	71.1	100.0	38	2	55.3	(50.0)	7.9	(0)	-
PO	94.7	(100.0)	94.7	100.0	19	1	73.7	(100.0)	0	(0)	-
IA	94.3	93.0	93.9	89.9	391	89	58.0	59.3	6.2	5.8	NS
HE	15.4	(0)	9.3	0	43	9	11.5	(0)	0	(0)	-
AU	(60.0)	-	60.0	-	5	-	(40.0)	-	(0)	-	-
CS	80.0	-	80.0	-	10	-	70.0	-	0	-	-
HG	(0)	(0)	0	0	2	2	(0)	(0)	(0)	(0)	-
RO	(100.0)	(0)	100.0	0	1	1	(0)	(0)	(0)	(0)	-
BG	(33.3)	-	33.3	-	3	-	(33.3)	-	(0)	-	-
YG	81.3	-	81.3	0	16	1	50.0	-	12.5	-	-
GR	84.6	(0)	84.6	0	13	1	76.9	(0)	0	(0)	-
TU	(100.0)	(100.0)	100.0	100.0	6	1	(66.7)	(100.0)	(16.7)	(0)	-
CY	-	-	-	-	-	-	-	-	-	-	-
ML	-	-	-	-	-	-	-	-	-	-	-
SY	-	-	-	-	-	-	-	-	-	-	-
LE	(0)	-	0	-	1	-	(0)	-	(0)	-	-
IL	-	-	-	-	-	-	-	-	-	-	-
ME	-	-	-	-	-	-	-	-	-	-	-
EG	-	-	-	-	-	-	-	-	-	-	-
LT	-	-	-	-	-	-	-	-	-	-	-
TO	-	-	-	-	-	-	-	-	-	-	-
AG	-	-	-	-	-	-	-	-	-	-	-
MA	-	-	-	-	-	-	-	-	-	-	-
SA	-	-	-	-	-	-	-	-	-	-	-

[a]   See chapter 2 (methods) for derivation of indices. Indices derived from less than 10 recoveries are indicated within parentheses.   Fisher's exact tests (Sokal & Rohlf 1981) were used to compare the proportions taken in each period. Significance levels (*<0.05; ** <0.01; *** <0.001) of the tests are indicated in column 1980+. Tests were carried out on all pairs except where indices were based on less than 10 recoveries.

[b]   Percentage of all recoveries other than those excluded on the basis of poor quality data (see chapter 2) taken by shooting and trapping.

[c]   Total number of recoveries other than those excluded on the basis of poor quality data.

[d]   G test (Sokal & Rohlf 1981) comparison between periods of the proportions of birds taken according to the classes shot, trapped, and shot or trapped. Significance levels of these comparisons are indicated as above. 'NS' indicates non-significant results where tests were carried out. Comparisons were not made where the expected frequency in any cell was less than 10.

Table.13.3. Fieldfare : Indices of birds taken for each breeding
population (across all years).

Breeding Population	Index of birds taken	Sample size
UK United Kingdom	-	-
CI Channel Islands	-	-
NO Norway	69.7	185
SV Sweden	44.6	103
DK Denmark	33.3	6
SF Finland	55.3	1407
SU USSR (Lithuania only)	-	-
PL Poland	-	-
DD East Germany	46.2	13
DF West Germany	58.5	200
NL Holland	75.0	4
BL Belgium	57.1	21
FR France	0	21
ES Spain	-	-
IA Italy	-	-
HE Switzerland	84.8	112
CJ Czechoslovakia	-	-
HG Hungary	-	-

Table 13.4   Regression analysis of temporal trends in the indices of Fieldfares taken.

Country of recovery	Intercept	Slope	t	P
France	54.5	0.39	2.62	*
Major	64.8	0.26	2.44	ns
Other	31.7	-0.10	-0.78	ns
All	63.1	-0.11	-0.68	ns

All regressions used a weighted technique where each 5-year index was weighted by the square root of the sample size.

Countries where 10 or more recoveries occurred in each year after 1950 were analysed. Data from the period before 1950 were not included in the analysis.

Major countries are those with a tradition of taking substantial numbers of birds that use western migration routes.
(i.e. BL, FR, ES, PO, IA, NA).

Significance levels indicated are: NS Not significant; * P<0.05;
** P<0.01; *** P<0.001.
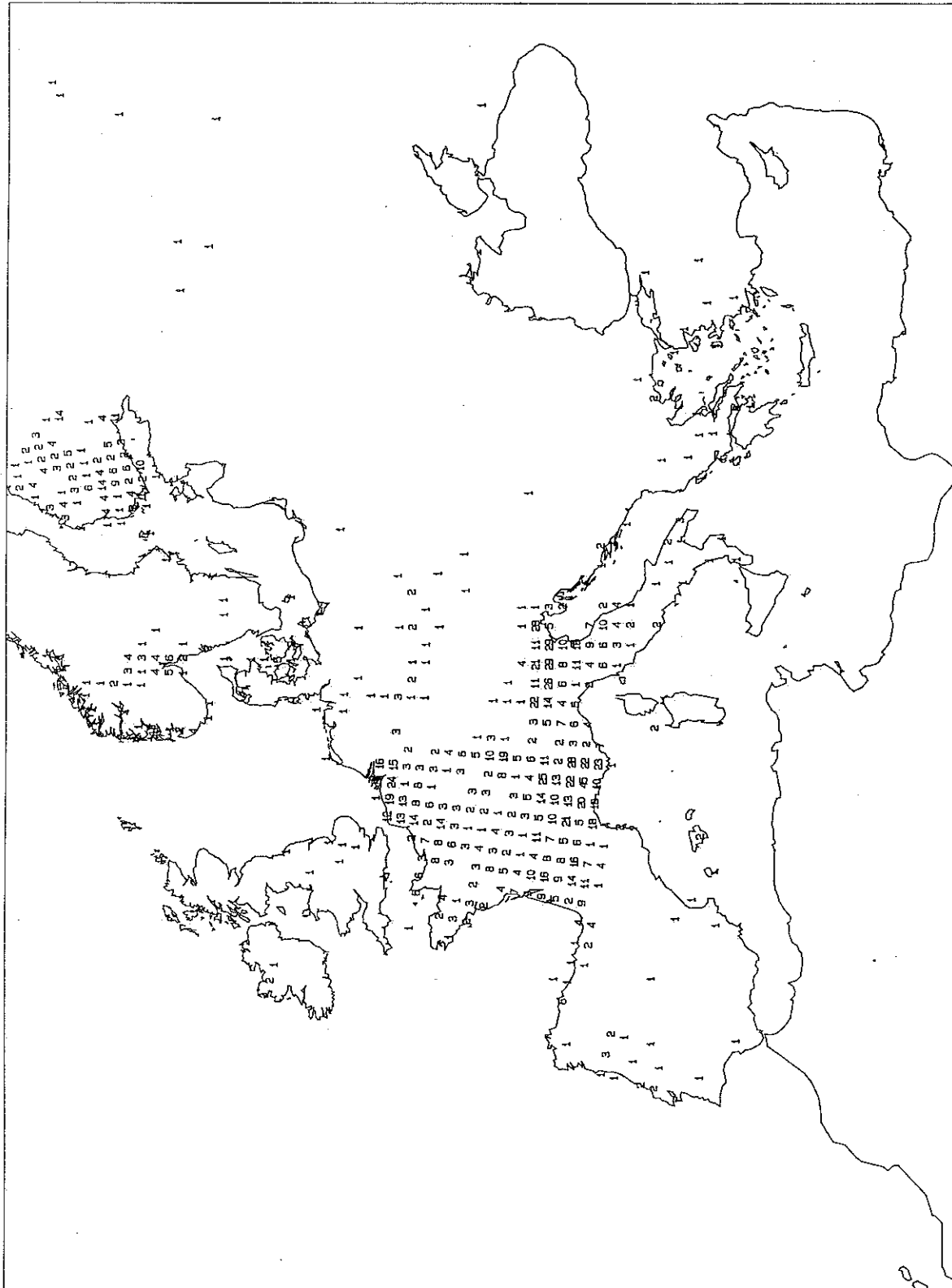
Figure 13.1a   Total numbers of Fieldfare ringing recoveries resulting from birds taken before 1980 in each 30' by 60' grid square.   ** Indicates numbers greater than 99.   8 recoveries were outside the limits of the map.
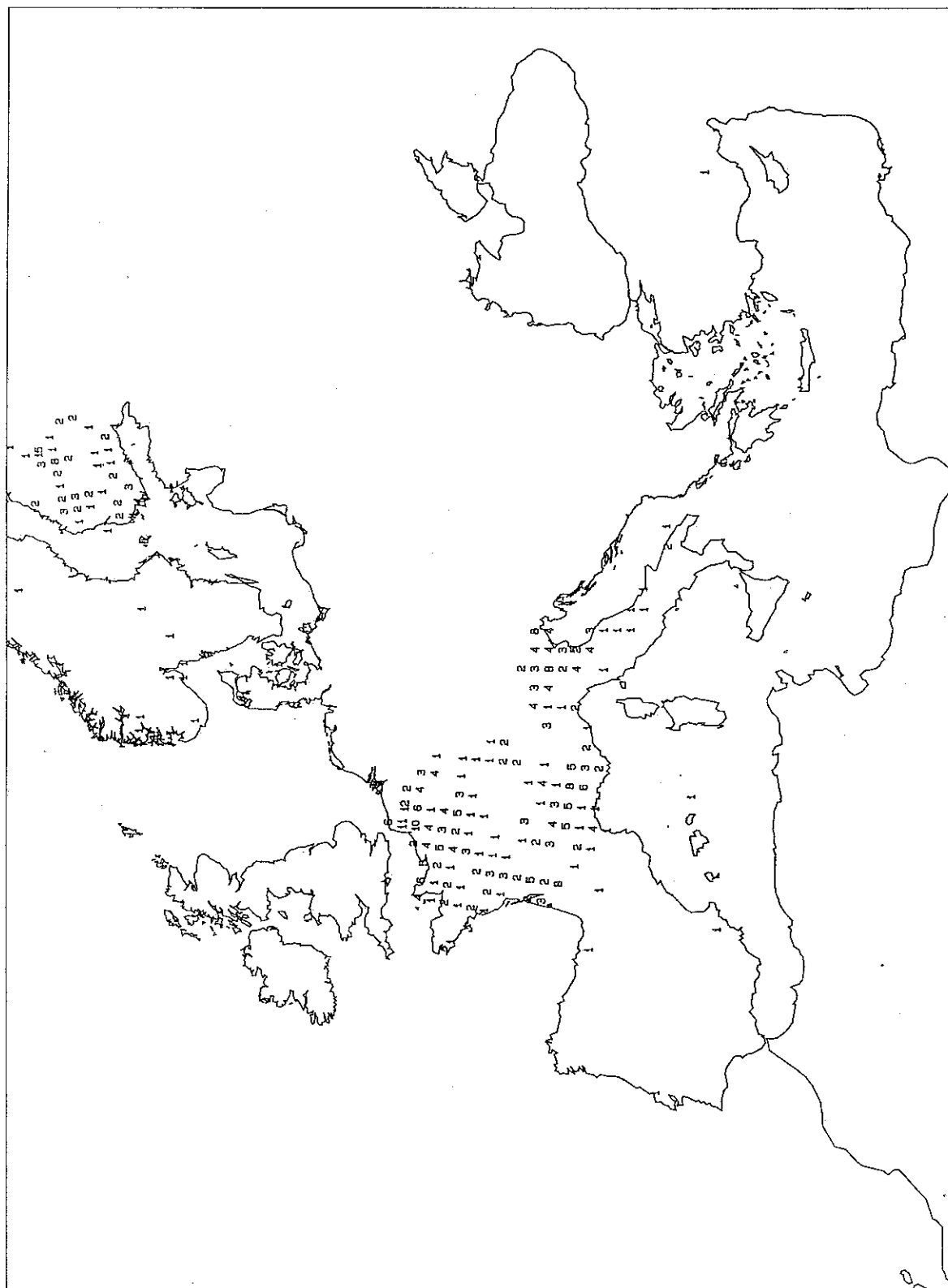
Figure 13.1b   Total numbers of Fieldfare ringing recoveries resulting from birds taken from 1980 onwards in each 3o' by 60' grid square.   ** Indicates numbers greater than 99.   2 recoveries were outside the limits of the map.
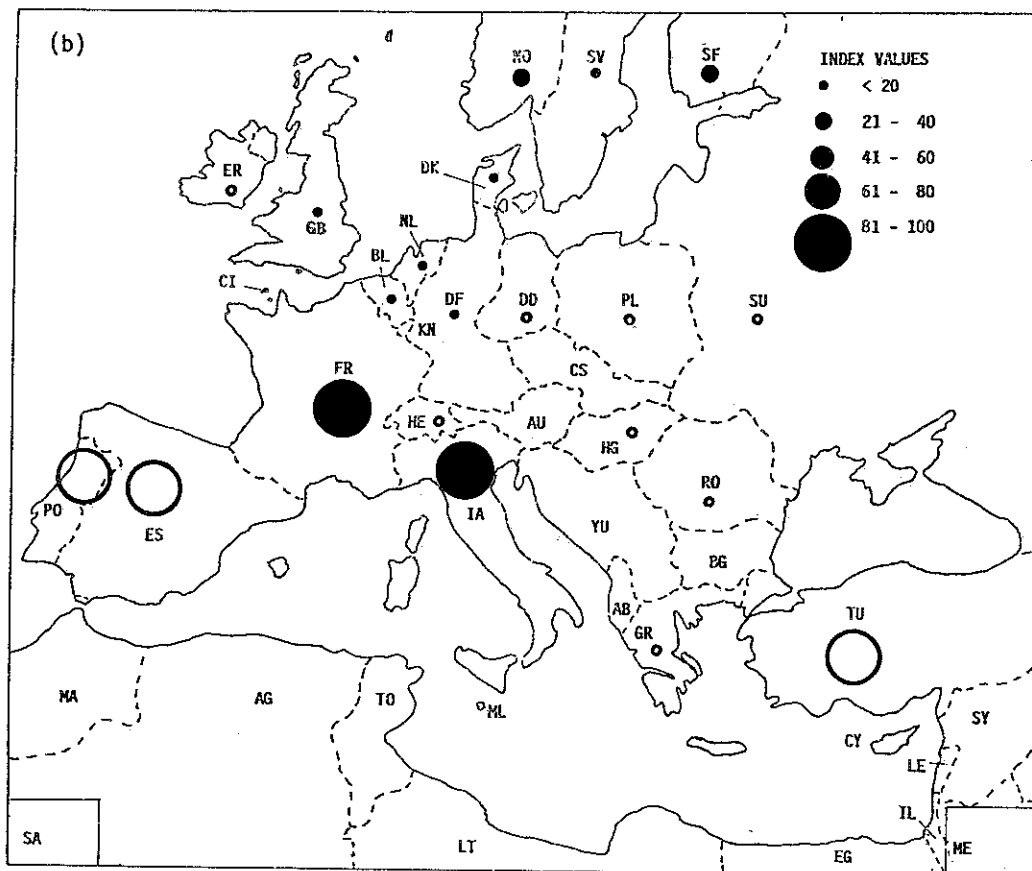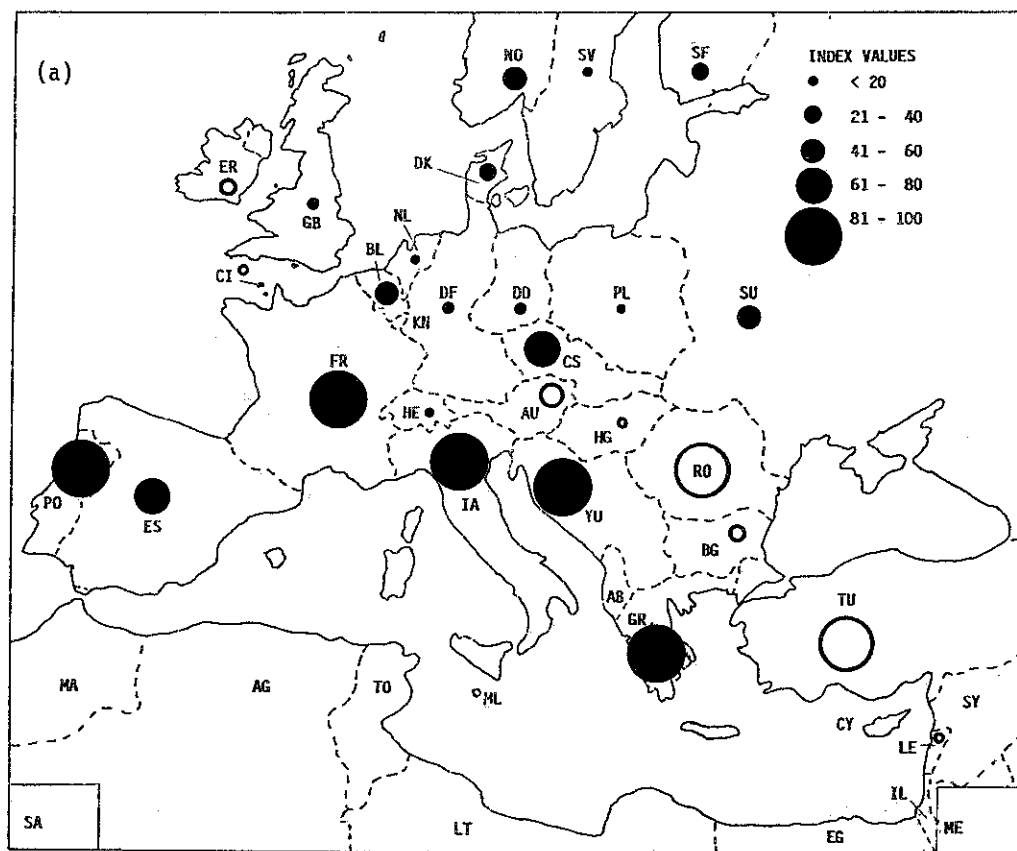
Figure 13.2 Geographical variation in the indices of Fieldfare
taken for each country of recovery in the period before 1980 (a) and from
1980 onwards (b).   Solid circles indicate values derived from more than 10
recoveries and open circles indicate those derived from less than 10.
Country codes are indicated in Table 2,4 of the Methods.
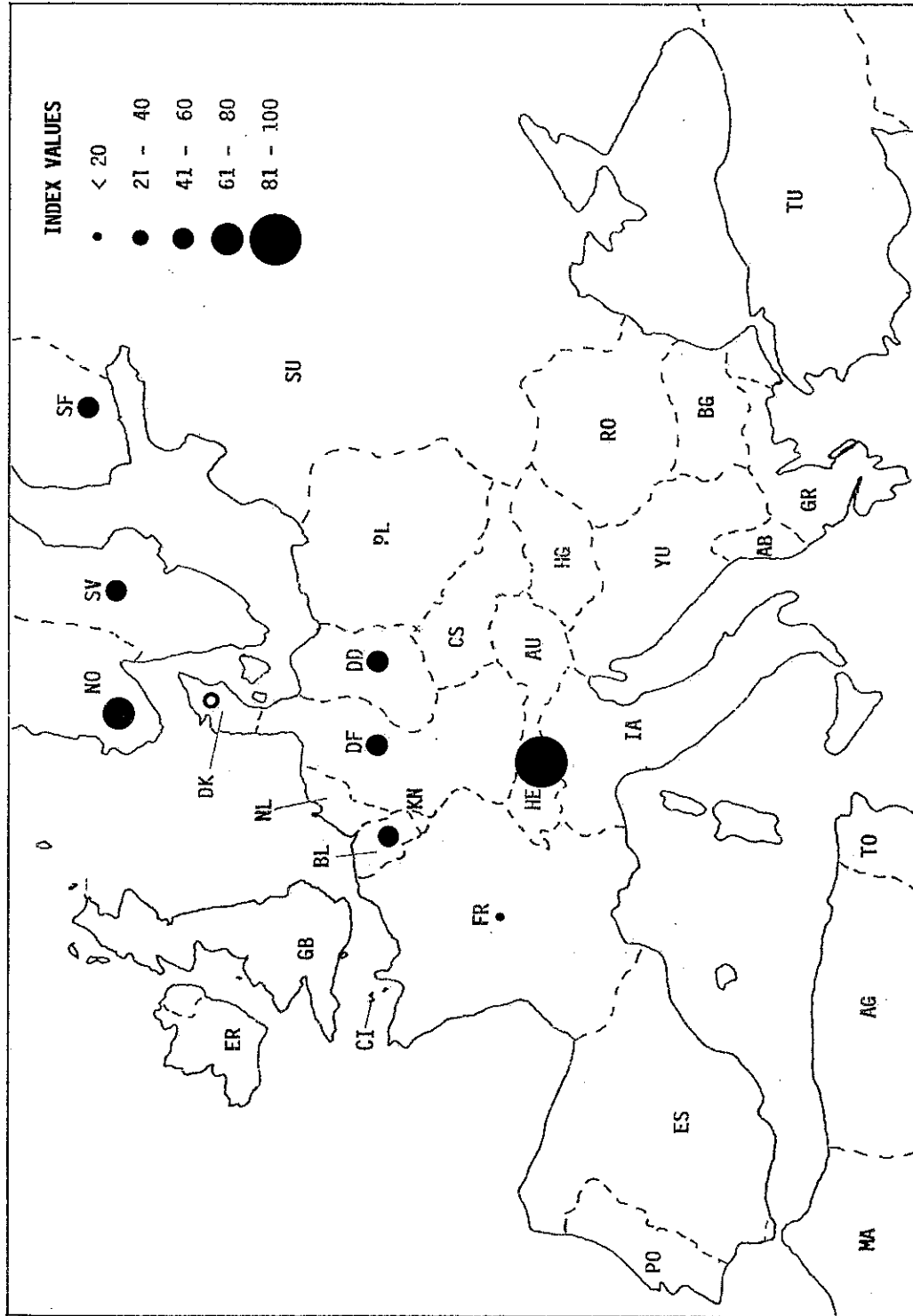
Figure 13.3 Geographical variation in the indices of Fieldfare taken over all years for each breeding population. Solid circles indicate values derived from more than 10 recoveries and open circles indicate those derived from less than 10. Country codes are indicated in Table 2.4 of the Methods.

Belgium

Index of birds taken

Portugal

Index of birds taken

France

Index of birds taken

Spain

Index of birds taken

Italy

Index of birds taken
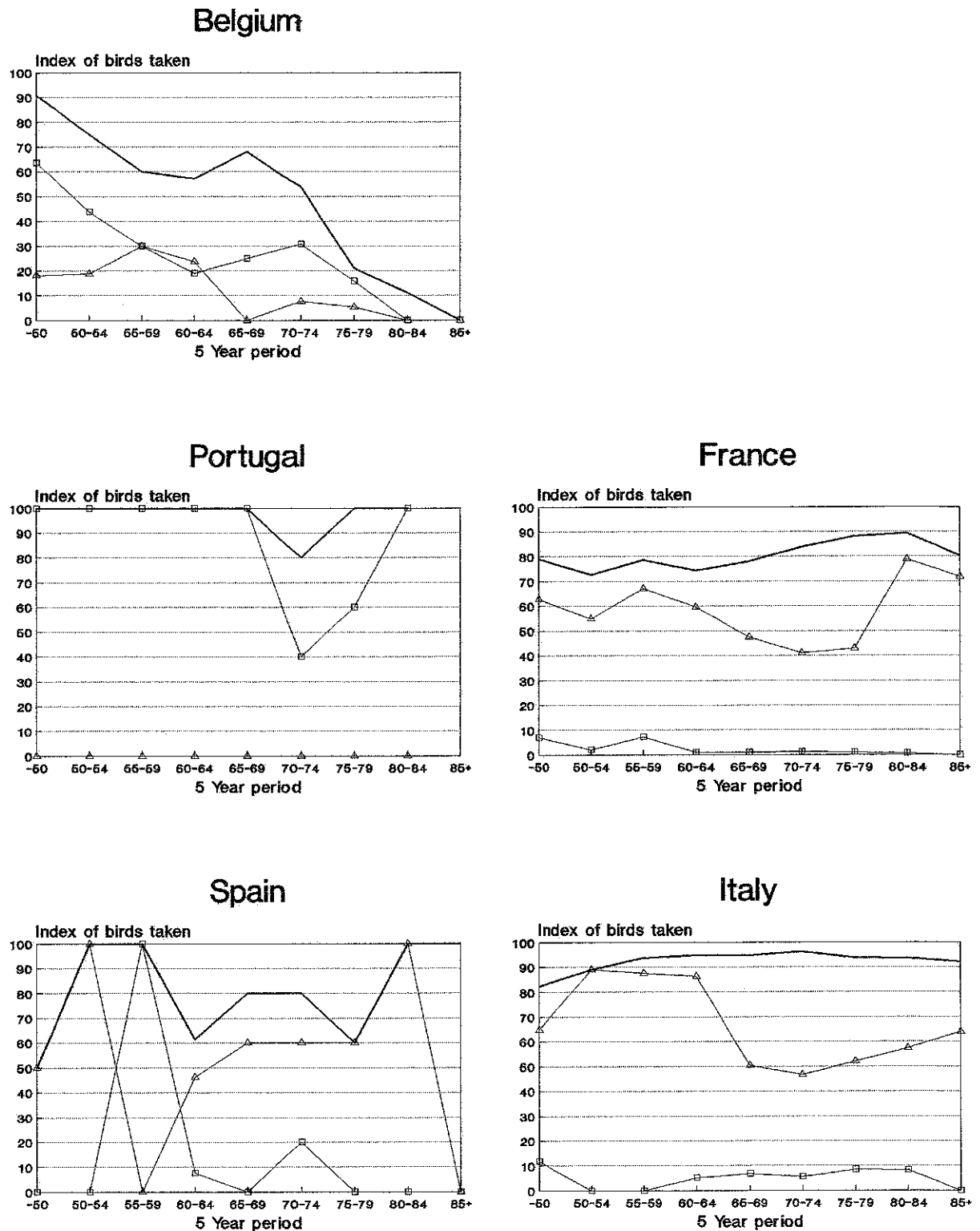
Figure 13.4   Trends in 5-yearly indices of Fieldfare taken in individual countries with high overall indices and sufficient recoveries for analysis.   The bold line without symbols indicates overall index values, triangles indicate index values based on birds reported as shot and squares indicate index values based on birds reported as trapped. The periods -50 and 85+ refer to all recoveries before 1950 and from 1985 onwards respectively.

BL,ES,FR,IA,PO

Index of birds taken

Others

Index of birds taken

All countries

Index of birds taken
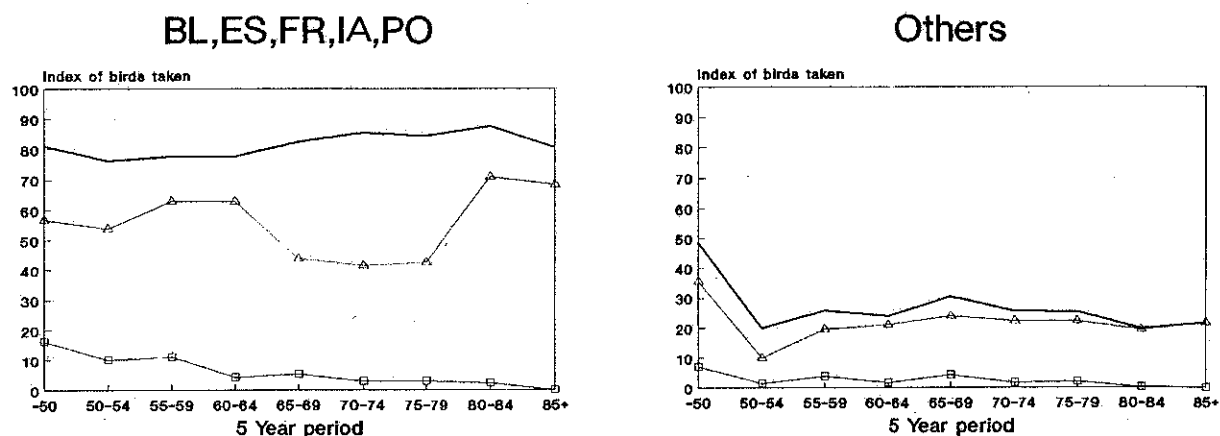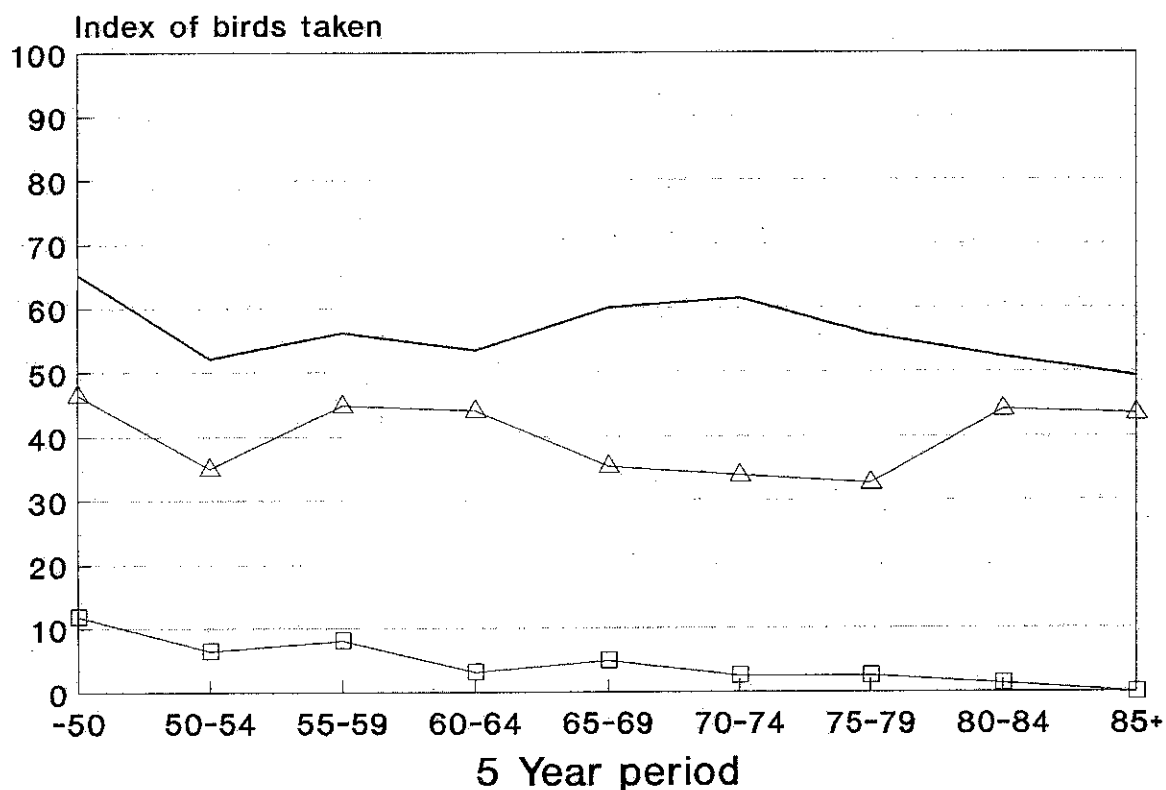
Figure   13.5   Trends in combined 5-yearly indices of Fieldfare
taken in: a) countries, for which data for this species were available,
with a tradition of taking substantial numbers of migratory birds on the
western European flyways (ie BL, ES, FR, IA. PO),
b) other countries and c) all countries.   The bold line with symbols
indicates overall index values, triangles indicate values based on birds
reported as shot and squares indicate index values based on birds reported
as trapped.   The periods -50 and 85+ refer to all recoveries before 1950
and from 1985 onwards respectively.

Belgium

France

Spain

Portugal

Italy
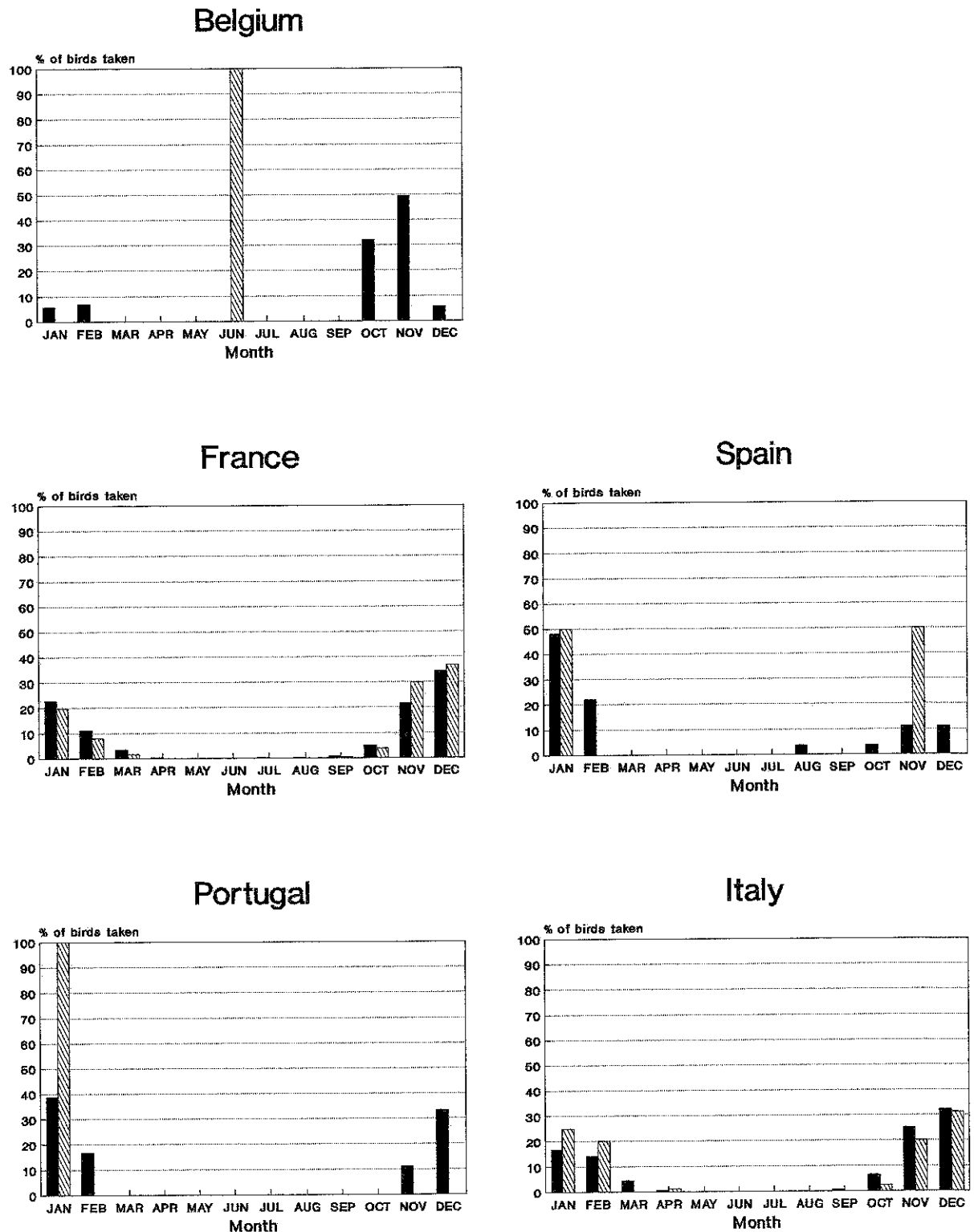
Figure 13.6   Monthly percentages of total   Fieldfare taken in individual countries with high overall indices and sufficient recoveries for analysis.   Solid bars indicate birds from the period before 1980 and hatched bars indicate birds taken from 1980 onwards.

14. SONG THRUSH (TURDUS PHILOMELOS)

14.1 Range

The Song Thrush breeds over a wide area of Eurasia, ranging from Britain and Ireland in the west, across to central Siberia in the east, as far north as northern Scandinavian and south to northern Spain, northern Italy and Greece. Breeding also occurs to the east of the Black sea in Iran. The winter range extends south to North Africa, the eastern Meditteranean coastline, southern Iran and along the Arabian Gulf coast.

14.2 Population trends

The British population of Song Thrushes has undergone a long-term decline since the mid-1970s (Marchant et al. 1990). Elsewhere in Europe populations appear to have been stable, and have increased in the Netherlands, Finland and Denmark. However, a marked decline took place in Denmark between 1975 and 1979 (Marchant et al. 1990, Nohr & Braae 1984). British population trends have been studied in detail by Ballie (1990), who showed that a simple model incorporating the number of days with freezing temperatures in January and February could explain most of the variation in the BTO Common Bird Census index for the species. However, since 1982 the observed decline in Song Thrushes has been greater than that predicted by Baillie's model and some other factor appears to be causing the continued population decrease. Baillie analyzed the ringing recoveries of British-ringed Song Thrushes attributable to hunting and concluded that it was unlikely that winter hunting had contributed to the population decline.

14.3 Migration

Song Thrush populations tend to show high affinities for regular wintering areas (Ashmole 1962; Claessens 1988a). Most of the birds from north and north-east Europe (the nominate race philomelos) are migratory with birds from Scandinavia, Finland, USSR, Poland, Germany and Switzerland wintering to the southwest in southern Britain, south-west France, Spain and Portugal (Ashmole 1962, Claessens 1988a). Those from farthest north move the greatest distance and winter as far south as the Canary Islands, North Africa and Cyprus (Roux 1959). Birds that breed in Denmark, Netherlands, Belgium and northern France are only partially migratory, normally only moving short distances south or southeast in mainland Europe or into Britain and Ireland (Ashmole 1962). Those breeding in Switzerland and eastwards move south to winter east of the Fenno-Scandian birds, along the French Mediterranean coast into Italy, Yugoslavia, Greece, Corsica, Cyprus, the Balkans and south to Libya.

The British breeding population (clarkei) is more sedentary than continental birds with only one-half of adult and two-thirds of first year Song Thrushes undergoing a short migration (Lack 1943). Those that move migrate mainly to north-west France, although not

until later in the year than the main immigration of thrushes from northern Europe (Claessens 1988a). Some birds move farther south into Iberia by January (Ashmole 1962).

The proportion of foreign ringed birds recovered in France is greatest in winters with longer periods of cold weather (Claessens 1988b). Similarly, substantial mid-winter arrivals may occur in North Africa as a result of extremely cold weather in Europe. Thus, migration patterns are not totally fixed, but are partly weather-dependent.

Return passage starts in March with movements continuing until mid-May (Ashmole 1962).

14.4 Status

The Song Thrush is a legal quarry species in several E.C. countries with hunting allowed in France (10 October - 29 February), Italy (third Sunday in September - 10 March), Spain (September - February inclusive), and Portugal (first Sunday in October - third Sunday in February) and Greece (15 September-10 March) (Bertelsen & Simionsen 1989). Amongst non-E.C. European countries hunting is allowed in Malta and Cyprus (Woldhek 1979). As a consequence of its low protection status and its abundance large numbers have been reported as being taken. Estimates of numbers taken include 3,250,000 thrushes (Turdus species) in Mallorca in 1976/77, 25,873,000 (+/- 27%) in France in 1975/76 and between 11,000 and 300,000 per annum in Malta (Woldhek 1979).

14.5 Geographical variation in the taking of Song Thrushes

Fig. 14.1 shows the number of recoveries of Song Thrushes taken up to 1980 (a) and from 1980 onwards (b). Prior to 1980 recoveries due to shooting and trapping occurred throughout Britain, Belgium, France, Spain, Portugal, Italy and North Africa. However, marked concentrations of recoveries are apparent in Belgium, southwest France, the French Pyrenees, eastern coastal Spain, south and south-western Spain, Majorca, north and western Italy and Algeria, particularly around Algiers (Fig. 14.1a). The location of recoveries in the period from 1980 onwards shows a similar pattern to the earlier period (Fig. 14.1b), although the proportion or recoveries from Britain and Belgium decreased substantially.

France accounted for the highest proportion of recoveries for most ringing countries in both periods (Table 14.1) followed by Spain, Portugal and Italy, depending on the country of origin. Thus, as a result of the differing migration routes, the proportion taken in Spain and Portugal was higher for birds ringed farthest north (eg. Finland and Sweden). The proportions taken in Italy were higher for birds of more easterly origin (eg. from Poland and Hungary).

The indices of birds taken for the two analysis periods are shown in Fig. 14.2 and Table 14.2. Amongst the countries with more than ten recoveries the northern and central European countries had low

indices for both periods, although a moderate index of 45.9 was recorded for Belgium in the pre-1980 period. In contrast, very high indices were recorded for France, Spain, Portugal, Italy, Morocco, Algeria and Tunisia, with the highest index (amongst those derived from 10 or more recoveries) of 91.3 recorded for Italy in the period from 1980 onwards. Appendix tables 8.1 - 8.5 present the departmental indices for Belgium, Portugal, France, Italy, and Spain.

Amongst breeding populations of Song Thrushes there is a very large range in the index of birds taken (Fig. 14.3, Table 14.3). The mostly resident population in the Channel Islands has an index of only 2.1. Similarly, British birds which are either resident or migrate to mostly north-western areas of France where shooting and trapping pressures are low (Appendix 8.3) have an index of only 8.0. In contrast, most northern and eastern populations have indices in excess of 70.0.

14.6 Temporal variation in the taking of Song Thrushes

Significant decreases in indices between the pre-1980 and 1980 onwards periods occurred in Britain and Belgium (Table 14.2). However, significant increases also occurred between the two periods in France, Spain and Italy. These changes are shown in more detail in Fig. 14.4 where 5-year indices are plotted against time. A significant decrease in index values from 1950 occurred in Belgium while a significant increase occurred in Italy (Table 14.4). Although the index from the combined data of the major countries (Fig. 14.5) showed no significant trend and the other countries showed a significant decrease, a weighted regression analysis indicated an overall increase in the index (Table 14.4).

Analysis of the percentage of birds taken in each month over both periods (Fig. 14.6) indicates that with the exception of Belgium birds were taken almost entirely within the period October to March. This reflects the hunting seasons in these countries. Excluding Belgium, no difference between the monthly patterns of taking Song Thrushes could be detected. The apparent change in the monthly distribution of recoveries from Belgium may be an artefact of the small sample size over the later period.

14.7 Methods used to take Song Thrushes

Amongst those countries taking high numbers of Song Thrushes there are substantial differences in the methods used (Table 14.2). Shooting is most common in France, Spain, Portugal and Italy. The proportion reported as shot has increased significantly in all these countries over the two study periods (Table 14.2 and Fig. 14.3). Belgium and Algeria take most birds by trapping and in Algeria the proportion reported as trapped has increased significantly to 82% of those taken.

TABLE 14.1a The distribution of Song Thrushes recovered due to shooting and trapping before 1980 in relation to their area of origin. The percentage of taken birds recovered in each country is shown for each national ringing scheme. Percentages within parentheses are based on less than ten recoveries.

Country of recovery	UK	CI	NO	SV	DK	SF	PL	DD	DF
GB	35.4	0	0	0	0	0	0	0	0.1
CI	0.2	0	0	0	0	0	0	0	0
ER	4.6	0	0	0	0	0	0	0	0
NO	0	0	3.2	0.2	0	0	0	0	0.3
SV	0	0	0	0	0	0	0	0	0.1
DK	0.2	0	0	0.2	2.7	0	0	0	0.1
SF	0	0	0	0	0.4	1.2	0	0	0.1
SU	0	0	0	0	0	0.2	0	0	0
PL	0	0	0	0	0	0	1.6	0	0
DD	0	0	0	0	0	0	0	3.0	0.1
DF	0	0	0	0	0	0	0.5	0	1.9
NL	0.2	0	0	0	0	0	0	0	0.1
BL	0.5	0	2.1	0.4	0.4	0.8	0.8	3.0	2.6
KN	0	0	0	0	0	0	0	0	0
FR	31.7	(100)	43.6	43.1	49.3	42.6	41.8	54.5	48.3
ES	17.1	0	25.5	39.3	28.9	36.6	26.8	21.2	24.0
PO	9.4	0	24.5	4.9	8.4	5.5	3.2	3.0	7.3
IA	0.7	0	0	9.3	8.0	9.8	21.4	8.1	11.6
HE	0	0	0	0.2	0	0	0	0	0.1
AU	0	0	0	0	0	0	0	0	0.1
CS	0	0	0	0	0	0	0	0	0
HG	0	0	0	0	0	0	0	0	0
RO	0	0	0	0	0	0	0	0	0
BG	0	0	0	0	0	0	0	0	0
YG	0	0	0	0	0	0.2	0.5	0	0
GR	0	0	0	0.4	0	0.3	0.3	0	0.1
TU	0	0	0	0	0	0	0	0	0
CY	0	0	0	0	0	0	0	0	0
ML	0	0	0	0	0	0	0	0	0
SY	0	0	0	0	0	0	0	0	0
LE	0	0	0	0	0	0	0	0	0
IL	0	0	0	0	0	0	0	0	0
ME	0	0	0	0	0	0	0	0	0
EG	0	0	0	0	0	0	0	0	0
LT	0	0	0	0	0	0	0	0	0
TO	0	0	0	0	0.4	0.2	0.3	0	0.1
AG	0	0	0	1.7	1.3	2.0	2.7	7.1	2.6
MA	0	0	1.1	0.2	0	0.7	0	0	0.3
SA	0	0	0	0	0	0	0	0	0
TOTAL RECOVERIES	584	1	94	473	225	603	373	99	1442

TABLE 14.1a (cont'd)   The distribution of Song Thrushes recovered due to shooting and trapping before 1980 in relation to their area of origin. The percentage of taken birds recovered in each country is shown for each national ringing scheme. Percentages within parentheses are based on less than ten recoveries.

Country of recovery	NL	BL	FR	ES	IA	HE	CS	HG
GB	0.3	0	1.5	0	0	0	–	0
CI	0.2	0	0	0	0	0	–	0
FR	0	0	0	0	0	0	–	0
NO	0.3	0	0	0	0	0	–	0
SV	0	0	0	0	0	0	–	0
DK	0	0	0	0	0	0	–	0
SF	0	0	0	0	0	0	–	0
SU	0	0	0	0	0	0	–	0
PL	0	0	0	0	0	0	–	0
DD	0	0	0	0	0	0	–	0
DF	0	0.3	0	0	0	0	–	0
NL	5.2	0	0	0	0	0	–	0
BL	5.5	7.7	1.5	0	0	0	–	0
KN	0	0	0	0	0	0	–	0
FR	59.2	63.3	41.2	0	0	58.1	–	5.9
ES	21.4	20.3	32.3	0	2.2	16.7	–	11.8
PO	7.1	7.1	1.5	0	0	0	–	0
IA	0.3	0.8	7.3	0	97.8	18.4	–	82.3
HE	0	0	0	0	0	0.2	–	0
AU	0	0	0	0	0	0	–	0
CS	0	0	0	0	0	0	–	0
HG	0	0	0	0	0	0	–	0
RO	0	0	0	0	0	0	–	0
BG	0	0	0	0	0	0	–	0
YG	0	0	0	0	0	0	–	0
GR	0	0.3	0	0	0	0	–	0
TU	0	0	0	0	0	0	–	0
CY	0	0	0	0	0	0	–	0
ML	0	0	0	0	0	0	–	0
SY	0	0	0	0	0	0	–	0
IE	0	0	0	0	0	0	–	0
IL	0	0	0	0	0	0	–	0
ME	0	0	0	0	0	0	–	0
EG	0	0	0	0	0	0	–	0
IT	0	0	0	0	0	0	–	0
TO	0	0	0	0	0	0.7	–	0
AG	0.5	0.3	14.7	0	0	6.0	–	0
MA	0	0	0	0	0	0	–	0
SA	0	0	0	0	0	0	–	0
TOTAL RECOVERIES	365	365	68	0	92	582	–	17

TABLE 14.1b The distribution of Song Thrushes recovered due to shooting and trapping from 1980 onwards in relation to their area of origin. The percentage of taken birds recovered in each country is shown for each national ringing scheme. Percentages within parentheses are based on less than ten recoveries.

Country of recovery	\- Country of ringing								
	UK	CI	NO	SV	DK	SF	PL	DD	DF
GB	7.8	0	0	0	0	0	0	0	0
CI	0	0	0	0	0	0	0	0	0
ER	0	0	0	0	0	0	0	0	0
NO	0	0	0	0	0	0	0	0	0.5
SV	0	0	0	0	0	0	0	0	0
DK	0	0	0	0	0	0	0	0	0
SF	0	0	0	0	0	0.9	0	0	0
SU	0	0	0	0	0	0	0	0	0
PL	0	0	0	0	0	0	0	0	0
DD	0	0	0	0	0	0	0	0	0
DF	0	0	0	0	0	0	0	0	0
NL	0	0	0	0	0	0	0	0	0
BL	0	0	0	0	0	0.4	0	0	0
KN	0	0	0	0	0	0	0	0	0
FR	41.6	(100)	52.8	49.5	47.8	32.7	47.5	0	37.9
ES	27.3	0	19.4	34.1	32.1	40.9	33.3	0	32.5
PO	22.1	0	25.0	9.6	12.6	8.6	8.1	0	22.9
IA	1.3	0	2.8	3.8	5.0	11.4	9.1	0	4.4
HE	0	0	0	0	0	0	0	0	0
AU	0	0	0	0	0	0	0	0	0
CS	0	0	0	0	0	0	0	0	0
HG	0	0	0	0	0	0	0	0	0
RO	0	0	0	0	0	0	0	0	0
BG	0	0	0	0	0	0	0	0	0
YG	0	0	0	0	0	0	0	0	0
GR	0	0	0	0	0.6	0.4	0	0	0
TU	0	0	0	0	0	0	0	0	0
CY	0	0	0	0	0	0	0	0	0
ML	0	0	0	0	0	0	0	0	0
SY	0	0	0	0	0	0	0	0	0
LE	0	0	0	0	0	0	0	0	0
IL	0	0	0	0	0	0	0	0	0
M	0	0	0	0	0	0	0	0	0
EG	0	0	0	0	0	0	0	0	0
LT	0	0	0	0	0	0	0	0	0
TO	0	0	0	0	0	0	0	0	0
AG	0	0	0	2.4	1.9	4.1	2.0	0	1.9
MA	0	0	0	0.5	0	0.4	0	0	0
SA	0	0	0	0	0	0	0	0	0
TOTAL RECOVERIES	77	3	208	159	220	99	0	206	

TABLE 14.1b (cont'd) The distribution of Song Thrushes recovered due to shooting and trapping from 1980 onwards in relation to their area of origin. The percentage of taken birds recovered in each country is shown for each national ringing scheme. Percentages within parentheses are based on less than ten recoveries.

Country of recovery	Country of ringing							
	NL	BL	FR	ES	IA	HE	CS	HG
GB	0	0	0	0	0	0	–	0
CI	0	0	0	0	0	0	–	0
ER	0	0	0	0	0	0	–	0
NO	0	0	0	0	0	0	–	0
SV	0	0	0	0	0	0	–	0
DK	0	0.4	0	0	0	0	–	0
SF	0	0	0	0	0	0	–	0
SU	0	0	0	0	0	0	–	0
PL	0	0	0	0	0	0	–	0
DD	0	0	0	0	0	0	–	0
DF	0	0	0	0	0	0	–	0
NL	0	0	0	0	0	0	–	0
BL	0	2.3	0	0	0	0	–	0
KN	0	0	0	0	0	0	–	0
FR	45.1	73.3	(33.3)	19.0	29.0	61.2	–	9.4
ES	33.8	13.6	(16.7)	76.2	12.1	24.5	–	0
PO	18.0	9.7	0	0	0	1.0	–	0
IA	1.5	0	0	4.8	46.5	12.2	–	86.8
HE	0	0	0	0	0.4	0	–	0
AU	0	0	0	0	0	0	–	0
CS	0	0	0	0	0	0	–	0
HG	0	0	0	0	0	0	–	0
RO	0	0	0	0	0	0	–	0
BG	0	0	0	0	0	0	–	0
YG	0	0	0	0	0	0	–	0
GR	0	0	0	0	0.2	0	–	1.9
TU	0	0	0	0	0	0	–	0
CY	0	0	0	0	0	0	–	0
ML	0	0	0	0	0	0	–	0
SY	0	0	0	0	0	0	–	0
IE	0	0	0	0	0	0	–	0
IL	0	0	0	0	0	0	–	0
ME	0	0	0	0	0	0	–	0
EG	0	0	0	0	0	0	–	0
LT	0	0	0	0	0	0	–	0
TO	0	0	0	0	0	0	–	0
AG	1.5	0.8	(50.0)	0	11.5	1.0	–	0
MA	0	0	0	0	0	0	–	0
SA	0	0	0	0	0	0	–	0
TOTAL RECOVERIES	133	258	6	42	520	98	–	53

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TABLE.14.2.SONG THRUSH:Indices of birds taken before 1980 and from 1980 onwards for each country of recovery.

	Index (all methods)[a]		% hunted[b]		Total recoveries[c]		Shooting Index[a]		Trapping Index[a]		G test[d]
	-1980	1980+	-1980	1980+	-1980	1980+	-1980	1980+	-1980	1980+	
GB	4.1	0.8***	2.6	0.4	8104	1500	2.0	0.8	2.1	0.0	-
CI	3.5	0.0	2.6	0.0	77	69	3.5	0.0	0.0	0.0	-
ER	23.9	0.0	18.9	0.0	143	20	2.6	0.0	19.5	0.0	-
NO	33.3	9.1	27.8	7.1	36	14	13.3	9.1	20.0	0.0	-
SV	2.9	0.0	1.7	0.0	58	22	0.0	0.0	2.9	0.0	-
DK	10.8	3.1	3.4	1.4	266	69	7.2	3.1	3.6	0.0	-
SF	7.4	3.9	1.8	0.6	504	319	1.6	0.0	5.7	2.0	-
SU	18.2	(0.0)	13.3	0.0	15	13	0.0	(0.0)	18.2	(0.0)	-
PL	35.3	(0.0)	25.0	0.0	24	13	5.9	(0.0)	29.4	(0.0)	-
DD	3.8	(0.0)	3.6	(0.0)	112	2	1.0	(0.0)	2.9	(0.0)	-
DF	13.9	0.0*	12.0	0.0	250	55	7.9	0.0	6.0	0.0	-
NL	6.7	0.0	4.8	0.0	437	105	1.3	0.0	5.1	0.0	-
BL	45.9	9.7***	32.8	5.2	323	135	9.5	2.8	19.5	6.9	-
KN	(0.0)	-	(0.0)	-	1	-	(0.0)	-	(0.0)	-	-
FR	77.5	84.0***	74.9	78.5	3406	1167	39.6	76.3	5.3	1.0	***
ES	82.6	88.1***	81.1	84.4	1657	659	40.6	59.2	17.6	14.9	***
PO	85.7	90.9	83.7	90.5	393	210	64.3	84.7	4.7	1.0	***
IA	84.1	91.3***	83.3	88.5	732	416	41.1	64.5	11.9	2.5	***
HE	15.8	20.0	5.4	20.0	-	10	15.8	20.0	0.0	0.0	-
AU	(20.0)	(0.0)	(14.3)	(0.0)	7	2	(0.0)	(0.0)	(20.0)	(0.0)	-
CS	(0.0)	-	(0.0)	-	3	-	(0.0)	-	(0.0)	-	-
HG	-	-	-	-	-	-	-	-	-	-	-
RO	-	-	-	-	-	-	-	-	-	-	-
BG	-	-	-	-	-	-	-	-	-	-	-
YG	(60.0)	-	(60.0)	-	5	-	(20.0)	-	(40.0)	-	-
GR	(100.0)	(80.0)	(100.0)	(66.7)	7	6	(71.4)	(80.0)	(14.3)	(0.0)	-
TU	-	-	-	-	-	-	-	-	-	-	-
CY	-	-	-	-	-	-	-	-	-	-	-
ML	-	-	-	-	-	-	-	-	-	-	-
SY	-	-	-	-	-	-	-	-	-	-	-
LE	-	-	-	-	-	-	-	-	-	-	-
IL	-	-	-	-	-	-	-	-	-	-	-
ME	-	-	-	-	-	-	-	-	-	-	-
EG	-	-	-	-	-	-	-	-	-	-	-
LT	-	-	-	-	-	-	-	-	-	-	-
TO	90.0	(50.0)	69.2	50.0	13	2	20.0	(50.0)	20.0	(0.0)	-
AG	77.4	80.5	74.4	74.4	172	124	14.6	6.2	40.8	66.4	***
MA	61.1	(40.0)	61.1	33.3	18	6	33.3	(20.0)	11.1	(20.0)	-
SA	-	-	-	-	-	-	-	-	-	-	-

[a]   See chapter 2 (methods) for derivation of indices. Indices derived from less than 10 recoveries are indicated within parentheses. Fisher's exact tests (Sokal & Rohlf 1981) were used to compare the proportions taken in each period. Significance levels (*<0.05; ** <0.01; *** <0.001) of the tests are indicated in column 1980+. Tests were carried out on all pairs except where indices were based on less than 10 recoveries.

[b]   Percentage of all recoveries other than those excluded on the basis of poor quality data (see chapter 2) taken by shooting and trapping.

[c]   Total number of recoveries other than those excluded on the basis of poor quality data.

[d]   G test (Sokal & Rohlf 1981) comparison between periods of the proportions of birds taken according to the classes shot, trapped, and shot or trapped. Significance levels of these comparisons are indicated as above. 'NS' indicates non-significant results where tests were carried out. Comparisons were not made where the expected frequency in any cell was less than 10.

Table.14.3. Song Thrush: Indices of birds taken for each breeding population (across all years).

Breeding Population		Index of birds taken	Sample size
UK	United Kingdom	8.0	3544
CI	Channel Islands	2.1	47
NO	Norway	79.0	124
SV	Sweden	78.9	336
DK	Denmark	72.6	223
SF	Finland	68.2	652
SU	USSR (Lithuania only)	90.5	21
PL	Poland	77.5	182
DD	East Germany	44.0	168
DF	West Germany	76.0	1124
NL	Holland	44.3	447
BL	Belgium	62.4	489
FR	France	12.7	212
ES	Spain	100	1
IA	Italy	100	8
HE	Switzerland	88.1	176
CJ	Czechoslovakia	-	-
HG	Hungary	53.7	82

Table 14.4   Regression analysis of temporal trends in the indices of Song Thrush taken.

Country of recovery	Intercept	Slope	t	P
Belgium	174.0	-2.33	-3.35	*
France	66.0	0.186	1.11	ns
Portugal	74.1	0.194	0.872	ns
Spain	73.5	0.160	0.961	ns
North Africa	42.3	0.453	2.37	ns
Italy	48.2	0.536	6.08	***
Major	68.0	0.175	1.46	ns
Other	11.6	-0.113	-3.59	*
All	-15.6	0.904	9.92	***

All regressions used a weighted technique where each 5-year index was weighted by the square root of the sample size.

Countries where 10 or more recoveries occurred in each year after 1950 were analysed. Data from the period before 1950 were not included in the analysis.

Major countries are those with a tradition of taking substantial numbers of birds that use western migration routes.
(i.e. BL, FR, ES, PO, IA, NA).

Significance levels indicated are: NS Not significant; * P<0.05; ** P<0.01; *** P<0.001.
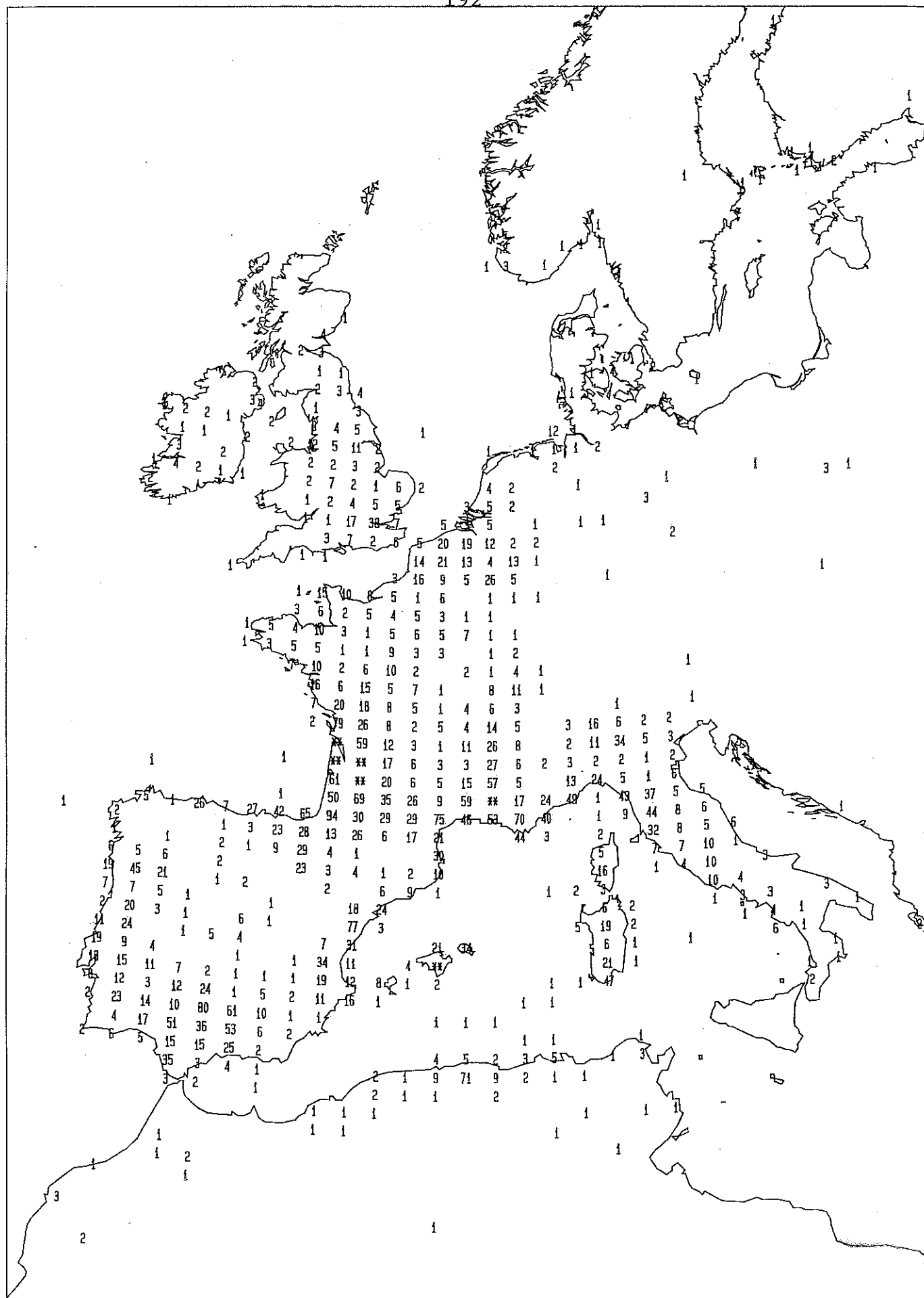
Figure 14.1a   Total numbers of Song Thrush ringing recoveries resulting from birds taken before 1980 in each 30' by 60' grid square. ** Indicates numbers greater than 99. 11 recoveries were outside the limits of the map.
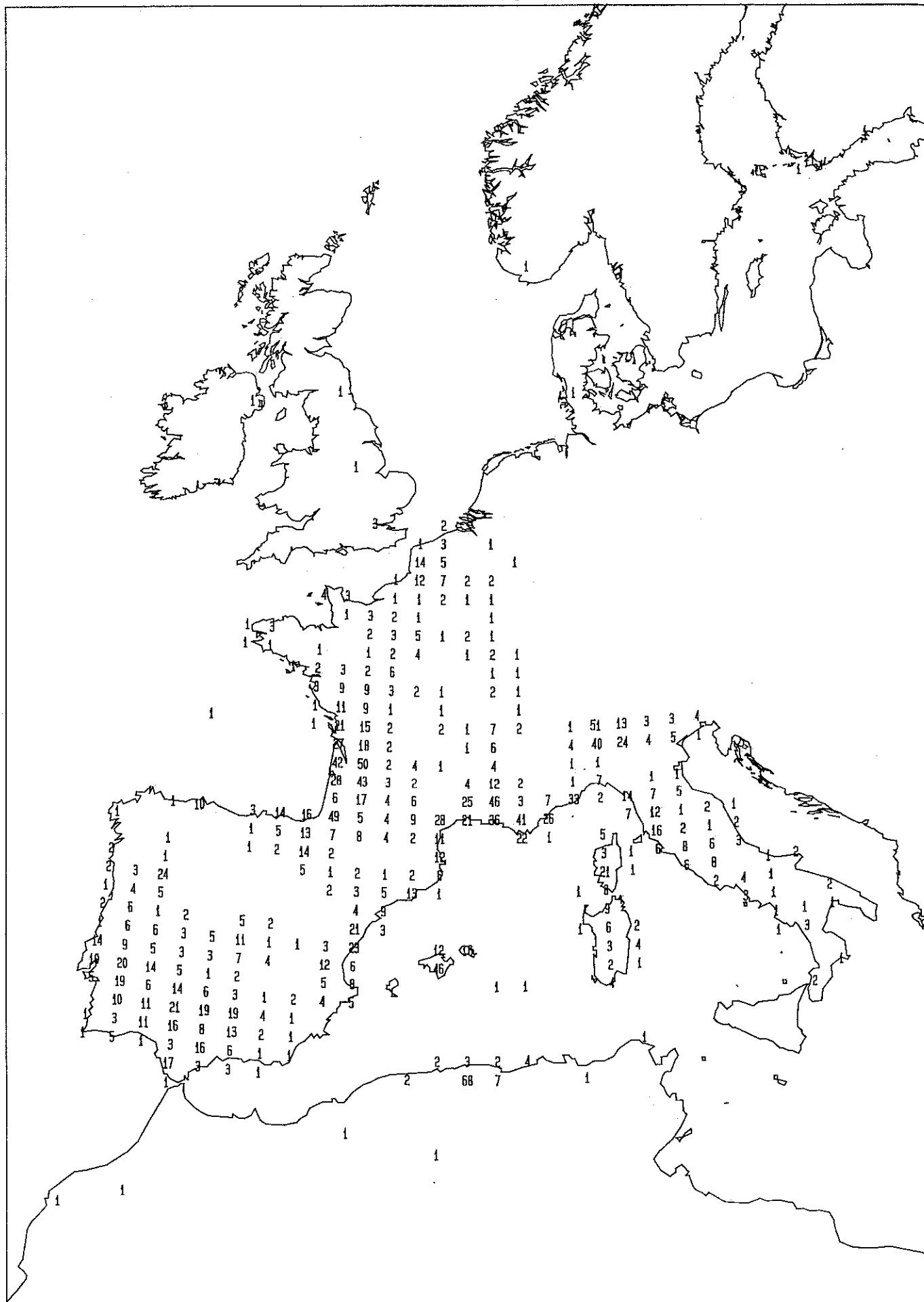
Figure 14.1b   Total numbers of   Song Thrush ringing recoveries from birds taken from 1980 onwards
in each 30' by 60' grid square.   ** Indicates numbers greater than 99.   2 recoveries were outside
the limits of the map.
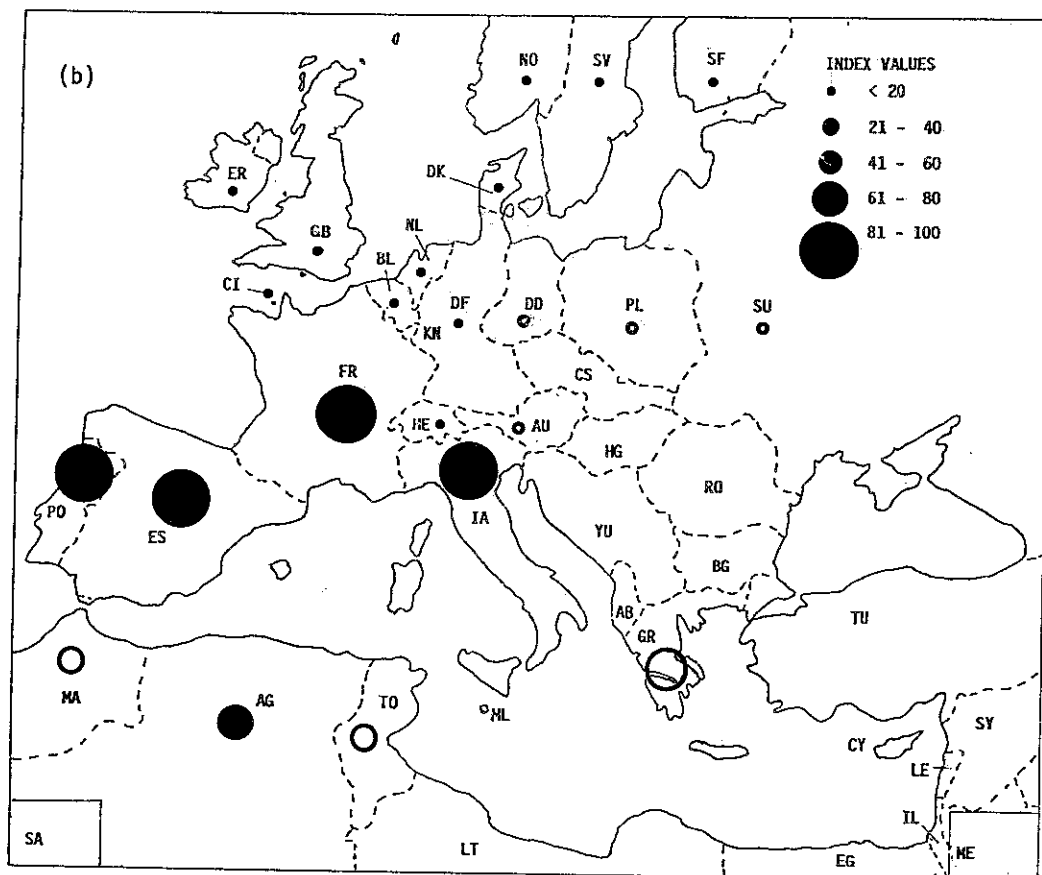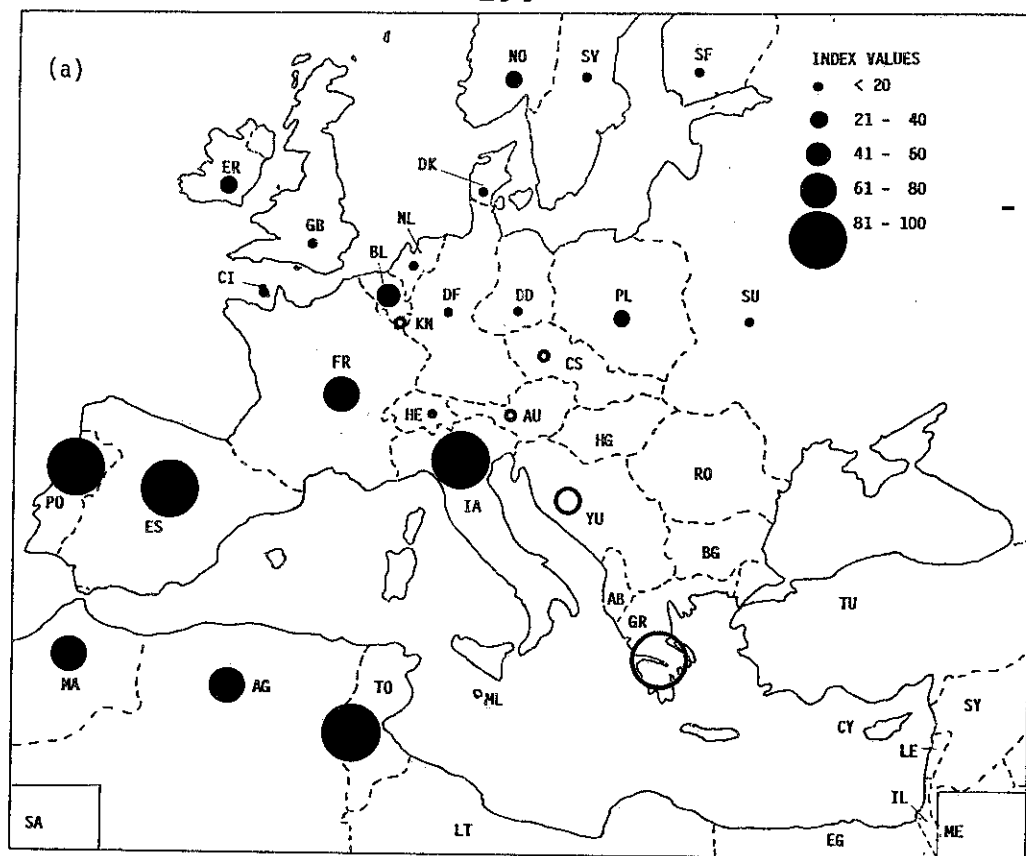
Figure 14.2 Geographical variation in the indices of Song Thrush
taken for each country of recovery in the period before 1980 (a) and from
1980 onwards (b). Solid circles indicate values derived from more than 10
recoveries and open circles indicate those derived from less than 10.
Country codes are indicated in Table 2,4 of the Methods.
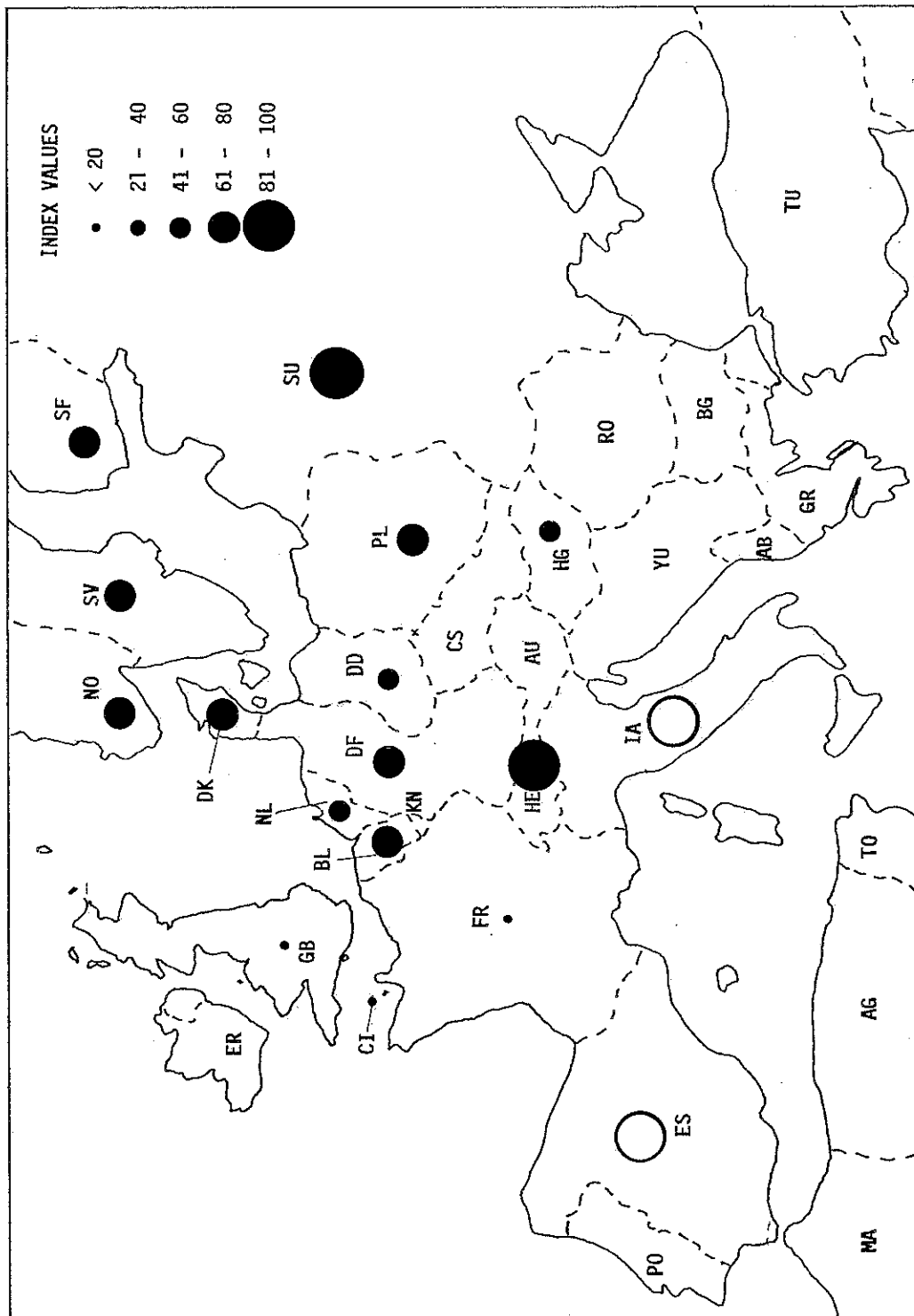
Figure 14.3 Geographical variation in the indices of Song Thrush taken over all years for each breeding population. Solid circles indicate values derived from more than 10 recoveries and open circles indicate those derived from less than 10. Country codes are indicated in Table 2.4 of the Methods.

Belgium

Index of birds taken

-50 50-54 55-59 60-64 65-69 70-74 75-79 80-84 85+
5 Year period

France

Index of birds taken

-50 50-54 55-59 60-64 65-69 70-74 75-79 80-84 85+
5 Year period

Portugal

Index of birds taken

-50 50-54 55-59 60-64 65-69 70-74 75-79 80-84 85+
5 Year period

Spain

Index of birds taken

-50 50-54 55-59 60-64 65-69 70-74 75-79 80-84 85+
5 Year period

North Africa

Index of birds taken

-50 50-54 55-59 60-64 65-69 70-74 75-79 80-84 85+
5 Year period

Italy

Index of birds taken

-50 50-64 55-59 60-64 65-69 70-74 75-79 80-84 85+
5 Year period
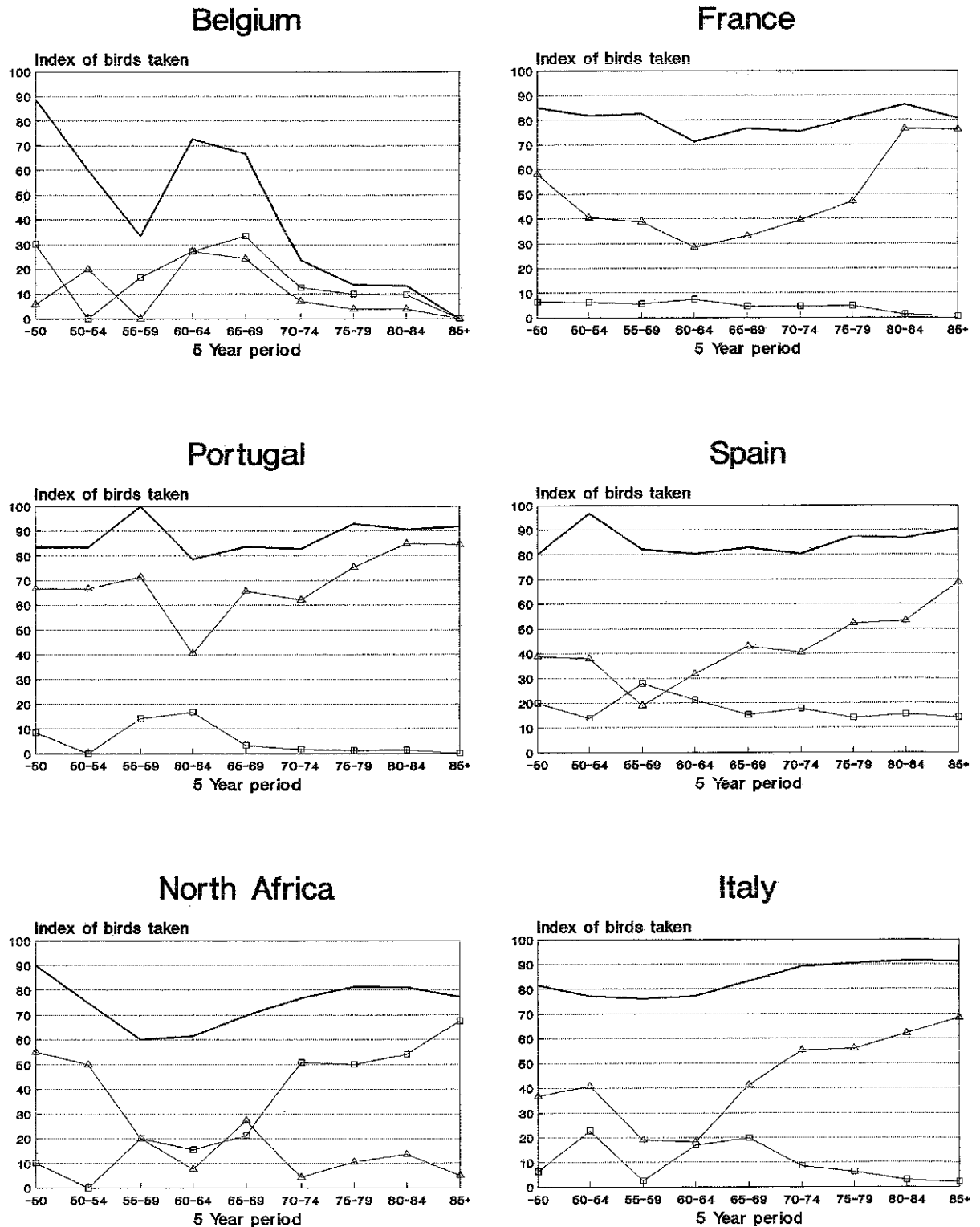
Figure 14.4   Trends in 5-yearly indices of Song Thrush taken in individual countries
with high overall indices and sufficient recoveries for analysis.   The bold line without
symbols indicates overall index values, triangles indicate index values based on birds
reported as shot and squares indicate index values based on birds reported as trapped.
The periods -50 and 85+ refer to all recoveries before 1950 and from 1985 onwards
respectively.

BL,ES,FR,IA,NA,PO

Index of birds taken

Other

Index of birds taken

All countries

Index of birds taken
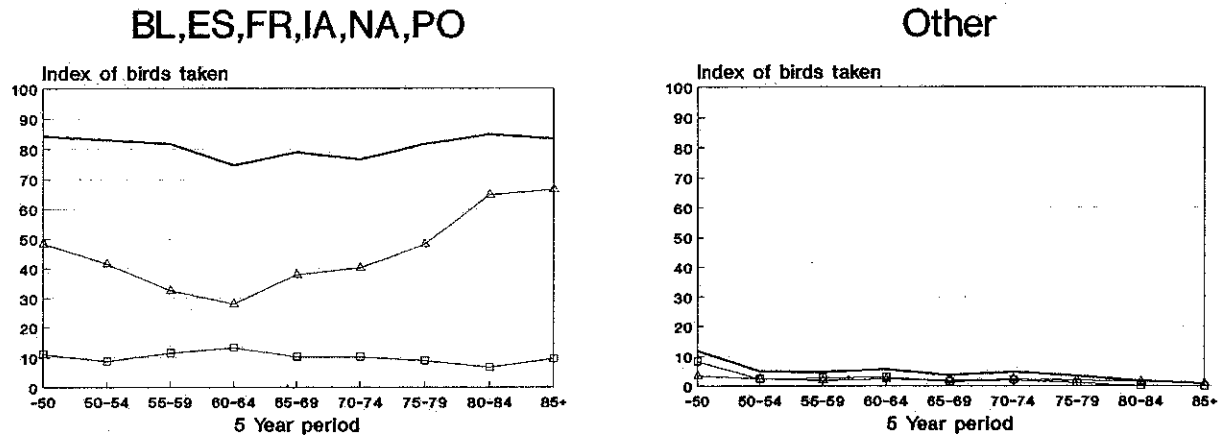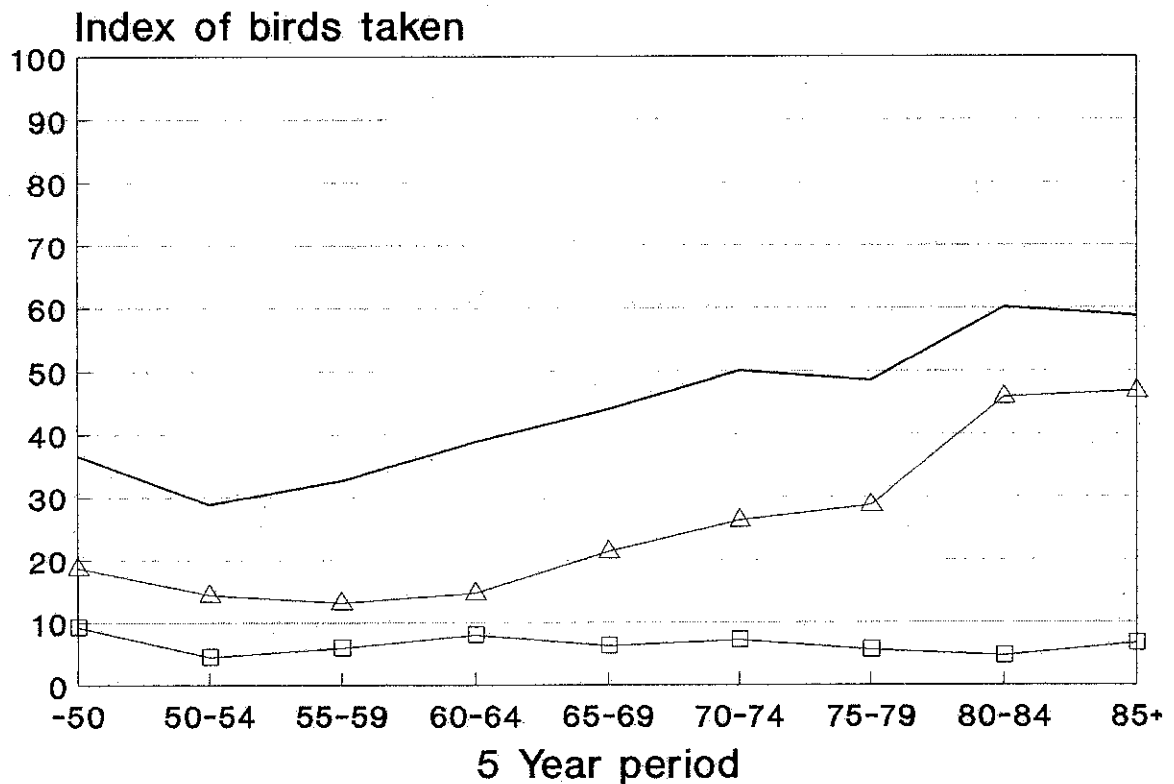
Figure 14,5 Trends in combined 5-yearly indices of Song Thrush
taken in: a) countries, for which data for this species were available,
with a tradition of taking substantial numbers of migratory birds on the
western European flyways (ie BL, ES, FR, IA. NA, PO),
b) other countries and c) all countries. The bold line with symbols
indicates overall index values, triangles indicate values based on birds
reported as shot and squares indicate index values based on birds reported
as trapped. The periods -50 and 85+ refer to all recoveries before 1950
and from 1985 onwards respectively.

Belgium

France

Portugal

Spain

North Africa

Italy
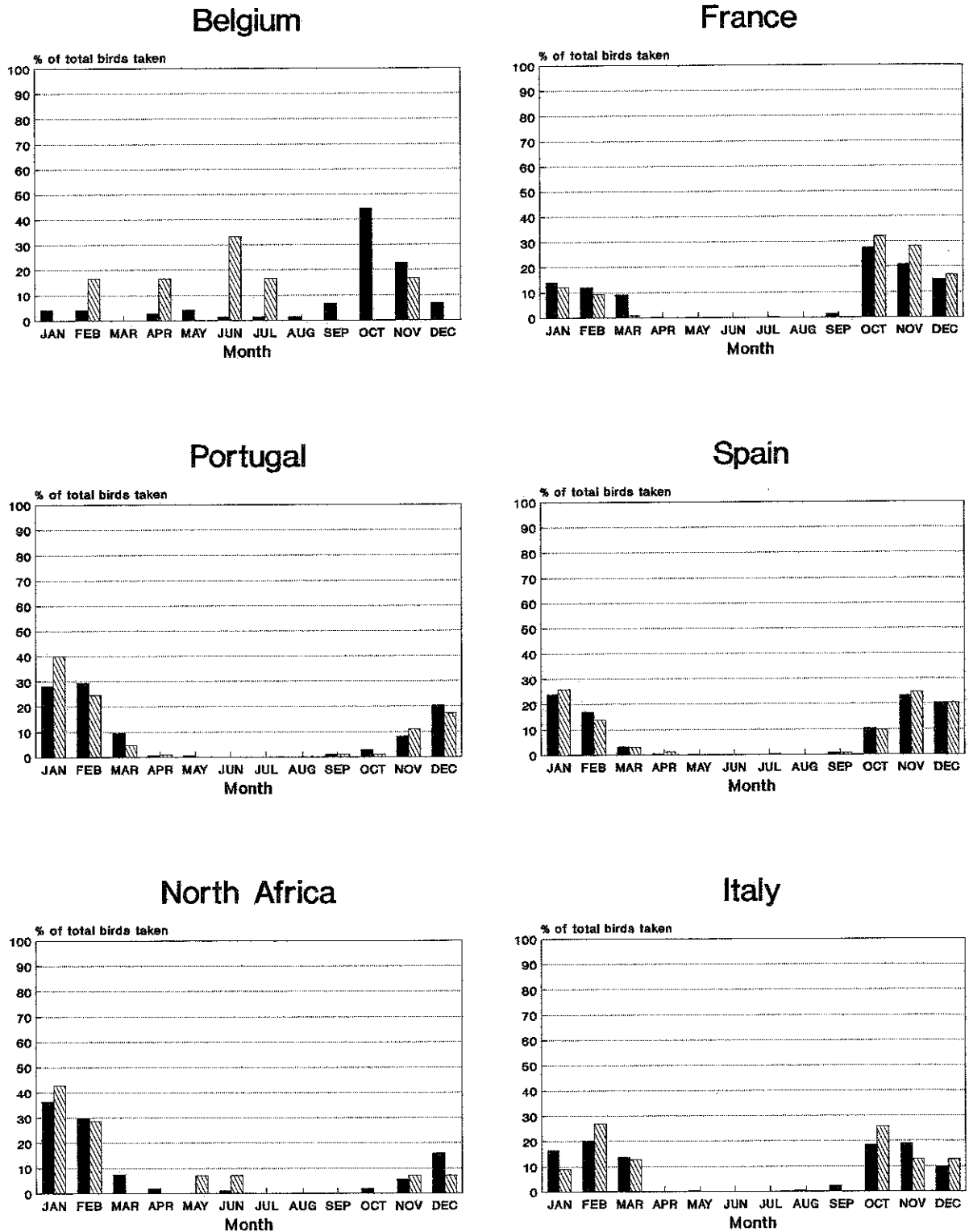
Figure 14.6   Monthly percentages of total   Song Thrush taken in individual countries with high overall indices and sufficient recoveries for analysis.   Solid bars indicate birds from the period before 1980 and hatched bars indicate birds taken from 1980 onwards.

15. REDWING (TURDUS ILIACUS)

15.1 Range

Within Europe the Redwing breeds in Scandinavia, north-eastern Poland and the northern Soviet Union. There is also a small breeding population in the United Kingdom. Redwings are present throughout the year only in south-western Norway, the Soviet Baltic states and the United Kingdom (Harrison 1982, Cramp and Simmons 1988). The species winters in Europe to the south of its breeding range, North Africa and the Middle East.

15.2 Population trends

Increased numbers have been reported from Finland, Poland and the southern U.S.S.R. in recent years (Cramp and Simmons 1988). The species was first recorded as breeding in the United Kingdom in 1925 and since then the size of the British population has fluctuated considerably, though remaining insignificant in a European context (Marchant et al. 1990).

15.3 Migration

Most European Redwings winter in an area extending from the United Kingdom to the Caspian Sea. There is some evidence of birds showing fidelity to particular areas within this zone in successive winters but many have been found to vary widely in their choice of wintering grounds in different years (Simms 1978, Zink 1981). In general, Redwings from Iceland winter in the United Kingdom, western France and Iberia, those from western Scandinavia and the south-eastern Baltic disperse over a wide area from the British Isles to the Black Sea and Finnish Redwings tend to occupy the region between the Black and Caspian Seas, though some occur farther west (Cramp and Simmons 1988). The numbers of Redwings wintering in North Africa fluctuates between years but the species has been recorded as far south as 29°N in Morocco (Zink 1981).

15.4 Status

Within the E.C. taking of Redwings is permitted in France, Spain, Portugal and Italy, from September to February, and in Greece, from September to March (Bertelsen and Simonsen 1989). Other Mediterranean countries found by Woldhek (1979) to permit the taking of Redwings were Malta, Cyprus, Lebanon, Tunisia and Algeria.

15.5 Geographical variation in the taking of Redwings

Prior to 1980, the highest indices of Redwings taken in countries providing at least 10 recoveries were found in Belgium, France, Spain, Portugal, Italy, Greece, and Lebanon (Table 15.2). These all had index values of at least 70. Indices greater than 40 were

also found in Norway, U.S.S.R., Yugoslavia and Turkey. France accounted for 52% of all recoveries of taken Redwings during this period. Italy (14%) and Spain (11%) were the only other countries to contribute 10% or more of the total.

In the period from 1980 onwards, few countries provided more than 10 recoveries. The highest indices of Redwings taken amongst these were for France, Spain, Portugal and Italy which all exceeded 80. Although based on small numbers of recoveries, the indices for eastern Mediterranean countries and North Africa remained high (Table 15.2). France (60%), Spain (13%), Portugal (12%) and Italy (11%) contributed the largest numbers of taken Redwings recovered in this period.

Recoveries of taken Redwings have been concentrated in south-western France, northern Italy, Portugal and southern Spain (Fig. 15.1a,b). In France the Departments of Basses-Pyrenees, Charente-Maritime, Gironde, Landes, Gers, Lot et Garonne, Herault, Var and Vaucluse have provided a substantial proportion of recoveries (Appendix 9.3). The largest numbers of recoveries of taken Redwings in Italy have come from the provinces of Bergamo, Como, Sandrio,Varese, Firenze, Livorno, Pisa, Lucca and Pistoia (Appendix 9.4). The regions of Guipuzcoa, Oviedo, Vizcaya, Cordoba and Sevilla all feature prominently among recoveries of Redwings taken in Spain (Appendix 9.5), while the majority taken in Portugal are from the provinces of Minho and Alta Atlantejo (Appendix 9.2).

The indices of birds taken for all European breeding populations of Redwings for which data were available are relatively high, all being greater than 50. Those breeding in Sweden appear to be the most susceptible to being taken (Table 15.4, Fig. 15.4) (Claessens 1990).

15.6 Temporal variation in the taking of Redwings

Indices of Redwings taken from 1980 were generally little different from those for the earlier period. There was, however, a statistically significant reduction in the index value for Belgium (Table 15.2). There were few recoveries from the eastern Mediterranean during this time.

Only in Belgium among the five countries analyzed did indices of Redwings taken show a strong decreasing trend with time. Regression of index of Redwings taken on year failed to reveal a significant relationship in any of the countries or combinations of countries tested (Table 15.4, Fig. 15.4, Fig. 15.5).

Analysis of the percentage of taken Redwings recovered in each month showed the distribution to coincide largely with times of permitted hunting, most birds being taken between October and February (Table 15.6).

15.7 Methods used to take Redwings

The majority of Redwings are taken by shooting. Prior to 1980, 55% of taken Redwing were known to have been shot and 10% trapped. The method used to take the remainder was not specified. Since 1980, 78% of taken Redwings have been recovered as a result of shooting and only 5% as a result of trapping. In France there was a significant increase between the two periods in the proportion of birds shot relative to those trapped while the converse occurred in Spain. No significant changes were found in any other country (Table 15.2).

TABLE 15.1a The distribution of Redwings recoveries due to shooting and trapping before 1980 in relation to their area of origin. The percentage of taken birds recovered in each country is shown for each national ringing scheme. Percentages within parentheses are based on less than ten recoveries.

Country of recovery	Country of ringing													
	UK	CI	NO	SV	DK	SF	DD	DF	NL	BL	FR	ES	IA	HE
GB	(1.6)	0	–	0	0	0	0	0	0	(0.7)	0	–	–	0
CI	0	0	–	0	0	0	0	0	0	(0.3)	0	–	–	0
ER	(0.2)	0	–	0	0	0	0	0	0	0	0	–	–	0
NO	(1.3)	0	–	0	0	(0.6)	0	(0.9)	0	(0.7)	0	–	–	0
SV	0	0	–	0	0	0	0	(0.4)	0	0	0	–	–	0
DK	0	0	–	0	(3.33)	0	0	0	0	0	0	–	–	0
SF	(1.8)	0	–	0	0	2.9	0	0	(1.5)	(0.3)	0	–	–	0
SU	4.9	0	–	(1.6)	0	2.0	0	(0.9)	(2.3)	(1.5)	0	–	–	0
PL	0	0	–	0	0	0	0	0	0	0	0	–	–	0
DD	0	0	–	0	0	0	0	0	0	0	0	–	–	0
DF	0	0	–	0	0	0	0	(2.2)	0	0	0	–	–	0
NL	0	0	–	0	0	0	0	(0.9)	(1.5)	(0.3)	0	–	–	0
BL	3.3	0	–	0	0	4.0	0	14.3	(6.1)	9.7	0	–	–	0
KN	0	0	–	0	0	0	(11.1)	0	0	0	0	–	–	0
FR	40.0	(44.4)	–	(54.0)	50.0	52.6	(55.6)	54.6	51.9	61.6	90.9	–	–	75.8
ES	11.6	(11.1)	–	(6.4)	(16.7)	10.3	(11.1)	11.7	14.5	10.6	0	–	–	(9.1)
PO	15.3	(44.4)	–	(14.3)	(13.3)	5.4	0	4.8	(5.3)	8.9	0	–	–	(3.0)
IA	14.9	0	–	19.1	(16.7)	19.7	(22.2)	7.8	9.9	5.0	(9.1)	–	–	(9.1)
HE	0	0	–	0	0	0	0	0	0	0	0	–	–	0
AU	0	0	–	0	0	0	0	0	0	0	0	–	–	0
CS	0	0	–	0	0	0	0	0	0	0	0	–	–	0
HG	0	0	–	0	0	0	0	0	0	0	0	–	–	0
RO	0	0	–	0	0	0	0	0	0	0	0	–	–	0
BG	0	0	–	0	0	0	0	0	0	0	0	–	–	0
YG	(0.2)	0	–	0	0	(0.3)	0	0	0	0	0	–	–	0
GR	2.2	0	–	(1.6)	0	1.1	0	0	(1.5)	(0.3)	0	–	–	0
TU	(0.9)	0	–	(1.6)	0	0	0	(0.9)	(3.1)	0	0	–	–	0
CY	0	0	–	0	0	(0.2)	0	0	0	0	0	–	–	0
ML	0	0	–	0	0	0	0	0	0	0	0	–	–	0
SY	(0.2)	0	–	0	0	(0.1)	0	0	(0.8)	0	0	–	–	0
LE	(1.1)	0	–	0	0	(0.7)	0	0	0	(0.3)	0	–	–	(3.0)
IL	0	0	–	0	0	0	0	0	0	0	0	–	–	0
ME	(0.2)	0	–	0	0	(0.1)	0	0	0	0	0	–	–	0
EG	0	0	–	0	0	0	0	0	0	0	0	–	–	0
LT	0	0	–	0	0	0	0	0	0	0	0	–	–	0
TO	0	0	–	0	0	0	0	0	0	0	0	–	–	0
AG	(0.2)	0	–	(1.6)	0	0	0	(0.9)	(0.8)	0	0	–	–	0
MA	0	0	–	0	0	0	0	0	(0.8)	0	0	–	–	0
SA	0	0	–	0	0	0	0	0	0	0	0	–	–	0
TOTAL No.	450	9	–	63	30	1062	9	231	131	404	11	–	–	33

Note: No data available for Poland, Czechoslovakia or Hungary.

TABLE 15.1b The distribution of Redwings recovered due to shooting and trapping from 1980 onwards in relation to their area of origin. The percentage of taken birds recovered in each country is shown for each national ringing scheme. Percentages within parentheses are based on less than ten recoveries.

Country of recovery	Country of ringing													
	UK	CI	NO	SV	DK	SF	DD	DF	NL	BL	FR	ES	IA	HE
GB	(0.9)	0	–	0	0	0	–	0	0	0	0	0	0	0
CI	0	0	–	0	0	0	–	0	0	0	0	0	0	0
ER	(0.9)	0	–	0	0	0	–	0	0	0	0	0	0	0
NO	(1.7)	0	–	0	0	0	–	0	0	0	0	0	0	0
SV	0	0	–	(2.0)	0	0	–	0	0	0	0	0	0	0
DK	0	0	–	0	0	0	–	0	0	0	0	0	0	0
SF	0	0	–	(2.0)	0	4.1	–	0	0	(0.3)	0	0	0	0
SU	(2.6)	0	–	0	0	0	–	(3.7)	(2.1)	(0.3)	0	0	0	0
PL	0	0	–	0	0	0	–	0	0	0	0	0	0	0
DD	0	0	–	0	0	0	–	0	0	0	0	0	0	0
DF	0	0	–	0	0	0	–	0	0	0	0	0	0	0
NL	0	0	–	0	0	0	–	0	0	0	0	0	0	0
BL	0	0	–	0	0	0	–	0	0	0	0	0	0	0
KN	0	0	–	0	0	0	–	0	0	0	0	0	0	0
FR	53.9	(50.0)	–	64.7	84.2	54.2	–	59.3	66.0	68.6	0	0	32.1	(100)
ES	18.3	(50.0)	–	(7.8)	0	12.2	–	(7.4)	21.2	14.5	(100)	(100)	(1.8)	0
PO	14.8	0	–	(3.9)	(5.3)	13.7	–	(18.5)	(6.4)	12.8	0	0	0	0
IA	(4.4)	0	–	(17.7)	(10.5)	13.3	–	(7.4)	(2.1)	3.2	0	0	66.1	0
HE	0	0	–	0	0	0	–	0	0	0	0	0	0	0
AU	0	0	–	0	0	0	–	0	0	0	0	0	0	0
CS	0	0	–	0	0	0	–	0	0	0	0	0	0	0
HG	0	0	–	0	0	0	–	0	0	0	0	0	0	0
RO	0	0	–	0	0	0	–	0	0	0	0	0	0	0
BG	0	0	–	0	0	0	–	0	0	0	0	0	0	0
YG	0	0	–	0	0	(0.4)	–	0	0	0	0	0	0	0
GR	(1.7)	0	–	(2.0)	0	(0.7)	–	0	(2.1)	0	0	0	0	0
TU	0	0	–	0	0	(0.4)	–	0	0	0	0	0	0	0
CY	0	0	–	0	0	(0.4)	–	(3.7)	0	0	0	0	0	0
ML	0	0	–	0	0	0	–	0	0	0	0	0	0	0
SY	(0.9)	0	–	0	0	0	–	0	0	0	0	0	0	0
LE	0	0	–	0	0	(0.4)	–	0	0	0	0	0	0	0
IL	0	0	–	0	0	0	–	0	0	0	0	0	0	0
ME	0	0	–	0	0	0	–	0	0	0	0	0	0	0
EG	0	0	–	0	0	0	–	0	0	0	0	0	0	0
LT	0	0	–	0	0	0	–	0	0	0	0	0	0	0
TO	0	0	–	0	0	0	–	0	0	(0.3)	0	0	0	0
AG	0	0	–	0	0	0	–	0	0	0	0	0	0	0
MA	0	0	–	0	0	(0.4)	–	0	0	0	0	0	0	0
SA	0	0	–	0	0	0	–	0	0					
TOTAL No.	115	2	–	51	19	271	–	27	47	344	1	3	56	2

Note: No data available for Poland, Czechoslovakia or Hungary.

TABLE.15.2 REDWING: Indices of birds taken before 1980 and from 1980 onwards for each country of recovery.

	Index (all methods)[a]		% hunted[b]		Total recoveries[c]		Shooting Index[a]		Trapping Index[a]		G test[d]
	-1980	1980+	-1980	1980+	-1980	1980+	-1980	1980+	-1980	1980+	
GB	3.6	0.7	2.2	0.4	545	252	1.5	0.7	1.5	0	-
CI	9.1	(0)	7.1	0	14	3	0	(0)	0	(0)	-
ER	5.9	(16.7)	4.6	10.0	22	10	5.9	(16.7)	0	(0)	-
NO	42.5	20.0	35.4	13.3	48	15	17.5	10.0	17.5	10.0	-
SV	5.9	5.9	4.4	3.9	23	26	0	0	0	5.9	-
DK	7.7	(0)	5.6	0	18	10	0	(0)	7.7	(0)	-
SF	13.3	9.3	10.0	5.4	429	241	11.0	3.6	1.0	1.4	-
SU	59.8	66.7	56.7	42.9	97	14	38.0	44.4	8.7	11.1	-
PL	(0)	(0)	0	0	8	1	(0)	(0)	(0)	(0)	-
DD	(0)	(0)	0	0	9	4	(0)	(0)	(0)	(0)	-
DF	14.7	0	12.5	0	40	17	8.8	0	5.9	0	-
NL	5.6	0	3.3	0	150	34	1.1	0	3.4	0	-
BL	70.4	0***	54.1	0	255	48	8.7	0	36.2	0	-
KN	(100.0)	0	100.0	0	1	1	(0)	(0)	(0)	(0)	-
FR	84.9	83.1	83.5	78.7	1535	714	47.1	70.3	4.3	0.6	***
ES	84.4	87.0	83.8	86.4	315	147	53.7	62.3	8.6	13.7	**
PO	91.8	92.4	91.4	91.6	220	119	66.2	77.1	5.9	4.2	NS
IA	94.6	89.6*	94.4	88.0	372	107	46.4	48.7	11.9	11.3	NS
HE	-	-	-	-	-	-	-	-	-	-	-
AU	-	-	-	-	-	-	-	-	-	-	-
CS	(0)	-	0	-	1	-	0	-	0	-	-
HG	-	-	-	-	-	-	-	-	-	-	-
RO	-	-	-	-	-	-	-	-	-	-	-
BG	-	-	-	-	-	-	-	-	-	-	-
YG	57.1	(50.0)	57.1	50.0	7	2	14.3	(50.0)	14.3	(0)	-
GR	89.7	(75.0)	89.7	75.0	29	8	62.1	(75.0)	0	(0)	-
TU	64.7	(40.0)	64.7	40.0	17	5	52.9	(40.0)	0	(0)	-
CY	(66.7)	(100.0)	66.7	100.0	3	3	(33.3)	(33.3)	(0)	(66.7)	-
ML	-	-	-	-	-	-	-	-	-	-	-
SY	(100.0)	(100.0)	100.0	100.0	3	1	(100.0)	(0)	(0)	(0)	-
LE	93.3	(100.0)	87.5	100.0	16	1	73.3	100.0	0	0	-
IL	-	-	-	-	-	-	-	-	-	-	-
ME	(66.7)	-	66.7	-	3	-	(66.7)	-	(0)	-	-
EG	-	-	-	-	-	-	-	-	-	-	-
LT	-	-	-	-	-	-	-	-	-	-	-
TO	-	-	-	-	-	-	-	-	-	-	-
AG	(83.3)	-	71.4	0	7	1	(16.7)	-	(0)	-	-
MA	(33.3)	(100.0)	33.3	100.0	3	1	(33.3)	(0)	(0)	(100.0)	-
SA	-	-	-	-	-	-	-	-	-	-	-

[a] See chapter 2 (methods) for derivation of indices. Indices derived from less than 10 recoveries are indicated within parentheses. Fisher's exact tests (Sokal & Rohlf 1981) were used to compare the proportions taken in each period. Significance levels (*<0.05; ** <0.01; *** <0.001) of the tests are indicated in column 1980+. Tests were carried out on all pairs except where indices were based on less than 10 recoveries.

[b] Percentage of all recoveries other than those excluded on the basis of poor quality data (see chapter 2) taken by shooting and trapping.

[c] Total number of recoveries other than those excluded on the basis of poor quality data.

[d] G test (Sokal & Rohlf 1981) comparison between periods of the proportions of birds taken according to the classes shot, trapped, and shot or trapped. Significance levels of these comparisons are indicated as above. 'NS' indicates non-significant results where tests were carried out. Comparisons were not made where the expected frequency in any cell was less than 10.

Table.15.3. Redwing : Indices of birds taken for each breeding population (across all years).

Breeding Population		Index of birds taken	Sample size
UK	United Kingdom	-	-
CI	Channel Islands	-	-
NO	Norway	-	-
SV	Sweden	75.3	77
DK	Denmark	69.2	13
SF	Finland	65.0	1433
SU	USSR (Lithuania only)	-	-
PL	Poland	-	-
DD	East Germany	50.0	2
DF	West Germany	89.5	19
NL	Holland	66.7	3
BL	Belgium	66.7	3
FR	France	-	-
ES	Spain	-	-
IA	Italy	-	-
HE	Switzerland	-	-
CJ	Czechoslovakia	-	-
HG	Hungary	-	-

Table 15.4   Regression analysis of temporal trends in the indices of Redwings taken.

Country of recovery	Intercept	Slope	t	P
France	73.0	0.15	1.02	ns
Major	82.5	0.03	0.35	ns
Other	50.1	-0.47	-2.17	ns
All	68.1	-0.04	-0.18	ns

All regressions used a weighted technique where each 5-year index was weighted by the square root of the sample size.

Countries where 10 or more recoveries occurred in each year after 1950 were analysed. Data from the period before 1950 were not included in the analysis.

Major countries are those with a tradition of taking substantial numbers of birds that use western migration routes.
(i.e. BL, FR, ES, PO, IA, NA).

Significance levels indicated are: NS Not significant; * P<0.05; ** P<0.01; *** P<0.001.
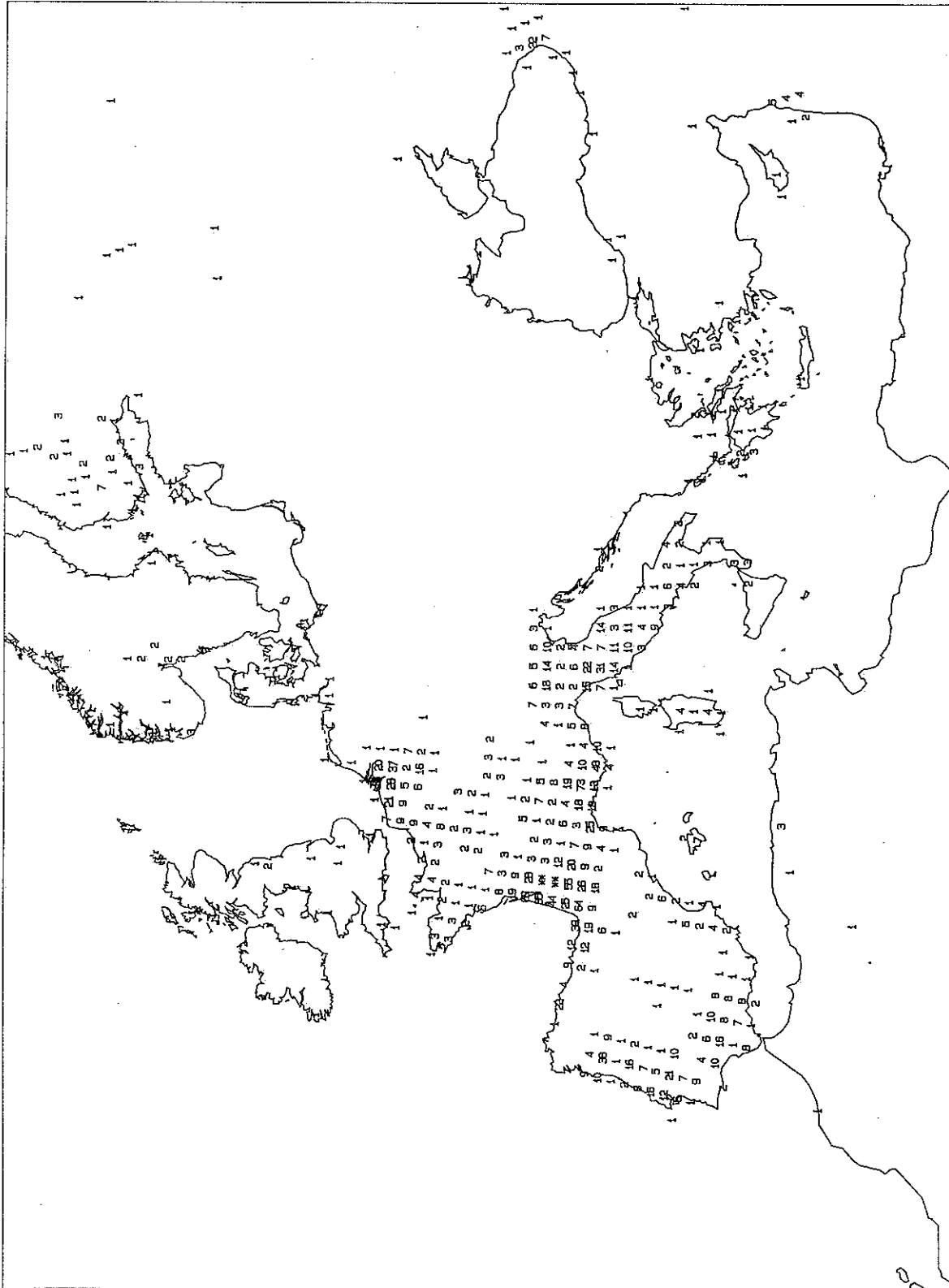
Figure 15.1a Total numbers of Redwing ringing recoveries resulting from birds taken before 1980 in each 30' by 60' grid square. ** Indicates numbers greater than 99. 12 recoveries were outside the limits of the map.
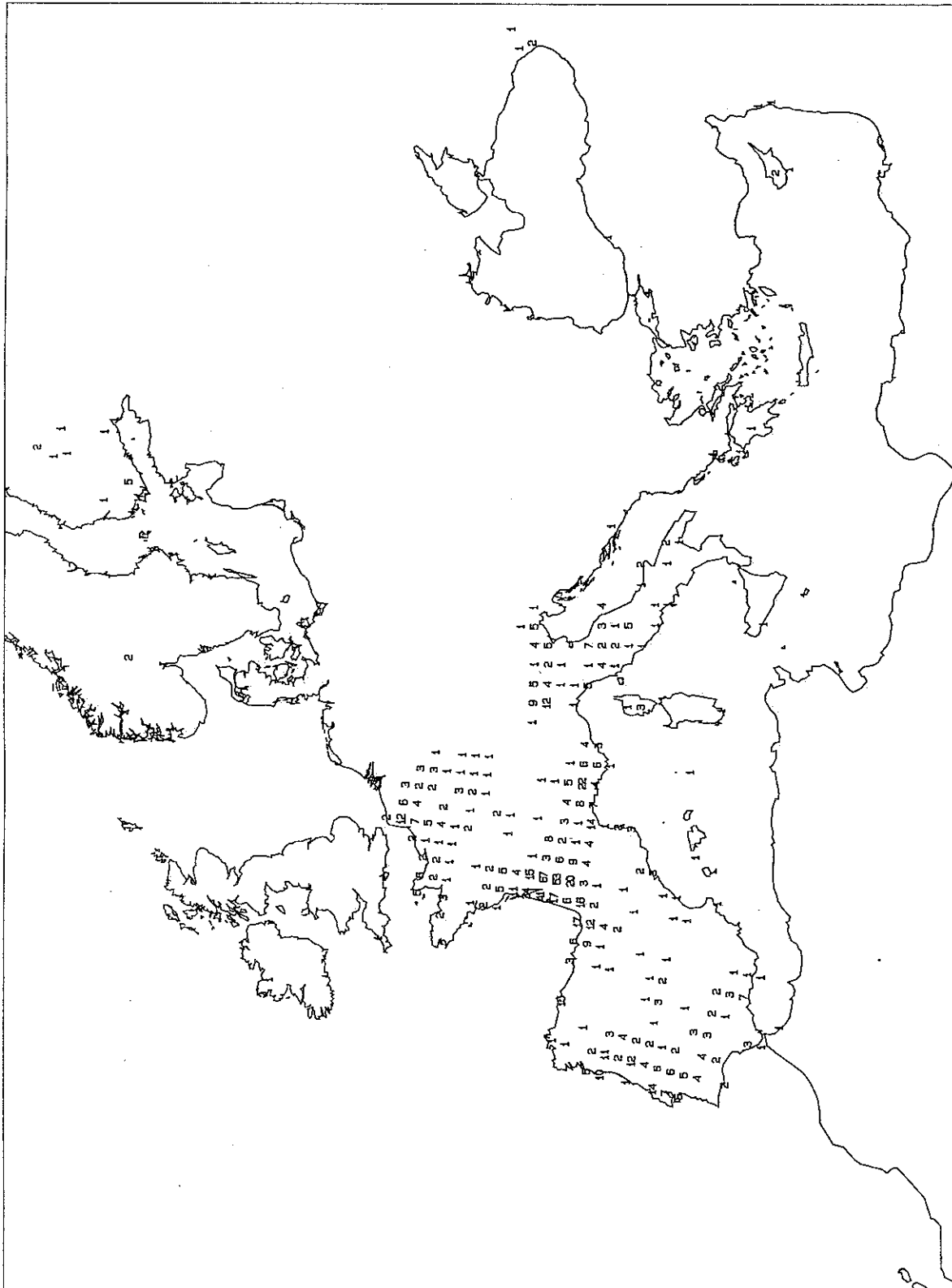
Figure 15.1b Total numbers of Redwing ringing recoveries resulting from birds taken from 1980 onwards in each 30' by 60' grid square. ** Indicates numbers greater than 99. 3 recoveries were outside the limits of the map.
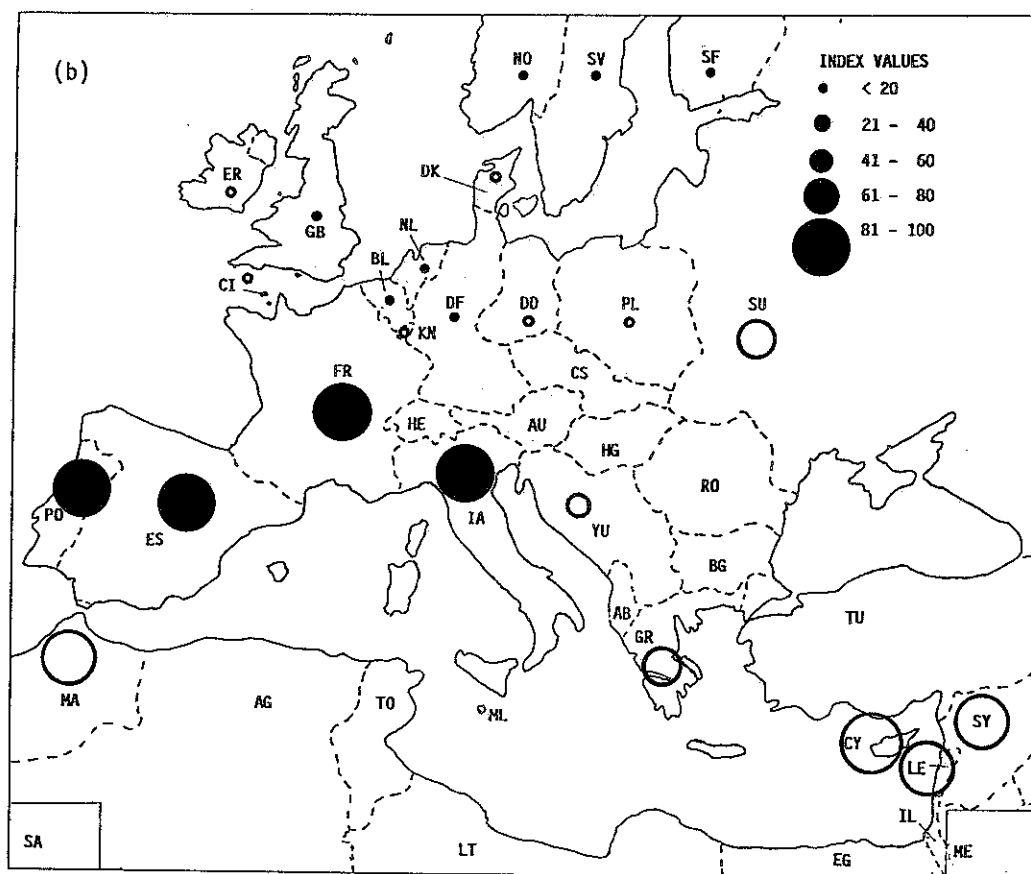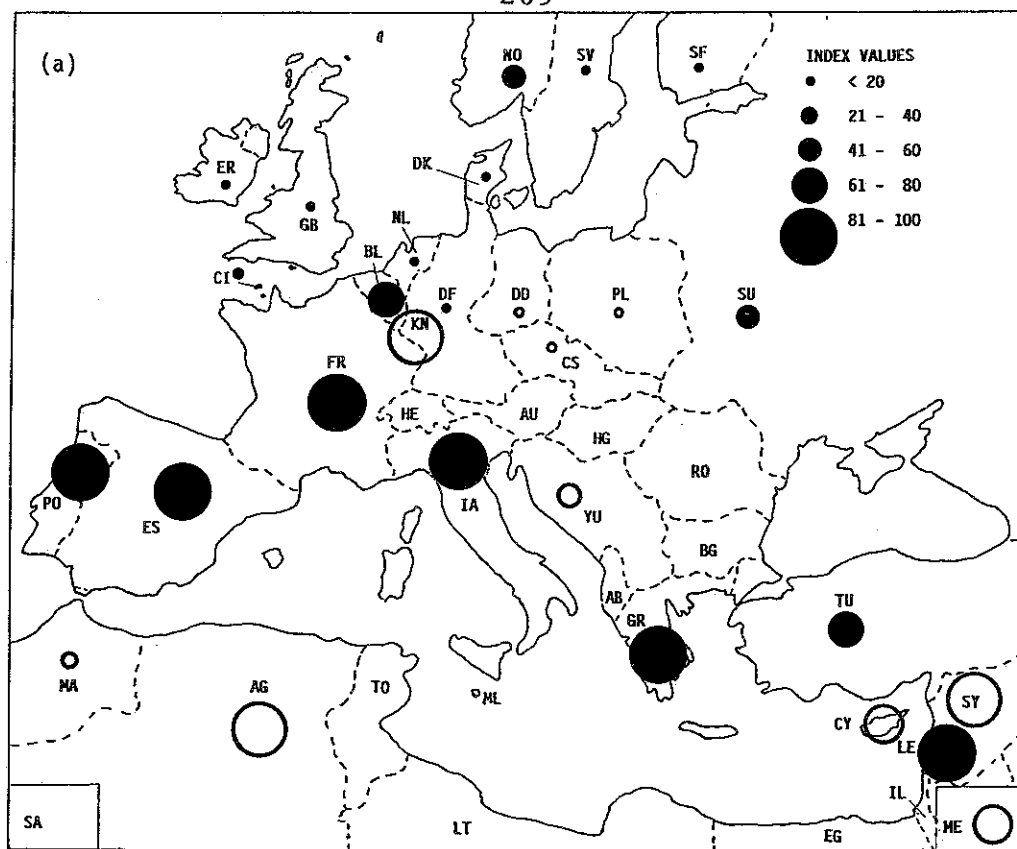
Figure 15.2 Geographical variation in the indices of Redwing
taken for each country of recovery in the period before 1980 (a) and from
1980 onwards (b).   Solid circles indicate values derived from more than 10
recoveries and open circles indicate those derived from less than 10.
Country codes are indicated in Table 2,4 of the Methods.
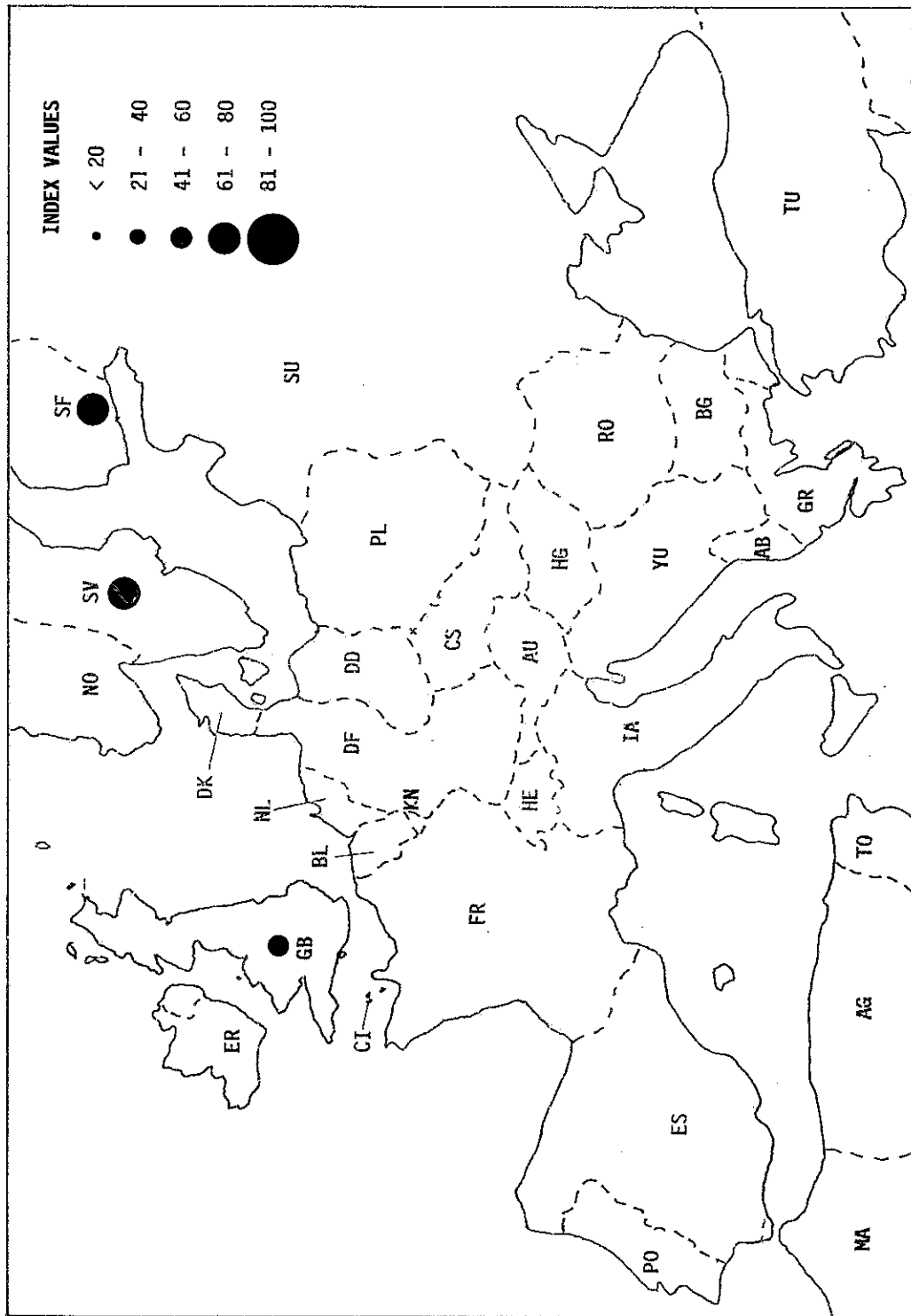
Figure 15.3 Geographical variation in the indices of Redwing taken over all years for each breeding population. Solid circles indicate values derived from more than 10 recoveries and open circles indicate those derived from less than 10. Country codes are indicated in Table 2.4 of the Methods.

Belgium

Index of birds taken

5 Year period

Portugal

Index of birds taken

5 Year period

France

Index of birds taken

5 Year period

Spain

Index of birds taken

5 Year period

Italy

Index of birds taken

5 Year period
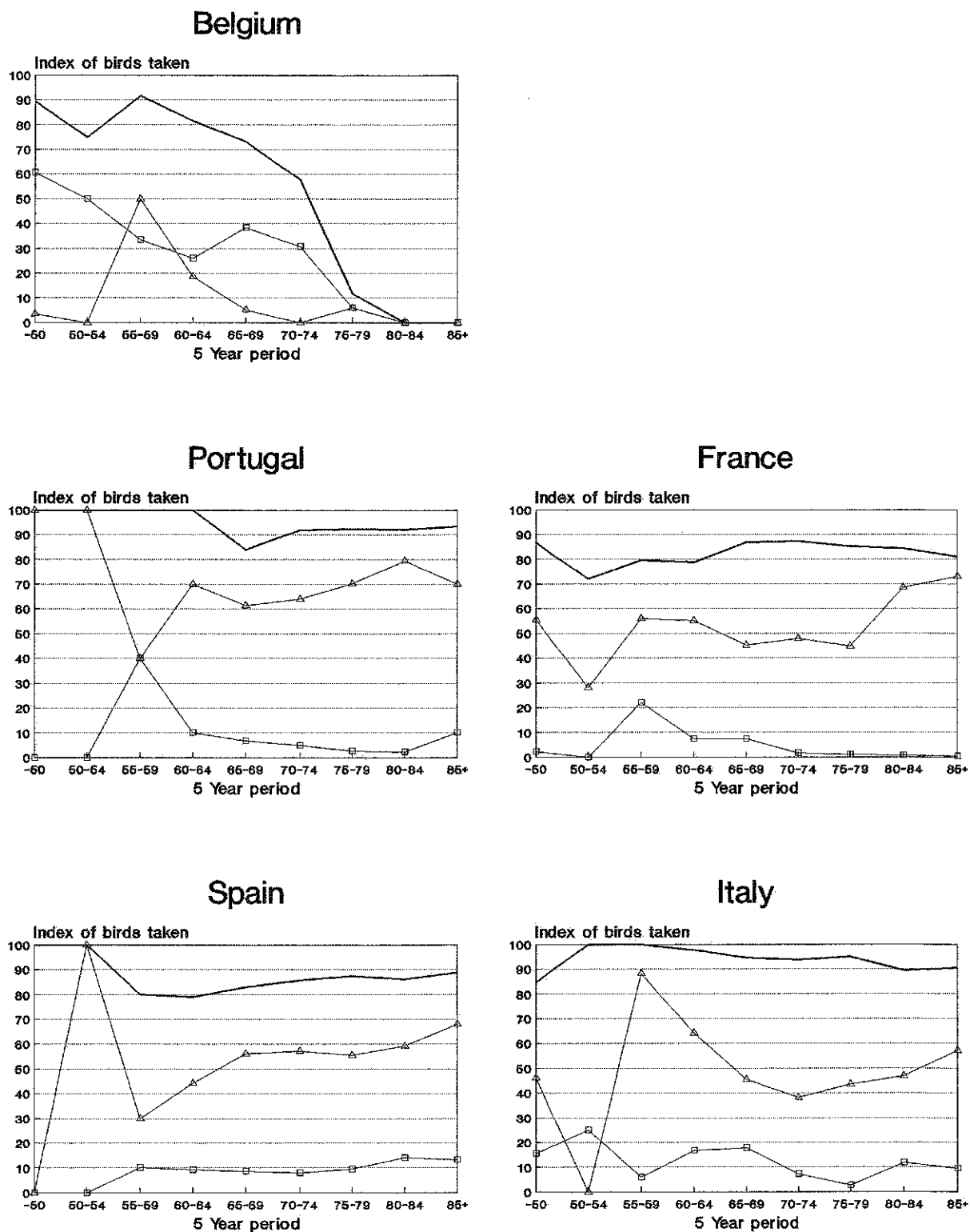
Figure 15.4   Trends in 5-yearly indices of Redwing taken in individual countries
with high overall indices and sufficient recoveries for analysis.   The bold line without
symbols indicates overall index values, triangles indicate index values based on birds
reported as shot and squares indicate index values based on birds reported as trapped.
The periods -50 and 85+ refer to all recoveries before 1950 and from 1985 onwards
respectively.

BL,ES,FR,IA,PO

Others
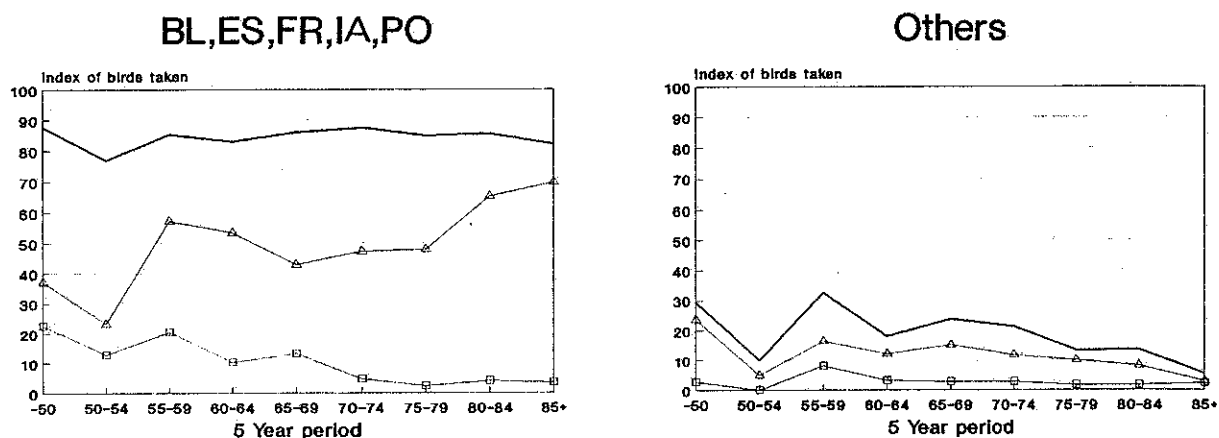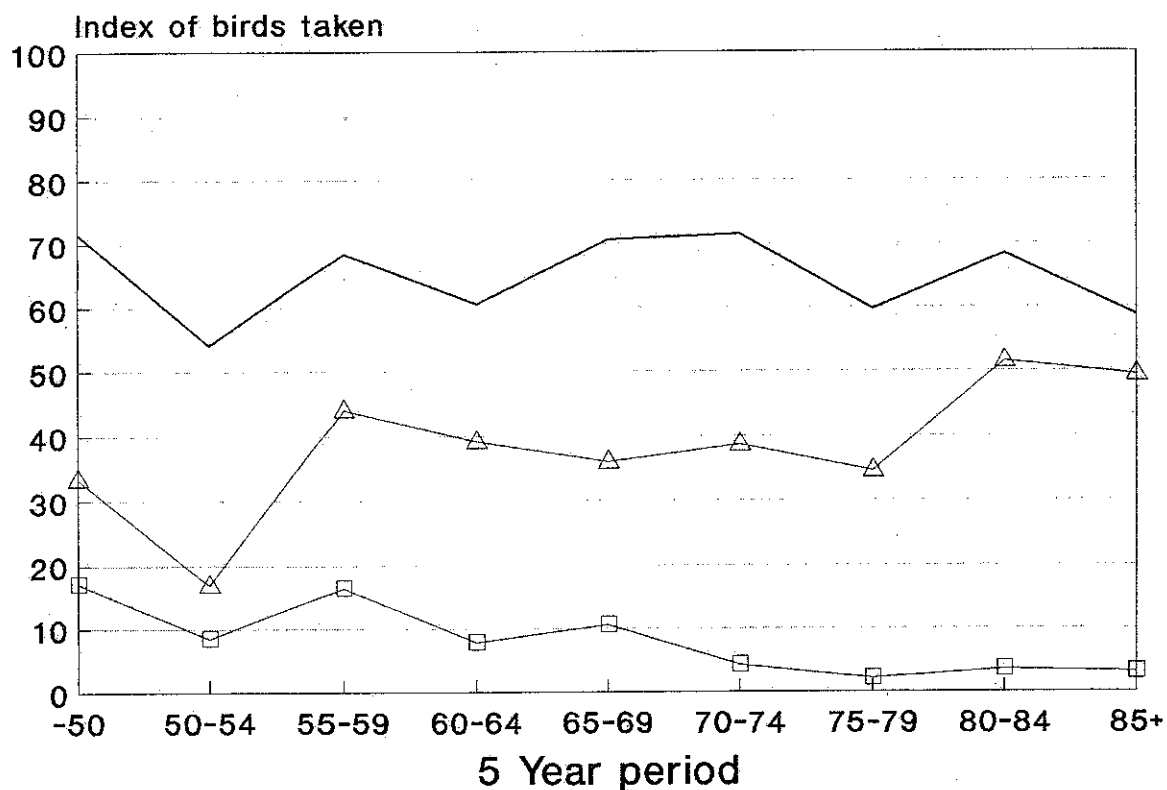
All countries

Figure 15.5 Trends in combined 5-yearly indices of Redwing
taken in: a) countries, for which data for this species were available, with a tradition of taking substantial numbers of migratory birds on the western European flyways (ie BL, ES, FR, IA, PO),
b) other countries and c) all countries. The bold line with symbols indicates overall index values, triangles indicate values based on birds reported as shot and squares indicate index values based on birds reported as trapped. The periods -50 and 85+ refer to all recoveries before 1950 and from 1985 onwards respectively.

Belgium

France

Spain

Portugal

Italy
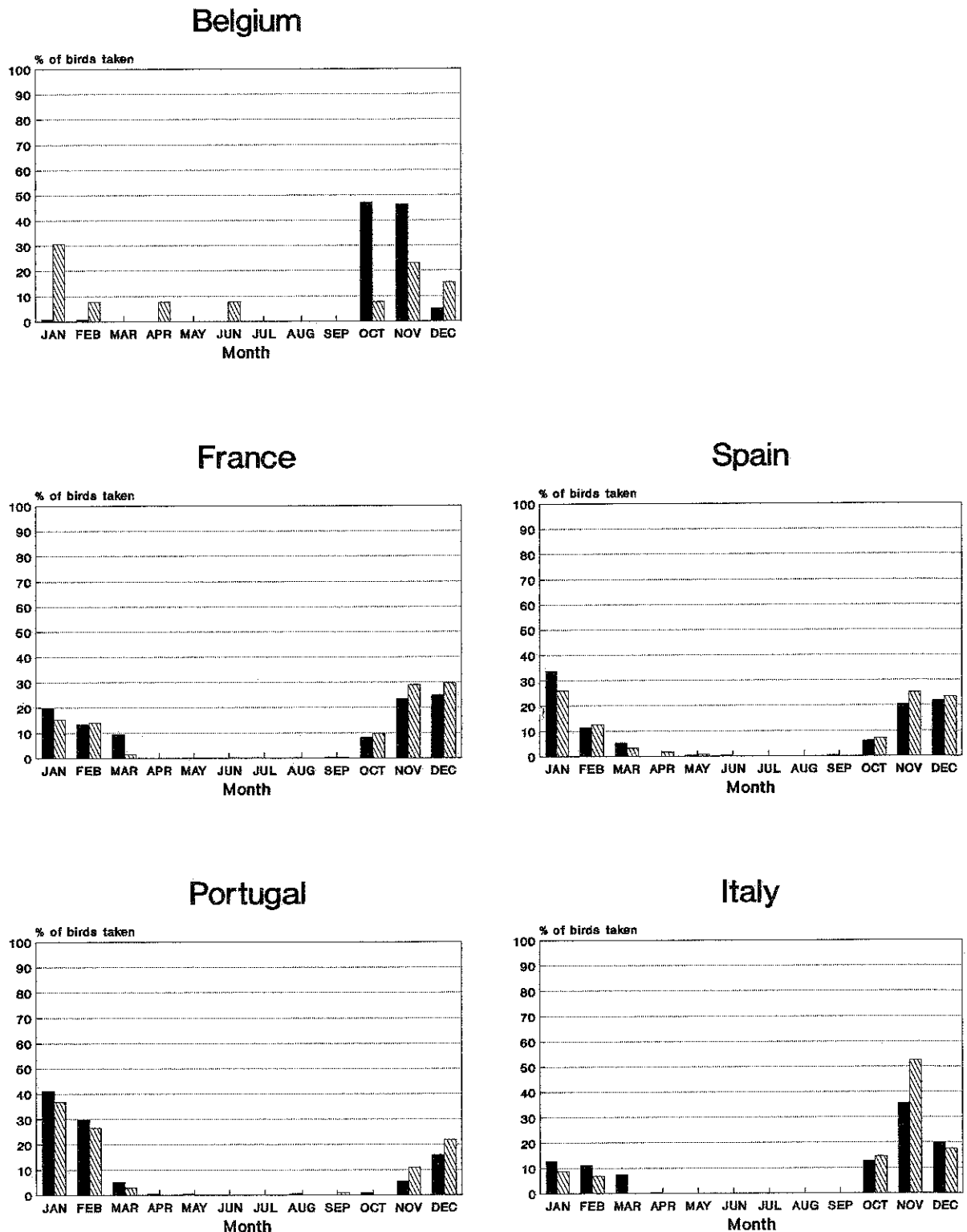
Figure 15.6   Monthly percentages of total   Redwing taken in individual countries with high overall indices and sufficient recoveries for analysis.   Solid bars indicate birds from the period before 1980 and hatched bars indicate birds taken from 1980 onwards.

16. REED WARBLER (ACROCEPHALUS SCIRPACEUS)

16.1 Range

The Reed Warbler breeds in continental Europe from southern Scandinavia to the Mediterranean and in north-west Africa and Asia Minor, wherever there is suitable habitat. The species is also a summer visitor to the southern United Kingdom (Harrison 1982). Reed Warblers are completely migratory throughout this range, wintering in Africa south of the Sahara.

16.2 Population trends

European Reed Warbler populations appear to be relatively stable (Marchant et al. 1990). There has, however, been recent expansion of range northwards and westwards into Norway and Ireland (Hustings 1988, Hutchinson 1989).

16.3 Migration

The predominant direction taken by migrating Reed Warblers from Scandinavia and western and central Europe in autumn is south-west through France and Iberia to North Africa and thence southward (Zink 1973). Some central European and Scandinavian birds follow a parallel route passing through northern Italy, while those from eastern Europe and a proportion of the Finnish population appear to cross to Africa by way of the eastern end of the Mediterranean. Several individuals from western populations have been recovered after having made south-eastern movements, however (Zink 1973).

16.4 Status

The Reed Warbler is fully protected in all E.C. countries (Bertelsen and Simonsen 1989). Amongst the non-E.C. countries investigated by Woldhek (1979) the taking of Reed Warblers was permitted in Malta, Cyprus and Jordan.

16.5 Geographical variation in the taking of Reed Warblers

Prior to 1980, the highest indices of Reed Warblers taken in countries with more than 10 recoveries were those for Spain, Portugal, Belgium and Morocco (Table 16.2). Index values were low in northern Europe, with the exception of the Soviet Union. Eastern Mediterranean countries tended to have high indices but very small sample-sizes (Fig. 16.2). The majority of recoveries of Reed Warblers taken during this period came from Portugal (41%), Spain (20%) and Morocco (15%).

From 1980 onwards the highest indices amongst major countries were found in Portugal, Spain and Morocco but no Reed Warblers were recovered as a result of shooting or trapping in Belgium. Very

few recoveries east of Italy were reported during this period (Table 16.2). Morocco (28%) provided the highest proportion of recoveries of Reed Warblers taken since 1980. Spain and Portugal (both 17%) were the only other countries to contribute 10% or more of taken recoveries.

In Portugal most recoveries of taken Reed Warblers come from the provinces of Beira Litoral, Algarve and Estremadura (Appendix 10.2). Recoveries of Reed Warblers taken in Spain come mainly from the south of the country, particularly from the province of Cadiz.

The indices of birds taken for the various European breeding populations for which data were available showed relatively little variation, most being between 30 and 45 (Table 16.3). The more peripheral populations of Scandinavia and the Channel Islands had lower index values, as did Swiss breeding birds (Fig. 16.3).

16.6 Temporal variation in the taking of Reed Warblers

Indices of Reed Warblers taken since 1980 were significantly lower than those for the earlier period in Belgium, Spain and Morocco (Table 16.2). There was little change in other countries for which comparative data were available, apart from a surprising significant increase in index value for East Germany. The sample-size for the latter period was very small in this case.

Indices of Reed Warblers taken for five year periods showed declining trends with time in Belgium, France and North Africa but not in Spain and Portugal (Fig. 16.4). Regression of index values on year revealed significant inverse relationships when data for all countries and all major countries were combined (Table 16).

Analysis of the percentage of taken Reed Warblers recovered in each month showed that, in Europe, almost all are taken during the autumn migration, predominantly in August and September (Fig. 16.6). A higher proportion of Reed Warblers are taken in spring in North Africa, May being the peak month.

16.7 Methods used to take Reed Warblers

Reed Warblers are predominantly taken by trapping. Prior to 1980, 40% of the taken Reed Warblers recovered were known to have been trapped and 25% shot. The method used to take the remainder was not specified. From 1980 onwards 68% of taken recoveries were due to trapping and 18% to shooting. No significant change in the proportion of Reed Warblers taken by each method was found in any country (Table 16.2).

TABLE 16.1a The distribution of Reed Warblers recovered due to shooting and trapping before 1980 in relation to their area of origin. The percentage of taken birds recovered in each country is shown for each national ringing scheme. Percentages within parentheses are based on less than ten recoveries.

Country of recovery	Country of ringing													
	UK	CI	NO	SV	DK	SF	DD	DF	NL	BL	FR	ES	IA	HE
GB	(3.4)	(33.3)	–	0	0	0	0	0	0	0	0	–	–	0
CI	0	0	–	0	0	0	(20.0)	0	0	0	0	–	–	0
ER	0	0	–	0	0	0	0	0	0	0	0	–	–	0
NO	0	0	–	0	0	0	0	0	0	0	0	–	–	0
SV	0	0	–	0	0	0	0	0	0	0	0	–	–	0
DK	0	0	–	0	0	0	0	0	0	0	0	–	–	0
SF	0	0	–	0	0	(50.0)	0	0	0	0	0	–	–	0
SU	0	0	–	(9.1)	0	0	0	0	0	0	(7.1)	–	–	0
PL	0	0	–	0	0	0	0	0	0	0	0	–	–	0
DD	0	0	–	0	0	0	0	0	0	0	0	–	–	0
DF	0	0	–	0	0	0	0	(8.0)	(1.9)	(2.8)	0	–	–	0
NL	0	0	–	0	0	0	0	0	(1.9)	0	0	–	–	0
BL	0	0	–	0	0	0	0	0	(5.6)	58.3	0	–	–	0
KN	0	0	–	0	0	0	0	0	0	0	0	–	–	0
FR	(1.7)	0	–	0	0	0	0	(4.0)	(9.3)	0	(14.3)	–	–	0
ES	17.7	0	–	(45.5)	0	0	(20.0)	(36.0)	20.4	(11.1)	(28.6)	–	–	(50.0)
PO	60.5	(66.7)	–	(9.1)	(66.7)	0	(40.0)	(16.0)	42.6	(11.1)	(35.7)	–	–	0
IA	0	0	–	0	0	(50.0)	0	0	0	0	0	–	–	0
HE	0	0	–	0	0	0	0	(4.0)	0	0	0	–	–	0
AU	0	0	–	0	0	0	0	0	0	0	0	–	–	0
CS	0	0	–	0	0	0	0	0	0	0	0	–	–	0
HG	0	0	–	0	0	0	0	0	0	0	0	–	–	0
RO	0	0	–	0	0	0	0	0	0	0	0	–	–	0
BG	0	0	–	0	0	0	0	(4.0)	0	0	0	–	–	0
YG	0	0	–	0	0	0	0	0	0	0	0	–	–	0
GR	0	0	–	0	0	0	0	0	0	0	0	–	–	0
TU	0	0	–	0	0	0	0	0	0	0	0	–	–	0
CY	0	0	–	0	0	0	0	0	0	0	0	–	–	0
ML	0	0	–	0	0	0	0	0	0	0	0	–	–	0
SY	0	0	–	0	0	0	0	0	0	(2.8)	0	–	–	0
LE	0	0	–	0	0	0	0	0	0	0	0	–	–	0
IL	0	0	–	0	0	0	0	0	0	0	0	–	–	0
ME	0	0	–	0	0	0	0	0	(1.9)	0	0	–	–	0
EG	0	0	–	0	0	0	0	0	0	0	0	–	–	0
LT	0	0	–	0	0	0	0	0	0	0	0	–	–	0
TO	0	0	–	0	0	0	0	0	0	0	0	–	–	0
AG	0	0	–	0	0	0	0	0	0	0	0	–	–	0
MA	15.1	0	–	(27.3)	(33.3)	0	(20.0)	(20.0)	(14.8)	(11.1)	(7.1)	–	–	(25.0)
SA	(1.7)	0	–	0	0	0	0	(8.0)	(1.9)	0	(7.1)	–	–	(25.0)
TOTAL No.	119	3	–	11	3	2	5	25	24	36	54	–	–	4

Note: No data available for Poland, Czechoslovakia or Hungary.

TABLE 16.1b The distribution of Reed Warblers recovered due to shooting and trapping from 1980 onwards in relation to their area of origin. The percentage of taken birds recovered in each country is shown for each national ringing scheme. Percentages within parentheses are based on less than ten recoveries.

Country of recovery	UK	CI	NO	SV	DK	SF	DD	DF	NL	BL	FR	ES	IA	HE
						Country of ringing								
GB	0	–	0	0	–	0	–	0	(7.1)	0	0	0	0	–
CI	0	–	0	0	–	0	–	0	0	0	0	0	0	–
ER	0	–	0	0	–	0	–	0	0	0	0	0	0	–
NO	0	–	0	0	–	0	–	0	0	0	0	0	0	–
SV	0	–	0	(14.3)	–	0	–	0	0	0	0	0	0	–
DK	0	–	0	0	–	0	–	0	0	0	0	0	0	–
SF	0	–	0	0	–	0	–	0	0	0	0	0	0	–
SU	0	–	0	0	–	0	–	0	0	0	0	0	0	–
PL	0	–	0	0	–	0	–	0	0	0	0	0	0	–
DD	0	–	0	(14.3)	–	0	–	(25.0)	(14.3)	0	0	0	0	–
DF	0	–	0	0	–	0	–	0	(7.1)	(9.1)	0	0	0	–
NL	0	–	0	0	–	0	–	0	0	0	0	0	0	–
BL	0	–	0	0	–	0	–	0	0	0	0	0	0	–
KN	0	–	0	0	–	0	–	0	0	0	0	0	0	–
FR	0	–	(100)	0	–	0	–	(25.0)	(7.1)	0	(33.3)	0	0	–
ES	(21.4)	–	0	(14.3)	–	(50.0)	–	(12.5)	(7.1)	(9.1)	0	(100)	0	–
PO	(7.1)	–	0	0	–	0	–	(25.0)	(28.6)	(36.4)	0	0	0	–
IA	0	–	0	0	–	0	–	0	0	0	0	0	(100)	–
HE	0	–	0	0	–	0	–	0	0	0	0	0	0	–
AU	0	–	0	0	–	0	–	0	0	0	0	0	0	–
CS	0	–	0	0	–	0	–	0	0	0	0	0	0	–
HG	0	–	0	0	–	0	–	0	0	0	0	0	0	–
RO	0	–	0	0	–	0	–	0	0	0	0	0	0	–
BG	0	–	0	0	–	0	–	0	0	0	0	0	0	–
YG	0	–	0	0	–	0	–	0	0	0	0	0	0	–
GR	0	–	0	0	–	0	–	0	0	0	0	0	0	–
TU	0	–	0	0	–	0	–	0	0	0	0	0	0	–
CY	0	–	0	0	–	0	–	0	0	0	0	0	0	–
ML	0	–	0	0	–	0	–	0	0	0	0	0	0	–
SY	0	–	0	0	–	0	–	0	0	0	0	0	0	–
LE	0	–	0	0	–	0	–	0	0	0	0	0	0	–
IL	0	–	0	0	–	0	–	0	0	0	0	0	0	–
ME	0	–	0	0	–	0	–	0	0	0	0	0	0	–
EG	0	–	0	0	–	0	–	0	0	0	0	0	0	–
LT	0	–	0	0	–	0	–	0	0	0	0	0	0	–
TO	0	–	0	0	–	0	–	0	0	0	0	0	0	–
AG	0	–	0	0	–	(25.0)	–	(12.5)	0	(9.1)	0	0	0	–
MA	(57.1)	–	0	(57.1)	–	(25.0)	–	0	(21.4)	(9.1)	(33.3)	0	0	–
SA	(14.3)	–	0	0	–	0	–	0	(7.1)	(27.3)	(33.3)	0	0	–
TOTAL No.	14	–	1	7	–	4	–	8	14	11	3	1	1	–

Note: No data available for Poland, Czechoslovakia or Hungary.

TABLE.16.2. REED WARBLER: Indices of birds taken before 1980 and from 1980 onwards for each country of recovery.

	Index (all methods)[a]		% hunted[b]		Total recoveries[c]		Shooting Index[a]		Trapping Index[a]		G test[d]
	-1980	1980+	-1980	1980+	-1980	1980+	-1980	1980+	-1980	1980+	
GB	4.7	3.0	0.5	0.2	1065	557	0	0	4.7	3.0	-
CI	(11.1)	(0)	0.9	0	115	91	0	(0)	(11.1)	(0)	-
ER	-	(0)	-	0	-	4	-	(0)	-	(0)	-
NO	(0)	-	0	0	16	10	(0)	-	(0)	-	-
SV	0	4.4	0	0.3	79	325	0	0	0	0	-
DK	0	0	0	0	121	154	0	0	0	0	-
SF	(14.3)	0	4.8	0	24	234	(0)	0	(14.3)	0	-
SU	(50.0)	-	50.0	0	4	8	(0)	-	(25.0)	4.4	-
PL	-	-	0	0	4	2	-	-	-	-	-
DD	0	(71.4)**	0	17.2	76	29	0	(0)	0	(71.4)	-
DF	8.0	9.5	0.2	0.6	2124	342	0	0	8.0	9.5	-
NL	2.8	0	0.3	0	333	759	0	0	2.8	0	-
BL	68.6	0***	10.6	0	227	969	2.9	0	57.1	0	-
KN	-	(0)	0	0	7	5	-	(0)	-	(0)	-
FR	12.9	13.2	4.7	1.3	236	395	3.5	0	3.5	13.2	-
ES	74.0	44.0**	65.5	14.5	87	76	15.6	20.0	14.3	12.0	-
PO	73.3	78.6	70.1	35.5	164	31	26.9	42.9	19.8	21.4	-
IA	(33.3)	(50.0)	33.3	3.0	3	33	(0)	(0)	(0)	(50.0)	-
HE	(11.1)	(0)	1.4	0	71	29	(0)	(0)	(11.1)	(0)	-
AU	(0)	-	0	0	2	2	(0)	-	(0)	-	-
CS	-	(0)	0	0	4	5	-	(0)	-	(0)	-
HG	-	-	0	0	3	4	-	-	-	-	-
RO	-	-	-	-	-	-	-	-	-	-	-
BG	(100.0)	-	66.7	-	3	-	(50.0)	-	50.0	-	-
YG	-	-	-	-	-	-	-	-	-	-	-
GR	-	(0)	-	0	-	1	-	(0)	-	(0)	-
TU	(100.0)	-	100.0	-	1	-	(100.0)	-	(0)	-	-
CY	(100.0)	-	100.0	-	1	-	(0)	-	(0)	-	-
ML	-	-	-	-	-	-	-	-	-	-	-
SY	(100.0)	-	100.0	-	1	-	(100.0)	-	(0)	-	-
LE	(100.0)	-	100.0	-	1	-	(100.0)	-	(0)	-	-
IL	-	-	-	-	-	-	-	-	-	-	-
ME	(100.0)	-	100.0	-	1	-	(100.0)	-	(0)	-	-
EG	(50.0)	(0)	50.0	0	2	3	(0)	(0)	(50.0)	(0)	-
LT	-	-	-	-	-	-	-	-	-	-	-
TO	-	-	-	-	-	-	-	-	-	-	-
AG	(0)	(50.0)	0	50.0	1	6	(0)	(0)	(0)	(33.3)	-
MA	66.7	38.3**	53.9	32.1	78	56	3.2	2.1	38.1	34.0	-
SA	40.0	70.0	36.4	50.0	22	14	5.0	0	30.0	50.0	-

a   See chapter 2 (methods) for derivation of indices. Indices derived from less than 10 recoveries are indicated within parentheses. Fisher's exact tests (Sokal & Rohlf 1981) were used to compare the proportions taken in each period. Significance levels (*<0.05; ** <0.01; *** <0.001) of the tests are indicated in column 1980+. Tests were carried out on all pairs except where indices were based on less than 10 recoveries.

b   Percentage of all recoveries other than those excluded on the basis of poor quality data (see chapter 2) taken by shooting and trapping.

c   Total number of recoveries other than those excluded on the basis of poor quality data.

d   G test (Sokal & Rohlf 1981) comparison between periods of the proportions of birds taken according to the classes shot, trapped, and shot or trapped. Significance levels of these comparisons are indicated as above. 'NS' indicates non-significant results where tests were carried out. Comparisons were not made where the expected frequency in any cell was less than 10.

Table.16.3. Reed Warbler: Indices of birds taken for each breeding population (across all years).

Breeding Population		Index of birds taken	Sample size
UK	United Kingdom	36.1	305
CI	Channel Islands	9.1	11
NO	Norway	20.0	5
SV	Sweden	18.0	89
DK	Denmark	12.5	24
SF	Finland	18.5	27
SU	USSR (Lithuania only)	-	-
PL	Poland	-	-
DD	East Germany	33.3	12
DF	West Germany	30.0	80
NL	Holland	44.4	126
BL	Belgium	44.1	102
FR	France	42.9	35
ES	Spain	0	1
IA	Italy	100	1
HE	Switzerland	13.3	15
CJ	Czechoslovakia	-	-
HG	Hungary	-	-

Table 16.4 Regression analysis of temporal trends in the indices of Reed Warblers taken.

Country of recovery	Intercept	Slope	t	P
Major	175.9	-1.76	-6.59	***
Other	43.7	-0.45	-1.48	ns
All	140.0	-1.49	-3.89	**

All regressions used a weighted technique where each 5-year index was weighted by the square root of the sample size.

Countries where 10 or more recoveries occurred in each year after 1950 were analysed. Data from the period before 1950 were not included in the analysis.

Major countries are those with a tradition of taking substantial numbers of birds that use western migration routes.
(i.e. BL, FR, ES, PO, IA, NA).

Significance levels indicated are: NS Not significant; * P<0.05; ** P<0.01; *** P<0.001.

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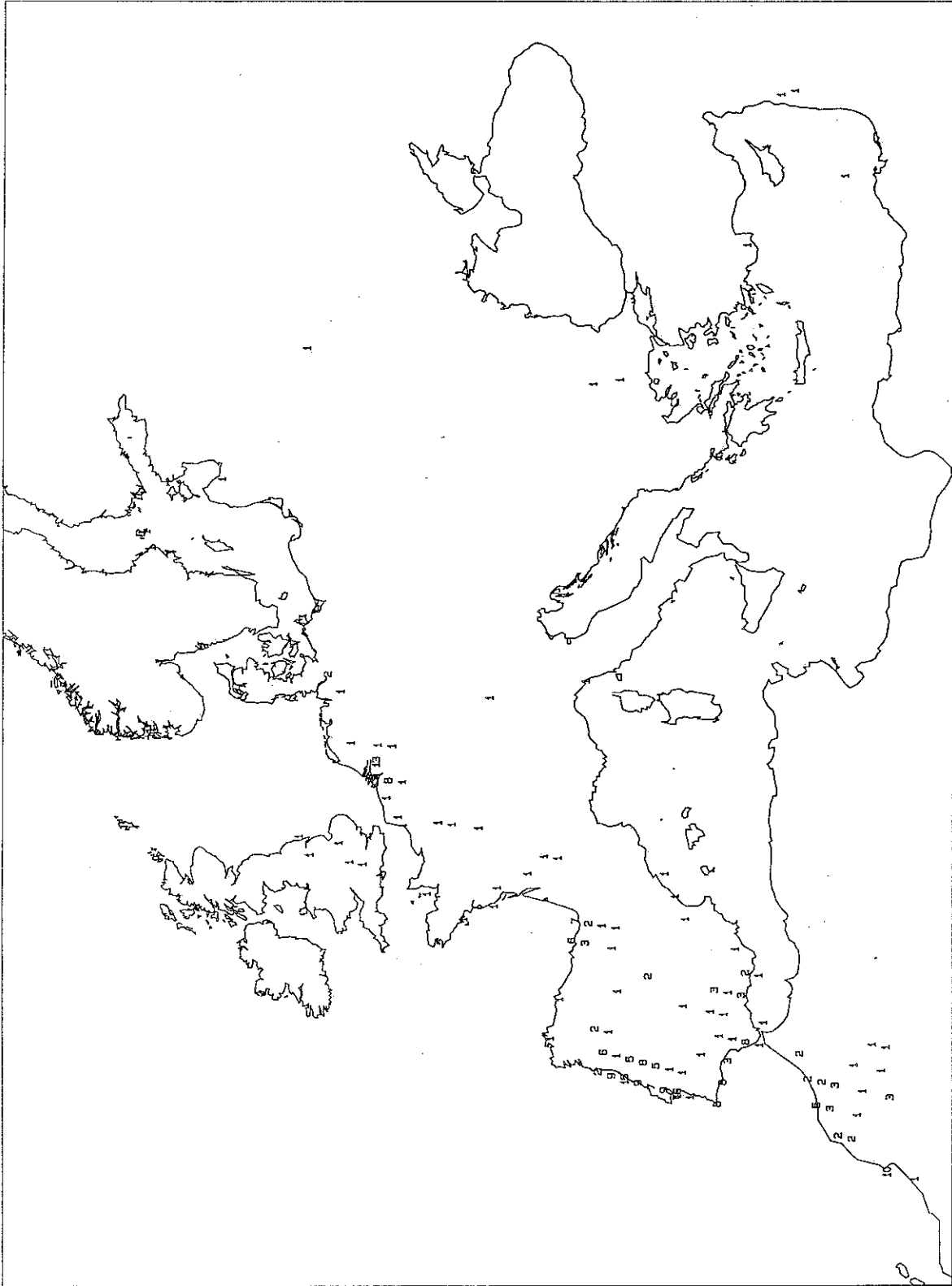
Figure 16.1a   Total numbers of Reed Warbler ringing recoveries resulting from birds taken before 1980 in each 30' by 60' grid square.   ** Indicates numbers greater than 99.   10 recoveries were outside the limits of the map.

Figure 16.1b Total numbers of Reed Warbler ringing recoveries resulting from birds taken from 1980 onwards in each 30' by 60' grid square. ** Indicates numbers greater than 99. 7 recoveries were outside the limits of the map.
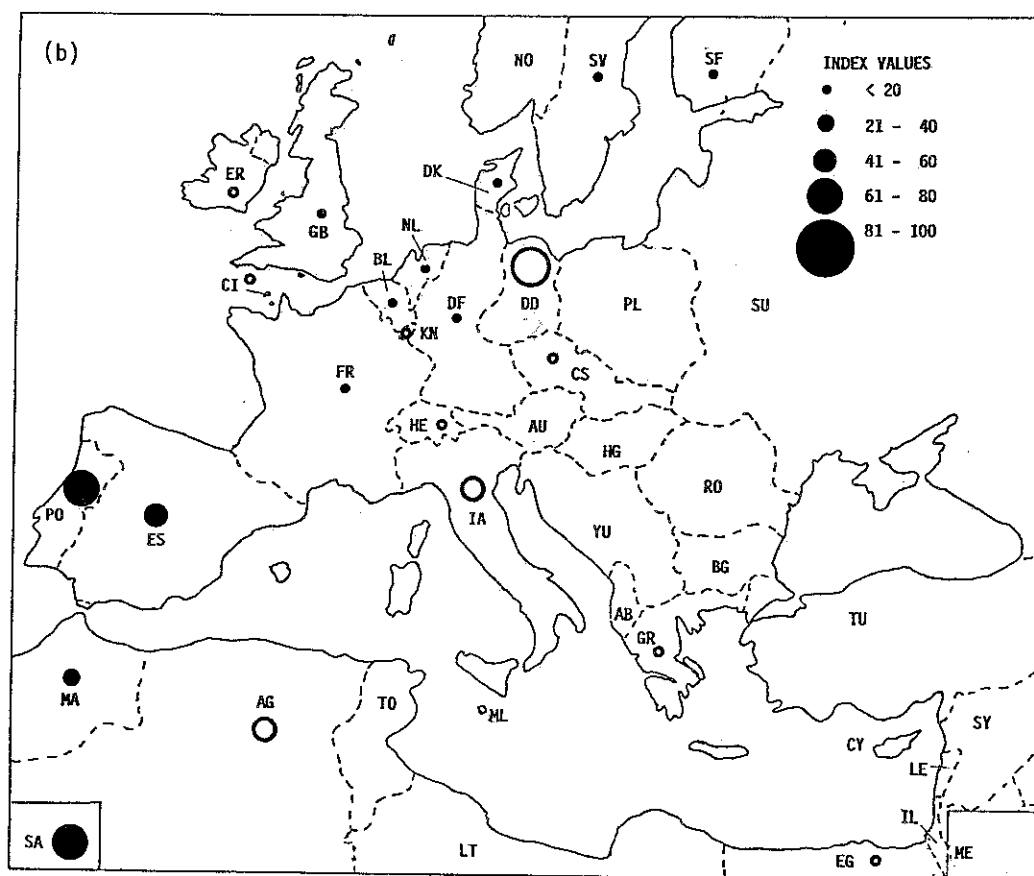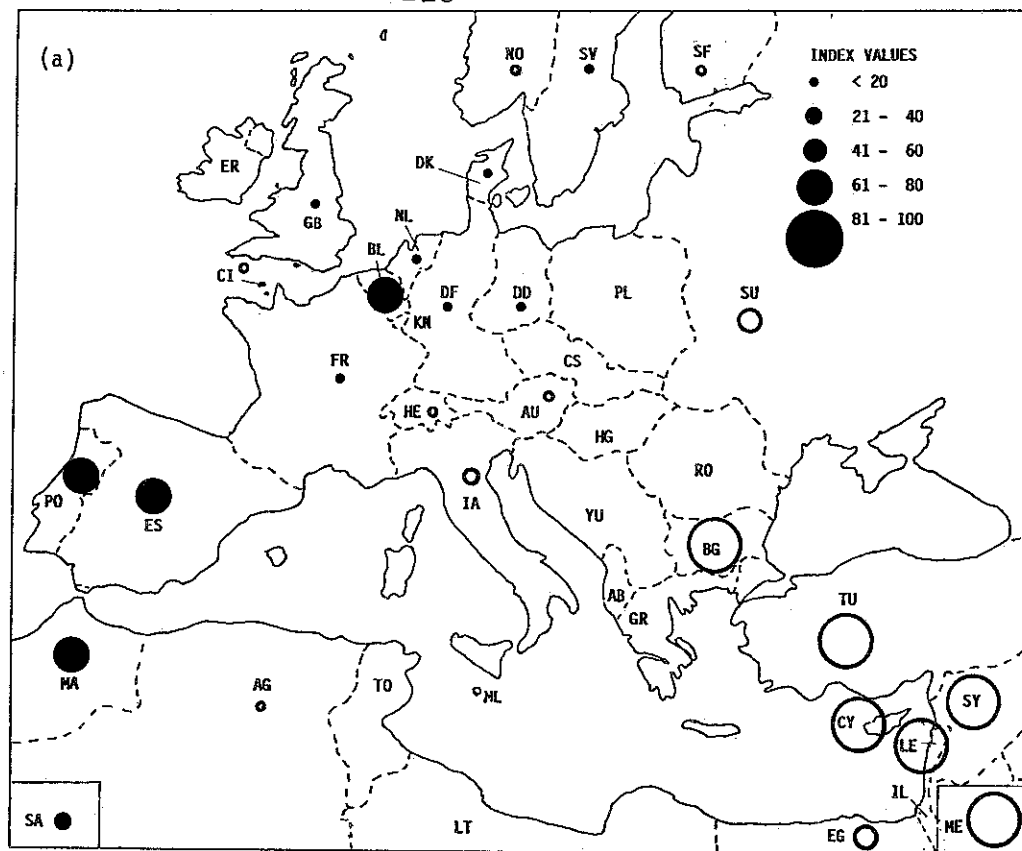
Figure 16.2 Geographical variation in the indices of Reed Warbler
taken for each country of recovery in the period before 1980 (a) and from
1980 onwards (b). Solid circles indicate values derived from more than 10
recoveries and open circles indicate those derived from less than 10.
Country codes are indicated in Table 2.4 of the Methods.
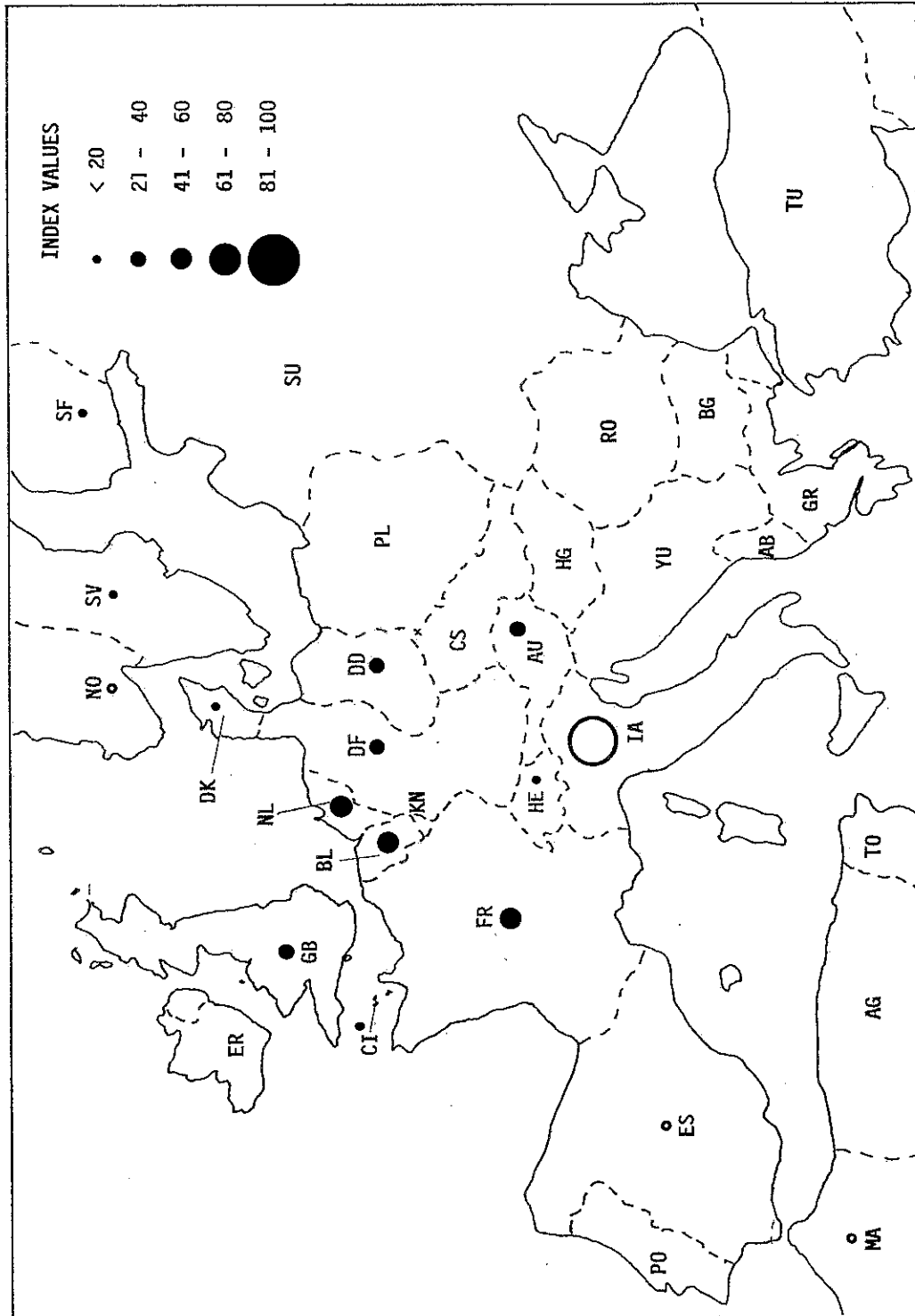
Figure 16.3 Geographical variation in the indices of Reed Warbler taken over all years for each breeding population. Solid circles indicate values derived from more than 10 recoveries and open circles indicate those derived from less than 10. Country codes are indicated in Table 2.4 of the Methods.

Belgium

Portugal

France

North Africa

Spain
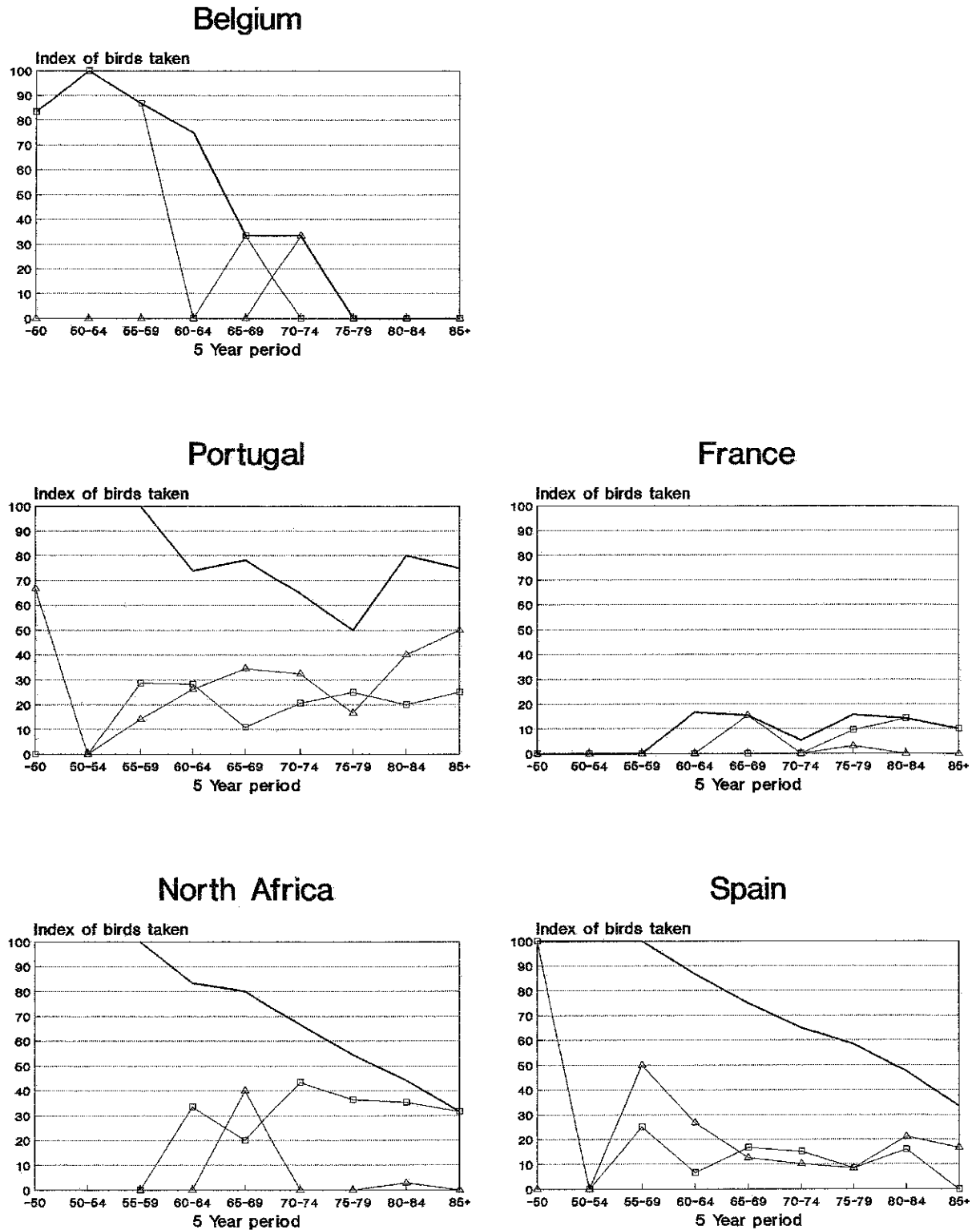
Figure 16.4   Trends in 5-yearly indices of Reed Warbler taken in individual countries with high overall indices and sufficient recoveries for analysis.   The bold line without symbols indicates overall index values, triangles indicate index values based on birds reported as shot and squares indicate index values based on birds reported as trapped. The periods -50 and 85+ refer to all recoveries before 1950 and from 1985 onwards respectively.

BL,ES,FR,NA,PO

Index of birds taken

5 Year period

Others

Index of birds taken

5 Year period

All countries

Index of birds taken

5 Year period
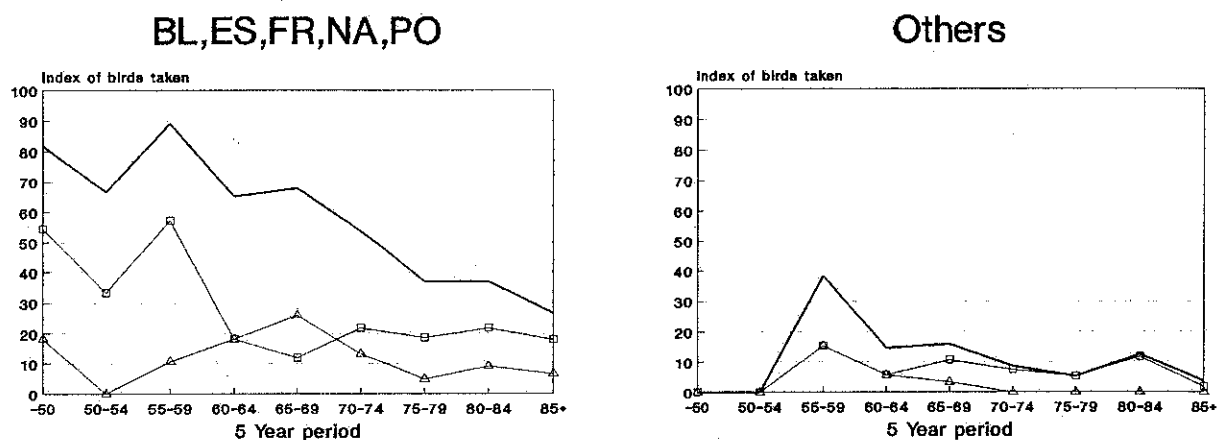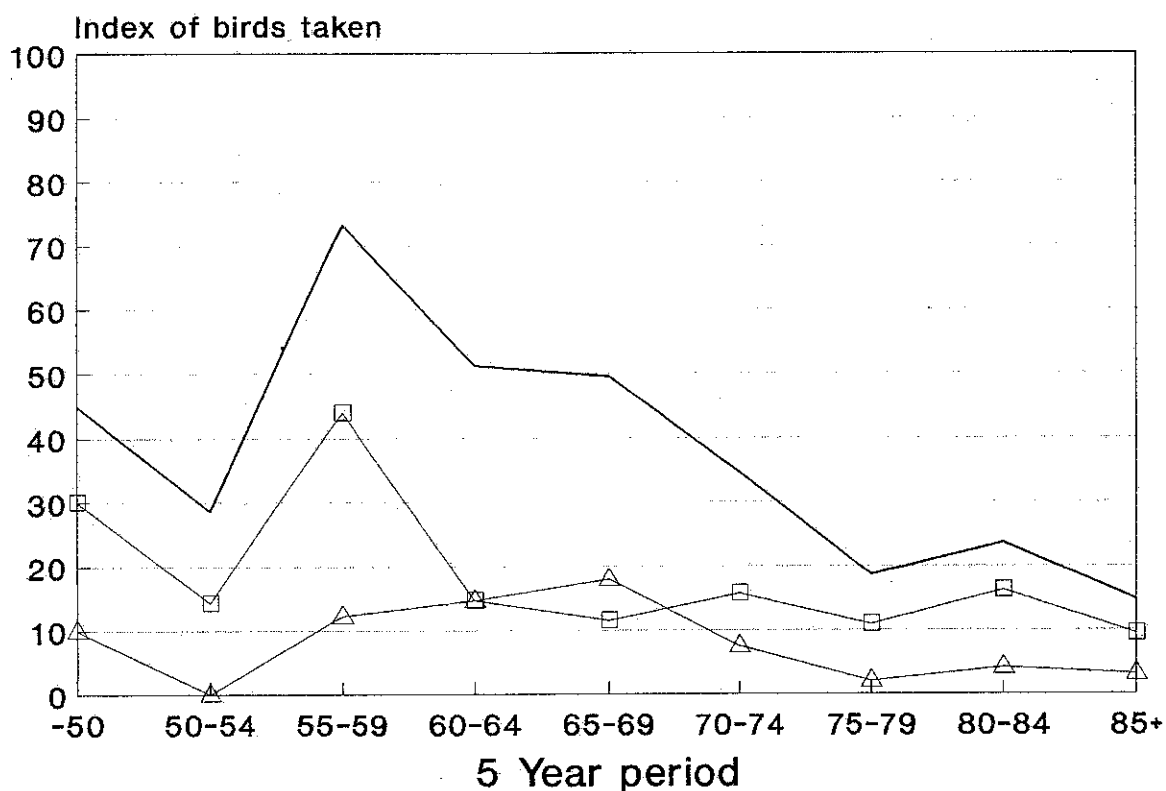
Figure   16.5   Trends in combined 5-yearly indices of Reed Warbler
taken in: a) countries, for which data for this species were available,
with a tradition of taking substantial numbers of migratory birds on the
western European flyways (ie BL, ES, FR, NA, PO),
b) other countries and c) all countries.   The bold line with symbols
indicates overall index values, triangles indicate values based on birds
reported as shot and squares indicate index values based on birds reported
as trapped.   The periods -50 and 85+ refer to all recoveries before 1950
and from 1985 onwards respectively.

Belgium

France

Spain

Portugal

North Africa
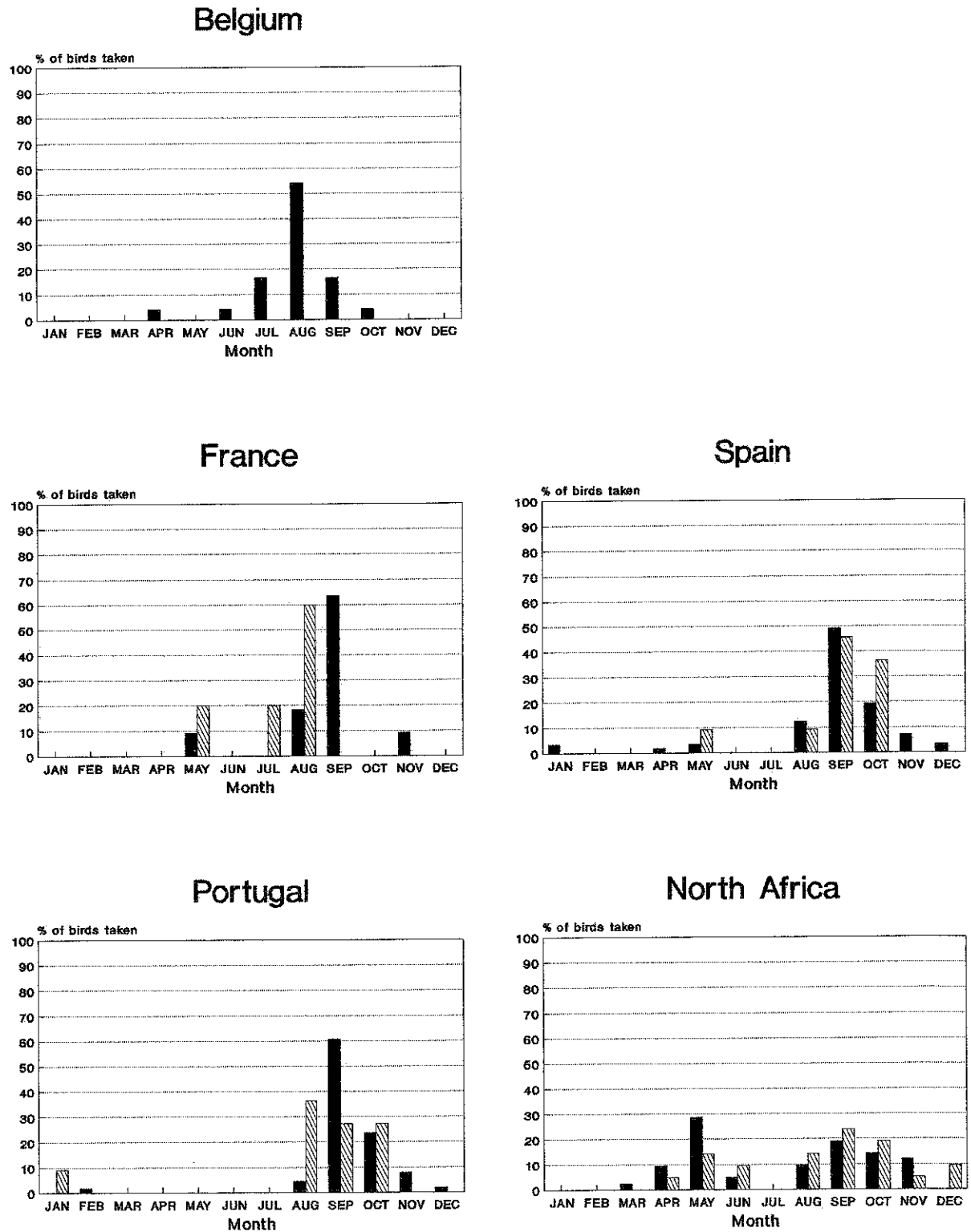
Figure 16.6   Monthly percentages of total   Reed Warbler taken in individual countries with high overall indices and sufficient recoveries for analysis.   Solid bars indicate birds from the period before 1980 and hatched bars indicate birds taken from 1980 onwards.

17. GARDEN WARBLER (SYLVIA BORIN)

17.1 Range

The Garden Warbler breeds throughout most of Europe, being absent only from north-east Scandinavia, Portugal, the Mediterranean coast and the Balkans (Harrison 1982). The European population is totally migratory and winters in Africa south of the Sahara.

17.2 Population trends

Relatively few long-term data are available for this species but there are indications of a general increase in numbers of Garden Warblers in Europe in recent years (Berthold et al. 1986, Hustings 1988). This may parallel a similar increase in the British population which has recovered from a decline during the 1970s, thought to be due to drought conditions on the wintering grounds (Marchant et al. 1990).

17.3 Migration

Garden Warblers from north-west Europe and western Scandinavia migrate predominantly by the south-west route through France and Iberia in autumn, while those from Finland and the eastern Baltic follow a parallel route through central Europe and northern Italy (Moreau 1972, Zink 1973). The species appears to be relatively uncommon on the main migration routes of the eastern Mediterranean (Moreau 1961). However, there have been some recoveries of Garden Warblers of east European origin in this area.

17.4 Status

The Garden Warbler is fully protected in all E.C. countries (Bertelsen and Simonsen 1989). Amongst the non-E.C. countries investigated by Woldhek (1979) the taking of Garden Warblers was permitted in Malta, Cyprus and Jordan.

17.5 Geographical variation in the taking of Garden Warblers

Prior to 1980, the highest indices of Garden Warblers taken in countries with more than 10 recoveries were those for Spain, Portugal, Italy and Morocco (Table 17.2). These all exceeded 60. Index values were low in northern Europe and there were very few recoveries from eastern Mediterranean countries (Fig. 17.2). The majority of recoveries of Garden Warblers taken during this period came from Italy (35%), Spain (27%) and Portugal (11%).

From 1980 onwards the highest indices amongst major countries were found in Spain, Portugal and Morocco. Less than 10 Garden Warblers were recovered in Italy but the index remained high. Very few recoveries east of Italy were reported during this period (Table 17.2). Spain (38%) provided the highest proportion of recoveries

of Garden Warblers taken since 1980. Morocco (26%) and Portugal (12%) were the only other countries to contribute 10% or more of taken recoveries.

Recoveries of Garden Warblers taken in Spain come mainly from the north-west and south of the country, the provinces of Guipuzcoa and Cordoba having the highest regional totals (Fig. 17.1a,b). The Italian provinces returning the largest numbers of taken Garden Warblers were Vicenza, Genova, Massa Carrara, Spezia, Livorno, Pisa, Lucca and Pistoia.

The indices of birds taken for the various European breeding populations for which data were available showed relatively little variation, most being between 30 and 45 (Table 17.3). Only the populations of Sweden, Denmark and France had index values lower than 30 (Fig. 17.3). The highest index was that for Swiss breeding birds.

17.6 Temporal variation in the taking of Garden Warblers

The index of Garden Warblers taken in Belgium since 1980 was significantly lower than that for the earlier period (Table 17.2). There was little change in other countries for which comparative data were available.

Indices of Garden Warblers taken for five year periods showed declining trends with time in Belgium, France, Portugal and North Africa but not in Spain and Italy (Fig. 17.4). Regression of index values on year revealed significant inverse relationships when data for all countries and all major countries were combined (Table 17.5).

Analysis of the percentage of taken Garden Warblers recovered in each month showed that, in Europe, almost all are taken during the autumn migration, between August and October (Fig. 17.6). A higher proportion of Garden Warblers are taken in spring in North Africa, predominantly in April and May. A small number of birds was taken in Belgium between April and August prior to 1980.

17.7 Methods used to take Garden Warblers

Prior to 1980, Garden Warblers were predominantly taken by shooting. During that period, 37% of the taken Garden Warblers recovered were known to have been shot and 24% trapped. The method used to take the remainder was not specified. From 1980 onwards 34% of taken recoveries were due to shooting and 48% to trapping. It is not clear whether this overall change is simply due to increased precision of reporting or to a genuine relative increase in trapping. No significant change in the proportion of Garden Warblers taken by each method was found in any country (Table 17.2).

TABLE 17.1a The distribution of Garden Warblers recovered due to shooting and trapping before 1980 in relation to their area of origin. The percentage of taken birds recovered in each country is shown for each national ringing scheme. Percentages within parentheses are based on less than ten recoveries.

Country of recovery	Country of ringing													
	UK	CI	NO	SV	DK	SF	DD	DF	NL	BL	FR	ES	IA	HE
GB	(4.6)	–	0	0	0	0	0	0	0	0	0	–	–	0
CI	0	–	0	0	0	0	0	0	0	0	0	–	–	0
ER	0	–	0	0	0	0	0	0	0	0	0	–	–	0
NO	0	–	0	0	0	0	0	(5.4)	0	0	0	–	–	0
SV	0	–	0	0	(14.3)	0	0	0	0	0	0	–	–	0
DK	0	–	0	0	0	0	0	0	0	0	0	–	–	0
SF	0	–	0	0	0	(3.8)	0	0	0	0	0	–	–	0
SU	0	–	0	0	0	0	0	0	0	0	0	–	–	0
PL	0	–	0	0	0	0	0	0	0	0	0	–	–	0
DD	0	–	0	0	0	0	0	0	0	0	0	–	–	0
DF	0	–	0	(14.3)	0	0	0	0	0	0	(6.3)	–	–	0
NL	0	–	0	0	0	0	0	0	0	0	0	–	–	0
BL	0	–	0	0	0	0	0	0	0	(12.8)	0	–	–	0
KN	0	–	0	0	0	0	0	0	0	0	0	–	–	0
FR	(9.1)	–	0	0	0	(1.3)	0	(7.1)	(10.5)	(2.6)	(12.5)	–	–	(13.3)
ES	54.6	–	0	(14.3)	(14.3)	(1.3)	(25.0)	39.3	(31.6)	35.9	(31.3)	–	–	(53.3)
PO	(9.1)	–	0	0	0	0	0	(14.3)	(15.8)	38.5	(12.5)	–	–	0
IA	0	–	(100)	(57.1)	(57.1)	87.5	(25.0)	(16.1)	0	0	(6.3)	–	–	(13.3)
HE	0	–	0	0	0	0	0	1.8	0	0	0	–	–	0
AU	0	–	0	0	0	0	0	0	0	0	0	–	–	0
CS	0	–	0	0	0	(1.3)	0	0	0	0	0	–	–	0
HG	0	–	0	0	0	0	0	0	0	0	0	–	–	0
RO	0	–	0	0	0	0	0	0	0	0	0	–	–	0
BG	0	–	0	0	0	0	0	0	0	0	0	–	–	0
YG	0	–	0	0	0	0	0	0	0	0	0	–	–	0
GR	0	–	0	0	0	0	0	0	0	0	0	–	–	0
TU	0	–	0	0	0	0	0	0	0	0	0	–	–	0
CY	0	–	0	0	0	0	(25.0)	0	0	0	0	–	–	0
ML	0	–	0	0	0	0	0	0	0	0	0	–	–	0
SY	0	–	0	0	0	0	0	0	0	0	0	–	–	0
LE	0	–	0	0	0	0	0	0	0	0	0	–	–	0
IL	0	–	0	0	0	0	0	0	0	0	0	–	–	0
ME	0	–	0	0	0	0	0	0	0	0	0	–	–	0
EG	0	–	0	0	0	0	0	0	(5.3)	0	0	–	–	0
LT	0	–	0	0	0	0	0	0	0	0	0	–	–	0
TO	0	–	0	0	0	0	0	1.8	0	0	6.3	–	–	0
AG	0	–	0	0	(14.3)	(1.3)	0	0	0	0	0	–	–	0
MA	(22.7)	–	0	0	0	0	0	(5.4)	(26.3)	7.7	(12.5)	–	–	(6.7)
SA	0	–	0	(14.3)	0	(3.8)	(25.0)	(8.9)	(10.5)	(2.6)	(12.5)	–	–	(13.3)
TOTAL No.	22	–	2	7	7	80	4	56	19	39	16	–	–	15

Note: No data available for Poland, Czechoslovakia or Hungary.

TABLE 17.1b The distribution of Garden Warblers recovered due to shooting and trapping from 1980 onwards in relation to their area of origin. The percentage of taken birds recovered in each country is shown for each national ringing scheme. Percentages within parentheses are based on less than ten recoveries.

Country of recovery	Country of ringing													
	UK	CI	NO	SV	DK	SF	DD	DF	NL	BL	FR	ES	IA	HE
GB	(13.3)	–	0	0	0	0	–	0	0	0	–	0	–	0
CI	0	–	0	0	0	0	–	0	0	0	–	0	–	0
ER	0	–	0	0	0	0	–	0	0	0	–	0	–	0
NO	0	–	0	0	0	0	–	0	0	0	–	0	–	0
SV	0	–	0	0	(50.0)	0	–	0	0	0	–	0	–	0
DK	0	–	0	0	0	0	–	0	0	0	–	0	–	0
SF	0	–	0	0	0	0	–	0	0	0	–	0	–	0
SU	0	–	0	0	0	0	–	0	0	0	–	0	–	0
PL	0	–	0	0	0	0	–	0	0	0	–	0	–	0
DD	0	–	0	0	0	0	–	0	0	0	–	0	–	0
DF	0	–	0	0	0	0	–	0	0	0	–	0	–	0
NL	0	–	0	0	0	0	–	0	0	0	–	0	–	0
BL	0	–	0	0	0	0	–	0	0	0	–	0	–	0
KN	0	–	0	0	0	0	–	0	0	0	–	0	–	0
FR	0	–	0	(33.3)	0	0	–	0	0	0	–	0	–	0
ES	(33.3)	–	(100)	(33.3)	(50.0)	0	–	(80.0)	(40.0)	(37.5)	–	(33.3)	–	(50.0)
PO	(6.7)	–	0	0	0	0	–	0	(40.0)	(25.0)	–	0	–	0
IA	0	–	0	0	0	(60.0)	–	0	0	0	–	0	–	0
HE	0	–	0	0	0	0	–	0	0	0	–	0	–	0
AU	0	–	0	0	0	0	–	0	0	0	–	0	–	0
CS	0	–	0	0	0	0	–	0	0	0	–	0	–	0
HG	0	–	0	0	0	0	–	0	0	0	–	0	–	0
RO	0	–	0	0	0	0	–	0	0	0	–	0	–	0
BG	0	–	0	0	0	0	–	0	0	0	–	0	–	0
YG	0	–	0	0	0	0	–	0	0	0	–	0	–	0
GR	0	–	0	(33.3)	0	0	–	0	0	0	–	0	–	0
TU	0	–	0	0	0	0	–	0	0	0	–	0	–	0
CY	0	–	0	0	0	0	–	0	0	0	–	0	–	0
ML	0	–	0	0	0	0	–	0	0	0	–	0	–	0
SY	0	–	0	0	0	0	–	0	0	0	–	0	–	0
LE	0	–	0	0	0	0	–	0	0	0	–	0	–	0
IL	0	–	0	0	0	0	–	0	0	0	–	0	–	0
ME	0	–	0	0	0	0	–	0	0	0	–	0	–	0
EG	0	–	0	0	0	0	–	0	0	0	–	0	–	0
LT	0	–	0	0	0	0	–	0	0	0	–	0	–	0
TD	0	–	0	0	0	0	–	0	0	0	–	0	–	0
AG	0	–	0	0	0	(20.0)	–	0	0	0	–	0	–	0
MA	(26.7)	–	0	0	0	0	–	(20.0)	(20.0)	(31.3)	–	(66.7)	–	(50.0)
SA	(20.0)	–	0	0	0	(20.0)	–	0	0	(6.3)	–	0	–	0
TOTAL No.	15	–	1	3	2	5	–	5	5	16	–	3	–	2

Note: No data available for Poland, Czechoslovakia or Hungary.

TAB.17.2 GARDEN WARBLER: Indices of birds taken before 1980 and from 1980 onwards for each country of recovery.

	Index (all methods)[a]		% hunted[b]		Total recoveries[c]		Shooting Index[a]		Trapping Index[a]		G test[d]
	-1980	1980+	-1980	1980+	-1980	1980+	-1980	1980+	-1980	1980+	
GB	3.5	5.9	1.1	1.8	91	110	0	5.9	3.5	0	-
CI	-	(0)	0	0	3	2	-	(0)	-	(0)	-
ER	-	-	-	-	-	-	-	-	-	-	-
NO	21.4	(0)	12.0	0	25	22	7.1	(0)	14.3	(0)	-
SV	9.1	4.6	3.9	2.1	26	48	9.1	0	0	4.6	-
DK	0	0	0	0	54	84	0	0	0	0	-
SF	5.1	0	3.3	0	90	78	0	0	5.1	0	-
SU	-	-	0	0	2	4	-	-	-	-	-
PL	-	-	0	-	1	-	-	-	-	-	-
DD	(0)	(0)	0	0	7	3	(0)	(0)	(0)	(0)	-
DF	6.9	0	2.8	0	72	4	0	0	3.5	0	-
NL	(0)	(0)	0	0	26	67	(0)	(0)	(0)	(0)	-
BL	31.3	0*	5.5	0.5	91	201	12.5	0	18.8	0	-
KN	-	-	-	-	-	-	-	-	-	-	-
FR	22.6	6.7	15.2	2.3	92	44	4.8	6.7	3.2	0	-
ES	75.0	81.5	68.8	44.9	109	49	32.0	33.3	19.0	25.9	NS
PO	71.4	63.6	71.4	53.9	42	13	38.1	45.5	16.7	18.2	-
IA	83.3	(60.0)	81.9	20.0	116	15	36.8	(20.0)	7.0	(40.0)	-
HE	8.3	(0)	3.2	0	31	6	0	(0)	8.3	(0)	-
AU	-	-	-	-	-	-	-	-	-	-	-
CS	(50.0)	-	50.0	0	2	3	(0)	-	(0)	-	-
HG	-	-	-	-	-	-	-	-	-	-	-
RO	-	-	-	-	-	-	-	-	-	-	-
BG	-	-	-	-	-	-	-	-	-	-	-
YG	(0)	-	0	0	1	1	(0)	-	(0)	-	-
GR	(0)	(100.0)	0	100.0	1	1	(0)	(100.0)	(0)	(0)	-
TU	-	-	-	-	-	-	-	-	-	-	-
CY	(100.0)	-	100.0	-	1	-	(0)	-	(100.0)	-	-
ML	-	-	0	-	2	-	-	-	-	-	-
SY	-	-	-	-	-	-	-	-	-	-	-
LE	-	-	-	-	-	-	-	-	-	-	-
IL	-	-	-	-	-	-	-	-	-	-	-
ME	-	-	-	-	-	-	-	-	-	-	-
EG	(100.0)	-	100.0	-	2	-	50.0	-	(0)	-	-
LT	-	-	-	-	-	-	-	-	-	-	-
TO	(100.0)	-	100.0	-	2	-	(0)	-	(50.0)	-	-
AG	(66.7)	(50.0)	66.7	50.0	3	2	(0)	(0)	(66.7)	(50.0)	-
MA	61.3	53.5	61.3	50.0	31	30	6.5	3.6	22.6	39.3	-
SA	65.4	(62.5)	65.4	55.6	26	9	3.9	(0)	30.8	(50.0)	-

[a]   See chapter 2 (methods) for derivation of indices. Indices derived from less than 10 recoveries are indicated within parentheses.   Fisher's exact tests (Sokal & Rohlf 1981) were used to compare the proportions taken in each period. Significance levels (*<0.05; ** <0.01; *** <0.001) of the tests are indicated in column 1980+. Tests were carried out on all pairs except where indices were based on less than 10 recoveries.

[b]   Percentage of all recoveries other than those excluded on the basis of poor quality data (see chapter 2) taken by shooting and trapping.

[c]   Total number of recoveries other than those excluded on the basis of poor quality data.

[d]   G test (Sokal & Rohlf 1981) comparison between periods of the proportions of birds taken according to the classes shot, trapped, and shot or trapped. Significance levels of these comparisons are indicated as above. 'NS' indicates non-significant results where tests were carried out. Comparisons were not made where the expected frequency in any cell was less than 10.

Table.17.3. Garden Warbler: Indices of birds taken for each
breeding population (across all years).

Breeding Population		Index of birds taken	Sample size
UK	United Kingdom	30.4	92
CI	Channel Islands	0	1
NO	Norway	33.3	9
SV	Sweden	26.7	30
DK	Denmark	16.7	42
SF	Finland	46.5	157
SU	USSR (Lithuania only)	-	-
PL	Poland	-	-
DD	East Germany	57.1	7
DF	West Germany	40.0	100
NL	Holland	47.4	38
BL	Belgium	43.8	105
FR	France	23.7	38
ES	Spain	-	-
IA	Italy	0	2
HE	Switzerland	62.5	24
CJ	Czechoslovakia	-	-
HG	Hungary	-	-

Table 17.4 Regression analysis of temporal trends in the indices of Garden Warblers taken.

Country of recovery	Intercept	Slope	t	P
Major	136.1	-1.10	-3.14	*
Other	36.3	-0.34	-1.27	ns
All	130.9	-1.30	-3.97	**

All regressions used a weighted technique where each 5-year index was weighted by the square root of the sample size.

Countries where 10 or more recoveries occurred in each year after 1950 were analysed. Data from the period before 1950 were not included in the analysis.

Major countries are those with a tradition of taking substantial numbers of birds that use western migration routes.
(i.e. BL, FR, ES, PO, IA, NA).

Significance levels indicated are: NS Not significant; * $P<0.05$; ** $P<0.01$; *** $P<0.001$.

Figure 17.1a   Total numbers of Garden warbler ringing recoveries resulting from birds taken before 1980 in each 30' by 60' grid square.   ** Indicates numbers greater than 99.   18 recoveries were outside the limits of the map.

Figure 17.1b Total numbers of Garden Warbler ringing recoveries from birds taken from 1980 onwards in each 30' by 60' grid square. ** Indicates numbers greater than 99. recoveries were outside the limits of the map.
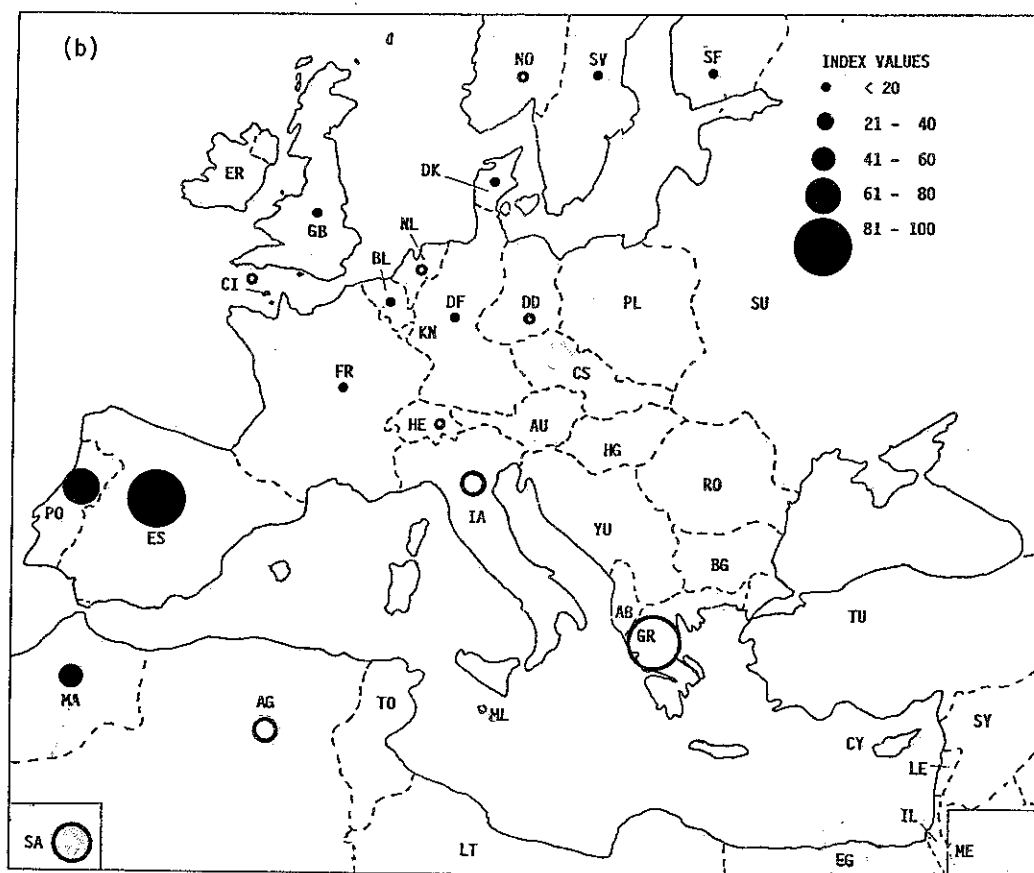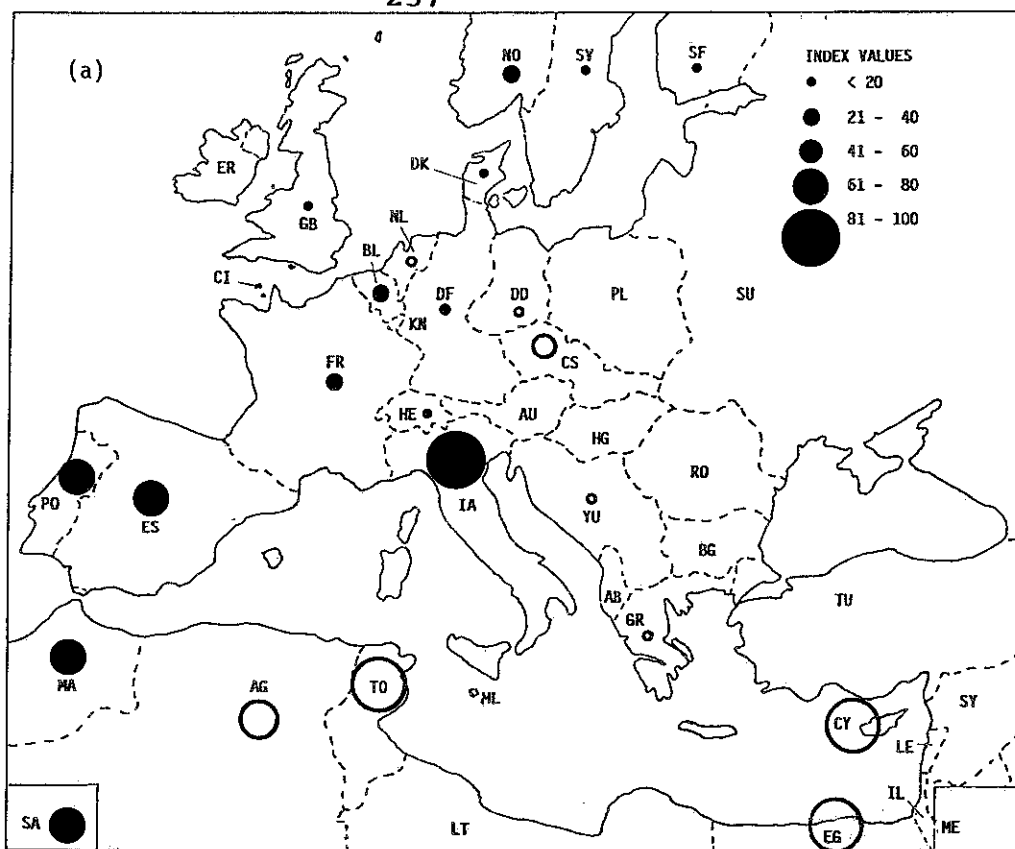
Figure 17.2 Geographical variation in the indices of Garden Warbler taken for each country of recovery in the period before 1980 (a) and from 1980 onwards (b). Solid circles indicate values derived from more than 10 recoveries and open circles indicate those derived from less than 10. Country codes are indicated in Table 2,4 of the Methods.
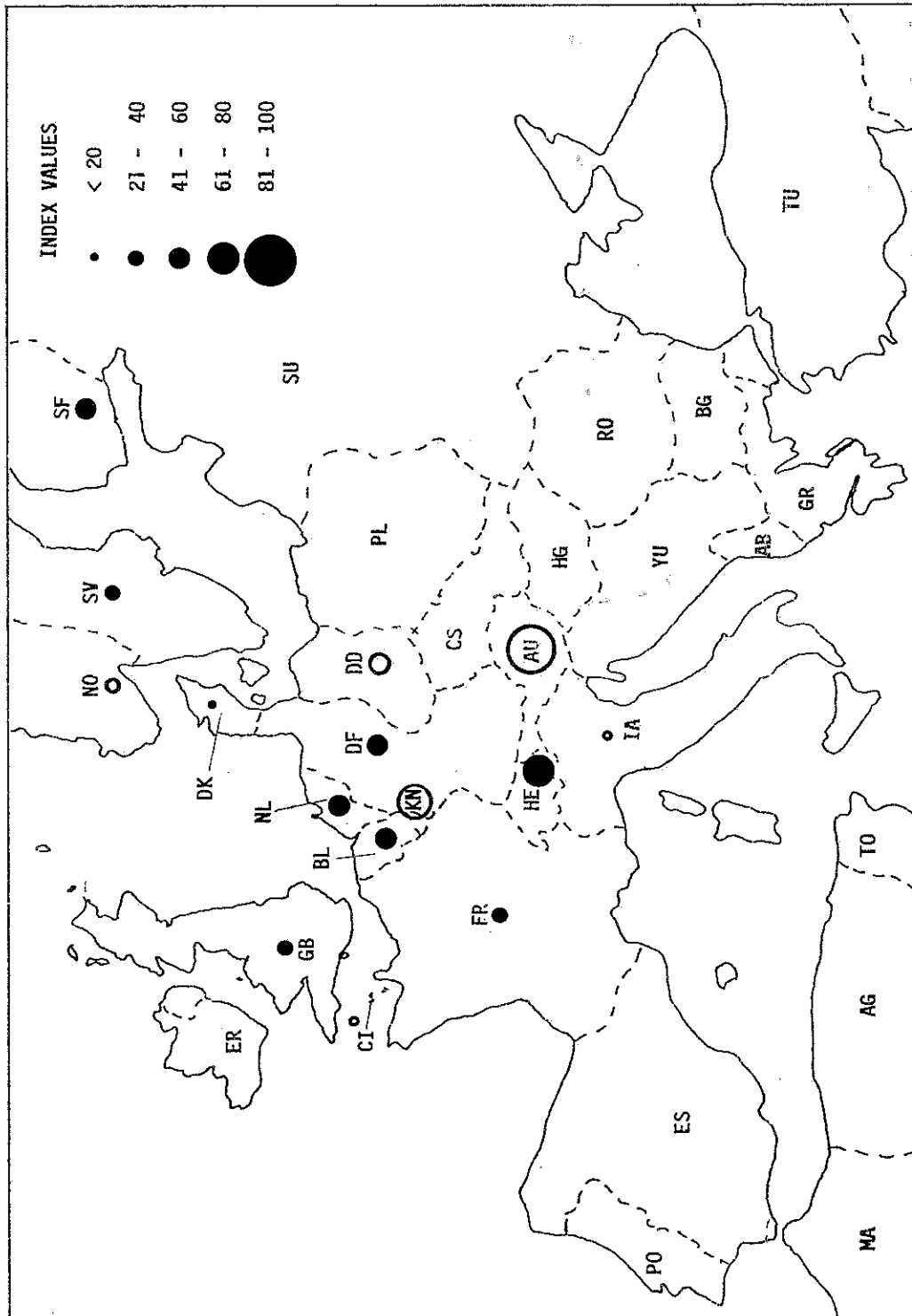
Figure 17.3 Geographical variation in the indices of Garden Warbler taken over all years for each breeding population. Solid circles indicate values derived from more than 10 recoveries and open circles indicate those derived from less than 10. Country codes are indicated in Table 2.4 of the Methods.

Belgium

Index of birds taken

5 Year period

France

Index of birds taken

5 Year period

Portugal

Index of birds taken

5 Year period

Spain

Index of birds taken

5 Year period

North Africa

Index of birds taken

5 Year period

Italy

Index of birds taken

5 Year period
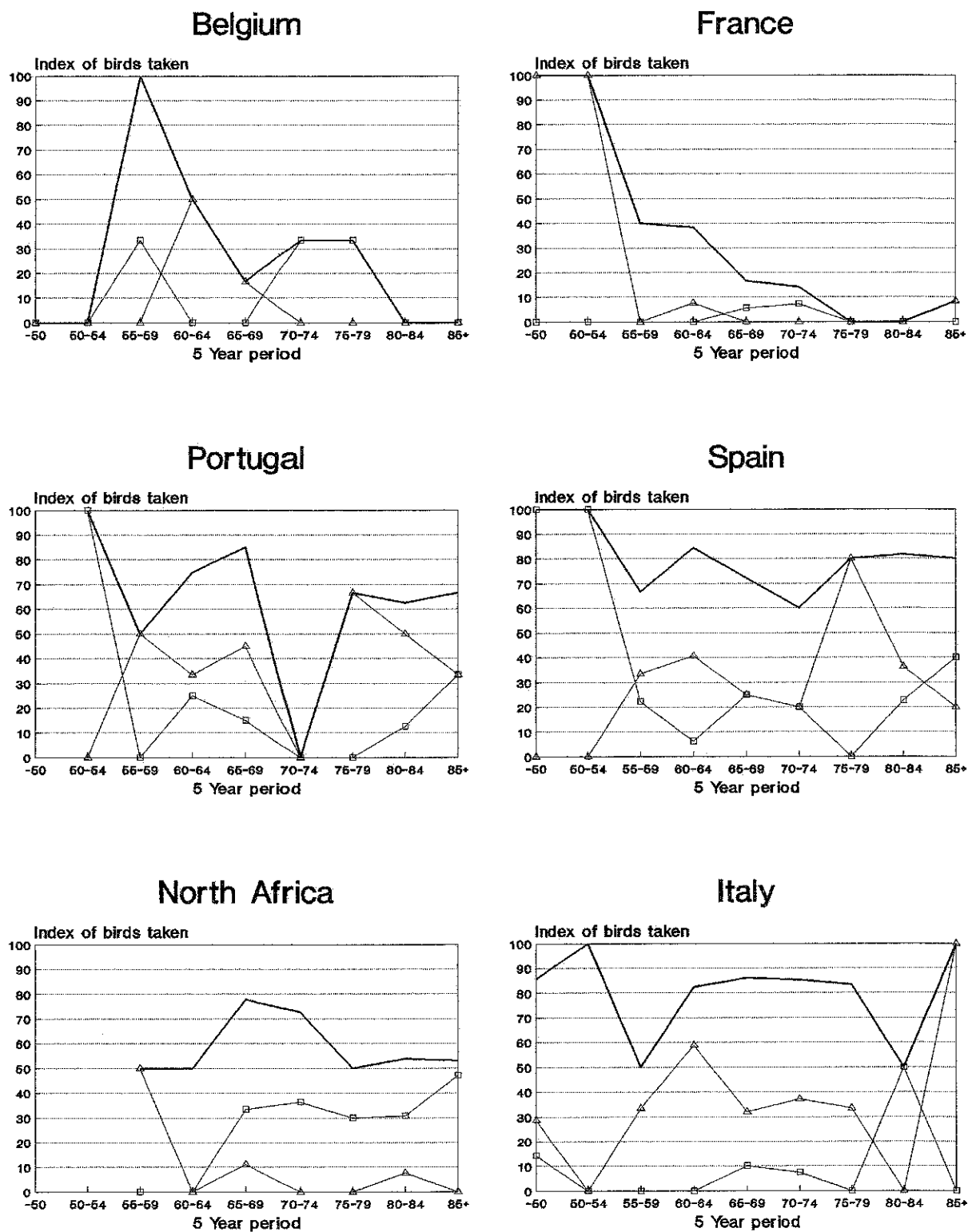
Figure 17.4   Trends in 5-yearly indices of Garden Warbler taken in individual countries
with high overall indices and sufficient recoveries for analysis.   The bold line without
symbols indicates overall index values, triangles indicate index values based on birds
reported as shot and squares indicate index values based on birds reported as trapped.
The periods -50 and 85+ refer to all recoveries before 1950 and from 1985 onwards
respectively.

BL,ES,FR,IA,NA,PO

Others
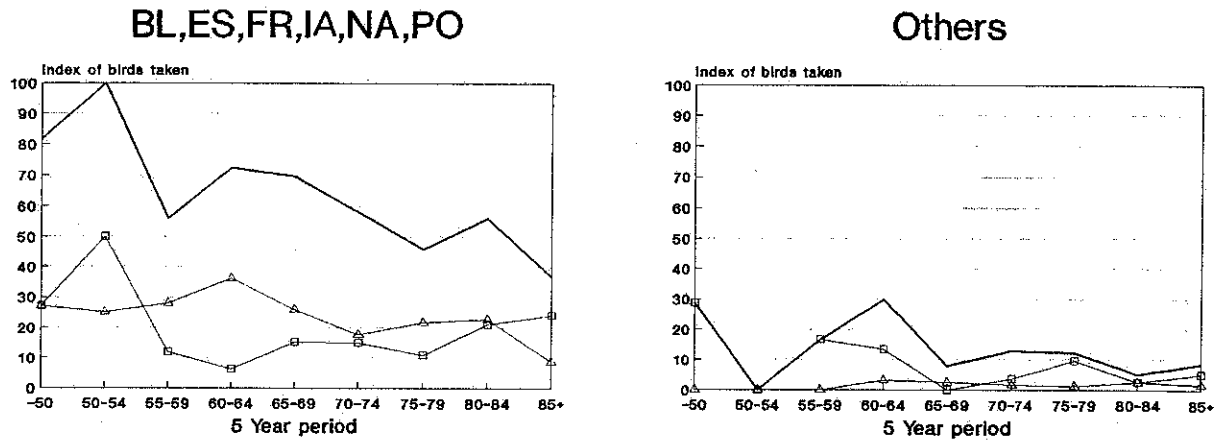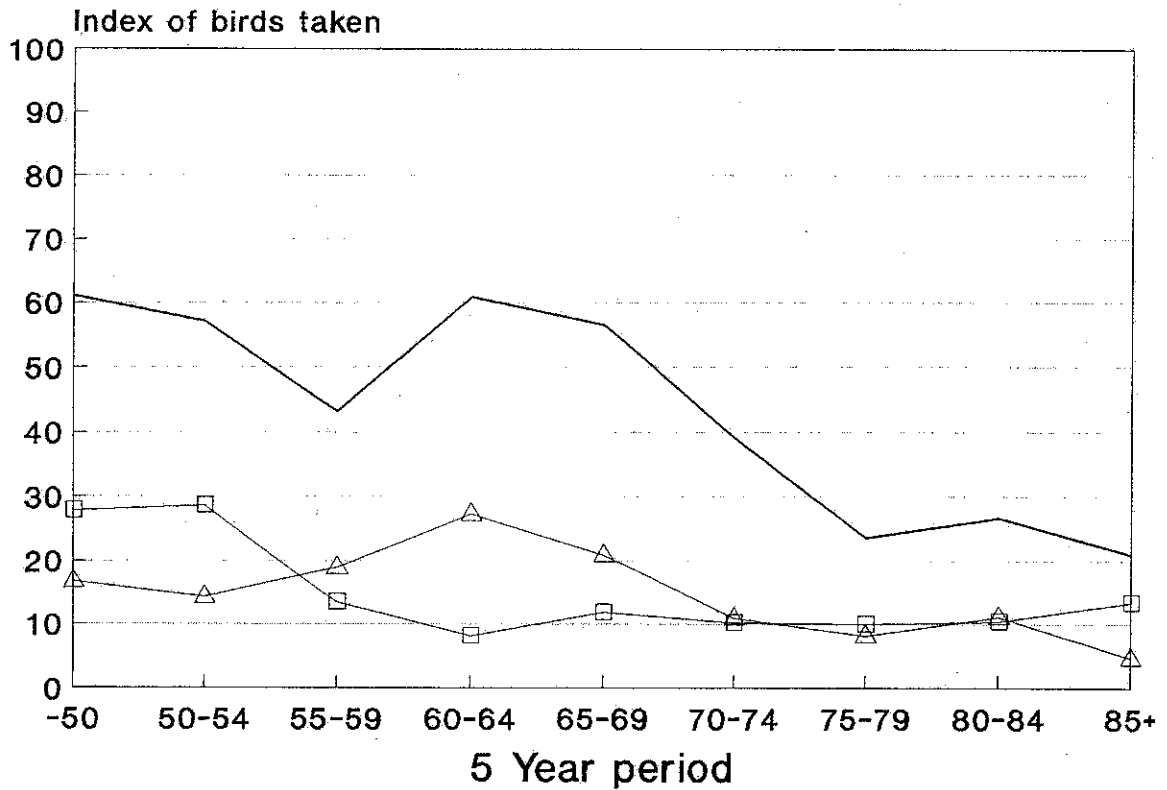
All countries

Figure 17.5 Trends in combined 5-yearly indices of Garden Warbler
taken in: a) countries, for which data for this species were available,
with a tradition of taking substantial numbers of migratory birds on the
western European flyways (ie BL, Es, FR, IA, NA, PO),
b) other countries and c) all countries. The bold line with symbols
indicates overall index values, triangles indicate values based on birds
reported as shot and squares indicate index values based on birds reported
as trapped. The periods -50 and 85+ refer to all recoveries before 1950
and from 1985 onwards respectively.

Belgium

France

Portugal

Spain

North Africa

Italy
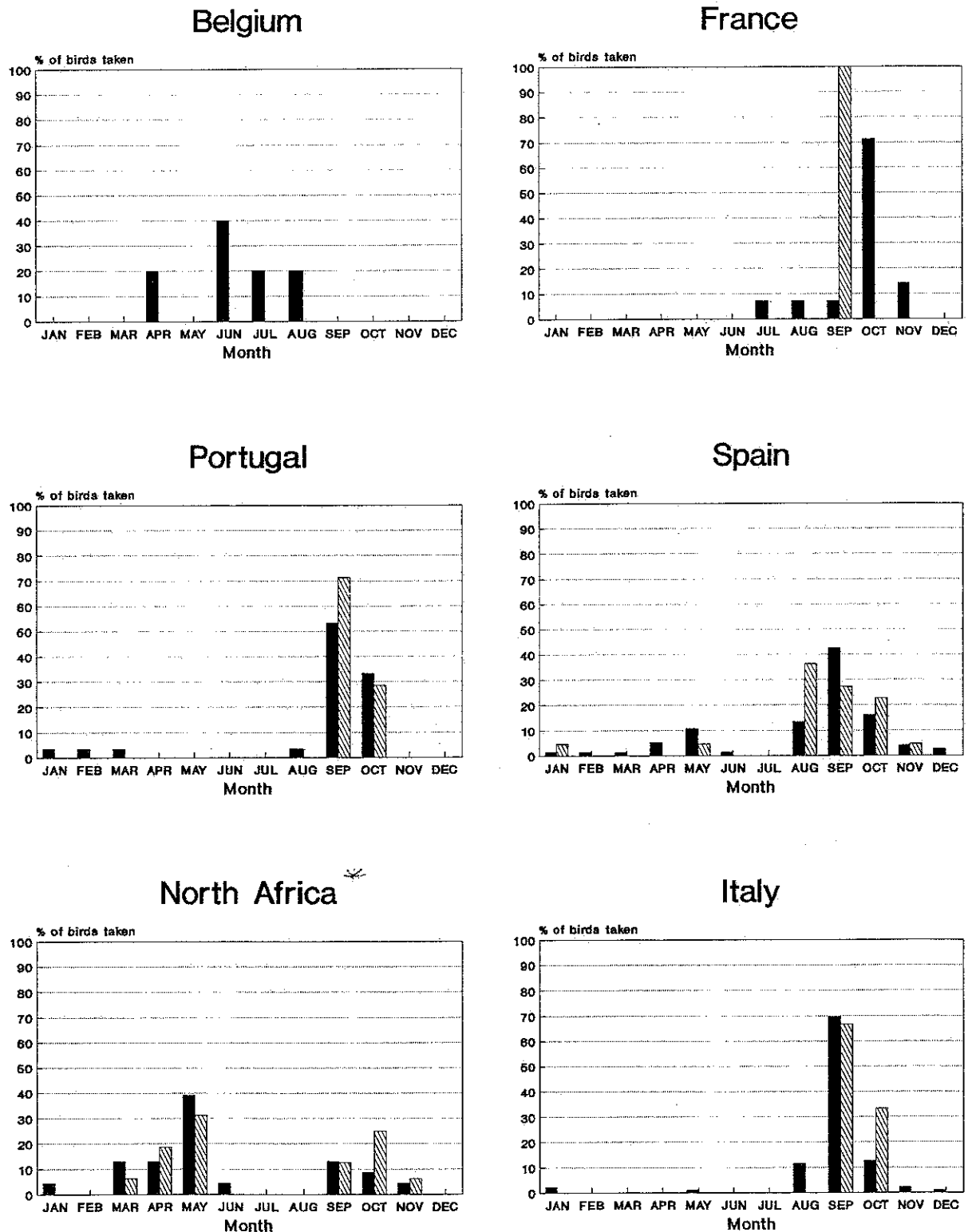
Figure 17.6   Monthly percentages of total Garden Warbler taken in individual countries with high overall indices and sufficient recoveries for analysis. Solid bars indicate birds from the period before 1980 and hatched bars indicate birds taken from 1980 onwards.

18. BLACKCAP (SYLVIA ATRICAPILLA)

18.1 Range

The Blackcap breeds from north-west Africa through Europe (except Fennoscandia) Turkey and northern Iran as far east as the West Siberian Plain in the Soviet Union (Harrison 1972). The majority of Blackcaps winter south of the Sahara (Moreau 1972) from Senegal, east to Sudan, as well as along the coastal strip from Nigeria to Ivory Coast and in East Africa. A smaller proportion winter north of the Sahara, mostly in North Africa and Iberia although some winter in France and Italy (Zink 1973). Until recently wintering in Britain and Ireland was rare, but since the 1950s the wintering population has grown to several thousands (Berthold & Terrill 1988).

18.2 Population trends

British breeding populations of Blackcaps have increased consistently over at least the last 30 years (Marchant et al. 1990). Similarly increases have occurred in Sweden from 1960 (Osterlof and Stolt 1982), in Austria and West Germany from 1984 (Berthold et al. 1986) and in Denmark, the Netherlands and Czechoslovakia during the 1980s (Hustings 1988, DOFF 1989).

18.3 Migration

Blackcaps show a marked migratory divide at about $12^{OO}E$ (Williamson 1964) and tend to move in autumn either south-west to Iberia, Morocco and onwards to West Africa or south-east to Egypt, Sudan and East Africa (Elgood, Sharland & Ward 1966, Moreau 1972, Zink 1973). Evidence from ringing recoveries shows that the British wintering population consists of birds that have migrated from continental Europe and that British birds migrate south to Iberia, North Africa and beyond (Zink 1973, Langslow 1979).

18.4 Status

The Blackcap is a protected species throughout all E.C countries and non-E.C. European Mediterranean countries other than Cyprus (Woldhek 1979). Liming in Cyprus takes large numbers of Blackcaps, both in spring and in autumn. Woldhek (1979) reports that 4,646 Blackcaps were taken in 64 days in the spring of 1968, and also states that approximately 90% of small birds limed in autumn are this species. Of the non-European countries for which information is available, hunting is allowed in Jordan (from September to the end of December) while the species is protected in Lebanon, Israel, Egypt, Tunisia and Morocco (Woldhek 1979).

18.5 Geographical variation in the taking of Blackaps

The recoveries of Blackcaps taken by shooting and trapping shows a large geographical spread (Fig. 18.1) reflecting the divided migration strategy of the species. Thus concentrations of recoveries occur in areas of high hunting activity along south and south-east migration routes in northern and mid-Italy, southern Spain and North Africa. For birds taking an easterly migration route most recoveries occur in Lebanon and Cyprus. Little difference is apparent between the pattern of recoveries from the pre-1980 (Fig. 18.1a) and 1980 onwards (Fig. 18.1b) periods, although a decrease in recoveries from Italy is apparent.

The split in recovery distributions according to source population is apparent in Table 18.1 for both periods. Birds from the south and west of the range (i.e. Britain, Belgium, Netherlands, France and Switzerland) are recovered mostly in Spain and North Africa, whilst those from the north and east (i.e. Norway, Sweden, Finland, Poland, East Germany, Czechoslovakia and Hungary) are recovered mostly in Cyprus and Lebanon, and are largely absent for North Africa.

The indices of birds taken for the two analysis periods are shown in Fig. 18.2 and Table 18.2. Over both periods most northern and central European countries had indices below 20, although Norway and Finland had indices of 25.0 and 30.0 respectively in the initial period. Most shooting and trapping occurs in the coastal Meditteranean countries, amongst which index values over 80 were recorded for Cyprus, Syria and Lebanon in the early period of analysis. Indices greater than 80 were also recorded for Yugoslavia, Turkey, Malta and Egypt, athough for these countries the indices may be unreliable as they were derived from less than 10 recoveries. In general, indices from Italy, Spain, Portugal, Morocco, Algeria and Tunisia were lower than those from the eastern Mediterranean countries in both periods, with index values ranging from 50.8 to 79.3 in the early period and from 21.7 to 75.8 in the later period.

Despite the major differences in migration routes taken amongst European Blackcap populations there is a comparatively moderate range in the indices (Table 18.3, Fig. 18.3). Of the breeding populations with indices derived from more than 10 recoveries, indices range from 30.2 for United Kingdom birds to 87.5 for Polish birds. Thus very high indices are apparent, especially for the more easterly populations. All breeding populations are exposed to at least a moderate degree of shooting and trapping.

18.6 Temporal variation in the taking of Blackcaps

Significant decreases in the indices of Blackcaps taken between the two analysis periods occurred in the United Kingdom, West Germany, France, Spain and Lebanon (Table 18.2). There was no increase in index for any country from which data were available . Of the countries analysed in greater detail for temporal trends (Fig. 18.4) the plots of 5-yearly index values against time indicated significant declines in the indices for France and Italy (Table 18.4). Stable index values were recorded for Spain and large fluctuations for Portugal and North Africa. Overall there have been significant declines in index values from 1950 for the major countries taking Blackcaps, all other countries and all countries combined (Fig. 18.5 and Table 18.4).

The monthly percentages of total birds taken for France, Portugal, Spain, North Africa and Italy show that most taking of Blackcaps is restricted to the period from September to the end of April (Fig. 18.6). Of these countries Italy tends to take most Blackcaps in the migration periods (particularly the autumn). This was more pronounced during the later period of analysis. However, France, Spain, Portugal and North Africa tend to take Blackcaps throughout the winter period. The peak in North Africa occurs around February. In Belgium, Blackcaps were taken mainly during the spring and summer in the early analysis period. The monthly proportions of birds taken in Belgium since 1980 indicate that most birds are now taken while on autumn migration.

18.7 Methods used to take Blackcaps

Amongst those countries with indices derived from more than 10 recoveries, shooting is the most commonly used method of taking birds in Portugal, Syria and Lebanon (Fig. 18.4 and Table 18.2). However, trapping is also a frequently used method for taking this species and is predominant in Belgium, Spain, Cyprus, Algeria and Morocco. Furthermore, there were increases in the proportion of recoveries reported as trapped from Algeria and Morocco (Fig. 18.4).

TABLE 18.1a The distribution of Blackcaps recovered due to shooting and trapping before 1980 in relation to their area of origin. The percentage of taken birds recovered in each country is shown for each national ringing scheme. Indices within parentheses indicate that the percentages are based on less than ten recoveries.

Country of recovery	Country of ringing								
	UK	CI	NO	SV	DK	SF	PL	DD	DF
GB	7.1	0	0	0	0	0	0	0	0.4
CI	0	0	0	0	0	0	0	0	0
FR	0	0	0	0	0	0	0	0	0
NO	1.0	0	20.0	0	0	0	3.6	0	0
SV	0	0	0	0	0	34.9	0	0	0
DK	0	0	0	0	0	0	0	0	0
SF	0	0	0	0	0	0	0	0	0
SU	0	0	0	0	0	0	0	0	0
PL	0	0	0	0	0	0	0	0	0
DD	0	0	0	0	0	0	0	7.7	0.4
DF	0	0	0	0	0	0	0	0	4.3
NL	0	0	0	0	0	0	0	0	0.8
BL	1.0	0	0	0	0	0	0	0	0
KN	0	0	0	0	0	0	0	0	0
FR	5.0	0	6.7	0	0	0	0	7.7	5.1
ES	41.4	0	13.3	0	25.0	0	0	23.1	37.4
PO	4.0	0	0	0	0	0	0	0	4.7
IA	7.1	0	20.0	6.5	33.3	9.3	39.3	7.7	17.4
HE	0	0	0	0	0	0	0	0	0.4
AU	0	0	0	0	0	0	0	0	0
CS	0	0	6.7	0	0	0	0	0	0
HG	0	0	0	0	0	0	0	0	0
RO	0	0	0	0	0	0	0	0	0
BG	0	0	0	0	0	0	0	0	0
YG	0	0	0	0	0	0	0	0	0
GR	0	0	6.7	15.2	0	0	7.1	0	1.7
TU	0	0	0	2.2	8.3	2.3	0	0	0
CY	0	0	6.7	23.9	0	9.3	17.9	15.4	2.1
ML	0	0	0	0	0	0	3.6	0	0
SY	0	0	0	10.9	0	13.9	14.3	0	0.4
IE	6.1	0	13.3	32.6	16.7	27.9	14.3	15.4	1.3
IL	0	0	0	2.2	0	0	0	0	0
ME	0	0	0	2.2	0	0	0	0	0
EG	0	0	0	0	0	0	0	0	0
LT	0	0	0	0	0	0	0	0	0.8
TO	0	0	0	2.2	0	0	0	0	0.4
AG	9.1	0	6.7	2.2	8.3	2.3	0	7.7	14.9
MA	17.2	0	0	0	8.3	0	0	7.7	6.8
SA	1.0	0	0	0	0	0	0	0	0
TOTAL RECOVERIES	99	0	15	46	12	43	28	13	235

TABLE 18.1a (cont'd) The distribution of Blackcaps recovered due to shooting and trapping before 1980 in relation to their area of origin. The percentage of taken birds recovered in each country is shown for each national ringing scheme. Indices within parentheses indicate that the percentage are based on less than ten recoveries.

Country of recovery	Country of ringing							
	NL	BL	FR	ES	IA	HE	CS	HG
GB	0	0	0	0	0	0	0	0
CI	0	0	0	0	0	0	0	0
ER	0	0	0	0	0	0	0	0
NO	0	0	0	0	0	0	0	0
SV	0	0	0	0	0	0	0	0
DK	0	0	0	0	0	0	0	0
SF	0	0	0	0	0	0	0	0
SU	0	0	0	0	0	0	0	0
PL	0	0	0	0	0	0	0	0
DD	0	0	0	0	0	0	0	0
DF	4.0	0	0.7	0	0	0	0	0
NL	0	0	0	0	0.8	0	0	0
BL	0	3.4	0	0	0	0	0	0
KN	0	0	0	0	0	0	0	0
FR	0	3.4	8.0	0	2.4	1.4	0	0
ES	52.0	56.2	55.0	0	2.4	54.3	2.2	0
PO	4.0	7.5	2.0	0	0	2.9	0	0
IA	0	3.4	2.7	0	87.1	7.1	19.6	0
HE	0	0	0	0	0.8	1.4	0	0
AU	0	0	0	0	0	0	0	0
CS	0	0	0	0	0	1.4	2.2	0
HG	0	0	0	0	0	0	0	0
RO	0	0	0	0	0	0	0	0
BG	0	0	0	0	0	0	0	0
YG	0	0	0	0	0	0	0	0
GR	0	0	0.7	0	0	0	4.3	0
TU	0	0.7	0	0	0	0	0	0
CY	0	0	0	0	0	0	34.8	(25.0)
ML	0	0	0	0	0	0	0	0
SY	0	0	0	0	0	0	8.7	0
IE	0	0	0	0	0.8	1.4	21.7	(75.0)
IL	0	0	0	0	0	0	0	0
ME	0	0	0	0	0	0	0	0
EG	0	0	0	0	0	0	0	0
LT	0	0	0	0	0	0	2.2	0
TO	0	0.7	1.3	0	0	2.9	2.2	0
AG	16.0	13.0	17.4	0	1.6	22.9	2.2	0
MA	24.0	11.6	12.1	0	0	0	0	0
SA	0	0	0	0	0	0	0	0
TOTAL RECOVERIES	25	146	149	0	124	70	46	4

TABLE 18.1b The distribution of Blackcaps recovered due to shooting and trapping from 1980 onwards in relation to their area of origin. The percentage of taken birds recovered in each country is shown for each national ringing scheme. Indices within parentheses indicate that the percentages are based on less than ten recoveries.

Country of recovery	Country of ringing								
	UK	CI	NO	SV	DK	SF	PL	DD	DF
GB	0	0	0	0	0	0	0	0	0
CI	0	0	0	0	0	0	0	0	0
ER	0	0	0	0	0	0	0	0	0
NO	0	0	0	0	0	0	0	0	0
SV	0	0	0	0	0	0	0	0	0
DK	0	0	0	0	0	0	0	0	0
SF	0	0	0	0	0	0	0	0	0
SU	0	0	0	0	0	0	0	0	0
PL	0	0	0	0	0	0	0	0	0
DD	0	0	0	0	0	0	0	0	0
DF	0	0	0	0	0	0	0	0	1.5
NL	0	0	0	0	0	0	0	0	0
BL	0	0	0	0	0	0	0	0	3.0
KN	0	0	0	0	0	0	0	0	0
FR	0	0	(20.0)	0	0	0	0	0	0
ES	28.4	(100.0)	(20.0)	0	0	0	0	0	35.8
PO	3.7	0	0	0	0	0	0	0	1.5
IA	0	0	0	(14.3)	0	0	0	0	1.5
HE	0	0	0	0	0	0	0	0	0
AU	0	0	0	0	0	0	0	0	0
CS	0	0	0	0	0	0	0	0	0
HG	0	0	0	0	0	0	0	0	0
RO	0	0	0	0	0	0	0	0	0
BG	0	0	0	0	0	0	0	0	0
YG	0	0	0	0	0	0	0	0	0
GR	0	0	(20.0)	0	0	0	0	0	1.5
TU	0	0	(20.0)	(14.3)	0	0	0	0	0
CY	0	0	0	0	0	(50.0)	(100.0)	0	0
ML	0	0	0	0	0	0	0	0	0
SY	0	0	(20.0)	(28.6)	0	(50.0)	0	0	0
IE	0	0	0	(14.3)	(50.0)	0	0	0	0
IL	0	0	0	0	0	0	0	0	0
ME	0	0	0	0	0	0	0	0	0
EG	0	0	0	0	0	0	0	0	0
IT	0	0	0	0	0	0	0	0	0
TO	0	0	0	0	0	0	0	0	0
AG	23.5	0	0	(28.6)	0	0	0	0	35.8
MA	40.7	0	0	0	(50.0)	0	0	0	17.9
SA	3.7	0	0	0	0	0	0	0	1.5
TOTAL RECOVERIES	81	1	5	7	2	2	1	0	67

TABLE 18.1b (cont'd) The distribution of Blackcaps recovered due to shooting and trapping after 1980 in relation to their area of origin. The percentage of taken birds recovered in each country is shown for each national ringing scheme. Indices within parentheses indicate that the percentages are based on less than ten recoveries.

Country of recovery	Country of ringing							
	NL	BL	FR	ES	IA	HE	CS	HG
GB	0	0	0	0	0	0	0	0
CI	0	0	0	0	0	0	0	0
ER	0	0	0	0	0	0	0	0
NO	0	0.6	0	0	0	0	0	0
SV	0	0	0	0	0	0	0	0
DK	0	0	0	0	0	0	0	0
SF	0	0	0	0	0	0	0	0
SU	0	0	0	0	0	0	0	0
PL	0	0	0	0	0	0	0	0
DD	0	0	0	0	0	0	0	0
DF	0	0.6	0	0	0	0	0	0
NL	4.8	0.6	0	0	0	0	0	0
BL	0	0.6	4.0	0	0	0	0	0
KN	0	0	0	0	0	0	0	0
FR	0	1.3	0	0	0	0	0	0
ES	28.6	44.6	32.0	68.4	0	72.7	(11.1)	0
PO	4.8	5.7	4.0	0	0	0	0	0
IA	0	0.6	0	0	(16.7)	0	(11.1)	0
HE	0	0	0	0	0	0	0	0
AU	0	0	0	0	0	0	0	0
CS	0	0	0	0	0	0	0	0
HG	0	0	0	0	0	0	0	0
RO	0	0	0	0	0	0	0	0
BG	0	0	0	0	0	0	0	0
YG	0	0	0	0	0	0	0	0
GR	0	0	0	0	0	0	(22.2)	(28.6)
TU	0	0	0	0	0	0	(11.1)	(14.3)
CY	0	0	0	2.6	0	0	0	(42.9)
ML	0	0	0	0	0	0	0	0
SY	0	0	0	0	0	0	(11.1)	(14.3)
IE	0	0	4.0	0	0	0	(22.2)	0
IL	0	0	0	0	0	0	0	0
ME	0	0	0	0	0	0	0	0
EG	0	0	0	0	0	0	0	0
IT	0	0	0	0	0	0	0	0
TO	0	0	0	0	0	0	0	0
AG	28.6	27.4	32.0	15.8	(83.3)	18.2	(11.1)	0
MA	33.3	17.8	24.0	10.5	0	9.1	0	0
SA	0	0	0	2.6	0	0	0	0
TOTAL RECOVERIES	21	157	25	38	6	11	9	7

TABLE.18.2 Blackcap: Indices of birds taken before 1980 and from 1980 onwards for each country of recovery.

	Index (all methods)[a]		% hunted[b]		Total recoveries[c]		Shooting Index[a]		Trapping Index[a]		G test[d]
	-1980	1980+	-1980	1980+	-1980	1980+	-1980	1980+	-1980	1980+	
GB	6.5	0.0**	2.1	0.0	376	547	2.4	0.0	4.1	0.0	-
CI	-	(0.0)	0.0	0.0	6	6	-	(0.0)	-	(0.0)	-
ER	(0.0)	(0.0)	0.0	0.0	3	6	(0.0)	(0.0)	(0.0)	(0.0)	-
NO	25.0	9.1	15.0	3.1	33	32	0.0	0.0	25.0	9.1	-
SV	0.0	0.0	0.0	0.0	22	47	0.0	0.0	0.0	0.0	-
DK	(0.0)	0.0	0.0	0.0	28	33	(0.0)	0.0	(0.0)	0.0	-
SF	30.0	0.0**	4.6	0.0	329	498	0.0	0.0	30.0	0.0	-
SU	(0.0)	(0.0)	0.0	0.0	2	2	(0.0)	(0.0)	(0.0)	(0.0)	-
PL	(0.0)	(0.0)	0.0	0.0	12	5	(0.0)	(0.0)	(0.0)	(0.0)	-
DD	(22.2)	(0.0)	10.0	0.0	20	10	(0.0)	(0.0)	(22.2)	(0.0)	-
DF	12.1	3.2*	7.9	1.6	151	121	11.1	0.0	11.1	3.2	-
NL	16.7	6.1	5.6	1.6	54	124	5.6	0.0	11.1	6.1	-
BL	16.7	7.3	3.4	0.5	175	790	0.0	0.0	16.7	7.3	-
KN	(0.0)	(0.0)	0.0	0.0	2	3	(0.0)	(0.0)	(0.0)	(0.0)	-
FR	13.5	3.3**	9.7	1.5	433	204	1.3	3.3	5.5	0.0	-
ES	71.2	63.7*	67.9	32.4	529	534	15.7	15.4	24.1	31.8	***
PO	50.8	50.0	48.5	41.7	66	36	30.2	26.7	6.3	6.7	-
IA	72.5	21.7	61.0	3.8	341	132	18.8	4.3	18.1	13.0	-
HE	13.6	0.0	3.5	0.0	85	25	4.5	0.0	4.5	0.0	-
AU	(0.0)	(0.0)	0.0	0.0	6	7	(0.0)	(0.0)	(0.0)	(0.0)	-
CS	(60.0)	(0.0)	60.0	0.0	5	3	(0.0)	(0.0)	(60.0)	(0.0)	-
HG	(0.0)	(0.0)	0.0	0.0	4	5	(0.0)	(0.0)	(0.0)	(0.0)	-
RO	-	-	-	-	-	-	-	-	-	-	-
BG	(0.0)	-	0.0	-	2	-	(0.0)	-	(0.0)	-	-
YG	(100.0)	-	66.7	0.0	3	1	(0.0)	-	(100.0)	-	-
GR	70.8	46.1	65.4	46.1	26	13	20.8	30.8	20.8	0.0	-
TU	(100.0)	(66.7)	100.0	57.1	5	7	(80.0)	(33.3)	(0.0)	(33.3)	-
CY	88.4	(85.7)	88.2	66.7	51	9	19.6	(28.6)	47.1	(42.9)	-
ML	(100.0)	-	20.0	0.0	5	1	(100.0)	-	(100.0)	-	-
SY	87.5	(66.7)	87.5	66.7	24	9	50.0	(33.3)	20.8	(11.1)	-
LE	86.1	50.0*	84.9	45.4	73	11	55.6	30.0	6.9	10.0	-
IL	(25.0)	(0.0)	25.0	0.0	4	2	(0.0)	(0.0)	(25.0)	(0.0)	-
ME	(50.0)	(0.0)	50.0	0.0	2	1	(50.0)	(0.0)	(0.0)	(0.0)	-
EG	(100.0)	-	100.0	-	1	-	(100.0)	-	(0.0)	-	-
LT	(80.0)	-	80.0	33.3	5	3	(0.0)	-	(40.0)	-	-
TO	61.1	(33.3)	50.0	-	22	0	22.2	(0.0)	16.7	(0.0)	-
AG	79.3	75.8	72.1	70.4	165	169	7.3	1.9	55.3	61.8	*
MA	63.5	61.5	58.8	58.9	148	163	10.2	7.1	24.1	41.7	***
SA	(66.7)	(55.6)	50.0	50.0	4	10	(0.0)	(0.0)	(33.3)	(44.4)	-

[a] See chapter 2 (methods) for derivation of indices. Indices derived from less than 10 recoveries are indicated within parentheses. Fisher's exact tests (Sokal & Rohlf 1981) were used to compare the proportions taken in each period. Significance levels (*<0.05; ** <0.01; *** <0.001) of the tests are indicated in column 1980+. Tests were carried out on all pairs except where indices were based on less than 10 recoveries.

[b] Percentage of all recoveries other than those excluded on the basis of poor quality data (see chapter 2) taken by shooting and trapping.

[c] Total number of recoveries other than those excluded on the basis of poor quality data.

[d] G test (Sokal & Rohlf 1981) comparison between periods of the proportions of birds taken according to the classes shot, trapped, and shot or trapped. Significance levels of these comparisons are indicated as above. 'NS' indicates non-significant results where tests were carried out. Comparisons were not made where the expected frequency in any cell was less than 10.

Table.18.3. Blackcap : Indices of birds taken for each breeding population (across all years).

Breeding Population		Index of birds taken	Sample size
UK	United Kingdom	30.2	295
CI	Channel Islands	20.0	5
NO	Norway	31.6	19
SV	Sweden	53.3	45
DK	Denmark	38.1	21
SF	Finland	44.4	63
SU	USSR (Lithuania only)	–	3
PL	Poland	87.5	16
DD	East Germany	57.9	19
DF	West Germany	51.2	303
NL	Holland	47.6	42
BL	Belgium	54.8	310
FR	France	40.2	249
ES	Spain	–	5
IA	Italy	53.8	26
HE	Switzerland	50.6	79
CJ	Czechoslovakia	71.0	69
HG	Hungary	61.5	13

Table 18.4   Regression analysis of temporal trends in the indices of Blackcap taken.

Country of recovery	Intercept	Slope	t	P
Belgium	63.1	-0.659	-1.21	ns
France	52.9	-0.600	-2.55	*
Portugal	68.4	-0.228	-0.228	ns
Spain	98.8	-0.371	-2.05	ns
North Africa	72.7	-0.053	-0.125	ns
Italy	200.0	-2.06	-4.29	**
Major	90.5	-0.485	-2.63	*
Other	124.0	-1.34	-4.69	***
All	107.0	-0.840	-5.31	**

All regressions used a weighted technique where each 5-year index was weighted by the square root of the sample size.

Countries where 10 or more recoveries occurred in each year after 1950 were analysed. Data from the period before 1950 were not included in the analysis.

Major countries are those with a tradition of taking substantial numbers of birds that use western migration routes.
(i.e. BL, FR, ES, PO, IA, NA).

Significance levels indicated are: NS Not significant; * P<0.05; ** P<0.01; *** P<0.001.
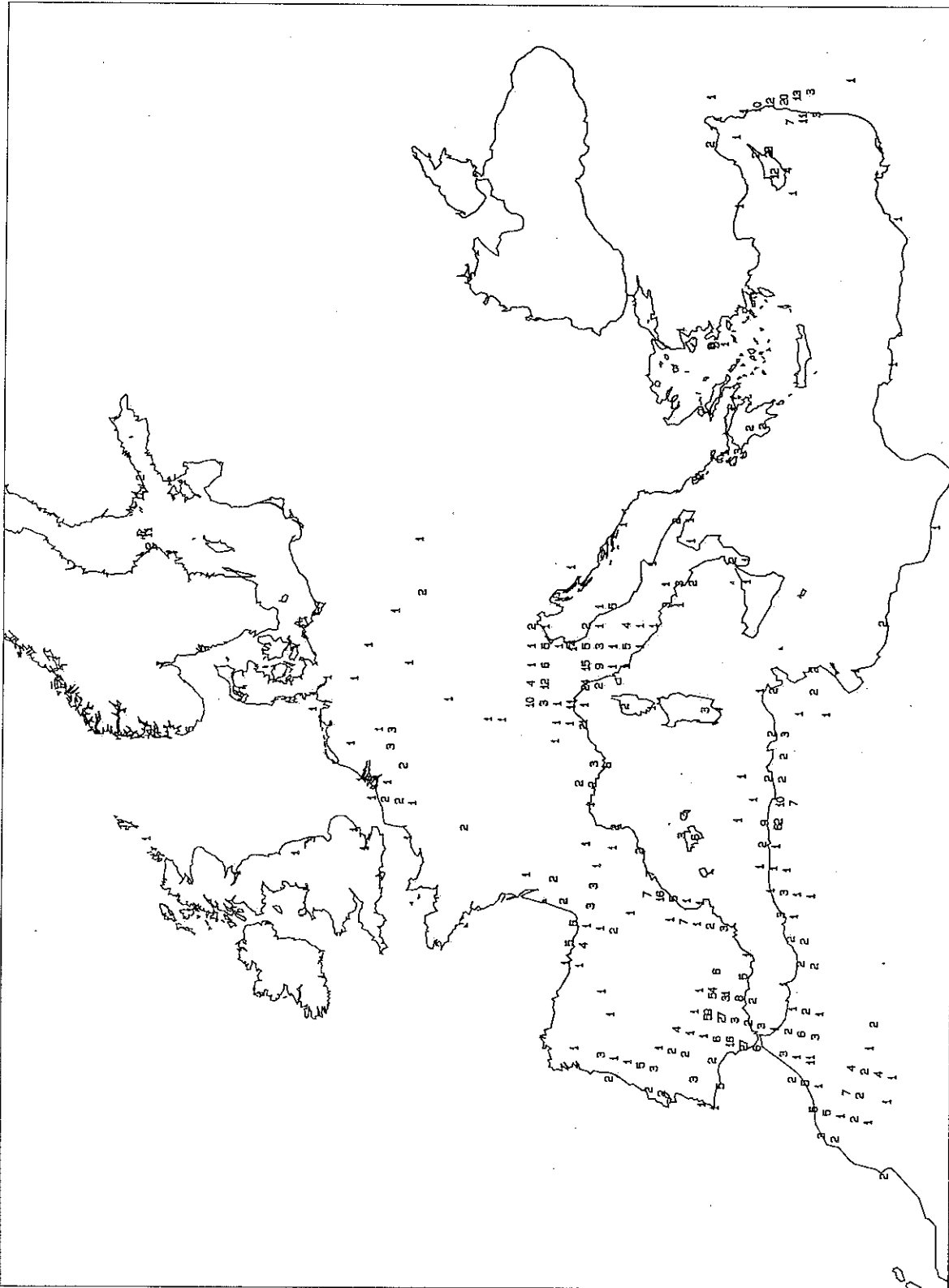
Figure 18.1a Total numbers of Blackcap ringing recoveries resulting from birds taken before 1980 in each 30' by 60' grid square. ** Indicates numbers greater than 99. 2 recoveries were outside the limits of the map.
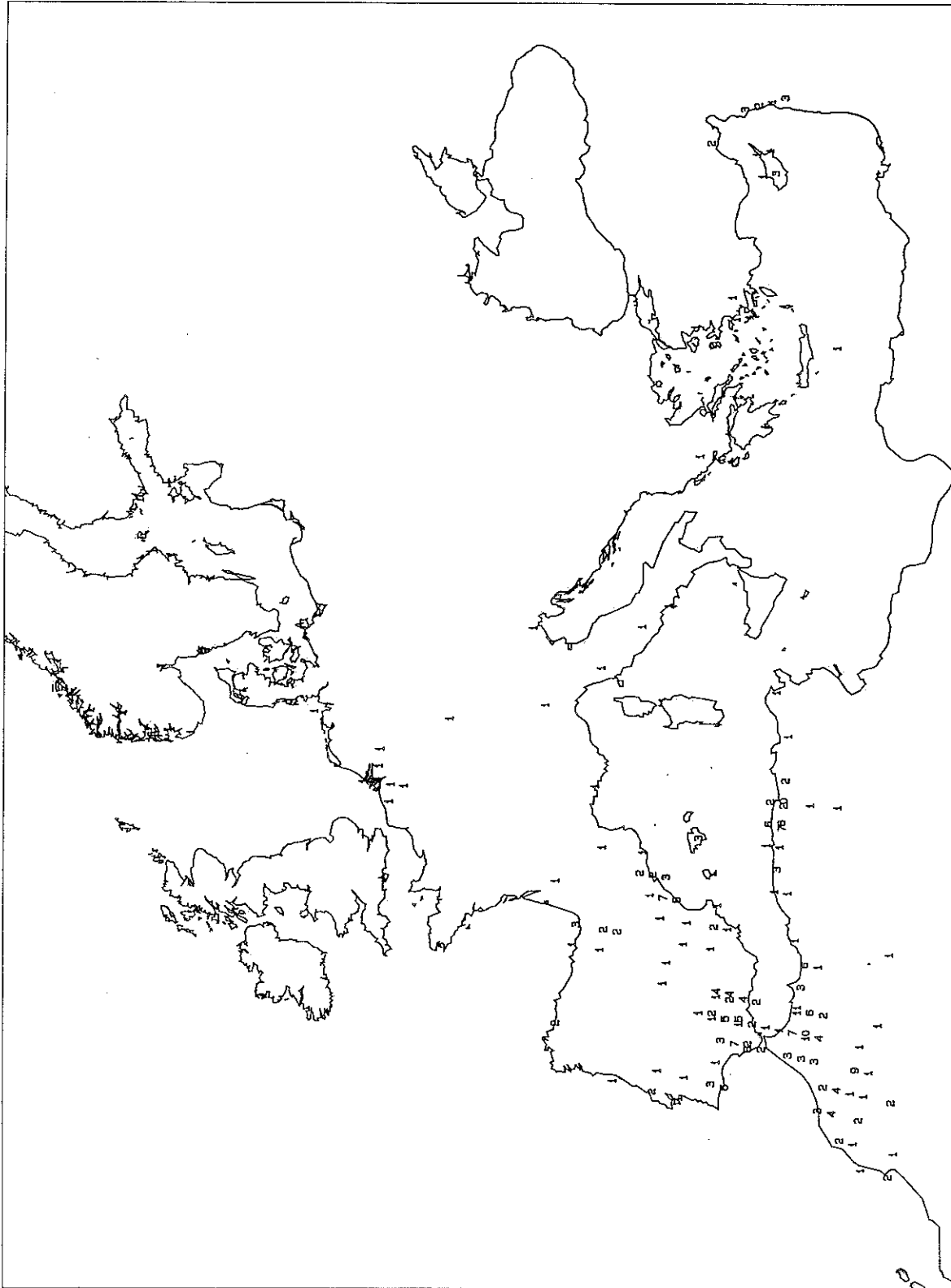
Figure 18.1b   Total numbers of Blackcap ringing recoveries from birds taken from 1980 onwards in each 30' by 60' grid square.   ** Indicates numbers greater than 99.   7 recoveries were outside the limits of the map.
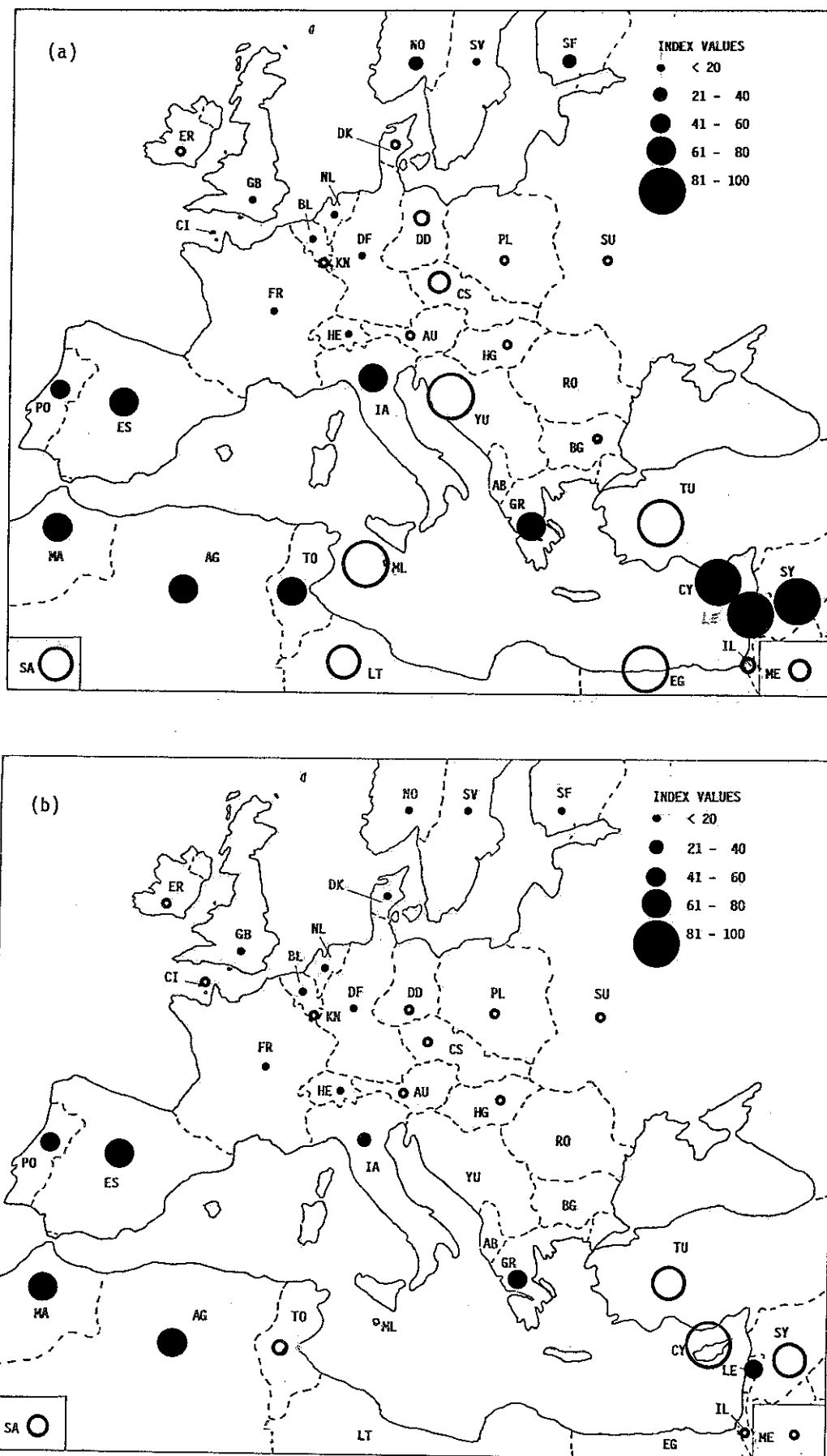
Figure 18.2 Geographical variation in the indices of Blackcap taken for each country of recovery in the period before 1980 (a) and from 1980 onwards (b). Solid circles indicate values derived from more than 10 recoveries and open circles indicate those derived from less than 10. Country codes are indicated in Table 2,4 of the Methods.
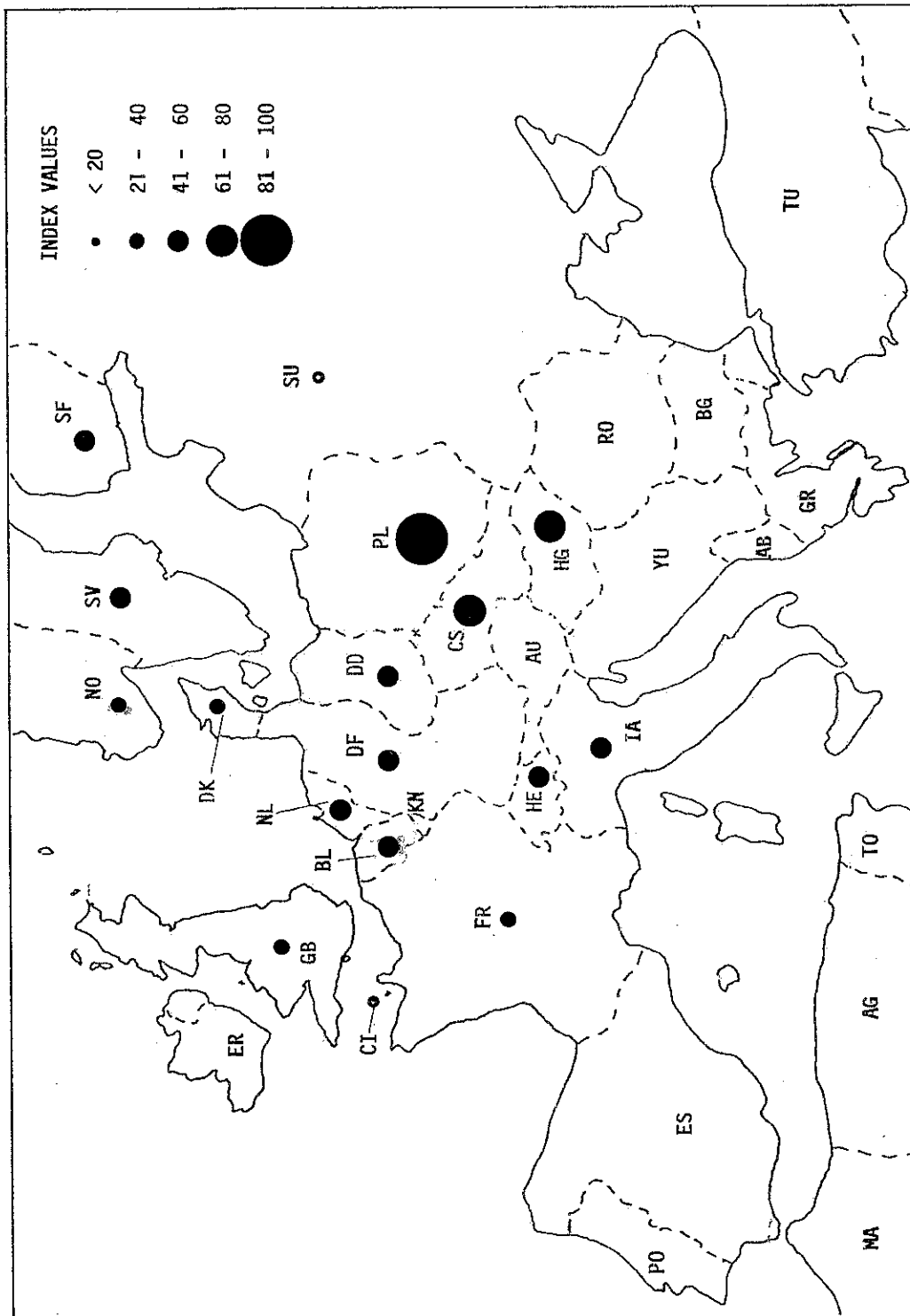
Figure 18.3 Geographical variation in the indices of Blackcap taken over all years for each
breeding population. Solid circles indicate values derived from more than 10 recoveries and open circles
indicate those derived from less than 10.   Country codes are indicated in Table 2.4 of the Methods.

Belgium

Index of birds taken

5 Year period

France

Index of birds taken

5 Year period

Portugal

Index of birds taken

5 Year period

Spain

Index of birds taken

5 Year period

North Africa

Index of birds taken

5 Year period

Italy

Index of birds taken

5 Year period
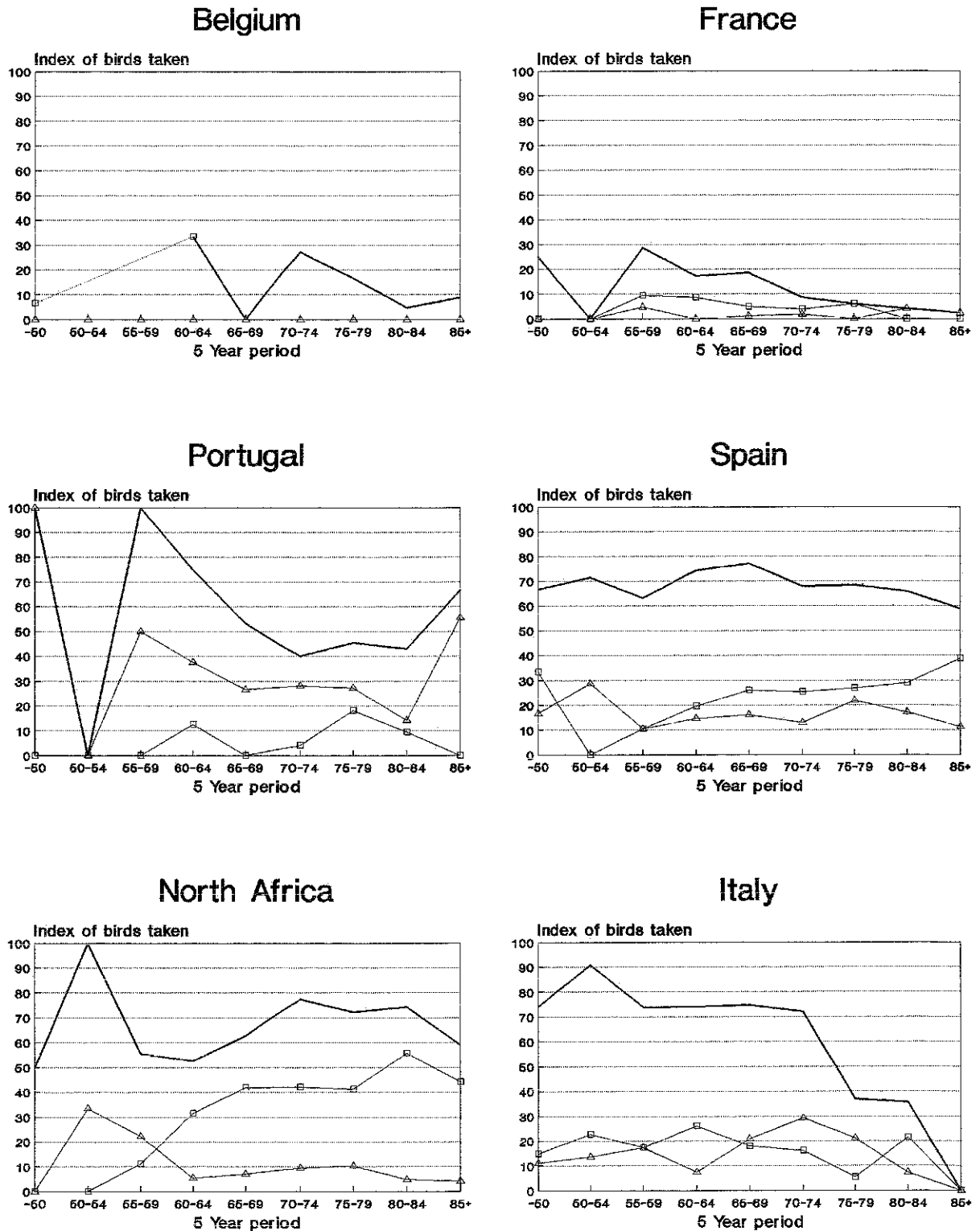
Figure 18.4   Trends in 5-yearly indices of Blackcap taken in individual countries
with high overall indices and sufficient recoveries for analysis.   The bold line without
symbols indicates overall index values, triangles indicate index values based on birds
reported as shot and squares indicate index values based on birds reported as trapped.
The periods -50 and 85+ refer to all recoveries before 1950 and from 1985 onwards
respectively.

BL,ES,FR,IA,NA,PO

Index of birds taken

Others

Index of birds taken

All countries

Index of birds taken
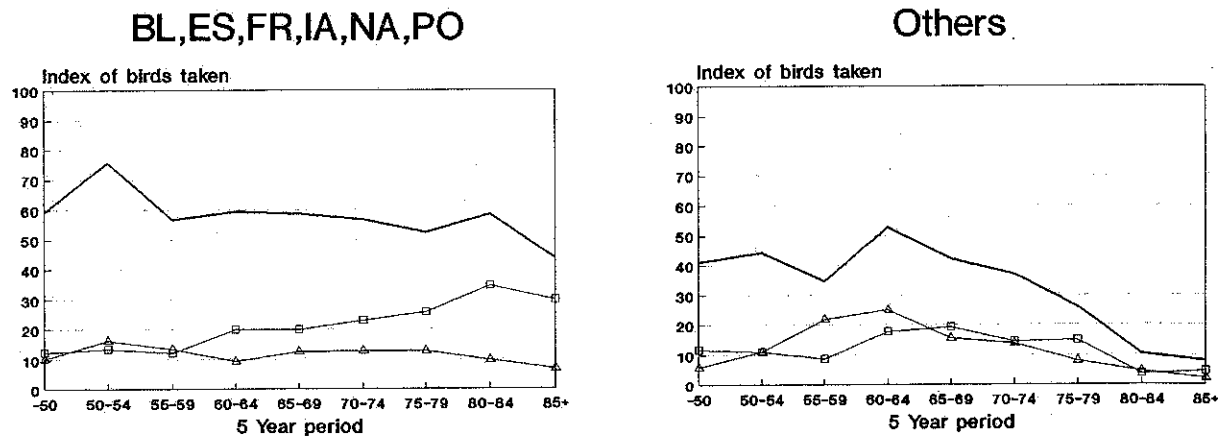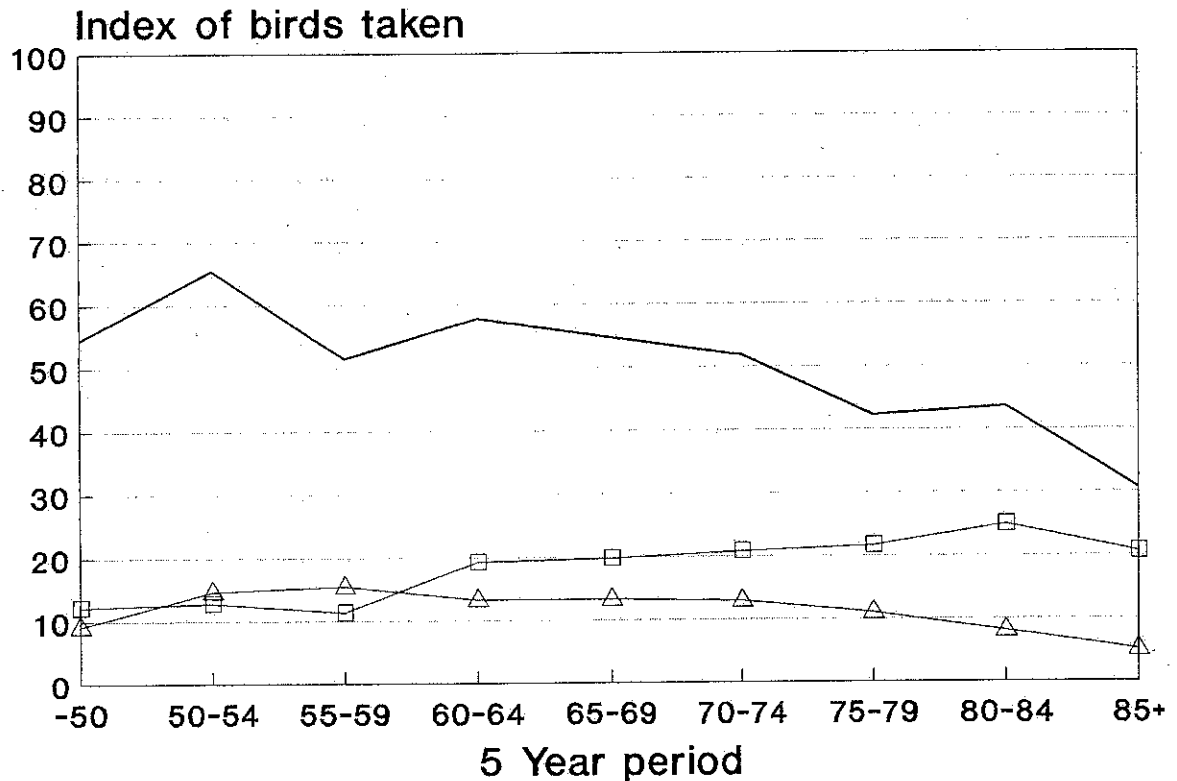
Figure 18.5 Trends in combined 5-yearly indices of Blackcap
taken in: a) countries, for which data for this species were available,
with a tradition of taking substantial numbers of migratory birds on the
western European flyways (ie BL, ES, FR, IA, NA, PO),
b) other countries and c) all countries. The bold line with symbols
indicates overall index values, triangles indicate values based on birds
reported as shot and squares indicate index values based on birds reported
as trapped. The periods -50 and 85+ refer to all recoveries before 1950
and from 1985 onwards respectively.

Belgium

% of total birds taken

France

% of total birds taken

Portugal

% of total birds taken

Spain

% of total birds taken

North Africa

% of total birds taken

Italy

% of total birds taken
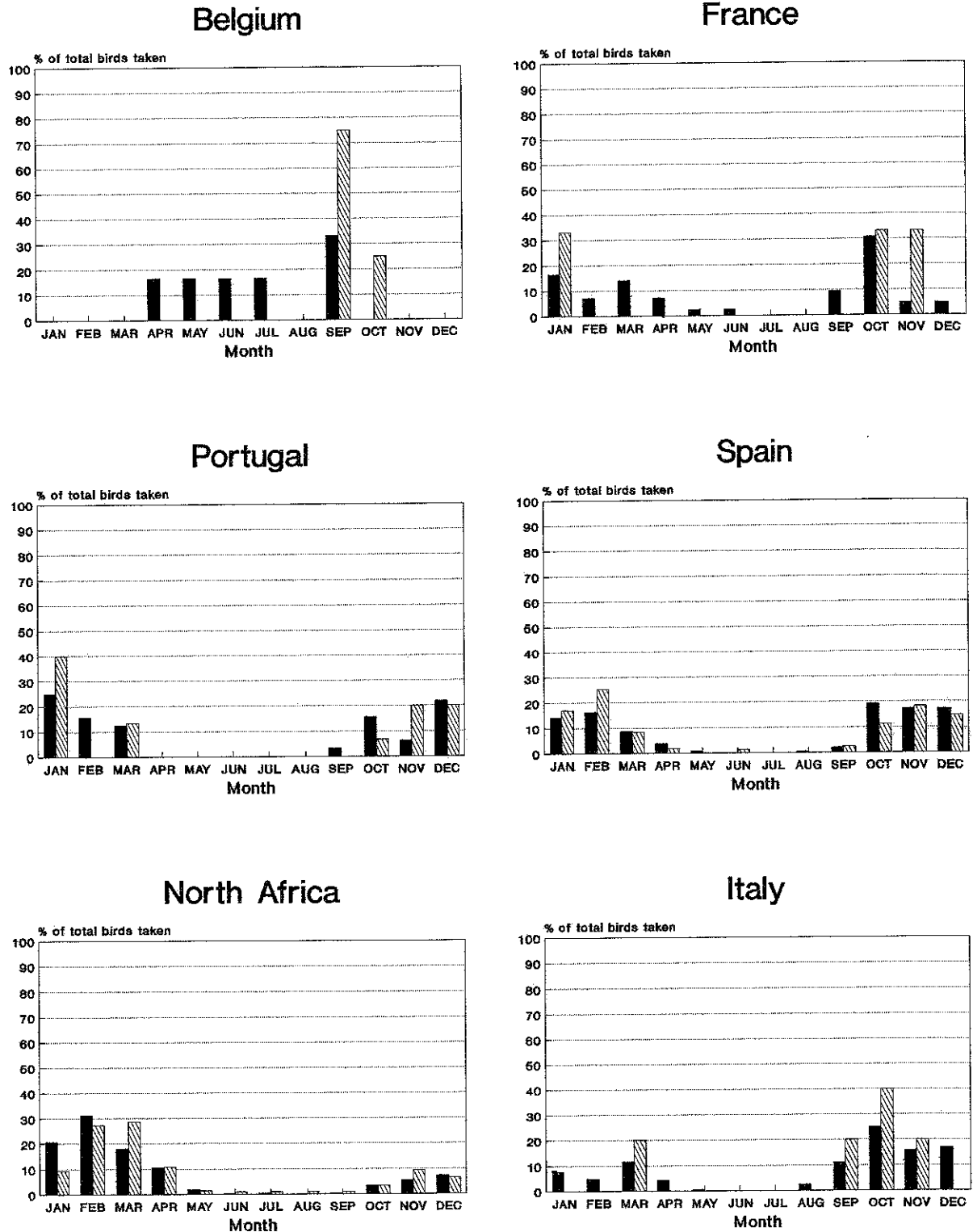
Figure 18.6   Monthly percentages of total Blackcap taken in individual countries with high overall indices and sufficient recoveries for analysis. Solid bars indicate birds from the period before 1980 and hatched bars indicate birds taken from 1980 onwards.

19. WILLOW WARBLER (PHYLLOSCOPUS TROCHILUS)

19.1 Range

The Willow Warbler breeds throughout northern Europe from the Alps to northernmost Scandinavia (Harrison 1982). The entire European population of this species leaves after breeding to winter in sub-Saharan Africa.

19.2 Population trends

Considerable fluctuations in the numbers of Willow Warblers breeding in various parts of Europe have been noted but nowhere has evidence been found of any long-term trends. Populations have generally shown a recovery in recent years from a decline during the 1970s (Hustings 1988, Marchant et al. 1990). This decline was not, however, as severe as that of other migrant species wintering farther north in drought-affected parts of Africa (Lack 1989).

19.3 Migration

Most Willow Warblers from western and central Europe and Norway undertake a south-westerly autumn migration to Africa through France and Iberia. Many of those from Sweden appear to follow a more easterly route, by way of Italy, across the Mediterranean, while Willow Warblers from Finland and the eastern Baltic have been found to move into Africa through the Balkans and the Levant (Zink 1973). Moreau (1961, 1972) records that Willow Warblers are extremely common on passage in Egypt in autumn but relatively scarce there on the return migration in spring. The reverse appears to be true of the route via Italy and Tunisia.

19.4 Status

The Willow Warbler is fully protected in all E.C. countries (Bertelsen and Simonsen 1989). Amongst the non-E.C. countries investigated by Woldhek (1979) the taking of Willow Warblers was permitted in Malta, Cyprus and Jordan.

19.5 Geographical variation in the taking of Willow Warblers

Prior to 1980, the highest indices of Willow Warblers taken in countries with more than 10 recoveries were those for Spain, Portugal, Italy, Greece and Egypt (Table 19.2). These all exceeded 70. Northern European countries, with the exception of the Soviet Union and Belgium, had low index values. Indices for eastern Mediterranean countries were high but sample sizes were generally very small (Fig. 19.2). Spain (29%) was the only country to provide more than 10% of the total number of recoveries of Willow Warblers taken during this period.

From 1980 onwards the highest indices amongst countries with adequate samples of recoveries were found in Spain, Algeria and

Morocco. Less than 10 Willow Warblers were recovered in Portugal and Egypt but their indices remained high (Table 19.2). Spain (17%) provided the highest proportion of recoveries of Willow Warblers taken since 1980. Morocco (11%), Algeria (10%) and Egypt (10%) were the only other countries to contribute 10% or more of taken recoveries.

Recoveries of Willow Warblers taken in Spain come mainly from the north-west of the country, the provinces of Guipuzcoa and Vizcaya having the highest regional totals. Recoveries in Portugal are widely distributed and those in Italy are predominantly from the north (Fig. 19.1a,b).

The indices of birds taken for the various European breeding populations for which data were available were generally low and showed relatively little variation, most being between 10 and 30 (Table 19.3). Only the populations of Belgium (42.4) and East Germany (31.3), among those providing more than 10 recoveries, had index values greater than 30 (Fig. 19.3). The lowest index for an extensively ringed population was that for Danish breeding birds.

19.6 Temporal variation in the taking of Willow Warblers

The indices of Willow Warblers taken in Belgium and Finland since 1980 were significantly lower than those for the earlier period (Table 19.2). Index values were lower in all other countries for which comparative data were available, except East Germany, Denmark, Egypt and Algeria, but not significantly so.

Indices of Willow Warblers taken for five year periods showed declining trends with time in Belgium, France, and Spain but not in Portugal and North Africa (Fig. 19.4). Regression of index values on year revealed significant inverse relationships when data for all countries and all major countries were combined (Table 19.5).

Analysis of the percentage of taken Willow Warblers recovered in each month showed that, in Europe, almost all are taken during the autumn migration, between August and October (Fig. 19.6). Willow Warblers are taken in spring mainly in North Africa and Spain. This occurs predominantly in March and April.

19.7 Methods used to take Willow Warblers

Most Willow Warblers are taken by trapping but a surprisingly high percentage are shot. Prior to 1980, 40% of the taken Willow Warblers recovered were known to have been trapped and 28% shot. The method used to take the remainder was not specified. From 1980 onwards 55% of taken recoveries were due to trapping and 32% to shooting. No significant change between the two periods in the proportion of Willow Warblers taken by each method was found in any country (Table 19.2).

TABLE 19.1a The distribution of Willow Warblers recovered due to shooting and trapping before 1980 in relation to their area of origin. The percentage of taken birds recovered in each country is shown for each national ringing scheme. Indices within parentheses indicate that the percentages are based on less than ten recoveries.

Country of recovery	UK	CI	NO	SV	DK	SF	DD	DF	NL	BL	FR	ES	IA	HE
						Country of ringing								
GB	12.8	0	–	0	0	0	0	0	0	0	0	–	0	0
CI	0	0	–	0	0	0	0	0	0	0	0	–	0	0
ER	0	0	–	0	0	0	0	0	0	0	0	–	0	0
NO	0	0	–	(7.1)	0	0	0	(6.1)	0	0	0	–	0	0
SV	0	0	–	(14.3)	0	0	0	0	0	0	0	–	0	0
DK	0	0	–	0	(14.3)	0	0	0	0	0	0	–	0	0
SF	0	0	–	0	0	23.4	0	0	0	0	0	–	0	0
SU	0	0	–	0	0	3.1	0	0	0	0	0	–	0	0
PL	0	0	–	0	0	0	0	0	0	0	0	–	0	0
DD	0	0	–	0	0	0	(100)	0	0	0	0	–	0	0
DF	0	0	–	0	0	0	0	(12.1)	0	(4.2)	0	–	0	0
NL	0	0	–	0	0	0	0	0	(23.1)	0	0	–	0	0
BL	0	0	–	0	0	0	0	0	0	58.3	0	–	0	0
KN	0	0	–	0	0	0	0	0	0	0	0	–	0	0
FR	(7.5)	0	–	0	0	0	0	(3.0)	(7.7)	(4.2)	0	–	0	0
ES	48.9	(100)	–	(21.4)	(42.9)	0	0	33.3	(30.8)	(20.8)	(42.9)	–	0	0
PO	21.3	0	–	(7.1)	0	0	0	(21.2)	(7.7)	(4.2)	(28.6)	–	(100)	(100)
IA	0	0	–	(28.6)	(42.9)	(1.6)	0	(3.0)	0	(4.2)	0	–	0	0
HE	0	0	–	0	0	0	0	0	0	0	0	–	0	0
AU	0	0	–	0	0	0	0	0	0	0	0	–	0	0
CS	0	0	–	0	0	0	0	0	0	0	0	–	0	0
HG	0	0	–	0	0	0	0	0	0	0	0	–	0	0
RO	0	0	–	0	0	0	0	0	0	0	0	–	0	0
BG	0	0	–	0	0	(1.6)	0	0	0	0	0	–	0	0
YG	0	0	–	0	0	(1.6)	0	0	0	0	0	–	0	0
GR	0	0	–	0	0	(17.2)	0	0	0	0	0	–	0	0
TU	0	0	–	(7.1)	0	(3.1)	0	0	0	0	0	–	0	0
CY	0	0	–	0	0	(1.6)	0	0	0	0	0	–	0	0
ML	0	0	–	0	0	0	0	0	0	0	0	–	0	0
SY	0	0	–	0	0	(1.6)	0	0	0	0	0	–	0	0
LE	0	0	–	(7.1)	0	(3.1)	0	0	0	0	0	–	0	0
IL	0	0	–	0	0	0	0	0	0	0	0	–	0	0
ME	0	0	–	0	0	0	0	0	0	0	0	–	0	0
EG	0	0	–	0	0	31.3	0	0	0	0	0	–	0	0
LT	0	0	–	0	0	0	0	0	0	0	0	–	0	0
TO	0	0	–	0	0	0	0	0	0	0	0	–	0	0
AG	(2.1)	0	–	0	0	0	0	(9.1)	(7.7)	0	0	–	0	0
MA	(5.3)	0	–	(7.1)	0	0	0	(12.1)	(23.1)	(4.2)	0	–	0	0
SA	(2.1)	0	–	0	0	(10.9)	0	0	–	0	(28.6)	–	0	0
TOTAL No.	94	1	–	14	7	64	5	33	13	24	7	–	1	1

Note: No data available for Poland, Czechoslovakia or Hungary.

TABLE 19.1a The distribution of Willow Warblers recovered due to shooting and trapping before 1980 in relation to their area of origin. The percentage of taken birds recovered in each country is shown for each national ringing scheme. Indices within parentheses indicate that the percentages are based on less than ten recoveries.

Country of recovery						Country of ringing								
	UK	CI	NO	SV	DK	SF	DD	DF	NL	BL	FR	ES	IA	HE
GB	12.8	0	–	0	0	0	0	0	0	0	0	–	0	0
CI	0	0	–	0	0	0	0	0	0	0	0	–	0	0
ER	0	0	–	0	0	0	0	0	0	0	0	–	0	0
NO	0	0	–	(7.1)	0	0	0	(6.1)	0	0	0	–	0	0
SV	0	0	–	(14.3)	0	0	0	0	0	0	0	–	0	0
DK	0	0	–	0	(14.3)	0	0	0	0	0	0	–	0	0
SF	0	0	–	0	0	23.4	0	0	0	0	0	–	0	0
SU	0	0	–	0	0	3.1	0	0	0	0	0	–	0	0
PL	0	0	–	0	0	0	0	0	0	0	0	–	0	0
DD	0	0	–	0	0	0	(100)	0	0	0	0	–	0	0
DF	0	0	–	0	0	0	0	(12.1)	0	(4.2)	0	–	0	0
NL	0	0	–	0	0	0	0	0	(23.1)	0	0	–	0	0
BL	0	0	–	0	0	0	0	0	0	58.3	0	–	0	0
KN	0	0	–	0	0	0	0	0	0	0	0	–	0	0
FR	(7.5)	0	–	0	0	0	0	(3.0)	(7.7)	(4.2)	0	–	0	0
ES	48.9	(100)	–	(21.4)	(42.9)	0	0	33.3	(30.8)	(20.8)	(42.9)	–	0	0
PO	21.3	0	–	(7.1)	0	0	0	(21.2)	(7.7)	(4.2)	(28.6)	–	(100)	(100)
IA	0	0	–	(28.6)	(42.9)	(1.6)	0	(3.0)	0	(4.2)	0	–	0	0
HE	0	0	–	0	0	0	0	0	0	0	0	–	0	0
AU	0	0	–	0	0	0	0	0	0	0	0	–	0	0
CS	0	0	–	0	0	0	0	0	0	0	0	–	0	0
HG	0	0	–	0	0	0	0	0	0	0	0	–	0	0
RO	0	0	–	0	0	0	0	0	0	0	0	–	0	0
BG	0	0	–	0	0	(1.6)	0	0	0	0	0	–	0	0
YG	0	0	–	0	0	(1.6)	0	0	0	0	0	–	0	0
GR	0	0	–	0	0	(17.2)	0	0	0	0	0	–	0	0
TU	0	0	–	(7.1)	0	(3.1)	0	0	0	0	0	–	0	0
CY	0	0	–	0	0	(1.6)	0	0	0	0	0	–	0	0
ML	0	0	–	0	0	0	0	0	0	0	0	–	0	0
SY	0	0	–	0	0	(1.6)	0	0	0	0	0	–	0	0
LE	0	0	–	(7.1)	0	(3.1)	0	0	0	0	0	–	0	0
IL	0	0	–	0	0	0	0	0	0	0	0	–	0	0
ME	0	0	–	0	0	0	0	0	0	0	0	–	0	0
EG	0	0	–	0	0	31.3	0	0	0	0	0	–	0	0
LT	0	0	–	0	0	0	0	0	0	0	0	–	0	0
TO	0	0	–	0	0	0	0	0	0	0	0	–	0	0
AG	(2.1)	0	–	0	0	0	0	(9.1)	(7.7)	0	0	–	0	0
MA	(5.3)	0	–	(7.1)	0	0	0	(12.1)	(23.1)	(4.2)	0	–	0	0
SA	(2.1)	0	–	0	0	(10.9)	0	0	–	0	(28.6)	–	0	0
TOTAL No.	94	1	–	14	7	64	5	33	13	24	7	–	1	1

Note: No data available for Poland, Czechoslovakia or Hungary.

TABLE 19.2. Willow Warbler : Indices of birds taken before 1980 and from 1980 onwards for each country of recovery.

	Index (all methods)[a]		% hunted[b]		Total recoveries[c]		Shooting Index[a]		Trapping Index[a]		G test[d]
	-1980	1980+	-1980	1980+	-1980	1980+	-1980	1980+	-1980	1980+	
GB	5.5	1.8	1.9	0.4	590	855	1.5	1.2	4.0	0	-
CI	-	(0)	0	0	8	23	-	(0)	-	(0)	-
ER	(0)	-	0	0	7	7	(0)	-	(0)	-	-
NO	12.5	6.7	4.8	1.7	62	58	0	0	12.5	6.7	-
SV	3.8	0	1.9	0	106	186	0	0	3.8	0	-
DK	3.2	10.0	0.9	1.4	114	147	3.2	0	0	10.0	-
SF	10.1	2.6*	7.9	0.7	189	297	2.7	1.3	7.4	1.3	-
SU	(50.0)	(0)	28.6	0	7	35	(50.0)	(0)	(0)	(0)	-
PL	-	-	0	0	1	5	-	-	-	-	-
DD	33.3	(66.7)	23.8	28.6	21	7	0	0	33.3	(66.7)	-
DF	8.1	0	4.1	0	121	92	0	0	8.1	0	-
NL	5.7	0	2.1	0	140	281	0	0	5.7	0	-
BL	48.3	10.0*	13.3	1.2	105	83	0	0	48.3	10.0	-
KN	(0)	-	0	-	1	-	(0)	-	(0)	-	-
FR	20.0	13.0	12.6	4.9	87	61	3.6	0	9.1	13.0	-
ES	74.5	60.0	69.3	24.5	114	49	24.5	30.0	16.0	30.0	-
PO	76.1	(50.0)	71.4	28.6	49	7	23.9	(25.0)	19.6	(0)	-
IA	76.9	(33.3)	71.4	20.0	14	5	23.1	(0)	23.1	(33.3)	-
HE	(0)	(0)	0	0	56	6	(0)	(0)	(0)	(0)	-
AU	-	-	-	-	-	-	-	-	-	-	-
CS	(0)	-	0	-	1	-	(0)	-	(0)	-	-
HG	-	-	0	0	1	2	-	-	-	-	-
RO	-	(0)	-	0	-	1	-	(0)	-	(0)	-
BG	(33.3)	(0)	33.3	0	3	2	(0)	(0)	(0)	(0)	-
YG	(100.0)	-	100.0	-	1	-	(100.0)	-	(0)	(0)	-
GR	78.6	(33.3)	73.3	33.3	15	3	42.9	(0)	0	(0)	-
TU	(75.0)	(50.0)	75.0	50.0	4	4	(0)	(25.0)	(25.0)	(0)	-
CY	(100.0)	(50.0)	100.0	50.0	1	2	(0)	(50.0)	(100.0)	(0)	-
ML	-	-	-	0	-	1	-	-	-	-	-
SY	(100.0)	(0)	100.0	0	1	1	(0)	(0)	(0)	(0)	-
LE	(100.0)	(100.0)	100.0	100.0	3	4	(0)	(75.0)	(33.3)	(0)	-
IL	-	-	-	-	-	-	-	-	-	-	-
ME	-	-	-	-	-	-	-	-	-	-	-
EG	87.0	(87.5)	87.0	87.5	23	8	(52.2)	25.0	17.4	(50.0)	-
LT	-	-	-	-	-	-	-	-	-	-	-
TO	(0)	(0)	0	0	2	2	(0)	(0)	(0)	(0)	-
AG	46.2	63.6	46.2	46.7	13	15	0	9.1	30.8	54.6	-
MA	48.3	42.1	42.4	33.3	33	24	10.3	5.3	27.6	36.8	-
SA	73.3	66.7	73.3	58.8	15	17	0	13.3	20.0	33.3	-

[a] See chapter 2 (methods) for derivation of indices. Indices derived from less than 10 recoveries are indicated within parentheses. Fisher's exact tests (Sokal & Rohlf 1981) were used to compare the proportions taken in each period. Significance levels (*<0.05; ** <0.01; *** <0.001) of the tests are indicated in column 1980+. Tests were carried out on all pairs except where indices were based on less than 10 recoveries.

[b] Percentage of all recoveries other than those excluded on the basis of poor quality data (see chapter 2) taken by shooting and trapping.

[c] Total number of recoveries other than those excluded on the basis of poor quality data.

[d] G test (Sokal & Rohlf 1981) comparison between periods of the proportions of birds taken according to the classes shot, trapped, and shot or trapped. Significance levels of these comparisons are indicated as above. 'NS' indicates non-significant results where tests were carried out. Comparisons were not made where the expected frequency in any cell was less than 10.

Table.19.3. Willow Warbler: Indices of birds taken for each breeding population (across all years).

Breeding Population		Index of birds taken	Sample size
UK	United Kingdom	20.5	487
CI	Channel Islands	33.3	3
NO	Norway	–	–
SV	Sweden	18.7	150
DK	Denmark	11.0	82
SF	Finland	27.8	281
SU	USSR (Lithuania only)	–	–
PL	Poland	–	–
DD	East Germany	31.3	16
DF	West Germany	27.4	117
NL	Holland	14.8	108
BL	Belgium	42.4	59
FR	France	22.2	27
ES	Spain	0	1
IA	Italy	50.0	2
HE	Switzerland	14.3	7
CJ	Czechoslovakia	–	–
HG	Hungary	–	–

Table 19.4   Regression analysis of temporal trends in the indices of Willow Warblers taken.

Country of recovery	Intercept	Slope	t	P
Major	136.0	-1.22	-4.57	**
Other	32.8	-0.27	-1.81	ns
All	93.4	-0.97	-7.33	***

All regressions used a weighted technique where each 5-year index was weighted by the square root of the sample size.

Countries where 10 or more recoveries occurred in each year after 1950 were analysed. Data from the period before 1950 were not included in the analysis.

Major countries are those with a tradition of taking substantial numbers of birds that use western migration routes.
(i.e. BL, FR, ES, PO, IA, NA).

Significance levels indicated are: NS Not significant; * P<0.05;
** P<0.01; *** P<0.001.
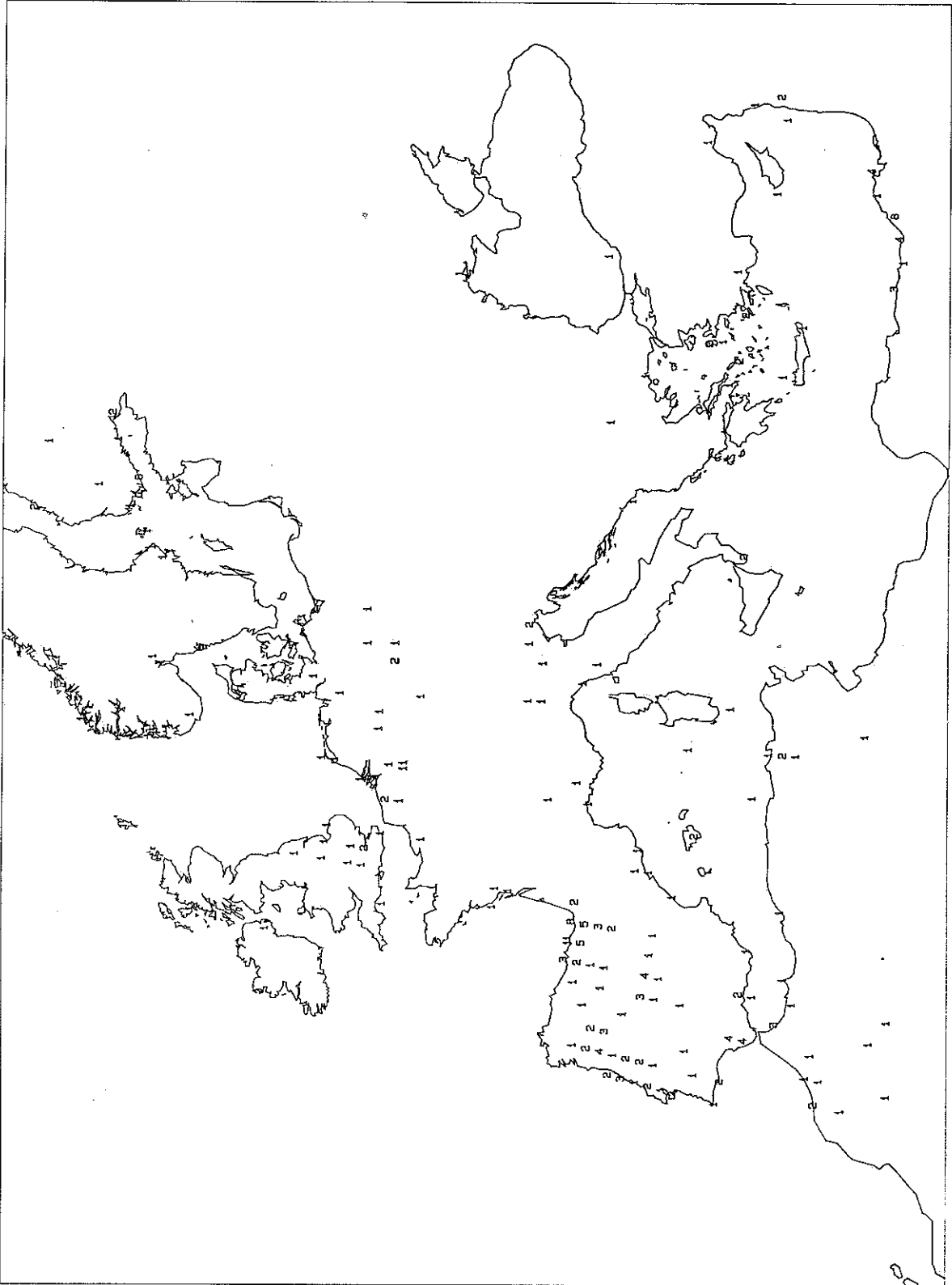
Figure 19.1a Total numbers of Willow Warbler ringing recoveries resulting from birds taken before 1980 in each 30' by 60' grid square. ** Indicates numbers greater than 99. 13 recoveries were outside the limits of the map.

Figure 19.1b Total numbers of Willow Warbler ringing recoveries from birds taken from 1980 onwards
in each 30' by 60' grid square. ** Indicates numbers greater than 99. 19 recoveries were outside
the limits of the map.
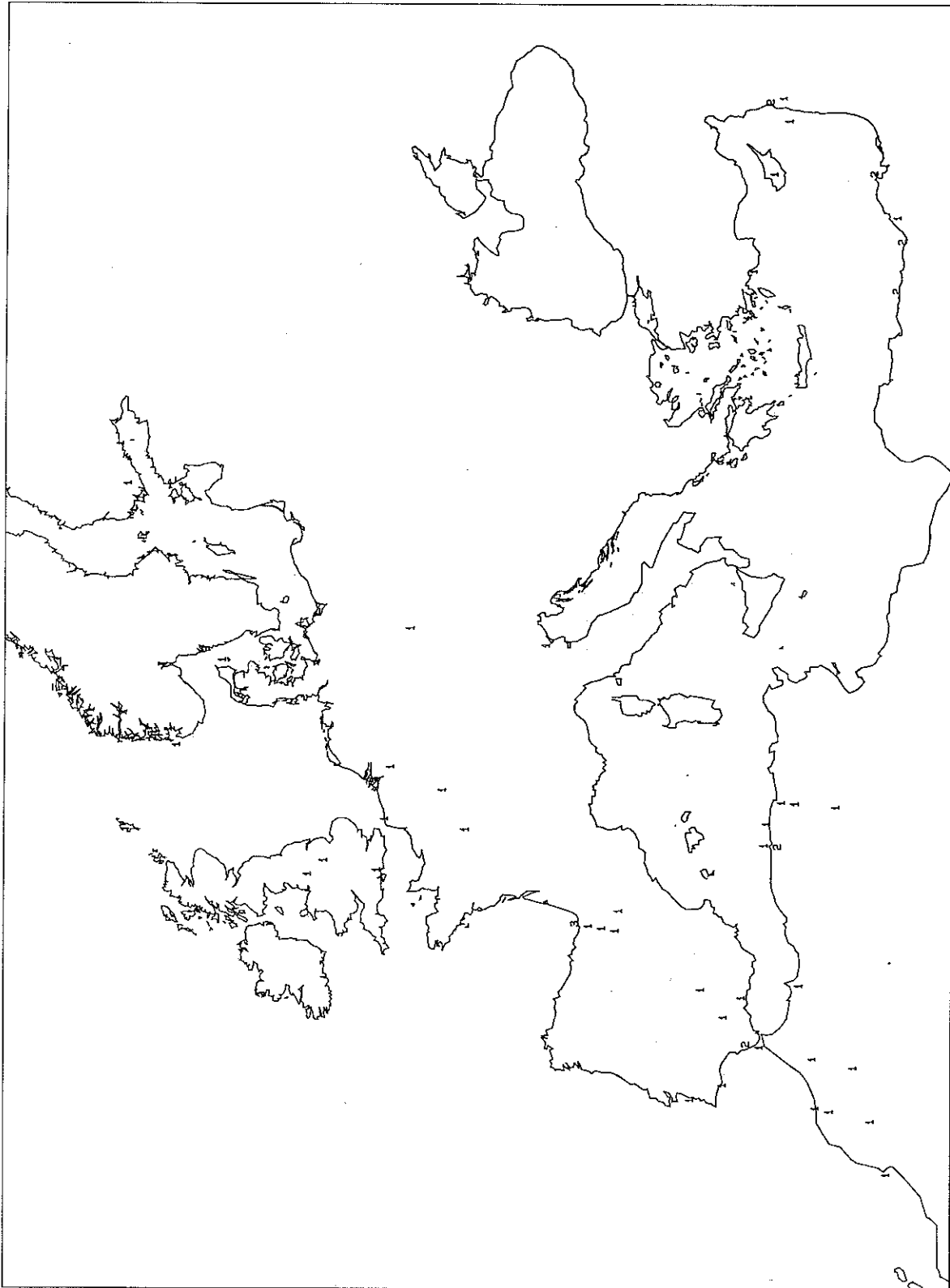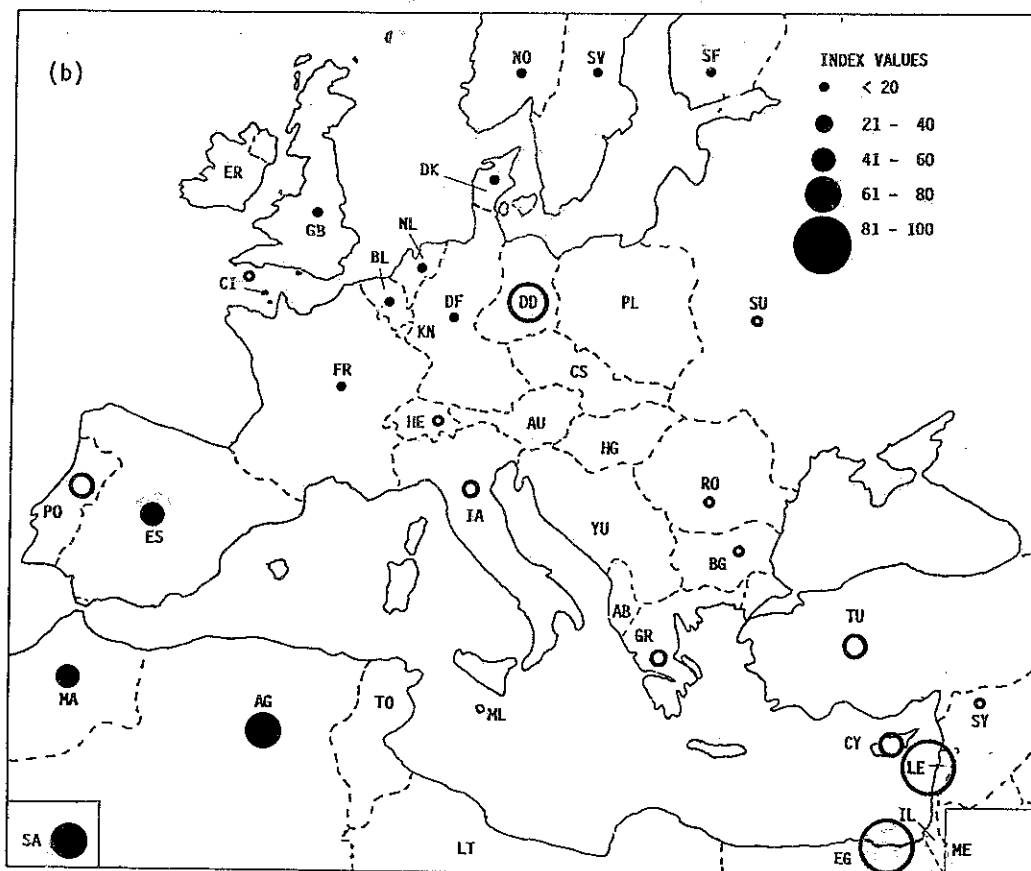
Figure 19.2 Geographical variation in the indices of Willow Warbler
taken for each country of recovery in the period before 1980 (a) and from
1980 onwards (b).   Solid circles indicate values derived from more than 10
recoveries and open circles indicate those derived from less than 10.
Country codes are indicated in Table 2,4 of the Methods.
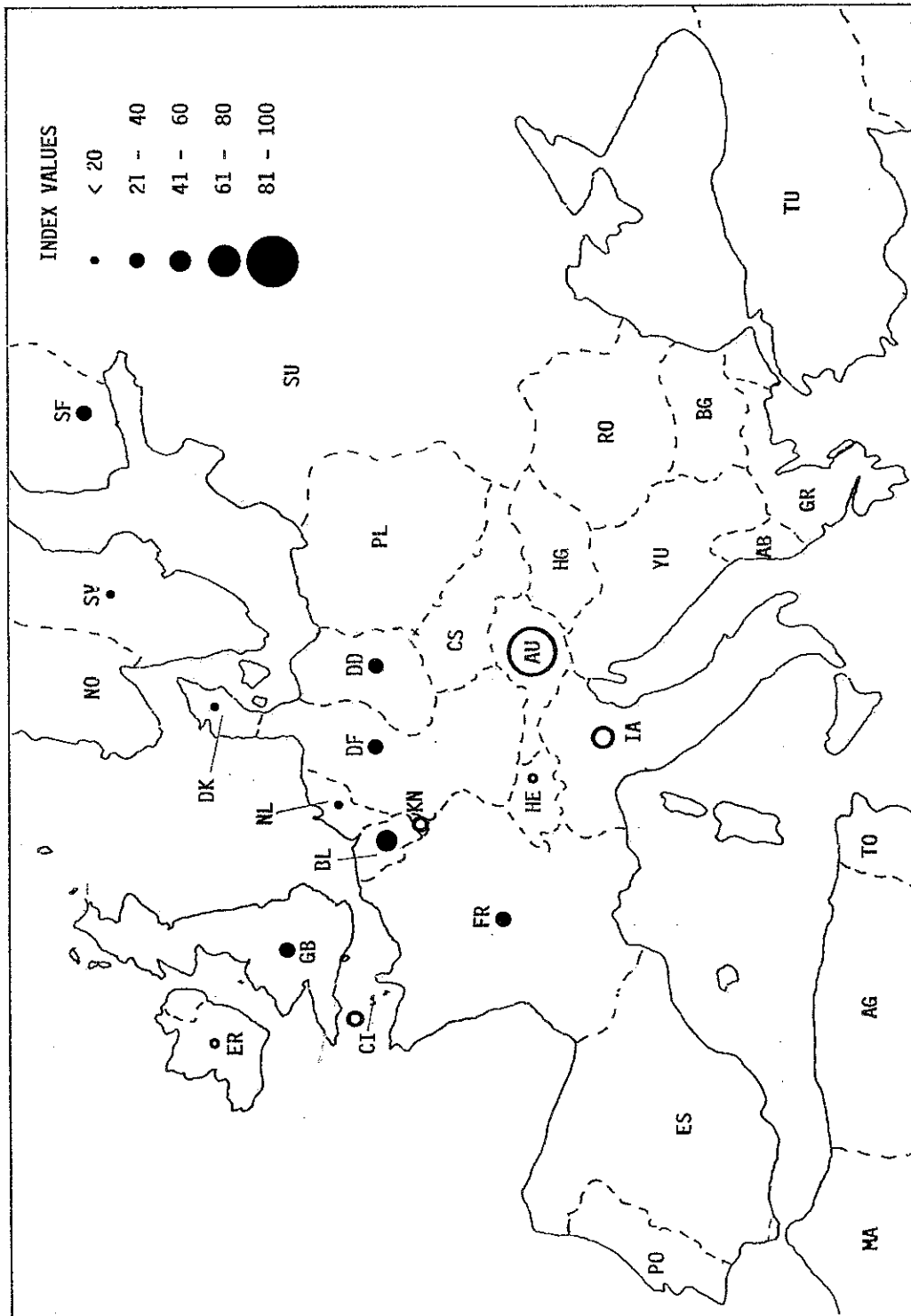
Figure 19.3 Geographical variation in the indices of Willow Warbler taken over all years for each breeding population. Solid circles indicate values derived from more than 10 recoveries and open circles indicate those derived from less than 10. Country codes are indicated in Table 2.4 of the Methods.

Belgium

Index of birds taken

Portugal

Index of birds taken

France

Index of birds taken

North Africa

Index of birds taken

Spain

Index of birds taken
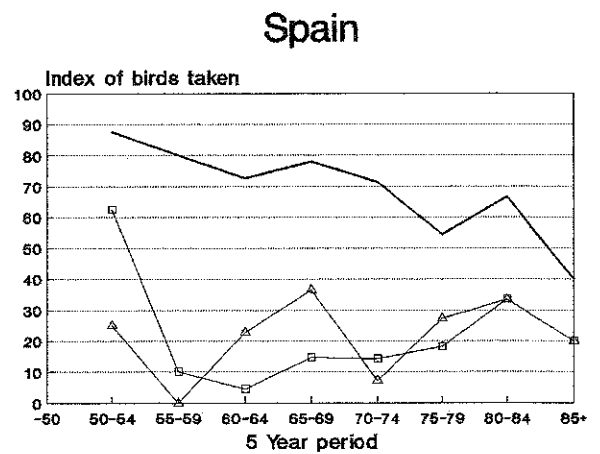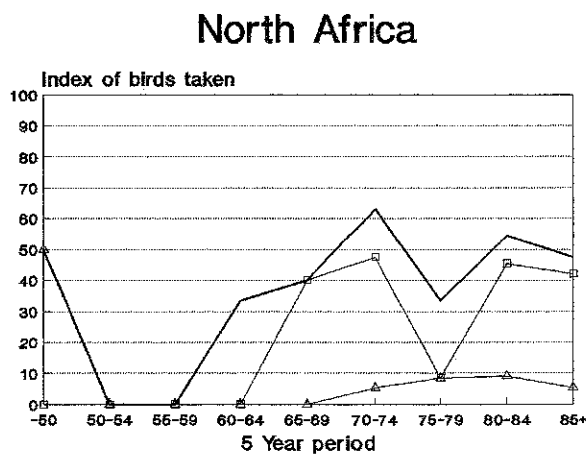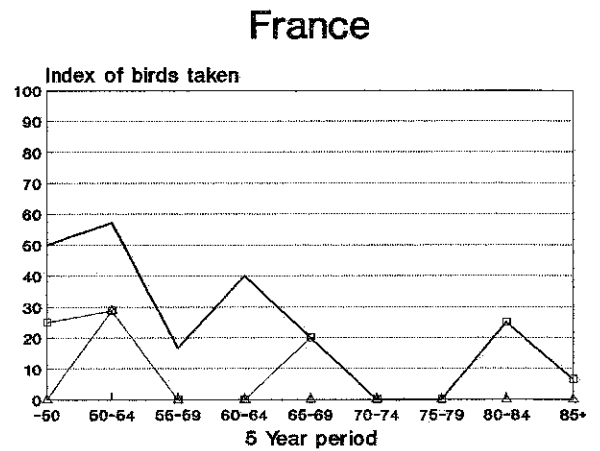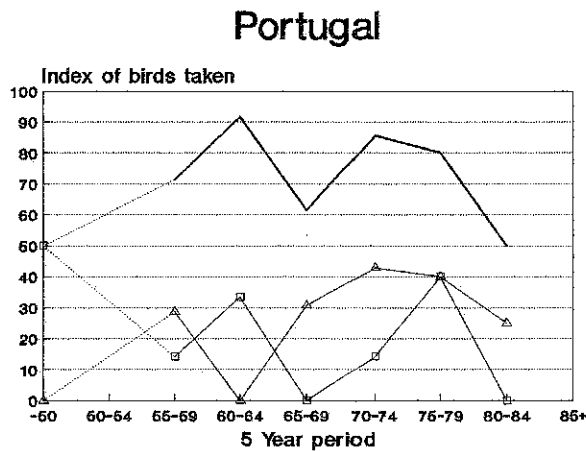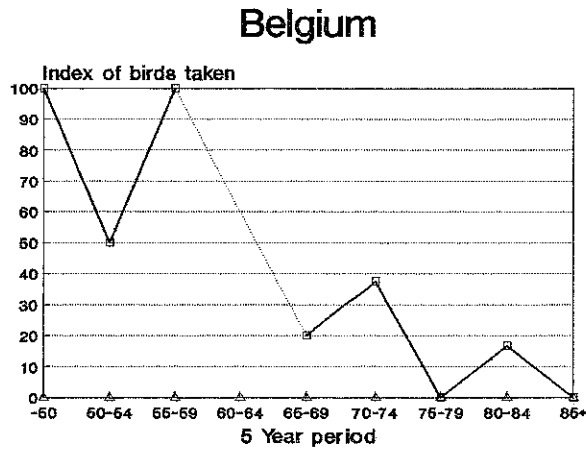
Figure 19.4   Trends in 5-yearly indices of Willow Warbler taken in individual countries with high overall indices and sufficient recoveries for analysis.   The bold line without symbols indicates overall index values, triangles indicate index values based on birds reported as shot and squares indicate index values based on birds reported as trapped. The periods -50 and 85+ refer to all recoveries before 1950 and from 1985 onwards respectively.

BL,ES,FR,NA,PO

Index of birds taken

100
90
80
70
60
50
40
30
20
10
0

-50 50-54 55-59 60-84 65-69 70-74 75-79 80-84 85+

5 Year period

Others

Index of birds taken

100
90
80
70
60
50
40
30
20
10
0

-50 50-64 55-59 60-64 65-69 70-74 75-79 80-84 85+

5 Year period

All countries

Index of birds taken

100

90

80

70

60

50

40

30

20

10

0

-50   50-54   55-59   60-64   65-69   70-74   75-79   80-84   85+

5 Year period
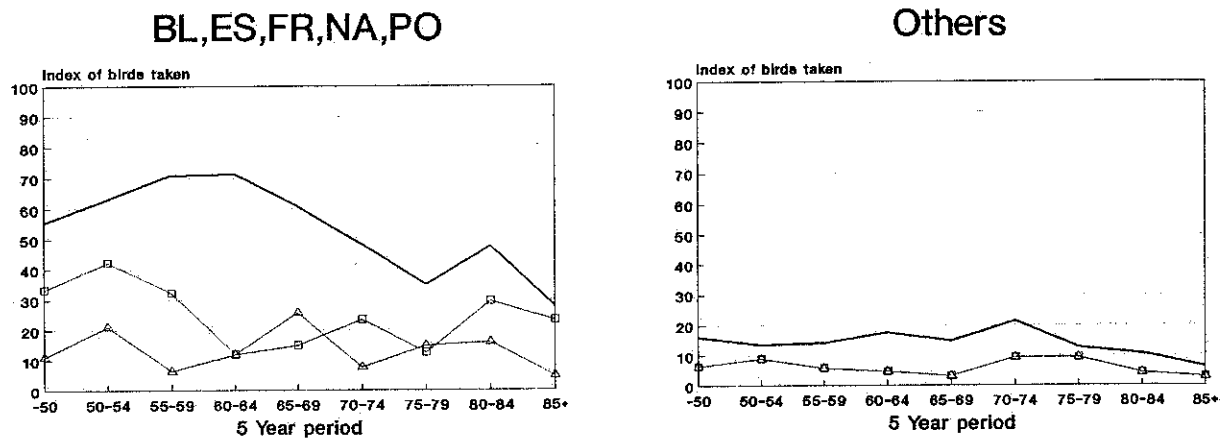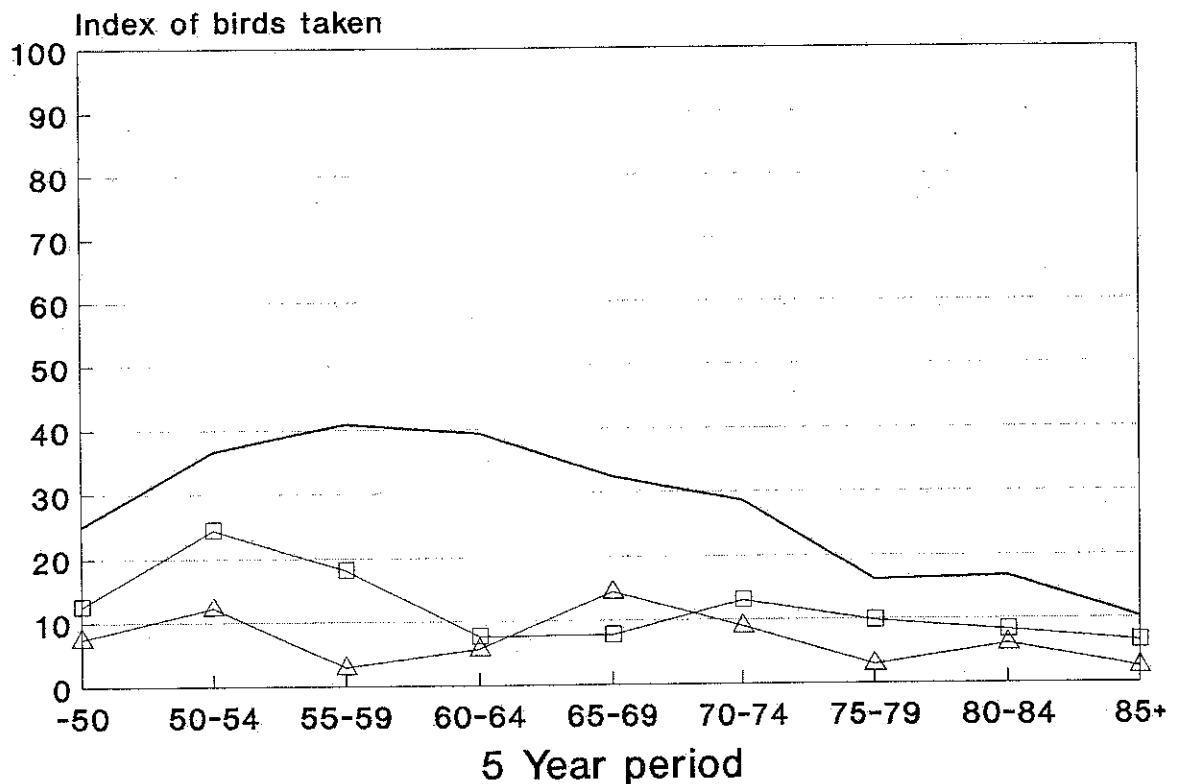
Figure   19.5   Trends in combined 5-yearly indices of Willow Warbler
taken in: a) countries, for which data for this species were available,
with a tradition of taking substantial numbers of migratory birds on the
western European flyways (ie BL, ES, FR, NA, PO),
b) other countries and c) all countries.   The bold line with symbols
indicates overall index values, triangles indicate values based on birds
reported as shot and squares indicate index values based on birds reported
as trapped.   The periods -50 and 85+ refer to all recoveries before 1950
and from 1985 onwards respectively.

Belgium

France

Spain

Portugal

North Africa
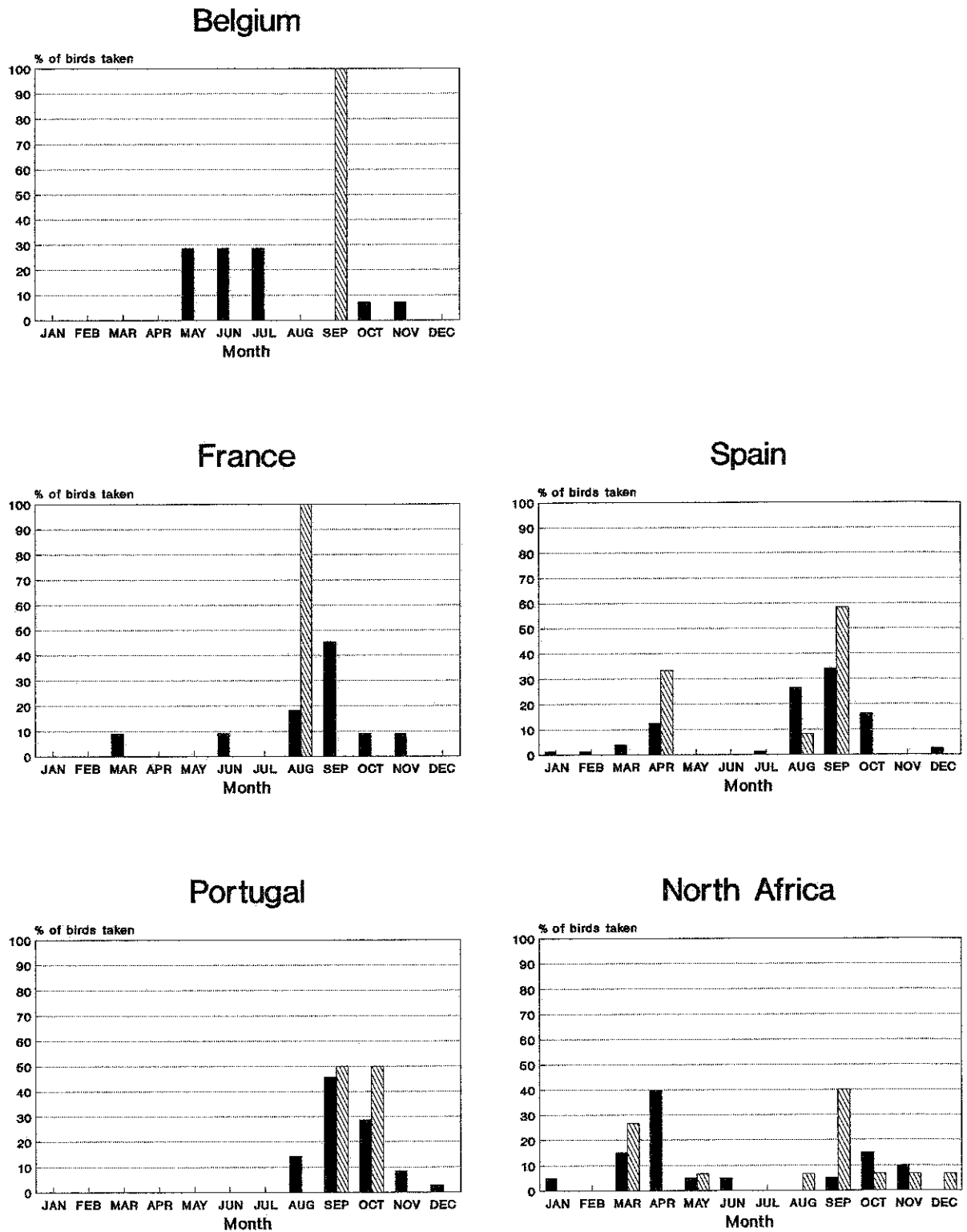
Figure 19.6 Monthly percentages of total Willow Warbler taken in individual countries with high overall indices and sufficient recoveries for analysis. Solid bars indicate birds from the period before 1980 and hatched bars indicate birds taken from 1980 onwards.

20. PIED FLYCATCHER (FICEDULA HYPOLEUCA)

20.1 Range

The Pied Flycatcher is a summer visitor to Europe which breeds primarily in the north and west of the continent. The species is absent from much of eastern Europe, including Hungary, Romania, and the Balkans. Farther west, The Pied Flycatcher does not breed in coastal France, much of Iberia and the western parts of Belgium and the Netherlands (Harrison 1982). There is a breeding population of Pied Flycatchers in north-west Africa. All populations are totally migratory, wintering in Africa south of the Sahara.

20.2 Population trends

European populations of Pied Flycatcher do not appear to exhibit any long-term trends in numbers. Populations in many areas have increased following the provision of nest-boxes (Marchant et al. 1990). Recent declines have, however, been reported from Denmark, the Netherlands and Switzerland (Hustings 1988, Bruderer and Hirschi 1984). In contrast, the Finnish population has recovered from an earlier decline and the species has recently expanded its breeding range westward into Ireland (Vaisanen et al. 1989, Hutchinson 1989).

20.3 Migration

The migration of the Pied Flycatcher from Europe to Africa in autumn has an extremely stong south-west trend with most populations, including many birds from Finland, Poland and the Soviet Union passing through Iberia (Moreau 1972). Some Scandinavian and German Pied Flycatchers take a slightly more easterly route through Italy and Tunisia (Zink 1985). Very few of this species appear to use the eastern Mediterranean migration routes in autumn but many do so on the return migration in spring (Moreau 1961).

20.4 Status

The Pied Flycatcher is fully protected in all E.C. countries (Bertelson and Simonsen 1989). The taking of Pied Flycatchers was permitted only in Cyprus among the Non-E.C. countries investigated by Woldhek (1979).

20.5 Geographical variation in the taking of Pied Flycatchers

Prior to 1980, the highest indices of Pied Flycatchers taken in countries with more than 10 recoveries were those for Spain, Portugal, Italy, Tunisia, Algeria and Morocco, coinciding with the greatest concentration of birds on migration (Table 20.2). These indices all exceeded 60. Northern European countries, with the exception of the Netherlands and Belgium, had low index values.

Indices for eastern Mediterranean countries were high but sample sizes were generally very small (Fig. 20.2). Portugal (24%) provided the highest number of recoveries of Pied Flycatchers taken during this period. Spain (18%), Morocco (12%) and Italy (10%) were the other major contributing countries.

From 1980 onwards the highest indices amongst major countries were found in Spain, Portugal and Morocco. Less than 10 Pied Flycatchers were recovered in Tunisia but the index remained high (Table 20.2). Morocco (43%) provided the highest proportion of recoveries of Pied Flycatchers taken since 1980. Spain (17%) was the only other country to contribute 10% or more of taken recoveries.

Recoveries of Pied Flycatchers taken in Spain come mainly from the north-west and south-west of the country, the provinces of Guipuzcoa, Vizcaya, Logrono, Navarra and Cadiz having the highest regional totals. Recoveries in Portugal are concentrated on the provinces of Beira Litoral and Tras os Montes, and those in Italy are predominantly from the north, in Bergamo and Brescia (Fig. 20.1a,b).

The indices of birds taken for the various European breeding populations for which data were available were generally low and showed relatively little variation, most being between 15 and 30 (Table 20.3). Only the populations of France (38.9), East Germany (33.3) and the United Kingdom (31.3), among those providing more than 10 recoveries, had index values greater than 30. Most northern populations had particularly low indices of birds taken (Fig. 20.3), but the lowest index for an extensively ringed population was that for Pied Flycatchers breeding in Switzerland.

20.6 Temporal variation in the taking of Pied Flycatchers

The indices of Pied Flycatchers taken in the Netherlands, France, Spain, Italy and Algeria since 1980 were significantly lower than those for the earlier period (Table 20.2). Index values were lower in all other countries for which comparative data were available, except Tunisia, but not significantly so.

Indices of Pied Flycatchers taken for five year periods showed declining trends with time in Belgium, France, Spain and Italy but not in Portugal and North Africa (Fig. 20.4). Regression of index values on year revealed significant inverse relationships in France and when data for all countries and all major countries were combined (Table 20.4, Fig. 20.5).

Analysis of the percentage of taken Pied Flycatchers recovered in each month showed that, in Europe, almost all are taken during the autumn migration, between August and October (Fig. 20.6). Pied Flycatchers are taken in spring mainly in North Africa and Italy. In North Africa more Pied Flycatchers are taken in spring than in autumn, predominantly in April and May.

20.7 Methods used to take Pied Flycatchers

Most Pied Flycatchers are taken by trapping. Prior to 1980, 48% of the taken Pied Flycatchers recovered were known to have been trapped and 24% shot. The method used to take the remainder was not specified. From 1980 onwards 73% of taken recoveries were due to trapping and 13% to shooting. The proportion of Pied Flycatchers trapped increased significantly relative to those shot between the two periods. No significant change in the proportion of birds taken by each method was found in any other country (Table 20.2).

TABLE 20.1a The distribution of Pied Flycatchers recovered due to shooting and trapping before 1980 in relation to their area of origin. The percentage of taken birds recovered in each country is shown for each national ringing scheme. Indices within parentheses indicate that the percentages are based on less than ten recoveries.

Country of recovery	UK	CI	NO	SV	DK	SF	DD	DF	NL	BL	FR	ES	IA	HE
GB	2.3	–	–	0	0	0	0	0	0.6	0	0	–	–	0
CI	0	–	–	0	0	0	0	0	0	0	0	–	–	0
ER	0	–	–	0	0	0	0	0	0	0	0	–	–	0
NO	0	–	–	0	0	0	0	1.0	0	0	0	–	–	0
SV	0	–	–	(13.6)	0	(0.2)	0	(0.5)	0	0	6.7	–	–	0
DK	0	–	–	0	0	0	0	0	0	0	0	–	–	0
SF	0	–	–	0	0	19.7	0	0	0	0	0	–	–	0
SU	(1.2)	–	–	0	0	0	0	0	0	0	0	–	–	0
PL	0	–	–	0	0	0	0	0	0	0	0	–	–	0
DD	0	–	–	(2.3)	0	(0.2)	47.1	0	(0.6)	0	0	–	–	0
DF	0	–	–	0	0	0	(1.5)	8.7	(1.2)	0	0	–	–	0
NL	0	–	–	0	0	0	0	0	72.2	0	0	–	–	0
BL	0	–	–	0	0	0	0	(0.5)	(1.2)	(33.3)	0	–	–	0
KN	0	–	–	0	0	0	0	0	0	0	0	–	–	0
FR	(4.6)	–	–	0	(50.0)	4.5	(2.9)	(3.4)	(1.2)	0	0	–	–	0
ES	18.4	–	–	22.7	(16.7)	19.0	16.9	19.3	(3.0)	0	(33.3)	–	–	71.4)
PO	37.9	–	–	27.3	(33.3)	23.3	23.5	36.2	(4.7)	(33.3)	(26.7)	–	–	(9.5)
IA	0	–	–	(9.1)	0	21.4	(3.7)	(3.4)	0	0	(6.7)	–	–	0
HE	0	–	–	0	0	0	0	0	0	0	0	–	–	(4.8)
AU	0	–	–	0	0	0	0	0	0	0	0	–	–	0
CS	0	–	–	0	0	0	0	(0.5)	0	0	0	–	–	0
HG	0	–	–	0	0	0	0	0	0	0	0	–	–	0
RO	0	–	–	0	0	0	0	0	0	0	0	–	–	0
BG	0	–	–	0	0	0	0	0	0	0	0	–	–	0
YG	0	–	–	0	0	0	0	0	0	0	0	–	–	0
GR	0	–	–	0	0	(0.4)	(0.7)	(0.5)	0	0	0	–	–	(4.8)
TU	0	–	–	0	0	0	0	0	0	0	0	–	–	0
CY	0	–	–	0	0	0	0	0	0	0	0	–	–	0
ML	0	–	–	0	0	(0.2)	0	(0.5)	0	0	0	–	–	0
SY	0	–	–	0	0	0	0	0	0	0	0	–	–	0
LE	0	–	–	0	0	0	0	0	0	0	0	–	–	0
IL	0	–	–	0	0	0	0	0	0	0	0	–	–	0
ME	0	–	–	0	0	0	0	0	0	0	0	–	–	0
EG	0	–	–	0	0	0	0	0	0	0	0	–	–	0
LT	0	–	–	0	0	(0.2)	0	(0.5)	0	0	0	–	–	0
TO	0	–	–	0	0	(0.9)	(0.7)	5.3	(1.2)	0	(6.7)	–	–	0
AG	(2.3)	–	–	0	0	(1.1)	0	(2.9)	(3.0)	0	0	–	–	(4.8)
MA	33.3	–	–	25.0	0	8.6	(2.9)	16.9	(11.2)	(33.3)	(20.0)	–	–	(4.8)
SA	0	–	–	0	0	(0.2)	0	0	0	0	0	–	–	0
TOTAL No.	87	–	–	44	6	463	136	207	169	3	15	–	–	21

Note: No data available for Poland, Czechoslovakia or Hungary.

TABLE 20.1b The distribution of Pied Flycatchers recovered due to shooting and trapping from 1980 onwards in relation to their area of origin. The percentage of taken birds recovered in each country is shown for each national ringing scheme. Indices within parentheses indicate that the percentages are based on less than ten recoveries.

Country of recovery	Country of ringing
	UK	CI	NO	SV	DK	SF	DD	DF	NL	BL	FR	ES	IA	HE
GB	(3.9)	–	–	0	–	0	–	0	0	–	0	0	0	0
CI	0	–	–	0	–	0	–	0	0	–	0	0	0	0
ER	0	–	–	0	–	0	–	0	0	–	0	0	0	0
NO	0	–	–	0	–	0	–	0	0	–	0	0	0	0
SV	0	–	–	(18.2)	–	0	–	0	0	–	0	0	0	0
DK	0	–	–	0	–	0	–	0	0	–	0	0	0	0
SF	0	–	–	0	–	(42.1)	–	0	0	–	0	0	0	0
SU	0	–	–	0	–	0	–	0	0	–	0	0	0	0
PL	0	–	–	0	–	0	–	0	0	–	0	0	0	0
DD	0	–	–	0	–	0	–	(5.6)	0	–	0	0	0	0
DF	0	–	–	0	–	0	–	(16.7)	0	–	0	0	0	0
NL	0	–	–	0	–	0	–	0	37.0	–	0	0	0	0
BL	0	–	–	0	–	0	–	0	(3.7)	–	0	0	0	0
KN	0	–	–	0	–	0	–	0	0	–	0	0	0	0
FR	0	–	–	0	–	(1.1)	–	(5.6)	0	–	0	0	0	0
ES	19.6	–	–	(21.2)	–	16.8	–	(11.1)	(3.7)	–	0	(100)	(100)	0
PO	(5.9)	–	–	(18.2)	–	(6.3)	–	0	0	–	0	0	0	0
IA	0	–	–	0	–	(2.1)	–	0	0	–	0	0	0	0
HE	0	–	–	0	–	0	–	0	0	–	0	0	0	0
AU	0	–	–	0	–	0	–	0	0	–	0	0	0	0
CS	0	–	–	0	–	0	–	0	0	–	0	0	0	0
HG	0	–	–	0	–	0	–	0	0	–	0	0	0	0
RO	0	–	–	0	–	0	–	0	0	–	0	0	0	0
BG	0	–	–	0	–	0	–	0	0	–	0	0	0	0
YG	0	–	–	0	–	0	–	0	0	–	0	0	0	0
GR	0	–	–	0	–	0	–	0	0	–	0	0	0	0
TU	0	–	–	0	–	0	–	0	0	–	0	0	0	0
CY	0	–	–	0	–	0	–	0	0	–	0	0	0	0
ML	0	–	–	0	–	0	–	0	0	–	0	0	0	0
SY	0	–	–	0	–	0	–	0	0	–	0	0	0	0
LE	0	–	–	0	–	0	–	0	0	–	0	0	0	0
IL	0	–	–	0	–	0	–	0	0	–	0	0	0	0
ME	0	–	–	0	–	0	–	0	0	–	0	0	0	0
EG	0	–	–	0	–	0	–	0	0	–	0	0	0	0
LT	0	–	–	0	–	0	–	0	0	–	0	0	0	0
TO	0	–	–	0	–	(4.2)	–	(11.1)	0	–	0	0	0	0
AG	(2.0)	–	–	0	–	(1.1)	–	0	0	–	0	0	0	0
MA	66.7	–	–	42.4	–	26.3	–	(44.4)	55.6	–	(100)	0	0	0
SA	(2.0)	–	–	0	–	0	–	(5.6)	0	–	0	0	0	0
TOTAL No.	51	–	–	33	–	95	–	18	27	–	1	2	1	1

Note: No data available for Poland, Czechoslovakia or Hungary.

TABLE 20.2. Pied Flycatcher: Indices of birds taken before 1980 and from 1980 onwards for each   country of recovery.

	Index (all methods)[a]		% hunted[b]		Total recoveries[c]		Shooting Index[a]		Trapping Index[a]		G test[d]
	-1980	1980+	-1980	1980+	-1980	1980+	-1980	1980+	-1980	1980+	
GB	4.0	1.7	1.1	0.2	276	1064	1.3	0.8	2.7	0.8	-
CI	-	-	-	0	-	4	-	-	-	-	-
ER	-	-	-	0	-	2	-	-	-	-	-
NO	10.0	0	6.5	0	31	16	0	0	10.0	0	-
SV	6.3	3.5	4.1	1.9	222	315	0.7	0	4.9	3.5	-
DK	0	0	0	0	166	64	0	0	0	0	-
SF	8.3	7.9	5.8	4.5	1562	884	0.3	0.8	8.1	7.1	-
SU	(14.3)	(0)	6.3	0	16	23	(0)	(0)	(14.3)	(0)	-
PL	(0)	-	0	0	11	4	(0)	-	(0)	-	-
DD	20.2	4.2	8.0	3.6	842	28	0.9	0	19.0	4.2	-
DF	3.5	2.8	0.4	1.0	5560	313	0.2	0.9	3.3	1.9	-
NL	31.1	2.5***	10.6	0.9	1154	1062	0.3	0	30.6	2.5	-
BL	36.4	(16.7)	14.3	3.9	28	26	0	(0)	18.2	(16.7)	-
KN	-	-	-	-	-	-	-	-	-	-	-
FR	25.6	5.3**	19.3	3.1	213	65	11.3	0	6.3	5.3	-
ES	68.6	48.8**	66.3	44.8	306	87	26.7	20.0	14.5	12.5	NS
PO	69.7	60.0	69.2	48.4	402	31	23.1	12.0	22.8	32.0	NS
IA	86.6	(33.3)**	83.5	25.0	139	8	42.5	(0)	12.7	(16.7)	-
HE	1.3	0	0.9	0	116	22	0	0	1.3	0	-
AU	(0)	(0)	0	0	5	4	(0)	(0)	(0)	(0)	-
CS	(33.3)	(0)	-	0	-	1	(33.3)	(0)	(0)	(0)	-
HG	-	-	-	-	-	-	-	-	-	-	-
RO	-	-	-	-	-	-	-	-	-	-	-
BG	-	-	-	-	-	-	-	-	-	-	-
YG	-	-	-	-	-	-	-	-	-	-	-
GR	(100.0)	-	100.0	-	5	-	(60.0)	-	(0)	-	-
TU	-	-	-	-	-	-	-	-	-	-	-
CY	-	-	-	-	-	-	-	-	-	-	-
ML	(100.0)	-	100.0	-	2	-	(50.0)	-	(50.0)	-	-
SY	-	-	-	-	-	-	-	-	-	-	-
LE	(0)	-	0	-	1	-	(0)	-	(0)	-	-
IL	-	-	-	-	-	-	-	-	-	-	-
ME	-	-	-	-	-	-	-	-	-	-	-
EG	-	-	-	-	-	-	-	-	-	-	-
LT	(33.3)	-	(33.3)	-	6	-	(16.7)	-	(16.7)	-	-
TO	71.1	(87.5)	69.0	77.8	29	9	3.7	(0)	22.2	(37.5)	-
AG	79.2	(25.0)*	73.1	25.0	26	8	8.3	(0)	41.7	(25.0)	-
MA	71.9	68.1	70.1	65.3	204	150	6.0	2.8	36.2	58.3	***
SA	(50.0)	(66.7)	50.0	66.7	2	3	(0)	(0)	(0)	(66.7)	-

[a]   See chapter 2 (methods) for derivation of indices.   Indices derived from less than 10 recoveries are indicated within parentheses.   Fisher's exact tests (Sokal & Rohlf 1981) were used to compare the proportions taken in each period.   Significance levels (*<0.05; ** <0.01; *** <0.001) of the tests are indicated in column 1980+. Tests were carried out on all pairs except where indices were based on less than 10 recoveries.

[b]   Percentage of all recoveries other than those excluded on the basis of poor quality data (see chapter 2) taken by shooting and trapping.

[c]   Total number of recoveries other than those excluded on the basis of poor quality data.

[d]   G test (Sokal & Rohlf 1981) comparison between periods of the proportions of birds taken according to the classes shot, trapped, and shot or trapped.   Significance levels of these comparisons are indicated as above.   'NS' indicates non-significant results where tests were carried out.   Comparisons were not made where the expected frequency in any cell was less than 10.

Table.20.3. Pied Flycatcher: Indices of birds taken for each breeding population (across all years).

Breeding Population		Index of birds taken	Sample size
UK	United Kingdom	31.3	396
CI	Channel Islands	–	–
NO	Norway	–	–
SV	Sweden	18.8	399
DK	Denmark	16.7	36
SF	Finland	24.2	2286
SU	USSR (Lithuania only)	–	–
PL	Poland	–	–
DD	East Germany	33.3	406
DF	West Germany	20.0	1062
NL	Holland	21.7	880
BL	Belgium	17.7	17
FR	France	38.9	18
ES	Spain	25.0	4
IA	Italy	0	2
HE	Switzerland	14.0	100
CJ	Czechoslovakia	–	–
HG	Hungary	–	–

Table 20.4 Regression analysis of temporal trends in the indices of Pied Flycatchers taken.

Country of recovery	Intercept	Slope	t	P
France	86.2	-0.97	-4.00	**
Portugal	103.0	-0.52	-1.66	ns
Spain	114.4	-0.74	-2.37	ns
Major	97.7	-0.50	-2.88	*
Other	22.9	-0.20	-1.14	ns
All	80.3	-0.79	-4.45	**

All regressions used a weighted technique where each 5-year index was weighted by the square root of the sample size.

Countries where 10 or more recoveries occurred in each year after 1950 were analysed. Data from the period before 1950 were not included in the analysis.

Major countries are those with a tradition of taking substantial numbers of birds that use western migration routes.
(i.e. BL, FR, ES, PO, IA, NA).

Significance levels indicated are: NS Not significant; * P<0.05; ** P<0.01; *** P<0.001.

Figure 20.1a   Total numbers of Pied Flycatcher ringing recoveries resulting from birds taken before 1980 in each 30' by 60' grid square.   ** Indicates numbers greater than 99.   15 recoveries were outside the limits of the map.

Figure 20.1b   Total numbers of Pied Flycatcher ringing recoveries from birds taken from 1980 onwards
in each 30' by 60' grid square.   ** Indicates numbers greater than 99.   4 recoveries were outside
the limits of the map.
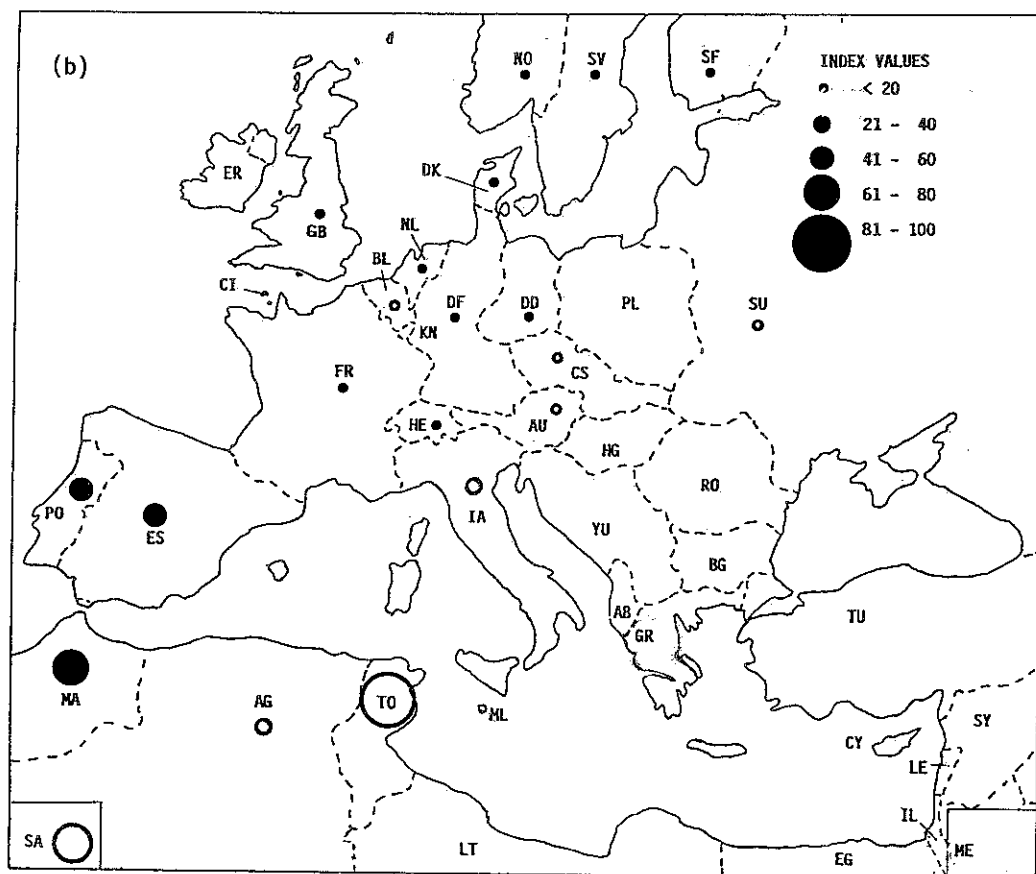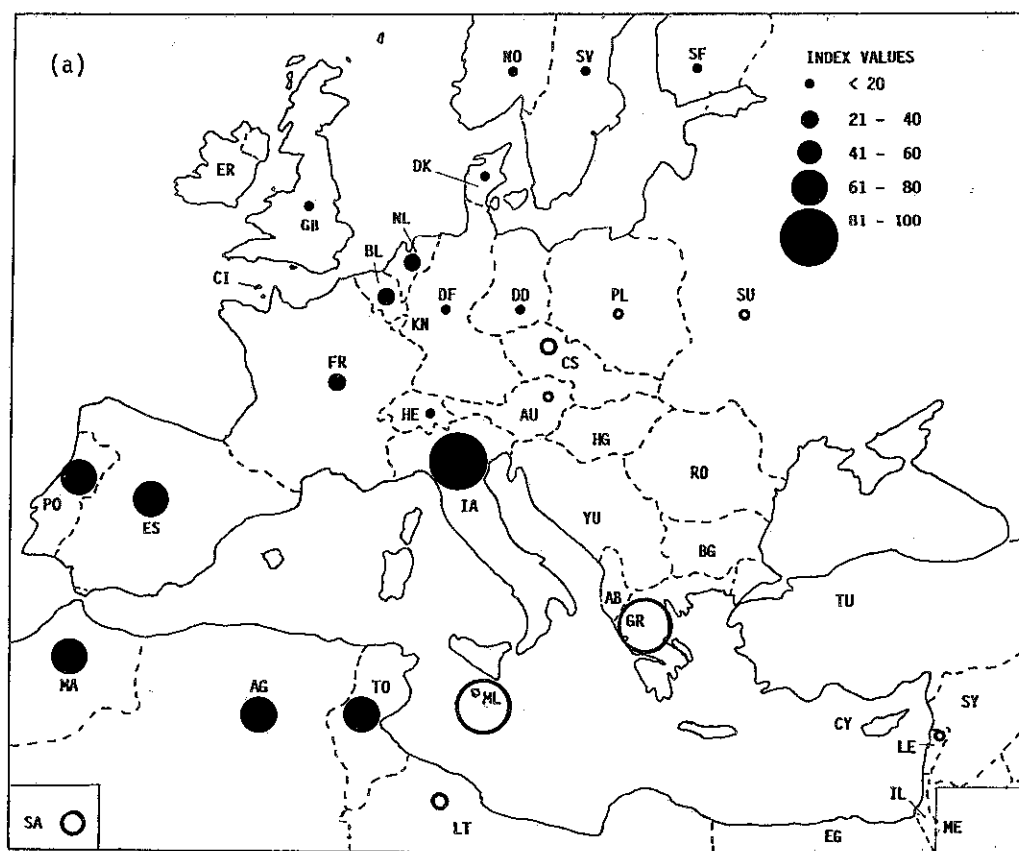
Figure 20.2 Geographical variation in the indices of Pied Flycatcher
taken for each country of recovery in the period before 1980 (a) and from
1980 onwards (b).   Solid circles indicate values derived from more than 10
recoveries and open circles indicate those derived from less than 10.
Country codes are indicated in Table 2.4 of the Methods.
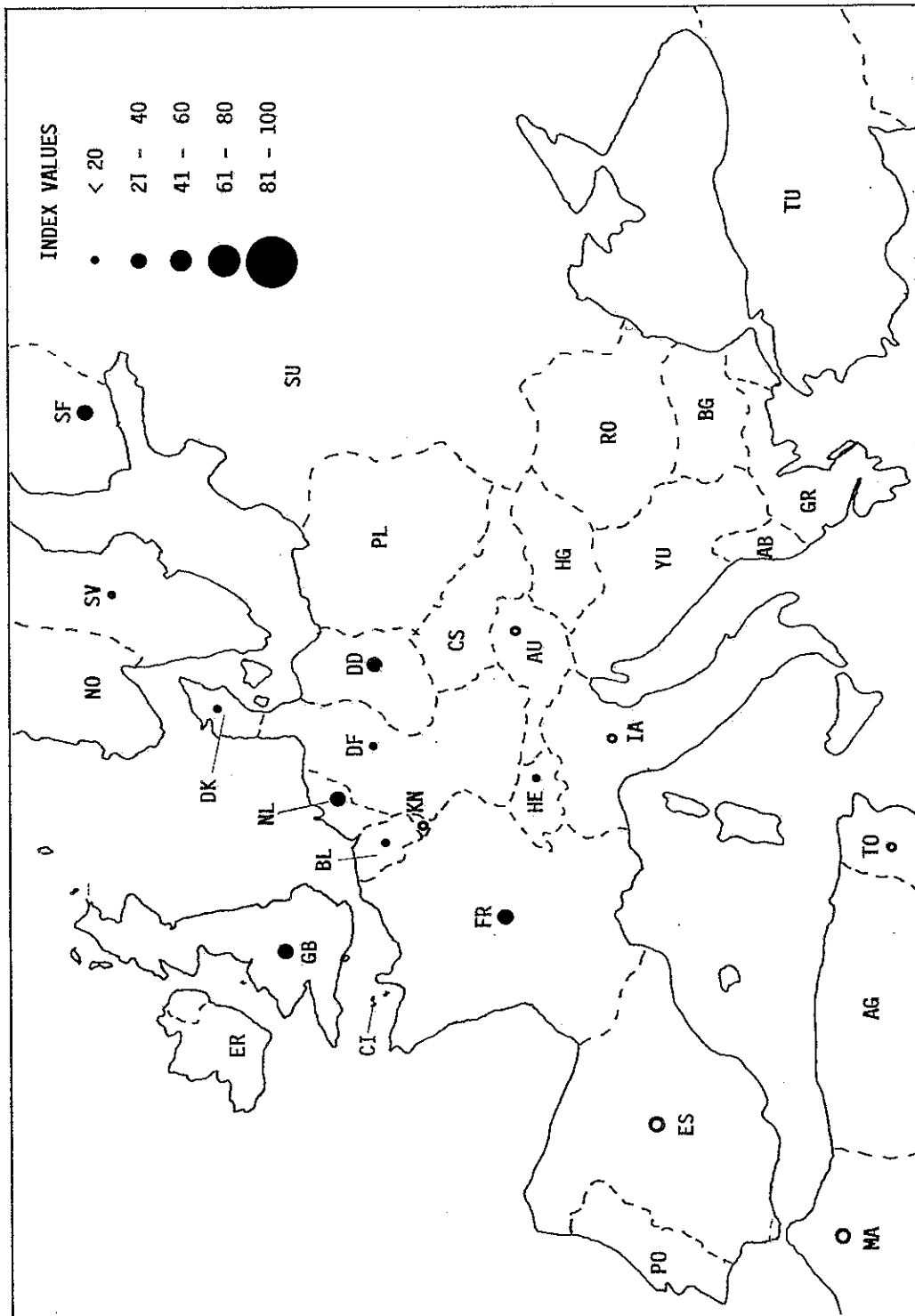
Figure 20.3 Geographical variation in the indices of Pied Flycatcher taken over all years for each breeding population. Solid circles indicate values derived from more than 10 recoveries and open circles indicate those derived from less than 10. Country codes are indicated in Table 2.4 of the Methods.

Belgium

Index of birds taken

France

Index of birds taken

Portugal

Index of birds taken

Spain

Index of birds taken

North Africa

Index of birds taken

Italy

Index of birds taken
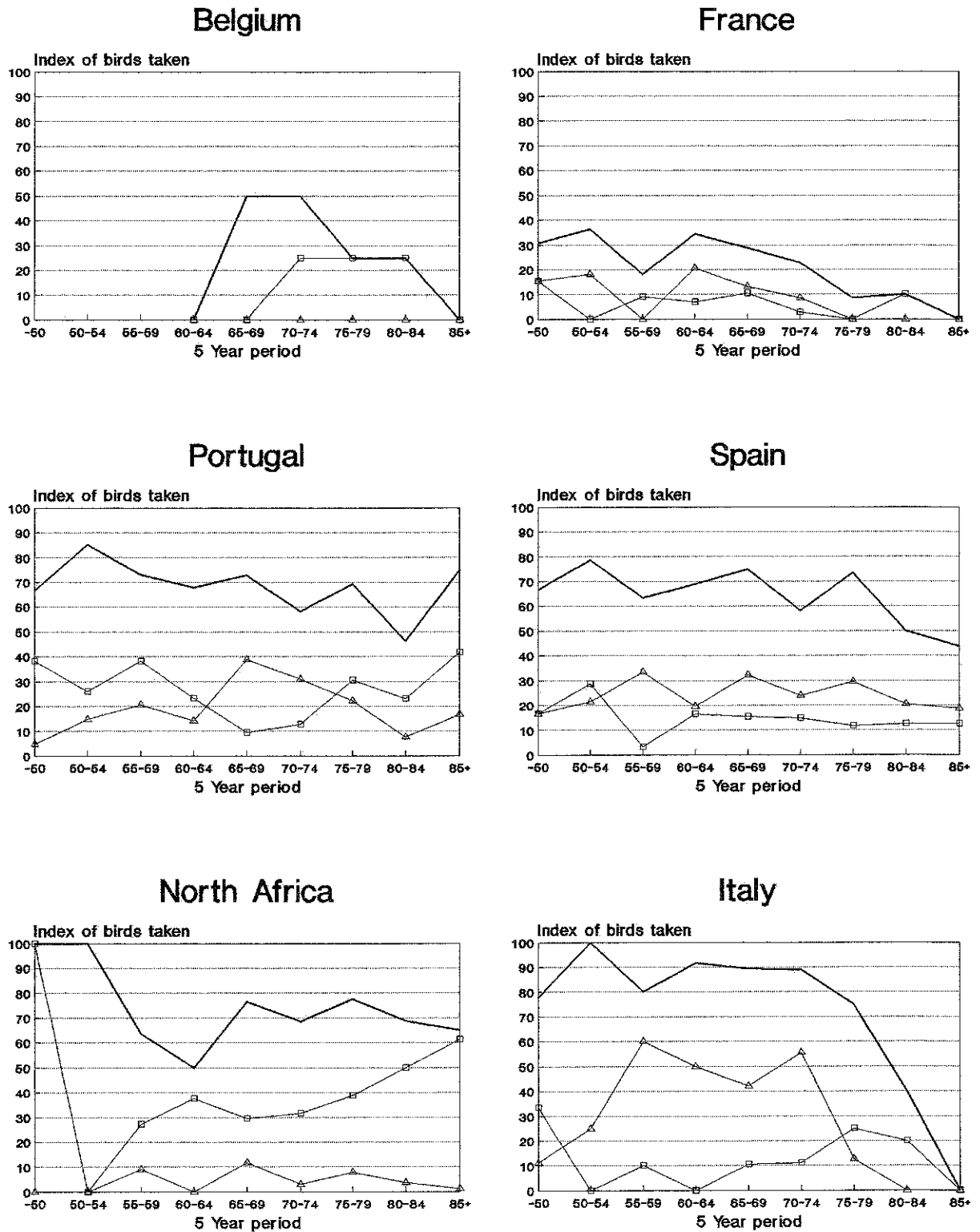
Figure 20.4 Trends in 5-yearly indices of Pied Flycatcher taken in individual countries with high overall indices and sufficient recoveries for analysis. The bold line without symbols indicates overall index values, triangles indicate index values based on birds reported as shot and squares indicate index values based on birds reported as trapped. The periods -50 and 85+ refer to all recoveries before 1950 and from 1985 onwards respectively.

BL,ES,FR,IA,NA,PO

Index of birds taken

5 Year period

Others

Index of birds taken

5 Year period

All countries

Index of birds taken

5 Year period
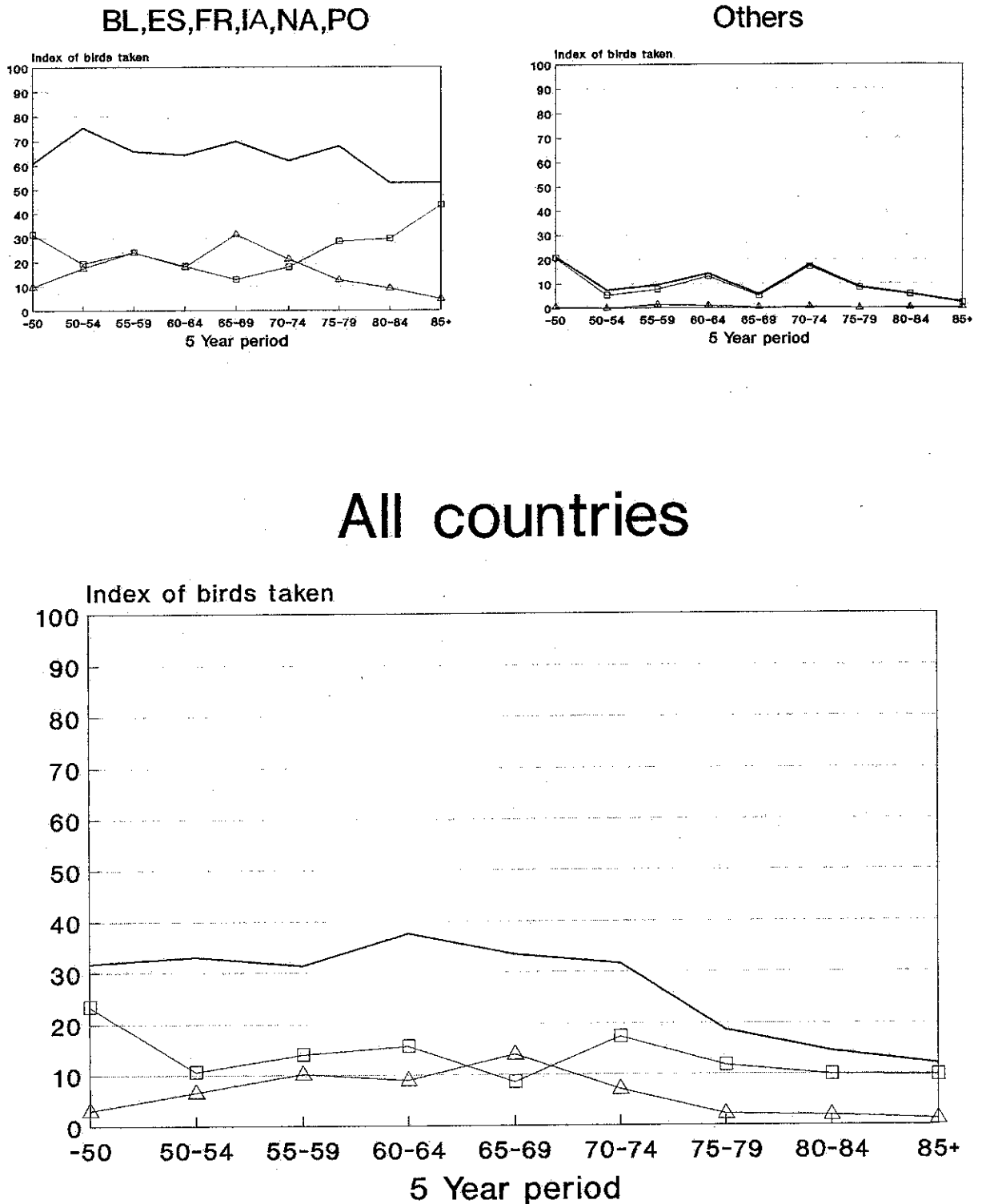
Figure 20.5 Trends in combined 5-yearly indices of Pied Flycatcher
taken in: a) countries, for which data for this species were available,
with a tradition of taking substantial numbers of migratory birds on the
western European flyways (ie BL, ES, FR, IA, NA, PO),
b) other countries and c) all countries. The bold line with symbols
indicates overall index values, triangles indicate values based on birds
reported as shot and squares indicate index values based on birds reported
as trapped. The periods -50 and 85+ refer to all recoveries before 1950
and from 1985 onwards respectively.

Belgium

France

Portugal

Spain

North Africa

Italy
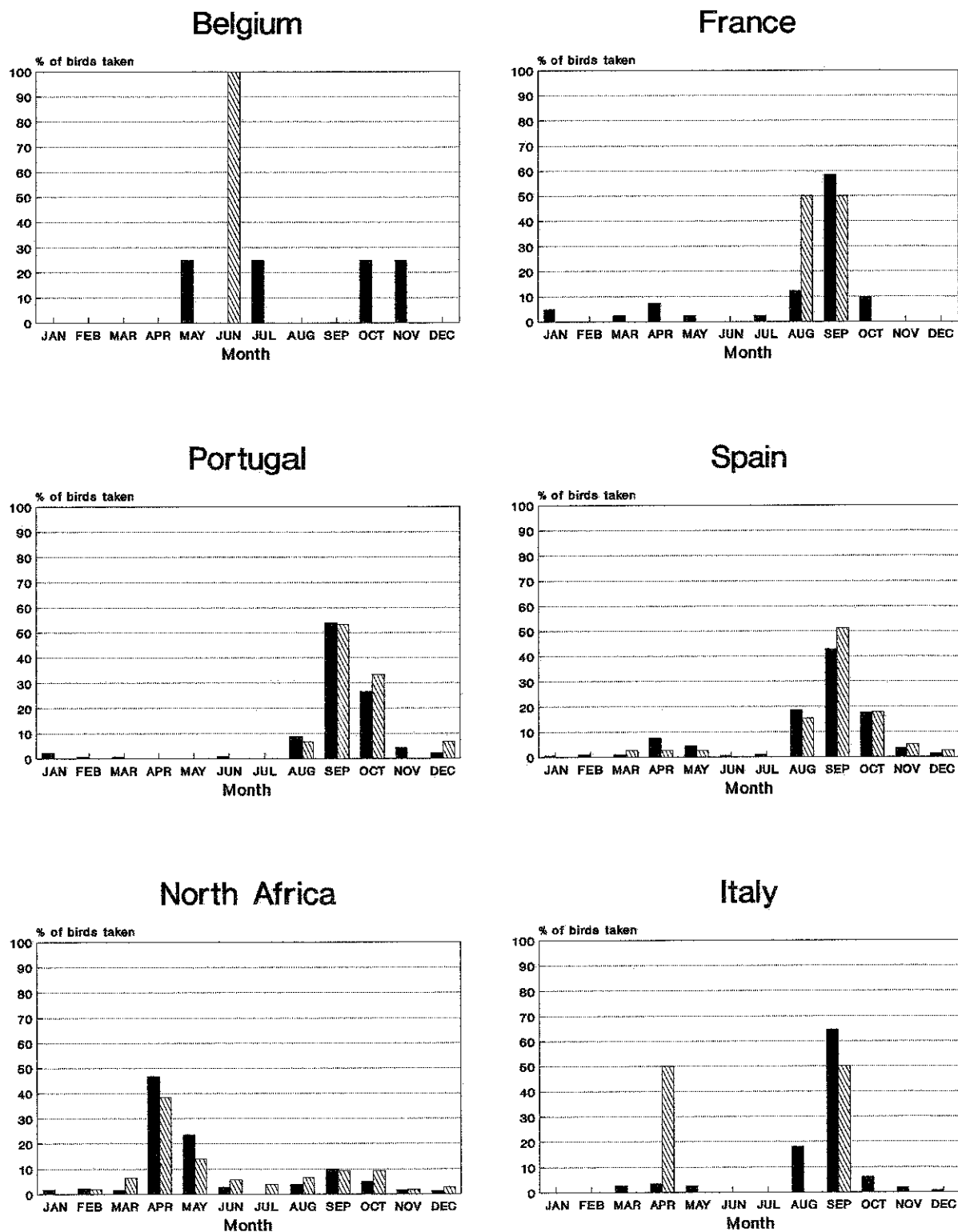
Figure 20.6 Monthly percentages of total Pied Flycatcher taken in individual countries with high overall indices and sufficient recoveries for analysis. Solid bars indicate birds from the period before 1980 and hatched bars indicate birds taken from 1980 onwards.

21. GOLDFINCH (CARDUELIS CARDUELIS)

21.1 Range

The Goldfinch breeds in Europe from southern Scandinavia to the Mediterranean and in North Africa and Asia Minor (Harrison 1982). The species is present throughout the year south of a line from Denmark to Romania. The northern most populations winter to the south and west of their breeding range.

21.2 Population trends

Most European populations appear to be stable, though there are few quantitative data available. In recent years declines have been reported in the United Kingdom and Czechoslovakia (Marchant et al. 1990, Hustings 1988).

21.3 Migration

While Scandinavian and north-east European Goldfinch populations are totally migratory, those further south vary in their migratory tendency. Although the proportion of birds migrating tends to increase with latitude, it may vary between years and, within populations, individuals may differ considerably in the distance they travel (Newton 1972). Most Goldfinches from the British Isles winter in western Europe from the Netherlands to Iberia where they are joined by others from north-western European populations (Table 21.1). Many Goldfinches from central Europe and the Alpine countries move into Italy and a small percentage of western birds cross to North Africa (Newton 1972).

21.4 Status

The Goldfinch is fully protected in all E.C. countries except Belgium, where it may be trapped under licence between 1 October and 15 November (Bertelsen and Simonsen 1989). In 1979 the taking of Goldfinches was still permitted in Malta, Cyprus and Egypt but prohibited in all other non-E.C. Mediterranean countries for which information was available (Woldhek 1979).

21.5 Geographical variation in the taking of Goldfinches

Prior to 1980, indices of Goldfinches taken were generally high throughout Europe and North Africa (Table 21.2). This was undoubtedly due to the former popularity of this species as a cagebird. Only in the United Kingdom, Scandinavia, West Germany, Luxembourg and Switzerland were the indices lower than 25. Most were greater than 50. Amongst countries providing at least 10 recoveries, Belgium, Spain, Italy and Portugal all had index values in excess of 80. The majority of recoveries of Goldfinches taken before 1980 came from Spain (42%) and Belgium (39%).

In the period since 1980 only Spain, Belgium and Morocco, among countries with 10 or more recoveries, had indices greater than 10 (Table 21.2). These countries each provided at least 10% of recoveries of taken Goldfinches. Spain (66%) was the most important single country. Belgium contributed 18% and Morocco 10%.

Recoveries of Goldfinches due to shooting or trapping in Belgium came mainly from the province of Luik (Liege) (Fig. 21.1a,b, Appendix 13.1). Those from Spain are were distributed mainly in northern, central and south-western regions with the provinces of Guipuzcoa, Navarra, Madrid and Cadiz being strongly represented (Fig. 21.1a,b, Appendix 13.2).

Amongst European breeding populations of Goldfinches that of the United Kingdom has the lowest index of birds taken (Fig. 21.3). All populations have index values greater than 40, however, and the highest occur in those countries which also provide the greatest number of taken recoveries from all sources (Table 21.3).

21.6 Temporal variation in the taking of Goldfinches

Indices of Goldfinches taken from 1980 onwards are lower than those for the earlier period in all countries for which there are comparative data, except Yugoslavia and Malta (Table 21.2). However, sample sizes for the latter two countries are very small. The reductions in index values in the Netherlands, Belgium and Spain are all statistically significant.

Indices of Goldfinches taken for five-year periods showed a decreasing trend with time in Belgium, France, Spain, Italy and North Africa (Fig. 21.4). Regression of index on year revealed significant inverse relationships in all individual countries and combinations of countries analyzed (Table 21.4, Fig. 21.5).

Analysis of the percentage of taken Goldfinches recovered in each month in each of the countries listed above showed that most birds were taken between October and December. This corresponds with the open season in Belgium and the arrival of migrants in Spain. Small numbers of Goldfinches are taken in spring, particularly in North Africa (Table 21.6).

21.7 Methods used to take Goldfinches

The majority of taken Goldfinches are trapped. Prior to 1980, 57% of all taken recoveries were due to trapping while only 6% were known to have been shot. The method used to take the remaining 37% was not specified. The precision of reporting has been greater since 1980 with 82% of taken recoveries being attributed to trapping and 10% to shooting. Significant changes in the proportion of birds taken by each method between the two periods in Belgium and Spain are attributable to changes in the precision of reporting rather than to real variation in methods used (Table 21.2).

TABLE 21.1a The distribution of Goldfinches recovered due to shooting and trapping before 1980 in relation to their area of origin. The percentage of taken birds recovered in each country is shown for each national ringing scheme. Percentages within parentheses are based on less than ten recoveries.

Country of recovery	UK	CI	NO	SV	DK	SF	DD	DF	NL	BL	FR	ES	IA	HE
GB	(3.2)	0	–	–	–	·0	0	0	0	(0.4)	(0.9)	0	–	0
CI	0	0	–	–	–	0	0	0	0	0	0	0	–	0
ER	(0.4)	0	–	–	–	0	0	0	0	0	0	0	–	0
NO	0	0	–	–	–	0	0	0	0	0	0	0	–	0
SV	0	0	–	–	–	0	0	0	0	0	0	0	–	0
DK	0	0	–	–	–	0	0	0	0	0	0	0	–	0
SF	0	0	–	–	–	0	0	0	0	0	0	0	–	0
SU	0	0	–	–	–	(100)	0	(0.3)	0	0	0	0	–	0
PL	0	0	–	–	–	0	(1.2)	(0.3)	0	0	(0.4)	0	–	0
DD	0	0	–	–	–	0	25.6	(0.8)	0	(0.4)	0	0	–	0
DF	0	0	–	–	–	0	(4.9)	8.4	2.2	(1.6)	(0.4)	0	–	0
NL	0	0	–	–	–	0	0	(0.6)	10.8	(2.5)	0	0	–	0
BL	11.6	0	–	–	–	0	(11.0)	59.4	85.0	81.6	10.4	0	–	0
KN	0	0	–	–	–	0	0	0	0	0	0	0	–	0
FR	11.6	0	–	–	–	0	(3.7)	3.9	(1.1)	(0.8)	12.6	0	–	(9.1)
ES	72.1	100	–	–	–	0	48.8	24.1	(1.1)	11.5	72.6	(100)	–	83.1
PO	(0.8)	0	–	–	–	0	0	(0.6)	0	(0.8)	(0.9)	0	–	(1.3)
IA	0	0	–	–	–	0	(2.4)	(1.4)	0	(0.4)	0	–	–	(3.9)
HE	0	0	–	–	–	0	0	0	0	0	0	0	–	–
AU	0	0	–	–	–	0	(1.2)	0	0	0	0	0	–	(1.3)
CS	0	0	–	–	–	0	(1.2)	0	0	0	0	0	–	0
HG	0	0	–	–	–	0	0	0	0	0	0	0	–	0
RO	0	0	–	–	–	0	0	0	0	0	0	0	–	0
BG	0	0	–	–	–	0	0	0	0	0	0	0	–	0
YG	0	0	–	–	–	0	0	(0.3)	0	0	0	0	–	0
GR	0	0	–	–	–	0	0	0	0	0	0	0	–	0
TU	0	0	–	–	–	0	0	0	0	0	0	0	–	0
CY	0	0	–	–	–	0	0	0	0	0	0	0	–	0
ML	0	0	–	–	–	0	0	0	0	0	0	0	–	0
SY	0	0	–	–	–	0	0	0	0	0	0	0	–	0
LE	0	0	–	–	–	0	0	0	0	0	0	0	–	0
IL	0	0	–	–	–	0	0	0	0	0	0	0	–	0
ME	0	0	–	–	–	0	0	0	0	0	0	0	–	0
EG	0	0	–	–	–	0	0	0	0	0	0	0	–	0
LT	0	0	–	–	–	0	0	0	0	0	0	0	–	0
TO	0	0	–	–	–	0	0	0	0	0	0	0	–	0
AG	0	0	–	–	–	0	0	0	0	0	0	0	–	0
MA	(0.4)	0	–	–	–	0	0	0	0	0	(1.3)	0	–	0
SA	0	0	–	–	–	0	0	0	0	0	0	0	–	0
TOTAL No.	251	11	–	–	–	2	82	357	93	244	230	1	–	77

Note: No data available for Poland, Czechoslovakia or Hungary.

TABLE 21.1b The distribution of Goldfinches recovered due to shooting and trapping from 1980 onwards in relation to their area of origin. The percentage of taken birds recovered in each country is shown for each national ringing scheme. Percentages within parentheses are based on less than ten recoveries.

Country of recovery	Country of ringing
	UK	CI	NO	SV	DK	SF	DD	DF	NL	BL	FR	ES	IA	HE
GB	(3.2)	0	–	0	–	–	–	0	0	0	–	0	–	0
CI	0	0	–	0	–	–	–	0	0	0	–	0	–	0
ER	(3.2)	0	–	0	–	–	–	0	0	0	–	0	–	0
NO	0	0	–	0	–	–	–	0	0	0	–	0	–	0
SV	0	0	–	0	–	–	–	0	0	0	–	0	–	0
DK	0	0	–	0	–	–	–	0	0	0	–	0	–	0
SF	0	0	–	0	–	–	–	0	0	0	–	0	–	0
SU	0	0	–	0	–	–	–	0	0	0	–	0	–	0
PL	0	0	–	0	–	–	–	0	0	0	–	0	–	0
DD	0	0	–	0	–	–	–	0	0	0	–	0	–	0
DF	0	0	–	0	–	–	–	0	0	0	–	0	–	0
NL	0	0	–	0	–	–	–	0	0	0	–	0	–	0
BL	(12.9)	0	–	(100)	–	–	–	(60.0)	(50.0)	66.7	–	(2.6)	–	0
KN	0	0	–	0	–	–	–	0	0	0	–	0	–	0
FR	(3.2)	0	–	0	–	–	–	0	0	0	–	0	–	(8.3)
ES	(71.0)	(100)	–	0	–	–	–	(40.0)	(50.0)	(22.2)	–	89.5	–	91.7
PO	0	0	–	0	–	–	–	0	0	0	–	0	–	0
IA	0	0	–	0	–	–	–	0	0	0	–	0	–	0
HE	0	0	–	0	–	–	–	0	0	0	–	0	–	0
AU	0	0	–	0	–	–	–	0	0	0	–	0	–	0
CS	0	0	–	0	–	–	–	0	0	0	–	0	–	0
HG	0	0	–	0	–	–	–	0	0	0	–	0	–	0
RO	0	0	–	0	–	–	–	0	0	0	–	0	–	0
BG	0	0	–	0	–	–	–	0	0	0	–	0	–	0
YG	0	0	–	0	–	–	–	0	0	0	–	0	–	0
GR	0	0	–	0	–	–	–	0	0	0	–	0	–	0
TU	0	0	–	0	–	–	–	0	0	0	–	0	–	0
CY	0	0	–	0	–	–	–	0	0	0	–	0	–	0
ML	(3.2)	0	–	0	–	–	–	0	0	0	–	0	–	0
SY	0	0	–	0	–	–	–	0	0	0	–	0	–	0
LE	0	0	–	0	–	–	–	0	0	0	–	0	–	0
IL	0	0	–	0	–	–	–	0	0	0	–	0	–	0
ME	0	0	–	0	–	–	–	0	0	0	–	0	–	0
EG	0	0	–	0	–	–	–	0	0	0	–	0	–	0
LT	0	0	–	0	–	–	–	0	0	0	–	0	–	0
TO	0	0	–	0	–	–	–	0	0	0	–	0	–	0
AG	0	0	–	0	–	–	–	0	0	0	–	0	–	0
MA	(3.2)	0	–	0	–	–	–	0	0	(11.1)	–	(7.9)	–	0
SA	0	0	–	0	–	–	–	0	0	0	–	0	–	0
TOTAL No.	31	2	–	1	–	–	–	5	2	18	–	38	–	12

Note: No data available for Poland, Czechoslovakia or Hungary.

TABLE.21.2 Goldfinch: Indices of birds taken before 1980 and from 1980 onwards for each country of recovery.

	Index (all methods)[a]		% hunted[b]		Total recoveries[c]		Shooting Index[a]		Trapping Index[a]		G test[d]
	-1980	1980+	-1980	1980+	-1980	1980+	-1980	1980+	-1980	1980+	
GB	4.9	1.6	2.5	0.7	440	148	0	0	3.6	1.6	-
CI	(0)	(0)	0	0	14	6	(0)	(0)	(0)	(0)	-
ER	(66.7)	(50.0)	50.0	25.0	4	4	(0)	(0)	(66.7)	(50.0)	-
NO	-	-	-	-	-	-	-	-	-	-	-
SV	(0)	-	0	0	3	1	(0)	-	(0)	-	-
DK	(0)	-	0	0	10	1	(0)	-	(0)	-	-
SF	(0)	(0)	0	0	1	3	(0)	(0)	(0)	(0)	-
SU	(75.0)	-	60.0	-	5	-	(25.0)	-	(50.0)	-	-
PL	(42.9)	-	42.9	-	7	-	(0)	-	(28.6)	-	-
DD	29.8	(0)	19.1	0	131	3	4.8	(0)	25.0	(0)	-
DF	21.9	(0)	13.4	0	306	1	1.6	(0)	19.8	(0)	-
NL	42.9	0**	20.5	0	88	31	0	0	40.5	0	-
BL	87.8	59.5***	57.1	30.1	967	73	0	0	63.6	59.5	***
KN	(0)	-	0	-	3	-	(0)	-	(0)	-	-
FR	25.2	9.1	20.5	5.9	420	34	0.6	0	10.1	9.1	-
ES	87.1	76.2**	84.3	47.9	696	163	9.9	9.9	37.1	76.2	-
PO	81.8	(0)	75.0	0	12	2	18.2	(0)	36.4	(0)	-
IA	85.0	-	85.0	0	20	3	0	-	30.0	-	-
HE	0	(0)	0	0	49	7	0	(0)	0	(0)	-
AU	(42.9)	-	37.5	-	8	-	(0)	-	(42.9)	-	-
CS	(50.0)	-	33.3	-	6	-	(0)	-	(50.0)	-	-
HG	-	-	-	-	-	-	-	-	-	-	-
RO	-	-	-	-	-	-	-	-	-	-	-
BG	-	-	-	-	-	-	-	-	-	-	-
YG	(100.0)	(100.0)	60.0	100.0	5	1	(0)	(0)	(66.7)	(100.0)	-
GR	(50.0)	-	50.0	-	2	-	(0)	-	(50.0)	-	-
TU	-	-	-	-	-	-	-	-	-	-	-
CY	-	-	-	-	-	-	-	-	-	-	-
ML	(100.0)	(100.0)	100.0	100.0	1	1	0	(0)	100.0	(100.0)	-
SY	-	-	-	-	-	-	-	-	-	-	-
LE	-	-	-	-	-	-	-	-	-	-	-
IL	-	-	-	-	-	-	-	-	-	-	-
ME	-	-	-	-	-	-	-	-	-	-	-
EG	-	-	-	-	-	-	-	-	-	-	-
LT	-	-	-	-	-	-	-	-	-	-	-
TO	(85.7)	-	75.0	-	8	-	(0)	-	(14.3)	-	-
AG	(75.0)	-	75.0	-	4	-	(0)	-	(25.0)	-	-
MA	66.7	57.1	63.2	57.1	38	21	0	9.5	16.7	57.1	-
SA	-	-	-	-	-	-	-	-	-	-	-

a   See chapter 2 (methods) for derivation of indices. Indices derived from less than 10 recoveries are indicated within parentheses. Fisher's exact tests (Sokal & Rohlf 1981) were used to compare the proportions taken in each period. Significance levels (*<0.05; ** <0.01; *** <0.001) of the tests are indicated in column 1980+. Tests were carried out on all pairs except where indices were based on less than 10 recoveries.

b   Percentage of all recoveries other than those excluded on the basis of poor quality data (see chapter 2) taken by shooting and trapping.

c   Total number of recoveries other than those excluded on the basis of poor quality data.

d   G test (Sokal & Rohlf 1981) comparison between periods of the proportions of birds taken according to the classes shot, trapped, and shot or trapped. Significance levels of these comparisons are indicated as above. 'NS' indicates non-significant results where tests were carried out. Comparisons were not made where the expected frequency in any cell was less than 10.

Table.21.3. Goldfinch : Indices of birds taken for each breeding population (across all years).

Breeding Population		Index of birds taken	Sample size
UK	United Kingdom	46.6	399
CI	Channel Islands	50.0	18
NO	Norway	–	–
SV	Sweden	–	–
DK	Denmark	0	2
SF	Finland	0	1
SU	USSR (Lithuania only)	–	–
PL	Poland	–	–
DD	East Germany	60.0	70
DF	West Germany	63.2	209
NL	Holland	58.3	12
BL	Belgium	74.3	74
FR	France	54.6	194
ES	Spain	69.7	33
IA	Italy	–	–
HE	Switzerland	59.5	42
CJ	Czechoslovakia	–	–
HG	Hungary	–	–

Table 21.4. Regression analysis of temporal trends in the indices of Goldfinches taken.

Country of recovery	Intercept	Slope	t	P
Belgium	127.1	-0.69	-2.40	ns
France	98.0	-1.13	-6.35	***
Spain	119.4	-0.51	-2.23	ns
Major	115.2	-0.66	-6.61	***
Other	56.9	-0.64	-4.66	**
All	98.4	-0.65	-3.57	*

All regressions used a weighted technique where each 5-year index was weighted by the square root of the sample size.

Countries where 10 or more recoveries occurred in each 5-year period after 1950 were analysed. Data from the period before 1950 were not included in the analysis.

Major countries are those with a tradition of taking substantial numbers of birds on the western migratory flyways. (i.e. BL, FR, ES, PO, IA, NA).

Significance levels indicated are: ns not significant; * P<0.05; ** P<0.01; *** P<0.001.

Figure 21.1a   Total numbers of Goldfinch ringing recoveries resulting from birds taken before 1980 in each 30' by 60' grid square.   ** Indicates numbers greater than 99.   3 recoveries were outside the limits of the map.

Figure 21.1b   Total numbers of Goldfinch ringing recoveries from birds taken from 1980 onwards
in each 30' by 60' grid square.   ** Indicates numbers greater than 99. 0 recoveries were outside
the limits of the map.
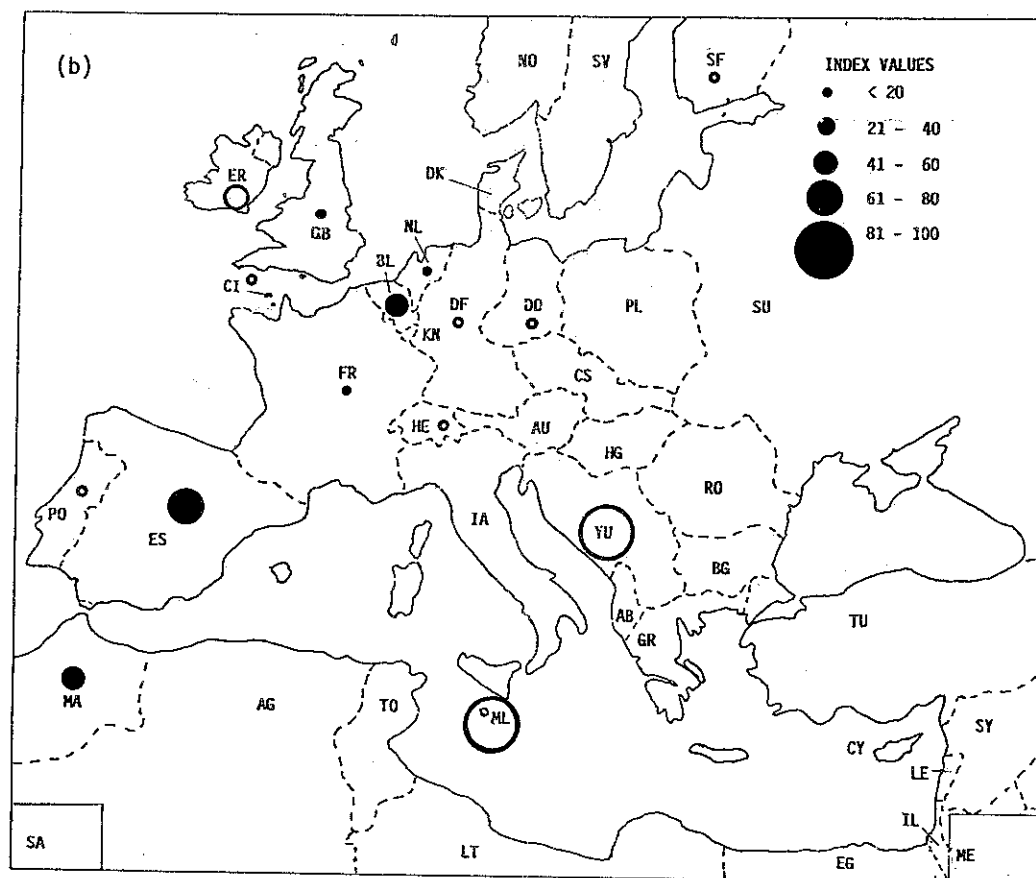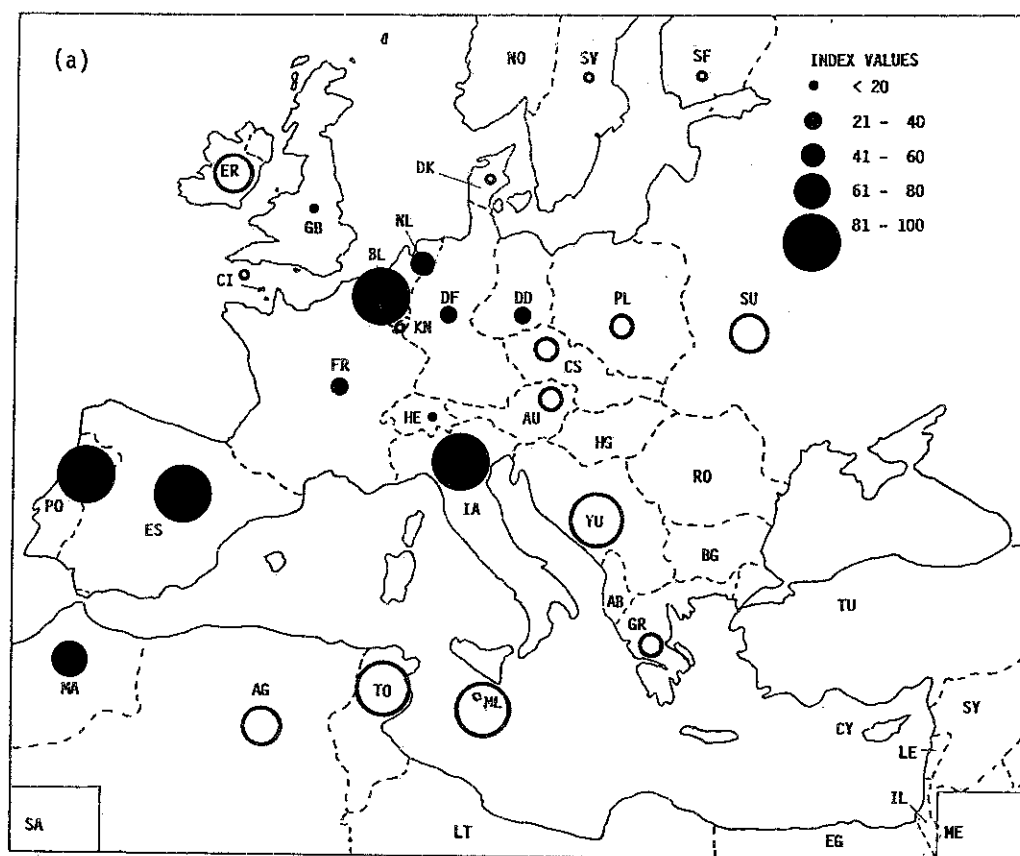
Figure 21.2. Geographical variation in the indices of Goldfinch taken for each country of recovery in the period before 1980 (a) and from 1980 onwards (b). Solid circles indicate values derived from more than 10 recoveries and open circles indicate those derived from less than 10. Country codes are indicated in Table 2.4 of the Methods.
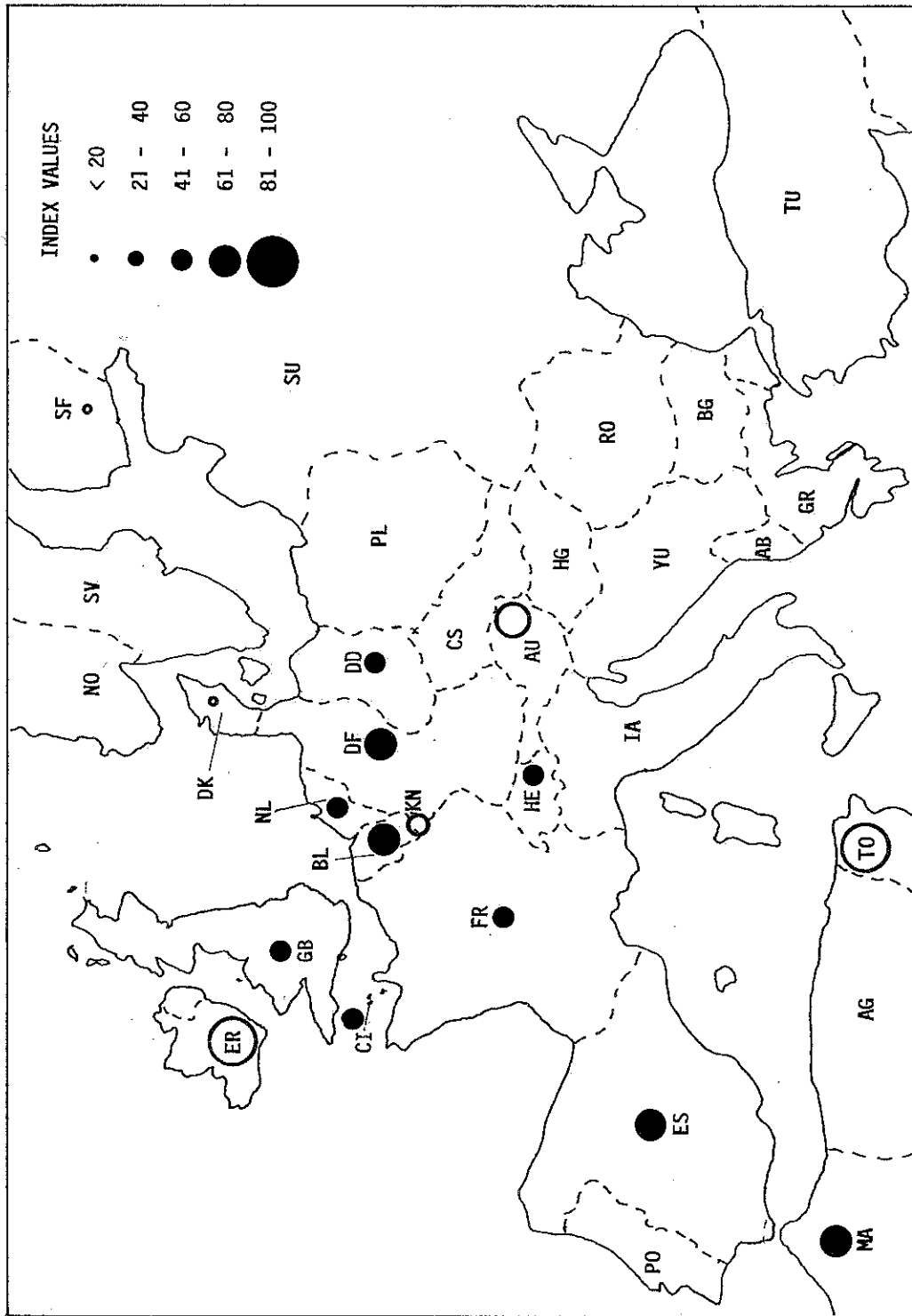
Figure 21.3 Geographical variation in the indices of Goldfinch taken over all years for each breeding population. Solid circles indicate values derived from more than 10 recoveries and open circles indicate those derived from less than 10. Country codes are indicated in Table 2.4 of the Methods.

Belgium

Index of birds taken

5 Year period

France

Index of birds taken

5 Year period

Spain

Index of birds taken

5 Year period

North Africa

Index of birds taken

5 Year period

Italy

Index of birds taken

5 Year period
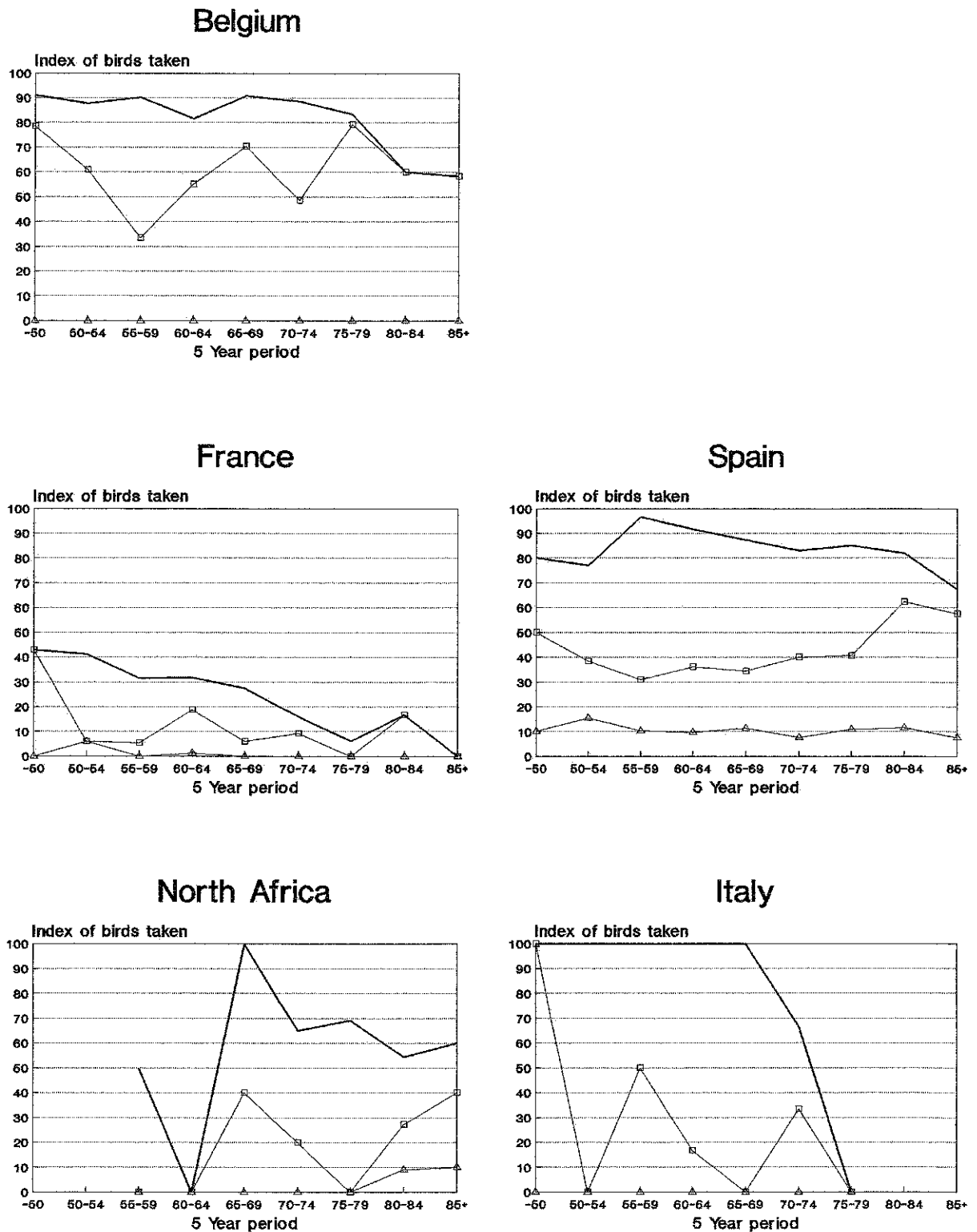
Figure 21.4   Trends in 5-yearly indices of Goldfinch taken in individual countries with high overall indices and sufficient recoveries for analysis.   The bold line without symbols indicates overall index values, triangles indicate index values based on birds reported as shot and squares indicate index values based on birds reported as trapped. The periods -50 and 85+ refer to all recoveries before 1950 and from 1985 onwards respectively.

BL,ES,FR,IA,NA

Others
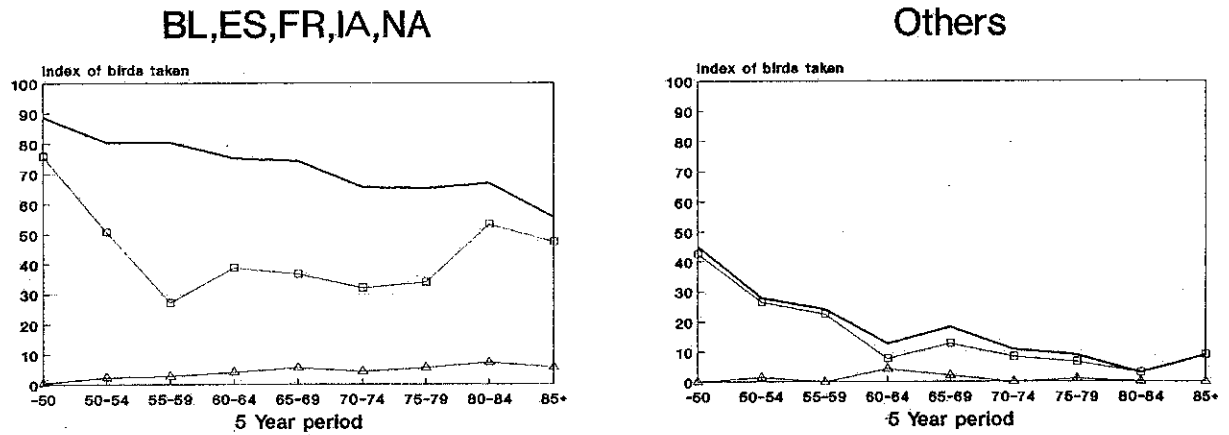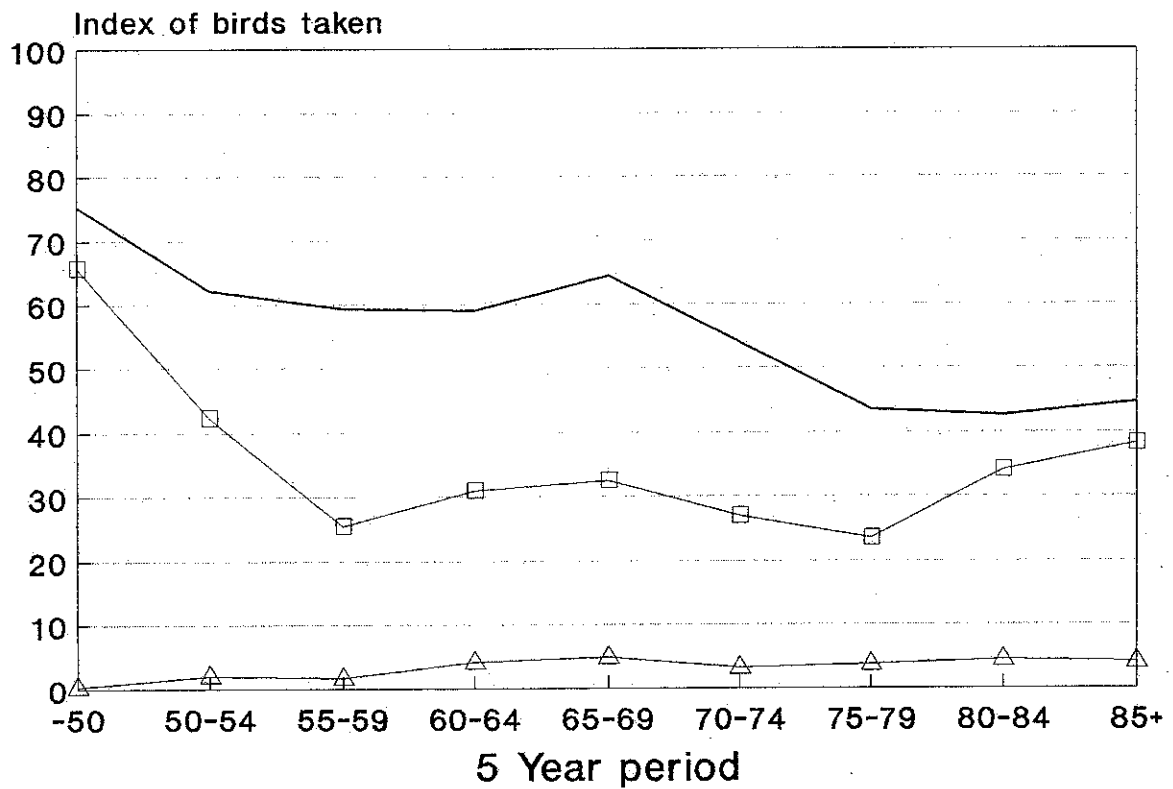
All countries

Figure 21.5 Trends in combined 5-yearly indices of Goldfinch
taken in: a) countries, for which data for this species were available,
with a tradition of taking substantial numbers of migratory birds on the
western European flyways (ie BL, ES, FR, IA. NA),
b) other countries and c) all countries. The bold line with symbols
indicates overall index values, triangles indicate values based on birds
reported as shot and squares indicate index values based on birds reported
as trapped. The periods -50 and 85+ refer to all recoveries before 1950
and from 1985 onwards respectively.

Belgium

% of birds taken

JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
Month

France

% of birds taken

JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
Month

Spain

% of birds taken

JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
Month

North Africa

% of birds taken

JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
Month

Italy

% of birds taken

JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
Month
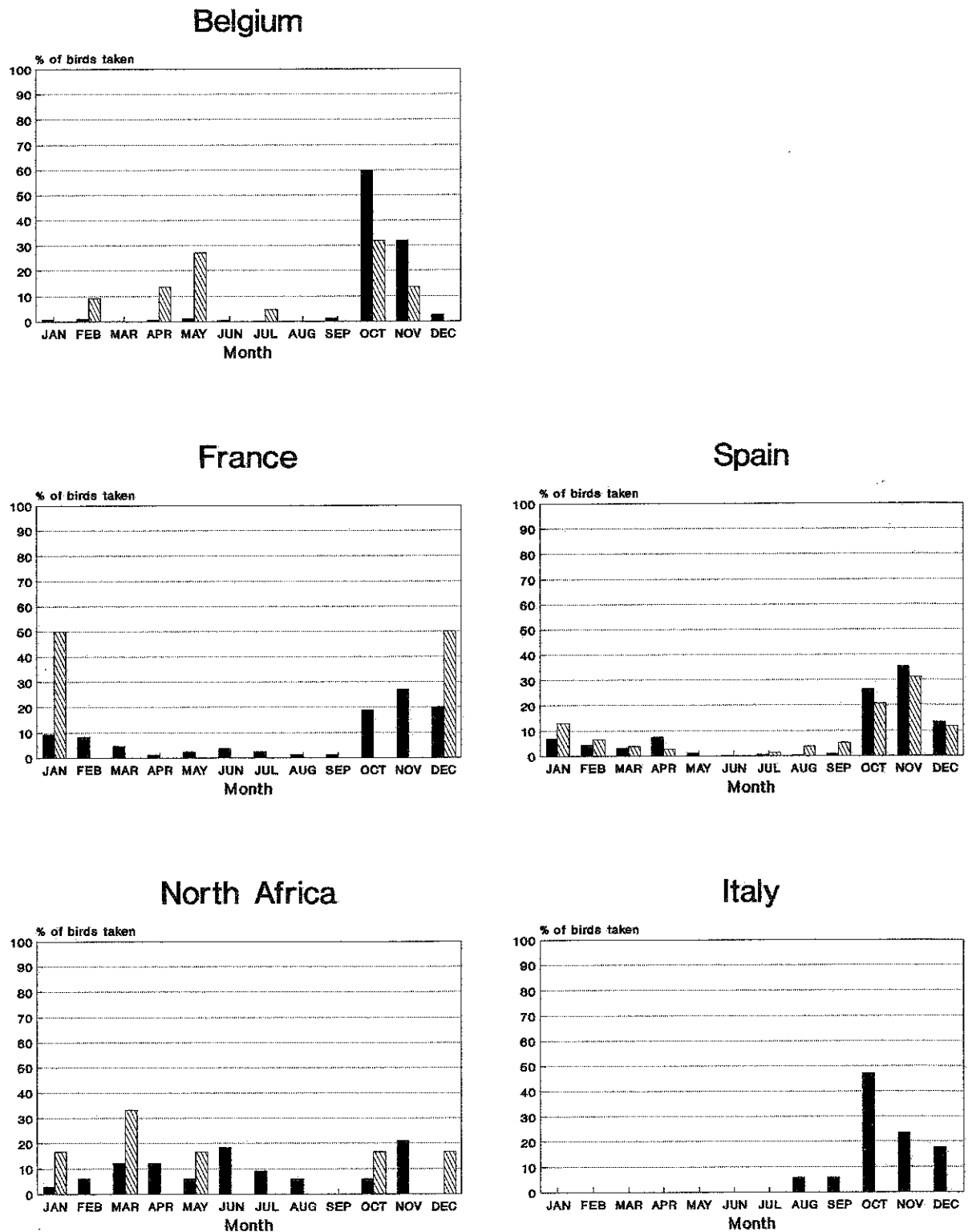
Figure 21.6 Monthly percentages of total Goldfinch taken in individual countries with high overall indices and sufficient recoveries for analysis. Solid bars indicate birds from the period before 1980 and hatched bars indicate birds taken from 1980 onwards.

22. LINNET (CARDUELIS CANNABINA)

22.1 Range

Linnets breed in Europe from the southern edge of Scandinavia to the Mediterranean. The species is also resident in north-west Africa, Asia Minor and the Levant (Harrison 1982). Breeding areas north and east of a line from Denmark to the Crimea are abandoned in winter, except for the southernmost parts of Norway and Sweden. The wintering grounds of these northern birds are generally within areas occupied by other Linnet populations during the breeding season but some eastern Linnets winter to the south of the species breeding range in North Africa and the Middle East.

22.2 Population trends

The Linnet has declined sharply in much of western europe since the 1970s (Hustings 1988, Marchant et al. 1990). This has been attributed to increasing chemical suppression of the species' food-plants. In the first half of this century the Linnet increased in the United Kingdom following the cessation of trapping for the cagebird trade (Newton 1972).

22.3 Migration

The migratory pattern of the Linnet is very similar to that of the Goldfinch (see Chapter 21) and sympatric populations of the two species tend to have similar wintering areas. The Linnet also shares with the Goldfinch high individual variability in the distance and direction moved (Newton 1972). North-western and Scandinavian Linnets tend to winter from the Netherlands and Belgium, through south-west France to Iberia (Table 22.1). Although some eastern European and Finnish birds also winter in these areas most appear to move towards Italy and the Balkans (Newton 1972). A small proportion of west European Linnets winter in North Africa.

22.4 Status

The Linnet is fully protected in all E.C. countries except Belgium, where it may be trapped under licence between 1 October and 15 November (Bertelsen and Simonsen 1989). In 1979 the taking of Linnets was still permitted in Malta, Cyprus and Egypt but prohibited in all other non-E.C. Mediterranean countries for which information was available (Woldhek 1979).

22.5 Geographical variation in the taking of Linnets

Prior to 1980, western European countries, with the exception of the United Kingdom, had indices of Linnets taken of at least 25 (Table 22.2). Amongst those countries providing at least 10 recoveries, Italy, Spain, and Belgium all had index values greater

than 80 during this period. In contrast, Scandinavian and central European countries all had low indices. In North Africa, only Morocco had at least 10 recoveries but its index of birds taken was high at 53.9. The majority of pre-1980 recoveries due to shooting and trapping came from Belgium (39%), France (28%) and Spain (21%).

Since 1980 the only recoveries of Linnets taken in Europe have come from West Germany, the Netherlands, Belgium, France and Spain. Of these, only Spain and Belgium had indices greater than 20 (Table 22.2). During the period since 1980 more Linnets were taken in Spain (64%) than in all other countries. Only Belgium (22%) amongst these others accounted for more than 10% of all taken recoveries. The taking of Linnets in Belgium was most prevalent in the provinces of Antwerpen, Luik, Oost-Vlanderen and West-Vlanderen (Appendix 14.1). In France most recoveries of birds taken have come from the Departments of Basses-Pyrenees, Gironde, Landes, Lot et Garonne and Bouches du Rhone (Appendix 14.2). The most significant provinces for the taking of Linnets in Spain were Guipuzcoa, Vizcaya, Barcelona, Castellon, Valencia, Madrid, Cadiz and Jaen (Fig. 22.1a,b, Appendix 14.3).

All European breeding populations of Linnets for which data were available had indices of birds taken greater than 40 (Table 22.3). The highest values were found in countries having the greatest overall indices (Table 22.2) and those immediately adjacent to them. The relatively low index for Finnish breeding birds is probably a result of their more easterly migration route, mostly avoiding Belgium, France and Spain, and of low numbers of birds being taken locally (Table 22.1)

22.6 Temporal variation in the taking of Linnets

Indices of Linnets taken since 1980 are lower than those for the earlier period in all countries other than Algeria and Morocco, for which the samples are very small. The reductions in the indices for Belgium and France are highly significant, while that for Spain is minimal (Table 22.2).

Indices of Linnets taken for five-year periods showed a decreasing trend with time in Belgium, France and Italy, but not in Spain (Fig. 22.4). Regression of index on year revealed significant inverse relationships in all countries and combinations of countries analyzed, with the exception of Spain (Table 22.4, Fig. 22.5).

Analysis of the percentage of taken Linnets recovered in each month in Belgium, France, Spain and Italy showed that most birds are taken in October and November. In Belgium this coincides with the open season for trapping. Small numbers of Linnets have also been taken between April and June, particularly in Belgium and Italy (Fig. 22.6).

22.7 Methods used to take Linnets

The great majority of Linnets taken are trapped. Prior to 1980, 61% of taken Linnets recovered were kown to have been trapped and 8% shot. The method of taking was not specified for the remaining recoveries. The corresponding figures for the period from 1980 onwards are 76% trapped and 13% shot. Significant changes in the proportion of Linnets taken by each method in Belgium and Spain are attributable to increased precision in the reporting of the cause of recoveries (Table 22.2).

TABLE 22.1a The distribution of Linnets recovered due to shooting and trapping before 1980 in relation to their area of origin. The percentage of taken birds recovered in each country is shown for each national ringing scheme. Percentages within parentheses are based on less than ten recoveries.

Country of recovery	Country of ringing													
	UK	CI	NO	SV	DK	SF	DD	DF	NL	BL	FR	ES	IA	HE
GB	0	0	–	0	0	0	0	0	0	0	0.5	–	–	0
CI	0	0	–	0	0	0	0	0	0	0	0	–	–	0
ER	(0.5)	0	–	0	0	0	0	0	0	0	0	–	–	0
NO	0	0	–	0	0	0	0	0	0	0	0	–	–	0
SV	0	0	–	0	0	0	0	0	(0.3)	0	0	–	–	0
DK	0	0	–	0	(9.1)	0	0	(0.3)	0	(0.2)	0	–	–	0
SF	0	0	–	0	0	0	0	0	0	0	0	–	–	0
SU	0	0	–	0	0	0	0	0	0	0	0	–	–	(2.2)
PL	0	0	–	0	0	0	0	0	0	0	0	–	–	0
DD	0	0	–	0	0	(12.5)	19.8	(0.3)	0	0	0	–	–	(2.2)
DF	0	0	–	0	(9.1)	0	(1.2)	27.3	(0.6)	(0.9)	0	–	–	0
NL	(0.2)	0	–	0	0	0	0	(0.8)	5.3	(1.1)	(0.9)	–	–	0
BL	(2.1)	0	–	0	(9.1)	0	0	36.5	70.6	61.1	14.6	–	–	0
KN	0	0	–	0	0	0	0	0	0	0	0	–	–	0
FR	62.9	68.7	–	(33.3)	(36.4)	0	39.5	12.2	14.0	16.4	43.8	–	–	37.0
ES	26.5	31.3	–	(66.7)	(27.3)	(12.5)	25.6	18.4	8.7	19.9	39.3	–	–	37.0
PO	(0.5)	0	–	0	0	0	0	0	0	(0.1)	0	–	–	0
IA	(0.5)	0	–	0	(9.1)	(75.0)	14.0	3.8	0	0	0	–	–	(19.6)
HE	0	0	–	0	0	0	0	(0.3)	0	0	0	–	–	0
AU	0	0	–	0	0	0	0	0	0	0	0	–	–	0
CS	0	0	–	0	0	0	0	0	0	0	0	–	–	0
HG	0	0	–	0	0	0	0	0	0	0	0	–	–	0
RO	0	0	–	0	0	0	0	0	0	0	0	–	–	0
BG	0	0	–	0	0	0	0	0	0	0	0	–	–	0
YG	0	0	–	0	0	0	0	0	0	0	0	–	–	0
GR	0	0	–	0	0	0	0	0	0	0	0	–	–	0
TU	0	0	–	0	0	0	0	0	0	0	0	–	–	0
CY	0	0	–	0	0	0	0	0	0	0	0	–	–	0
ML	0	0	–	0	0	0	0	0	0	0	0	–	–	(2.2)
SY	0	0	–	0	0	0	0	0	0	0	0	–	–	0
LE	0	0	–	0	0	0	0	0	0	0	0	–	–	0
IL	0	0	–	0	0	0	0	0	0	0	0	–	–	0
ME	0	0	–	0	0	0	0	0	0	0	0	–	–	0
EG	0	0	–	0	0	0	0	0	0	0	0	–	–	0
LT	0	0	–	0	0	0	0	0	0	0	0	–	–	0
TO	0	0	–	0	0	0	0	0	0	0	0	–	–	0
AG	0	0	–	0	0	0	0	0	0	0	0	–	–	0
MA	(0.2)	0	–	0	0	0	0	0	(0.6)	(0.1)	(0.9)	–	–	0
SA	0	0	–	0	0	0	0	0	0	0	0	–	–	0
TOTAL No.	423	32	–	3	11	8	86	370	357	854	219	–	–	46

Note: No data available for Poland, Czechoslovakia or Hungary.

TABLE 22.1b The distribution of Linnets recovered due to shooting and trapping from 1980 onwards in relation to their area of origin. The percentage of taken birds recovered in each country is shown for each national ringing scheme. Percentages within parentheses are based on less than ten recoveries.

Country of recovery	Country of ringing													
	UK	CI	NO	SV	DK	SF	DD	DF	NL	BL	FR	ES	IA	HE
GB	0	0	–	0	–	–	–	0	0	0	–	0	–	0
CI	0	0	–	0	–	–	–	0	0	0	–	0	–	0
ER	0	0	–	0	–	–	–	0	0	0	–	0	–	0
NO	0	0	–	0	–	–	–	0	0	0	–	0	–	0
SV	0	0	–	0	–	–	–	0	0	0	–	0	–	0
DK	0	0	–	0	–	–	–	0	0	0	–	0	–	0
SF	0	0	–	0	–	–	–	0	0	0	–	0	–	0
SU	0	0	–	0	–	–	–	0	0	0	–	0	–	0
PL	0	0	–	0	–	–	–	0	0	0	–	0	–	0
DD	0	0	–	0	–	–	–	0	0	0	–	0	–	0
DF	0	0	–	0	–	–	–	(66.7)		(1.9)	–	0	–	0
NL	0	0	–	0	–	–	–	0	0	(3.9)	–	0	–	0
BL	0	0	–	(33.3)	–	–	–	0	(40.0)	30.8	–	0	–	0
KN	0	0	–	0	–	–	–	0	0	0	–	0	–	0
FR	0	0	–	0	–	–	–	0	0	(5.8)	–	0	–	0
ES	100	(100)	–	(66.7)	–	–	–	(33.3)	(60.0)	51.9	–	(100)	–	(66.7)
PO	0	0	–	0	–	–	–	0	0	0	–	0	–	0
IA	0	0	–	0	–	–	–	0	0	0	–	0	–	0
HE	0	0	–	0	–	–	–	0	0	0	–	0	–	0
AU	0	0	–	0	–	–	–	0	0	0	–	0	–	0
CS	0	0	–	0	–	–	–	0	0	0	–	0	–	0
HG	0	0	–	0	–	–	–	0	0	0	–	0	–	0
RO	0	0	–	0	–	–	–	0	0	0	–	0	–	0
BG	0	0	–	0	–	–	–	0	0	0	–	0	–	0
YG	0	0	–	0	–	–	–	0	0	0	–	0	–	0
GR	0	0	–	0	–	–	–	0	0	0	–	0	–	0
TU	0	0	–	0	–	–	–	0	0	0	–	0	–	0
CY	0	0	–	0	–	–	–	0	0	0	–	0	–	0
ML	0	0	–	0	–	–	–	0	0	0	–	0	–	0
SY	0	0	–	0	–	–	–	0	0	0	–	0	–	0
LE	0	0	–	0	–	–	–	0	0	0	–	0	–	0
IL	0	0	–	0	–	–	–	0	0	0	–	0	–	0
ME	0	0	–	0	–	–	–	0	0	0	–	0	–	0
EG	0	0	–	0	–	–	–	0	0	0	–	0	–	0
LT	0	0	–	0	–	–	–	0	0	0	–	0	–	0
TO	0	0	–	0	–	–	–	0	0	0	–	0	–	0
AG	0	0	–	0	–	–	–	0	0	0	–	0	–	(33.3)
MA	0	0	–	0	–	–	–	0	0	5.8	–	0	–	0
SA	0	0	–	0	–	–	–	0	0	0	–	0	–	0
TOTAL No.	10	4	–	3	–	–	–	3	5	52	–	6	–	3

Note: No data available for Poland, Czechoslovakia or Hungary.

TABLE.22.2 Linnet: Indices of birds taken before 1980 and from 1980 onwards for each country of recovery.

	Index (all methods)[a]		% hunted[b]		Total recoveries[c]		Shooting Index[a]		Trapping Index[a]		G test[d]
	-1980	1980+	-1980	1980+	-1980	1980+	-1980	1980+	-1980	1980+	
GB	7.3	0	3.7	0	790	74	1.8	0	5.3	0	
CI	(0)	(0)	0	0	27	7	(0)	(0)	(0)	(0)	
ER	(62.5)	–	62 5	–	8	–	(0)	–	(37.5)	–	
NO	–	–	0	0	3	4	–	–	–	–	
SV	8.3	–	5.9	0	17	3	0	–	0	–	
DK	7.0	0	2.7	0	147	35	3.5	0	3.5	0	
SF	0	(0)	0	0	14	3	0	(0)	0	(0)	
SU	(50.0)	–	50.0	–	2	–	(0)	–	(50.0)	–	
PL	(0)	–	0	–	1	–	(0)	–	(0)	–	
DD	25.6	(0)	21.5	0	93	3	1.3	(0)	24.4	(0)	
DF	40.4	20.0	33.8	9.1	334	33	2.9	0	26.8	20.0	
NL	29.3	14.3	16.7	3.6	204	55	0.9	0	12.1	14.3	
BL	85.8	45.2***	49.3	8.5	1934	235	0.7	0	59.9	42.9	*
KN	–	–	–	–	–	–	–	–	–	–	
FR	63.9	11.5***	56.5	7.0	1194	43	6.9	3.9	33.0	7.7	
ES	85.9	83.3	83.0	63.2	630	87	14.1	13.6	46.8	57.6	*
PO	(75.0)	(0)	75.0	0	4	1	(25.0)	(0)	(50.0)	(0)	
IA	92.6	(0)	90.9	0	55	3	31.5	(0)	18.5	(0)	
HE	(14.3)	(0)	7.7	0	13	2	(0)	(0)	(14.3)	(0)	
AU	(0)	–	0	–	2	–	(0)	–	(0)	–	
CS	(0)	–	0	–	1	–	(0)	–	(0)	–	
HG	–	–	–	–	–	–	–	–	–	–	
RO	–	–	–	–	–	–	–	–	–	–	
BG	–	–	–	–	–	–	–	–	–	–	
YG	–	–	0.	–	1	–	–	–	–	–	
GR	–	–	–	–	–	–	–	–	–	–	
TU	–	–	–	–	–	–	–	–	–	–	
CY	–	–	–	–	–	–	–	–	–	–	
ML	(100.0)	–	100.0	–	9	–	(0)	–	(88.9)	–	
SY	–	–	–	–	–	–	–	–	–	–	
LE	–	–	–	–	–	–	–	–	–	–	
IL	–	–	–	–	–	–	–	–	–	–	
ME	–	–	–	–	–	–	–	–	–	–	
EG	–	–	–	–	–	–	–	–	–	–	
LT	–	–	–	–	–	–	–	–	–	–	
TO	(100.0)	–	100.0	–	2	–	(0)	–	(50.0)	–	
AG	(0)	(100)	0	50.0	3	2	(0)	(100)	(0)	(0)	
MA	53.9	(100)	46.7	100.0	15	–	15.4	(0)	15.4	(66.7)	
SA	–	–	–	–	–	–	–	–	–	–	

[a]   See chapter 2 (methods) for derivation of indices. Indices derived from less than 10 recoveries are indicated within parentheses.   Fisher's exact tests (Sokal & Rohlf 1981) were used to compare the proportions taken in each period. Significance levels (*<0.05; ** <0.01; *** <0.001) of the tests are indicated in column 1980+. Tests were carried out on all pairs except where indices were based on less than 10 recoveries.

[b]   Percentage of all recoveries other than those excluded on the basis of poor quality data (see chapter 2) taken by shooting and trapping.

[c]   Total number of recoveries other than those excluded on the basis of poor quality data.

[d]   G test (Sokal & Rohlf 1981) comparison between periods of the proportions of birds taken according to the classes shot, trapped, and shot or trapped. Significance levels of these comparisons are indicated as above. 'NS' indicates non-significant results where tests were carried out. Comparisons were not made where the expected frequency in any cell was less than 10.

Table.22.3. Linnet   : Indices of birds taken for each breeding
population (across all years).

Breeding Population	Index of birds taken	Sample size
UK United Kingdom	48.7	633
CI Channel Islands	54.6	33
NO Norway	—	—
SV Sweden	60.0	10
DK Denmark	47.8	23
SF Finland	36.8	19
SU USSR (Lithuania only)	—	—
PL Poland	—	—
DD East Germany	49.6	135
DF West Germany	65.3	369
NL Holland	69.7	185
BL Belgium	70.8	480
FR France	65.3	176
ES Spain	75.0	4
IA Italy	—	—
HE Switzerland	81.0	21
CJ Czechoslovakia	—	—
HG Hungary	—	—

Table 22.4 Regression analysis of temporal trends in the indices
of Linnets taken.

Country of recovery	Intercept	Slope	t	p
Belgium	188.4	−1.78	−5.09	**
France	147.0	−1.41	−2.69	*
Spain	92.2	−0.11	−0.65	ns
Major	129.5	−0.88	−4.40	**
Other	84.3	−1.02	−4.19	**
All	134.0	−1.18	−3.93	*

All regressions used a weighted technique where each 5-year index
was weighted by the square root of the sample size.

Countries where 10 or more recoveries occurred in each year after
1950 were analysed. Data from the period before 1950 were not
included in the analysis.

Major countries are those with a tradition of taking substantial
numbers of birds that use western migration routes.
(i.e. BL, FR, ES, PO, IA, NA).

Significance levels indicated are: NS Not significant; * P<0.05;
** P<0.01; *** P<0.001.

Figure 22.1a   Total numbers of Linnet ringing recoveries resulting from birds taken before 1980 in each 30' by 60' grid square.   ** Indicates numbers greater than 99.   1 recovery was outside the limits of the map.

Figure 22.1b   Total numbers of Linnet ringing recoveries from birds taken from 1980 onwards
in each 30' by 60' grid square.   ** Indicates numbers greater than 99.   0 recoveries were outside
the limits of the map.
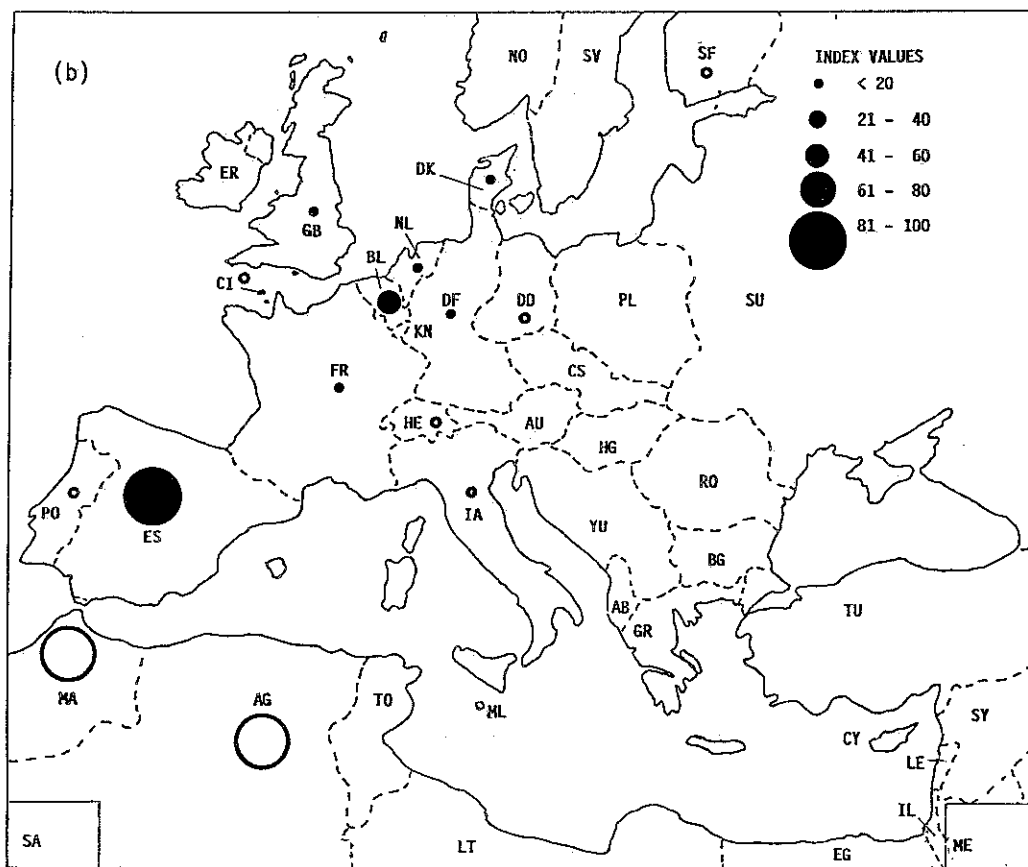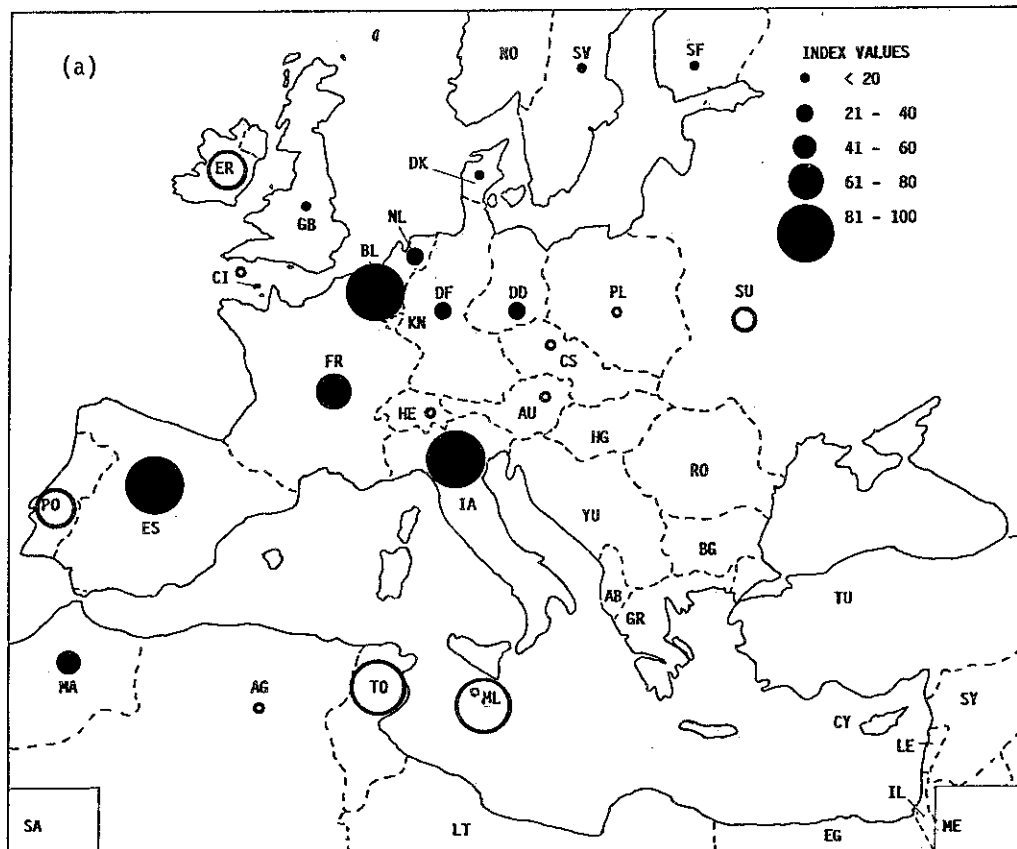
Figure 22.2 Geographical variation in the indices of Linnet
taken for each country of recovery in the period before 1980 (a) and from
1980 onwards (b). Solid circles indicate values derived from more than 10
recoveries and open circles indicate those derived from less than 10.
Country codes are indicated in Table 2,4 of the Methods.
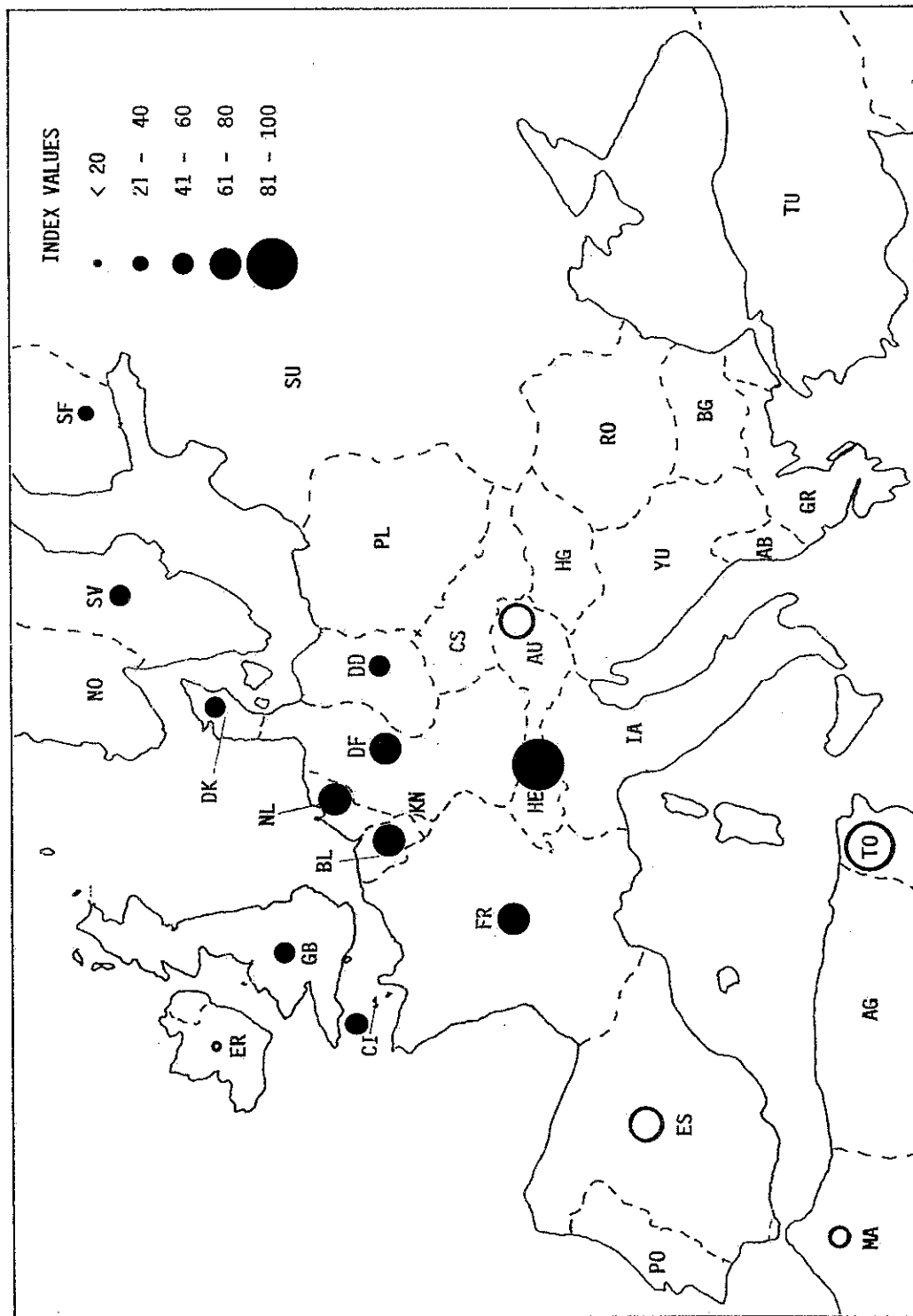
Figure 22.3   Geographical variation in the indices of Linnet taken over all years for each breeding population.   Solid circles indicate values derived from more than 10 recoveries and open circles indicate those derived from less than 10.   Country codes are indicated in Table 2.4 of the Methods.

Belgium

Index of birds taken

France

Index of birds taken

Spain

Index of birds taken

Italy

Index of birds taken
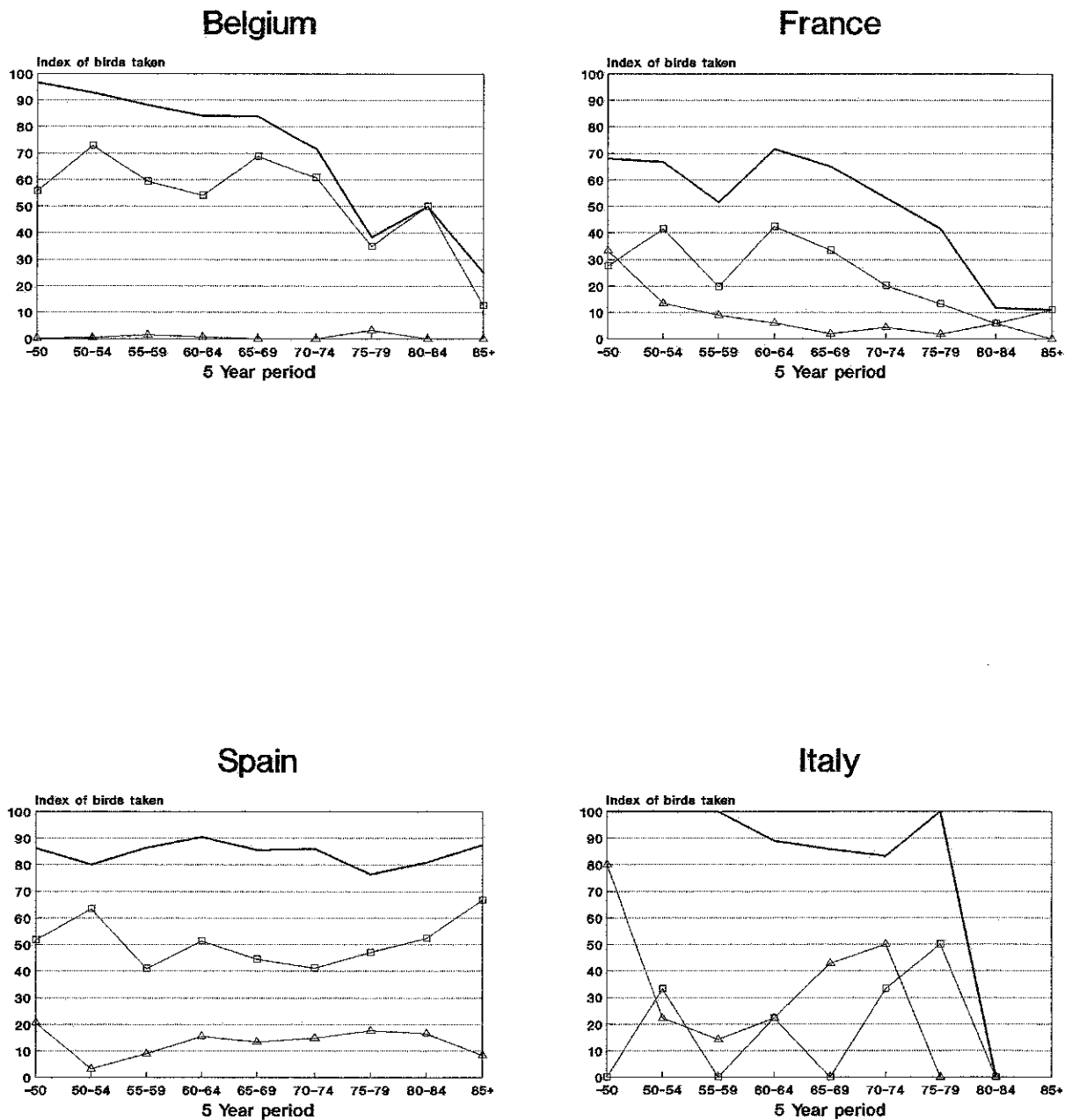
Figure 22.4   Trends in 5-yearly indices of Linnet taken in individual countries
with high overall indices and sufficient recoveries for analysis.   The bold line without
symbols indicates overall index values, triangles indicate index values based on birds
reported as shot and squares indicate index values based on birds reported as trapped.
The periods -50 and 85+ refer to all recoveries before 1950 and from 1985 onwards
respectively.

BL,ES,FR,IA

Others
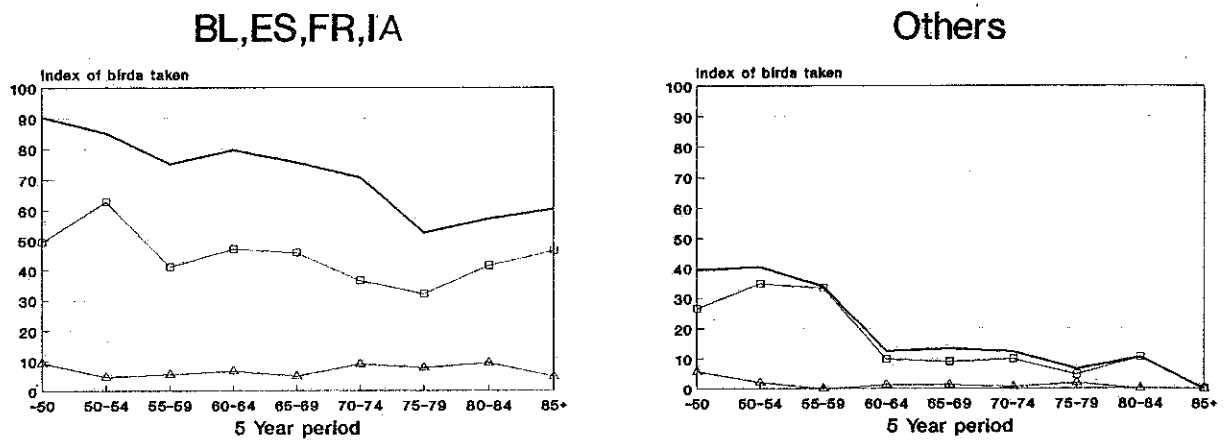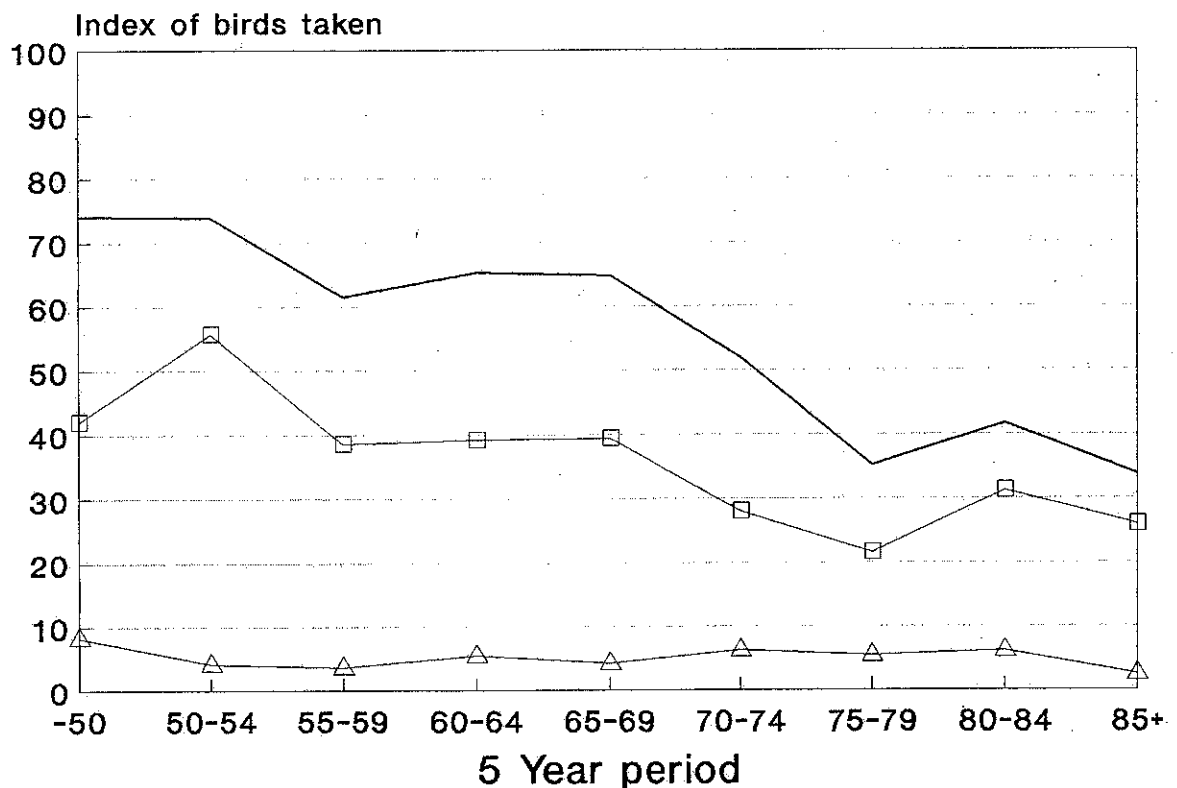
All countries

Figure   22.5   Trends in combined 5-yearly indices of Linnet
taken in: a) countries, for which data for this species were available,
with a tradition of taking substantial numbers of migratory birds on the
western European flyways (ie   BL, ES, FR, IA),
b) other countries and c) all countries.   The bold line with symbols
indicates overall index values, triangles indicate values based on birds
reported as shot and squares indicate index values based on birds reported
as trapped.   The periods -50 and 85+ refer to all recoveries before 1950
and from 1985 onwards respectively.

Belgium

France

Spain

Italy
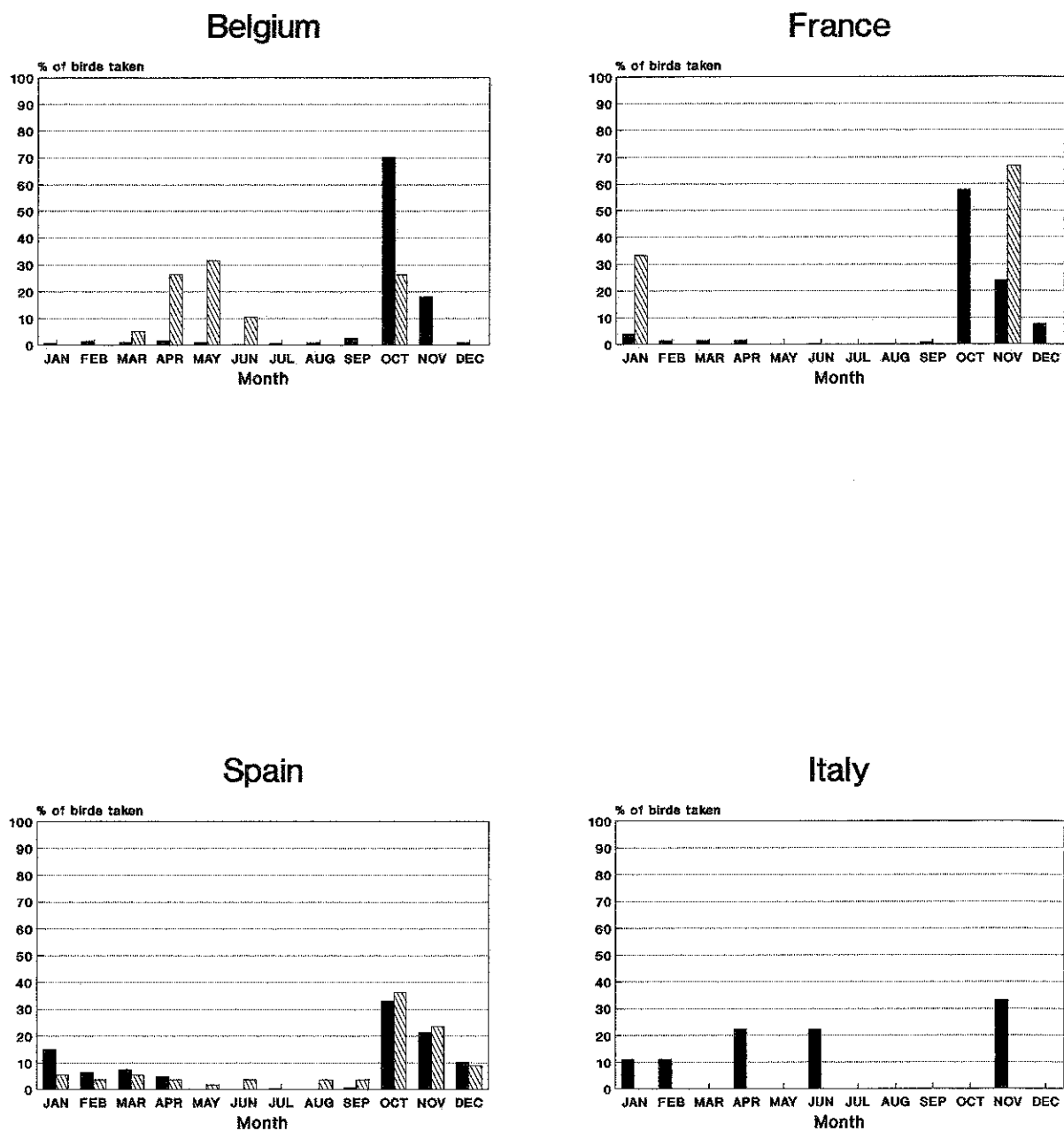
Figure 22.6   Monthly percentages of total   Linnet taken in individual countries with high overall indices and sufficient recoveries for analysis.   Solid bars indicate birds from the period before 1980 and hatched bars indicate birds taken from 1980 onwards.

23. DISCUSSION

23.1 Geographical variation in the taking of birds

This study confirms that losses to migratory birds resulting from shooting and trapping within Europe are incurred mainly in southern countries. In common with Woldhek (1979), we identify the western Mediterranean as the area where the taking of birds is most severe. Although most of the birds taken in this area are killed on the European side of the Mediterranean Sea, this analysis has revealed that substantial numbers of migrants are also taken while passing through north-west Africa. Relatively few birds, other than quarry species, are taken in Europe north of the Alps. Only the Soviet Union and Belgium, amongst northern European countries, have produced indices of birds taken greater than 50 for any species with adequate recovery samples. Recovery data available to this study for countries at the eastern end of the Mediterranean were relatively scarce but index values for species recovered in the Balkan countries and the Levant tended to be high, suggesting that the taking of migratory birds in the region may well be substantial, particularly in Cyprus and Lebanon. This is supported by the findings of Woldhek (1979) and Magnin (1987).

The distribution of recoveries of taken birds reflects the pattern of migration through Europe, the highest index values occurring on the approaches to "bottlenecks" where geographical features such as mountain ranges and narrow straits result in large numbers of birds being channelled through a relatively small area. Hence the taking of birds is particularly prevalent on both sides of the Straits of Gibraltar, between the western end of the Pyrenees, between the Alps and the Pyrenees and at the southern end of the Alpine passes.

23.1.1 The taking of birds within the European Community.

The countries of western Mediterranean Europe (France (pre-1980), Spain, Portugal and Italy) all produced indices of birds taken greater than, or equal to, 50 for a high proportion of the species analyzed.

Indices of birds taken in Italy during the period prior to 1980 were 50 or above for 95% of the study species and 75 or more for 75%. However, these proportions were reduced to 40% and 15% respectively in the period from 1980 onwards. The taking of migrant birds is carried out predominantly in the northern half of the country, trapping being permitted by law in the regions of Lombardia, Veneto, Friuli, Venezia-Giulia, Emilia Romagna, Liguria and Toscana.

The account of the taking of birds in Italy presented in this report is biased towards populations which breed in western Europe and Scandinavia. It is known that large numbers of birds from north-eastern Europe pass south-west through northern Italy each

autumn but few data were available to this study on birds ringed in eastern countries for species other than Robin, Song Thrush and Blackcap.

Index values for species taken in Iberia were consistently high in both of the time periods considered. In the earlier period, 97% of index values were 50 or above and 62% were 75 or more. The corresponding percentages since 1980 were 72% and 31%. In addition, the absolute numbers of taken birds recovered in Iberia are higher than in any other region for most of the songbird species analyzed, thrushes being the main exception. Taking of migratory birds in Iberia is most intensive in the migratory "bottleneck" areas at the western end of the Pyrenees and the south-west coast. The Spanish provinces of Guipuzcoa and Vizcaya in the north and Cadiz, Cordoba, Jaen and Sevilla in the south have particularly large numbers of recoveries. Woldhek (1979) reported that shooting and trapping of birds was widespread in Portugal, trapping being particularly common in the north. No estimate of the total number of birds taken annually has been made but those for individual passerine quarry species are known to be high. Over three million thrushes (Turdus sp.) were taken in Mallorca alone in 1976/77 (Woldhek 1979).

The taking of birds in France appears to be largely confined to legitimate quarry species (Skylark and thrushes), though index values for raptors were high during the period prior to 1980. Woldhek (1979) estimated the number of hunters in France at more than two million. The majority of birds are taken in the south-west, particularly in the Departments of Gironde, Basses-Pyrenees, Landes and Charente-Maritime, and in the south-east where many are taken in the Departments of Bouches du Rhone, Herault and Vaucluse. Woldhek (1979) identified both these regions as important trapping areas.

Relatively few recoveries of taken birds were obtained from Greece. This is probably a reflection of the western bias of the available data. The high index values obtained despite small sample sizes suggest that bird-taking in Greece may have been substantial until at least the time of accession to the E.C.. Woldhek (1979) found trapping of songbirds to be common on the islands of the Aegean and indiscriminate shooting to be widespread.

The trapping of a number of finch (Fringillidae) and bunting (Emberizidae) species, including Goldfinch and Linnet, is permitted under licence in Belgium but this practice is now much reduced.

23.1.2 The taking of birds outside the European Community.

All migratory bird species breeding within the E.C. are subject to being taken when on passage through non-E.C. countries which are not constrained by the 1979 Wild Birds Directive. Some of these nations are, however, signatories to the Bonn and Bern Conventions.

The results of this study indicate that few passerines are taken in non-E.C. countries in northern Europe (i.e Switzerland, Austria and the Fennoscandian countries). Fieldfares and Redwings are taken in Finland but indices suggest that those taken represent only a small proportion of the population. The taking of raptors in these areas has also declined dramatically since the mid-1960s.

Indices of birds taken in eastern European countries (i.e. USSR, Poland, East Germany, Czechoslovakia, Hungary, Romania, Bulgaria) were generally lower after 1980 than in the earlier period but insufficient recovery data were available to assess the extent of bird taking in this area.

Most recoveries of birds taken in non-E.C. countries in the eastern Mediterranean area came from Yugoslavia, Cyprus, Turkey and Lebanon. It may be that the generally high index values found are a reflection of large numbers of birds being taken, but the indices might be inflated if the probability of rings from birds dying from other causes being reported was lower than in western Europe. Given the low level of public interest in birds, from an ornithological standpoint, in the region (Woldhek 1979), it seems likely that reporting would also be low. However, the consistency of high index values across the range of species analyzed suggests that substantial numbers of birds are taken in this area. The small sample-sizes obtained for countries in this region are, to a large extent, due to lack of data on birds ringed in eastern Europe for species other than Robin, Song Thrush and Blackcap. Recoveries of the above species and the results of several migration studies indicate that this area is the source of a high proportion of birds migrating through the eastern Mediterranean.

Woldhek (1979) found that indiscriminate shooting of protected species was most prevalent in Lebanon and Egypt amongst eastern countries outside the E.C.. Trapping of passerines is known to be carried out on the Istrian coast of Yugoslavia, in northern Turkey and in Egypt but is not thought to make a significant contribution to the taking of migrants in the region, except in Cyprus (Woldhek 1979). Magnin (1987) estimated that approximately two million birds of many species are taken annually for culinary purposes by illegal mist-netting and liming in Cyprus.

Farther west, it has been estimated that more than three million migratory birds, mainly small passerines, are taken annually in Malta (Magnin 1986). The scarcity of Maltese recoveries in the data set analyzed in this study may be due to a high proportion of birds migrating through the island having an eastern origin, but it is likely that it also reflects a low reporting rate for ringed birds.

Indices of birds taken in the Maghreb region of north-west Africa (Morocco, Algeria and Tunisia) are high for many species and several have increased since 1979. This suggests that the extent of shooting and trapping in this area may be greater than previously suspected. Woldhek (1979) was able to provide little information on the scale of the taking of birds in the Maghreb. He concluded that shooting of other than game species was relatively

uncommon, but that trapping was widespread and locally fairly intensive. Trapping appears to be primarily recreational. The majority of recoveries of birds taken in this region have come from western Morocco and coastal Algeria.

23.2 Seasonal variation in the taking of birds

Most shooting and trapping of migratory birds in Europe occurs during the southward movement in autumn. This may be because numbers of birds are greatest in the autumn, with adults being joined by the young of that year. Autumn migration is also carried out at a slower rate than in spring, birds often staying for extended periods in good feeding areas along the route in order to lay down reserves of fat as "fuel" for further flight. In spring the reproductive performance of individuals is enhanced by early establishment of nesting territories and early nesting. This has led to the evolution of a migration which is fast and more direct thus providing less opportunity for birds to be taken en route. The majority of migrants are taken from August to November, the peak month for recoveries for each species becoming progressively later with decreasing latitude of the country analyzed. The thrushes, most of which spend the winter within Europe, are also taken throughout the winter months.

The seasonal distribution of recoveries resulting from shooting and trapping in North Africa, for most species analyzed, is quite different from that occurring in Europe where the taking of birds is predominantly an autumn activity. In North Africa almost as many birds are taken in spring as in autumn. This may be due to birds that winter to the south stopping off in the area for longer periods in spring than they do farther north because of their need to replace depleted fat reserves after the long Sahara crossing, thus making it worthwhile for the local inhabitants to attempt trapping (Moreau 1961). The taking of migrants in spring is potentially more damaging than in autumn because spring populations contain a higher proportion of probable breeders.

23.3 Long-term trends in the taking of birds

Comparison of indices of birds taken for the period before 1980 and from 1980 onwards suggests a general decline in the taking of birds throughout Europe. A total of 391 combinations of species and country of recovery were examined for differences in index value between the two periods. Of these 289 showed a reduction in index, 53 showed an increase and 49 were unchanged. Amongst the changes, 66 (23%) of the decreases and 6 (11%) of the increases were statistically significant. Taking of legitimate quarry species showed little change generally but the indices for Song Thrush increased significantly in France, Spain and Italy and the index for Skylark in France also increased significantly. This may indicate that increased protection of other species has resulted in a "compensatory" increase in the taking of quarry species, or it may simply reflect an increase in the amount of hunting undertaken.

The reduction in index values has been most marked amongst the raptor species, particularly Sparrowhawk and Buzzard. Much of the decline in the taking of these species can be attributed to the introduction of legislation protecting birds of prey in many northern and central European countries during the mid-1960s and early 1970s.

The reduction of index values over the last 40 years in countries where substantial numbers of birds were known to have previously been shot or trapped suggests that fewer birds are now being taken. It is possible, however, that such an effect could be generated if persons taking birds in those countries either failed to report recoveries of ringed birds, or reported them without indicating that the birds had been taken. This would be understandable in the case of illegally taken, non-quarry species and considering the growth of opposition to hunting in many parts of Europe. Such practices might apply particularly to locally ringed birds, when the finder is likely to be less inquisitive about discovering their origins or may wish to avoid drawing the attention of the local authorities to the taking of protected species.

A reduction in the reporting rate for Robins ringed in Finland has occurred over the last 20 years and this has been attributed to reduced taking of birds in Spain and Italy (Saurola 1983). At the present time there is little evidence to suggest that the reductions in indices found in this study are due to anything other than fewer birds being taken. This is further supported by the fact that the majority of low indices found for recent years follow a long-term decline in index values rather than an abrupt change and by the magnitude of the reduction in a number of countries. Further investigation is required to clarify the situation.

23.4 The effects of the taking of birds on population size.

The effect of hunting on the population size of quarry species depends on the way in which hunting mortality is related to the processes by which animal populations in general are regulated under natural conditions (Lack 1954, Sinclair 1989). In most bird species population size tends to remain stable, within relatively narrow limits, in relation to the exploitation of resources. Stabilizing influences restrict the tendencies of populations to deviate from equilibrium size. The factors causing stability tend to decrease population density when it is above the equilibrium level and to increase population density when it is below equilibrium. Thus the action of stabilizing factors varies with population density and, consequently such factors are termed "density-dependent". Density-dependent population regulation returns populations to equilibrium level by compensatory adjustments of reproductive and mortality rates. These adjustments are primarily the result of variation in the level of competition for limited resources, particularly food, at different population densities. For example, at high densities competition will be intense and a proportion of individuals may be unable to obtain

sufficient resources to survive, thus the mortality rate will rise and density will fall.

Reproductive output in birds is generally much greater than is required to compensate for adult mortality. A substantial proportion of the post-breeding population must, therefore, die between breeding seasons for the observed population levels to be demonstrated. This mortality has been shown to be density-dependent in several species (e.g. Murton & Westwood 1977, Hill 1984, McCleery & Perrins 1985, Newton 1988). The taking of birds by Man can only affect population size if it increases the mortality rate above that occurring naturally. Recent intensive studies of hunted populations of gamebirds suggest that a certain amount of mortality due to hunting can be compensated for by natural regulatory processes (Anderson & Burnham 1976, Hill 1984, Potts 1986). Reduction of population density by hunting in autumn may enhance the survival of remaining individuals by reducing competition during winter and at the time of establishment of breeding territories. Mortality due to hunting can also be compensated at other stages of the life-cycle, e.g. by increased reproductive rate at reduced population levels. The taking of birds in spring is potentially more of a threat to populations than in autumn as returning birds have survived the major natural hazards of migration and thus are likely to contribute to the year's reproductive output.

The effects of natural population regulation, increased losses due to hunting and compensation for such losses can usefully be considered together using harvesting theory (Robertson & Rosenberg 1988). This is based around the use of population dynamics models to predict the consequences for subsequent population size and harvest levels of particular levels of harvesting. It is generally accepted that most stable animal populations are regulated by density-dependent processes, and it is these processes which make harvesting possible. Results from a simple harvesting model are shown in Fig.23.1. At low harvesting levels there is little change in the size of the breeding population. As harvest levels increase the absolute size of the harvest increases yet the size of the breeding population declines. This apparently contradictory result occurs because when the breeding population size is depressed density-dependent mechanisms cause the productivity rate to increase. Further increases in harvest rate cause the absolute size of harvest to reach a peak and then decline. The point of maximum sustainable yield is the maximum harvest which can theoretically be taken from the population indefinitely. However this point is an unstable equilibrium such that overestimation of the maximum sustainable yield could easily result in a population decline. For this reason game managers usually aim for a more conservative sustainable harvest, generally known as an optimum sustainable yield. It must be stressed that while these general conclusions are likely to hold for most bird species details of harvest levels and population sizes will depend on the dynamics of individual species, particularly on the nature and strength of density-dependent processes. These are poorly understood for most non-game species. Generally, the post-breeding populations of species with greater reproductive rates and lower natural survival
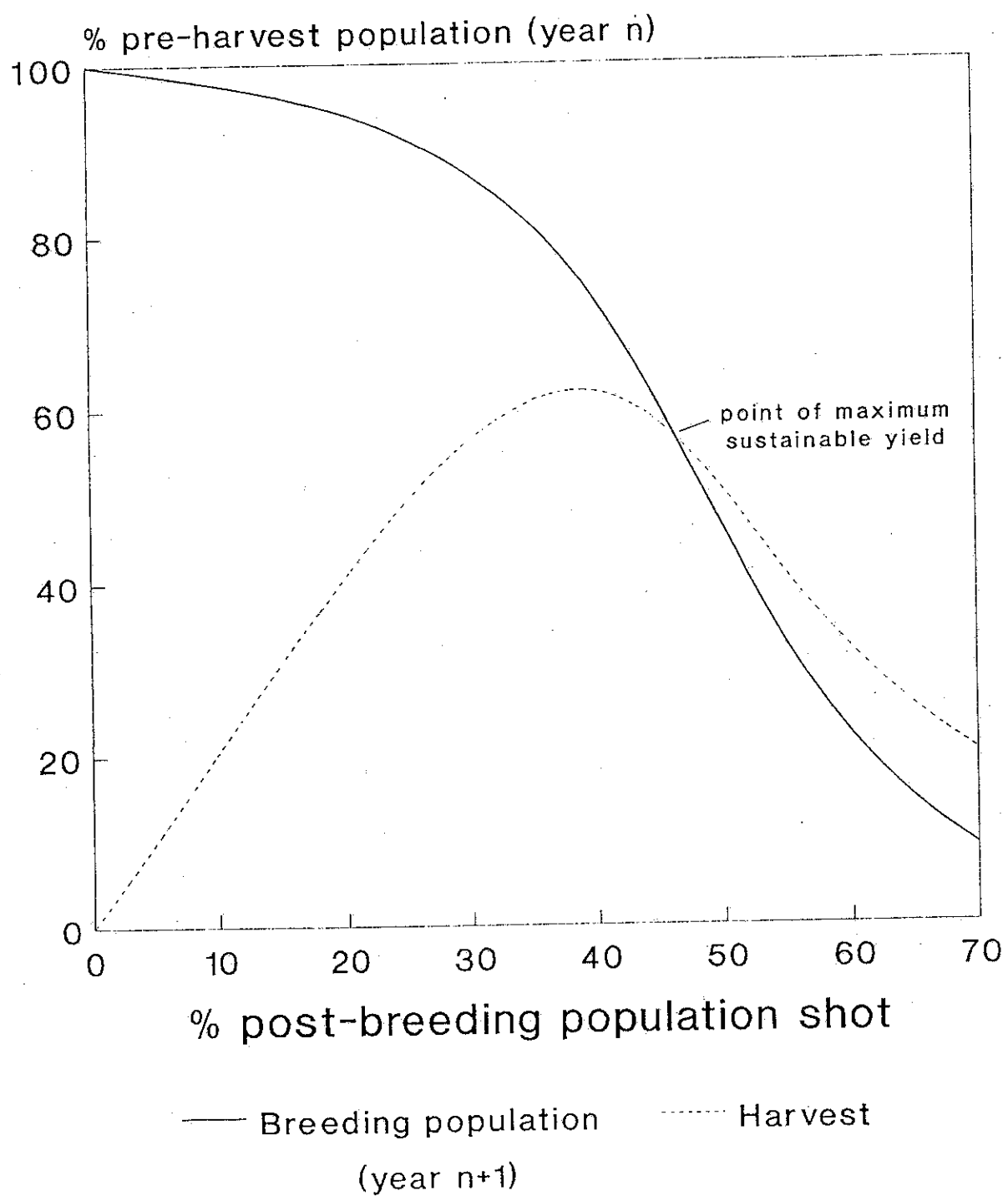
Figure 23.1   Simulation model of waterfowl population
harvested in autumn. (after BASC 1990).

can be harvested at a higher rate than tose which live a long time and have a low reproductive output.

The main conclusions from general understanding of population dynamics and harvesting theory for the taking of migratory birds are as follows. Low levels of harvesting are likely to have little effect on breeding population size. Moderate levels of harvesting are unlikely to cause populations to decline but will reduce the size of the breeding population. Very high levels of harvesting will lead to population declines, and for most species the harvesting level at which this will occur is unknown. Conservationists and hunters may thus have different priorities, the former group wishing to maximize the size of the breeding population while the latter wish to maximize the size of the harvest. It is in the interests of both groups to ensure that populations do not undergo long-term declines. Better data and modelling of the population dynamics of migratory birds subject to taking is needed. In the absence of such information high levels of taking should be avoided.

23.5 Long-term trends in the population levels of the study species and their relationship with trends in the index of birds taken

Relatively little monitoring of bird populations is carried out in much of Europe, therefore the quality of information on changes in bird numbers varies considerably between regions. At present only seven European countries (United Kingdom, Sweden, Denmark, Czechoslovakia, Estonia, Finland, Netherlands) have national monitoring schemes. Recent summaries of trends for terrestrial breeding birds are provided by Hilden and Sharrock (1982,1985), Hustings (1988) and Marchant et al (1990). The population trends presented in Figure 5 simply reflect the predominant status of the species in areas for which recent information is available and may not apply in all parts of the species' European range.

Figure 23.2 shows current population trends in relation to trends in taking revealed by this study. The accuracy of the latter depends on the reporting rate of ringed birds taken in each country being a true reflection of the numbers of birds taken within that country. Some bias may occur due both to cultural and sociological factors affecting the probability of rings being reported and to deliberate suppression of information.

The Song Thrush is the only species amongst those investigated for which there has been an increase in the taking of birds. The increase has coincided with a decline in population levels. However, this does not necessarily imply a causal relationship. British Song Thrushes, which are relatively sedentary, have declined despite being subject to little hunting (Baillie 1990). Those species where population increases are associated with decreases in the numbers taken are predominantly raptors, which are likely to be particularly vulnerable to the effects of hunting

because of their low reproductive rates. Three species (Skylark, Meadow Pipit and Linnet) have declined despite reduction, or no increase, in the index of birds taken.

The relationships described above provide little evidence that current levels of taking of birds are causing population declines but, given the relatively small amount and uneven distibution of population monitoring that has been undertaken, it would be unwise to assume that no such effect has occurred. These data do strongly suggest that raptor populations were previously depressed due to persecution by Man, although their depression and subsequent recovery is likely to be partly attributable to variation in the use of persistent organochlorine pesticides which caused high mortality and breeding failure, particularly in the 1960s. The study species that have declined in the absence of increased taking are all seed-eaters which appear to have been adversely affected by changes in agricultural practices. Although the taking of birds does not appear to have had a major impact on European populations of the study species to date, the continuation of uncontrolled taking of species already undergoing a decline as a result of other factors gives cause for concern. Lack of evidence of deleterious effects of taking on the study species does not necessarily mean that this is also the case in those migratory species that were not investigated.

23.6 Relationships between the taking of birds and current international legislation

23.6.1 E.C. Wild Birds Directive (1979)

This study suggests that the implementation of the E.C. Wild Birds Directive has coincided with a period when the taking of many species of migratory birds has been declining. It is not possible to assess the extent to which legislation has contributed to this decline, and to what extent the decline reflects a general change in attitudes which created a climate where legislation was deemed appropriate. However, the overall declining trend in index values started in most species well before the implementation of the directive. There were insufficient data to enable the effect of E.C. membership on the taking of migratory birds in Greece to be analyzed. Theoretically, membership should have had little effect as all species treated in this study, except Sparrowhawk, were already protected by Greek legislation prior to accession. Spain and Portugal only became members of the E.C. in 1986 and too few recovery data obtained after that date were available to assess the effect of the directive on the taking of birds in these countries. Again, all the species considered here, with the exception of thrushes, were fully protected by earlier local legislation (Woldhek 1979). It is apparent, however, that substantial numbers of protected migratory birds have continued to be taken in southern member states of the E.C. in recent years.

Figure 23.2. Recent European population trends in the 20 study species in relation to trends in the taking of these species.

Population
trend

+	Black Kite Red Kite Marsh Harrier Sparrowhawk Buzzard Garden Warbler Blackcap	Fieldfare Redwing	
=	Reed Warbler Willow Warbler Pied Flycatcher	Robin Redstart Wheatear	
−	Goldfinch Linnet	Skylark Meadow Pipit	Song Thrush

−   =   +

Trend in taking of birds

− decrease

= no change

+ increase

23.6.2   Bern Convention (1979)

The requirements of the Bern Convention are similar to those of the E.C. Directive. However, only eight European countries outside the E.C. were signatories at the beginning of 1989 (Austria, Cyprus, Finland, Liechtenstein, Norway, Sweden, Switzerland, Turkey). Amongst these only Cyprus and Turkey have a tradition of large scale bird-taking and insufficient data are available for the affect of the ratification of the Convention to assessed. It must be stressed that the annual samples of recoveries from individual countries are often small. Thus the recovery data are

more suited to the analysis of long-term changes than to seeking changes between individual years associated with specific items of legislation.

23.6.3   Bonn Convention (1983)

The European Community is a signatory to the Bonn Convention but it has been ratified by only three non-E.C. European states (Norway, Sweden, Hungary) none of which has a history of large-scale bird-taking. Implementation of the Convention's requirements within the E.C. has been too recent for any effect to be detected by this analysis.

Data from this and other studies suggest that, outside the E.C., migratory birds that breed in Community countries are particularly susceptible to being taken while on migration through Morocco, Algeria, Tunisia, Malta and Cyprus. Amongst these, only Tunisia had ratified the Bonn Convention by the beginning of 1989. It may be argued that if the E.C. considers a species to be worthy of protection it is also appropriate that it should also be protected when it is outside E.C. boundaries. The current situation would, therefore, be considerably improved if countries amongst those listed above which have not ratified the Bonn Convention could be persuaded to take this measure.

24.5 Suggestions for future work

This study has shown that ringing recovery data can be effectively used to elucidate variation in the taking of migratory birds over a wide area. There are several ways in which the techniques employed here could be developed to further investigate the effect of human predation on European bird populations.

Ringing recovery data for only a small proportion of the migratory species breeding in Europe have, so far, been analyzed and even for these species geographical coverage is incomplete. There is scope for a much greater number of species to be investigated for geographical and temporal variation in the proportion of birds taken by Man. There is a particular need for a more comprehensive analysis of ringing data relating to birds from Eastern Europe which pass through the Eastern Mediterranean on migration. Only limited data from these areas was available to this study because much of the recovery data from East European ringing schemes is not computerized.

Within the time-scale and resources available for this project it was only possible to investigate the effects of taking birds on the average annual survival of three species, and only for adults. It is important that such analyses should be extended to more species and age classes. There are at least 15 species with sufficient recoveries for adult survival analysis as carried out in this report. A further test of the effect of taking birds on population survival rates could also be achieved by examining the relationship between time specific estimates of taking birds and survival. This would involve statistical modelling of

relationships between annual recovery rates and annual survival rates, both estimated from the recovery data. Special methods of analysis are needed because simple estimates of the recovery and survival rate parameters are not independent. This approach has been used extensively to study waterfowl hunting in North America (Anderson et al. 1982). It could be applied to a range of species similar to those for which there are sufficient data to investigate geographical variation in survival rates. However, such analyses require detailed tabulations of numbers ringed by region, season and age class. This would require computerization of the ringing data for selected species.

The above approaches involving the analysis of ringing data are essential if a better understanding of how the hunting of migratory birds affects populations is to be achieved. It is important both that the historical ringing and recovery data should be fully available for computer analysis and that well planned programmes of ringing should be developed in the future. To do this substantially increased support of EURING and of its member schemes is needed. This should include resources for the computerization of ringing and recovery data which are currently held only in manual systems, together with increased support for the EURING data bank so that a fully up-to-date and comprehensive data source can be established.

Estimates of the absolute proportion of deaths attributable to birds being taken by man in specific areas would complement the broad approach taken by this study. Such studies should be carried out in areas of high hunting pressure. These areas can be identified from the information in this report and from the further analyses proposed above. The following approaches may be possible.

a) Field studies should be carried out in selected areas to determine numbers of birds being killed and numbers passing through the area. Numbers killed could be estimated using a combination of questionnaires, direct observations of hunters and any statistics on hunting or numbers of birds eaten. Estimates of the size of the bird population at risk would require a combination of counts and ringing to measure population turnover.

b) Estimation, from ringing data, of the absolute proportion of a population taken requires a measure of the proportion of ringed birds taken which are reported. This is likely to be difficult to obtain. One possibility may be to compare the proportions of ringed birds reported as taken with the proportions captured at ringing sites in the same area, or even with general estimates of the proportions of particular populations which are ringed. This would require estimates of the numbers killed in particular areas which could be related to the numbers of recoveries reported from these areas.

Initial assessments of which populations may be at risk from human predation should be made by examining the proportion taken as indicated by ringing and other information in relation to data on

life-history characteristics and population trends. Species which normally have low reproductive rates and high adult survival rates and those which have declining populations are most likely to be affected by shooting and trapping.

Relationships between population dynamics and the taking of birds should be examined in more detail for species identified from the above analysis as being at risk. This would involve building population models for selected species using extensive population data from long-term monitoring projects (Baillie 1990) and intensive studies (Potts 1986). Such models would allow the likely impact of different levels of human predation to be evaluated and would identify critical gaps in the data which require new field work.

Studies of geographical and temporal variation in the taking of birds, the effect of the taking of birds on survival rates and on the dynamics of populations of birds would probably identify populations of selected species for which there appear to be marked differences in demography and population trends. It would be highly desirable to carry out a rigorous study of such populations. This would provide data to test the models outlined above.

Such studies might also be linked to situations where a marked reduction in the taking of birds from particular populations is anticipated. This might allow a semi-experimental approach to testing our understanding of the impact of the taking of birds on migratory populations. It would be valuable not only in the context of human predation but also in order to predict the resilience of such populations to future threats.

ACKNOWLEDGEMENTS

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Appendix 1.1   Sparrowhawk – Belgium:
Regional indices of birds taken.

Dept. No.	Department	Index		Sample size	
		-79	80+	-79	80+
20	Antwerpen	68.8	8.7***	112	69
21	Brabant	66.7	18.5**	24	27
22	Henegouwen	77.8	0 ***	28	10
23	Limburg	39.1	15.4 NS	23	26
24	Luik	40.0	0 *	20	10
25	Luxembourg	20.0	0 NS	5	1
26	Namen	45.0	25.0 NS	20	8
27	Oost-Vlanderen	64.7	22.5***	34	49
28	West-Vlanderen	82.1	15.0	28	20

note: -79 = period 1900-1979
       80+ = period 1980 onwards

Appendix 2.1 Buzzard - France
Regional indices of birds taken

Dept. No.	Department	Index -79	Index 80+	Sample size -79	Sample size 80+
1	Calvados	–	0	–	2
2	Eure	75.0	–	4	–
3	Manche	–	–	–	–
4	Mayenne	0	–	1	–
5	Nord	50.0	0	2	3
6	Orne	100	–	1	–
7	Pas-de-Calais	25.0	0	4	3
8	Seine-Maritime	100	0	1	1
9	Somme	50.0	0	4	5
10	Aisne	58.3	50.0	12	2
11	Ardennes	25.0	0	4	5
12	Bas-Rhin	57.5	–	47	–
13	Haute-Marne	50.0	–	4	–
14	Haut-Rhin & Belfort	44.4	0	27	3
15	Marne	43.8	50.0	16	2
16	Meurthe Et Moselle	57.1	–	7	–
17	Meuse	14.3	–	7	–
18	Moselle	68.8	0	16	1
19	Vosges	66.7	–	6	–
20	Aube	80.0	–	5	1
21	Cote D'or	27.8	–	18	–
22	Eure Et Loire	–	–	–	–
23	Loir Et Cher	50.0	–	2	–
24	Loiret	80.0	–	5	–
25	Oise	50.0	0	4	1
26	Sarthe	75.0	0	3	1
27	Seine Et Marne	40.0	0	5	3
28	Seine Et Oise & Seine	100	0	4	1
29	Yonne	28.6	0	7	1
30	Basses - Pyrenees	50.0	–	4	–
31	Charente - Maritime	0	–	1	7
32	Cotes-Du-Nord	0	–	2	–
33	Finistere	0	–	2	–
34	Gironde	33.3	33.3	6	3
35	Ille Et Vilaine	50.0	–	2	–
36	Landes	25.0	–	4	–
37	Loire Atlantique	–	0	–	2
38	Morbihan	–	0	1	1
39	Vendee	66.7	0	3	1
40	Charente	100	0*	3	4
41	Correze	57.1	0	7	3
42	Creuse	0	0	4	7
43	Deux-Sevres	100	–	1	–
44	Dordogne	83.3	0	6	2
45	Haute-Vienne	33.3	0	3	3
46	Indre	100	0	2	3
47	Indre-Et-Loire	100	–	1	–
48	Maine-Et-Loire	–	0	1	3
49	Vienne	100	0	1	2
50	Allier	83.3	0	6	1

51	Ardeche	100	50.0	2	2
52	Cantal	100	–	2	–
53	Cher	71.4	–	7	–
54	Haute-Loire	25.0	–	4	–
55	Loire	58.3	–	12	–
56	Nievre	62.5	–	8	–
57	Puy-De-Dome	60.0	0	10	3
58	Rhone	66.7	0	9	2
59	Saone-Et-Loire	65.2	–	23	–
60	Ain	55.9	0	34	3
61	Basses-Alpes	–	–	1	–
62	Doubs	45.5	0	11	1
63	Drome	40.0	–	5	–
64	Hautes-Alpes	–	–	–	–
65	Haute-Saone	37.5	0	8	1
66	Haute-Savoie	–	0	–	1
67	Isere	57.9	0*	19	7
68	Jura	90.9	0	11	1
69	Savoie	–	–	2	–
70	Ariege	50.0	–	2	–
71	Aveyron	45.4	0	11	1
72	Gers	75.0	–	8	–
73	Haute-Garonne	100	0	5	1
74	Hautes-Pyrenees	–	–	–	–
75	Lot	50.0	0	6	1
76	Lot-Et-Garonne	80.0	–	5	–
77	Lozere	50.0	–	2	–
78	Tarn	75.0	0	8	1
79	Tarn Et Garonne	50.0	100	2	1
80	Alpes-Maritimes	–	–	–	–
81	Aude	75.0	–	4	–
82	Bouches-Du-Rhone	–	–	3	–
83	Gard	50.0	100	6	1
84	Herault	33.3	–	6	–
85	Pyrenees-Orientales	–	–	1	–
86	Var	100	–	2	–
87	Vaucluse	–	–	–	–
90	Corse	100	–	1	–

Appendix 3.1 Skylark - France
Regional indices of birds taken

Dept. No.	Department	Index -79	Index 80+	Sample size -79	Sample size 80+
1	Calvados	57.1	0	7	1
2	Eure	100	100	4	1
3	Manche	20.0	100	5	1
4	Mayenne	–	–	–	–
5	Nord	53.9	90.0	13	10
6	Orne	–	100	–	1
7	Pas-de-Calais	75.0	69.2	12	13
8	Seine-Maritime	33.3	100	3	3
9	Somme	90.9	71.4	11	7
10	Aisne	0	0	1	1
11	Ardennes	–	–	–	–
12	Bas-Rhin	–	–	–	–
13	Haute-Marne	–	–	–	–
14	Haut-Rhin & Belfort	–	–	–	–
15	Marne	–	–	–	–
16	Meurthe Et Moselle	–	–	–	–
17	Meuse	–	–	–	–
18	Moselle	–	–	–	–
19	Vosges	–	–	–	–
20	Aube	100	–	1	–
21	Cote D'or	–	–	–	–
22	Eure Et Loire	50.0	100	4	2
23	Loir Et Cher	100	60.0	2	5
24	Loiret	–	100	–	1
25	Oise	100	–	5	–
26	Sarthe	–	–	–	–
27	Seine Et Marne	100	0	2	1
28	Seine Et Oise & Seine	100	100	5	2
29	Yonne	–	–	–	–
30	Basses - Pyrenees	44.9	61.1	69	18
31	Charente - Maritime	93.8	91.7	16	12
32	Cotes-Du-Nord	100	–	1	–
33	Finistere	0	0	1	1
34	Gironde	58.8	85.7	97	21
35	Ille Et Vilaine	50.0	–	2	–
36	Landes	73.2	89.5	71	38
37	Loire Atlantique	–	66.7	3	3
38	Morbihan	33.3	0	6	1
39	Vendee	66.7	100	6	5
40	Charente	66.7	75.0	3	4
41	Correze	50.0	100	8	1
42	Creuse	–	–	–	–
43	Deux-Sevres	100	100	6	4
44	Dordogne	57.1	80.0	7 –	5
45	Haute-Vienne	100	–	1	–
46	Indre	75.0	–	4	–
47	Indre-Et-Loire	100	100	3	2
48	Maine-Et-Loire	66.7	100	3	1
49	Vienne	90.9	100	11	4
50	Allier	50.0	–	2	–

51	Ardeche	100	100	1	1
52	Cantal	0	100	2	1
53	Cher	–	–	–	–
54	Haute-Loire	–	–	–	–
55	Loire	100	–	1	–
56	Nievre	–	–	–	–
57	Puy-De-Dome	–	–	–	–
58	Rhone	100	–	1	–
59	Saone-Et-Loire	–	–	–	–
60	Ain	–	–	–	–
61	Basses-Alpes	–	–	–	–
62	Doubs	0	–	1	–
63	Drome	100	0	7	1
64	Hautes-Alpes	0	–	1	–
65	Haute-Saone	–	–	–	–
66	Haute-Savoie	–	–	–	–
67	Isere	100	100	6	2
68	Jura	–	–	–	–
69	Savoie	–	–	–	–
70	Ariege	–	–	–	–
71	Aveyron	100	–	2	–
72	Gers	0	–	1	–
73	Haute-Garonne	100	–	1	–
74	Hautes-Pyrenees	83.3	100	6	1
75	Lot	–	–	–	–
76	Lot-Et-Garonne	85.7	66.7	7	3
77	Lozere	–	–	–	–
78	Tarn	0	–	1	–
79	Tarn Et Garonne	100	100	1	1
80	Alpes-Maritimes	66.7	–	3	–
81	Aude	–	–	–	–
82	Bouches-Du-Rhone	0	–	1	–
83	Gard	100	–	1	–
84	Herault	50.0	–	2	–
85	Pyrenees-Orientales	–	–	–	–
86	Var	–	–	–	–
87	Vaucluse	100	100	2	1
90	Corse	–	–	–	–

Appendix 4.1 Meadow Pipit - Portugal
          Regional indices of birds taken.

Dept. No.	Department	Index -79	80+	Sample size -79	80+
80	Beira Alta	88.9	50.0	27	4
81	Beira Litoral	-	-	-	-
82	Douro Litoral	60.0	-	5	-
83	Minho	85.7	-	7	-
84	Tras os Montes	100.0	-	4	-
90	Algarve	61.1	40.0	18	10
91	Alto Atlantejo	73.3	83.3	15	6
92	Baixo Atlantejo	47.8	28.6	23	7
93	Beira Baxia	25.0	-	4	-
94	Estremadura	55.2	50.0	29	12
95	Ribatejo	55.6	100.0	9	6

note: -79 = period 1900-1979
      80+ = period 1980 onwards

Appendix 4.2 Meadow Pipit - France
Regional indices of birds taken

Dept. No.	Department	Index -79	Index 80+	Sample size -79	Sample size 80+
1	Calvados	0	—	4	—
2	Eure	0	—	1	—
3	Manche	0	—	1	—
4	Mayenne	—	—	—	—
5	Nord	16.7	0	12	2
6	Orne	50.0	0	2	1
7	Pas-de-Calais	25.0	0	4	4
8	Seine-Maritime	0	0	2	3
9	Somme	33.3	100	3	1
10	Aisne	0	—	1	—
11	Ardennes	0	—	1	—
12	Bas-Rhin	—	—	—	—
13	Haute-Marne	—	—	—	—
14	Haut-Rhin & Belfort	—	—	—	—
15	Marne	0	—	1	—
16	Meurthe Et Moselle	—	—	—	—
17	Meuse	—	—	—	—
18	Moselle	—	—	—	—
19	Vosges	—	—	—	—
20	Aube	—	—	—	—
21	Cote D'or	—	—	—	—
22	Eure Et Loire	50.0	33.3	2	3
23	Loir Et Cher	0	—	1	—
24	Loiret	40.0	—	5	—
25	Oise	50.0	—	2	—
26	Sarthe	50.0	0	2	2
27	Seine Et Marne	0	—	1	—
28	Seine Et Oise & Seine	0	50.0	2	2
29	Yonne	—	—	—	—
30	Basses - Pyrenees	69.4	0***	62	8
31	Charente - Maritime	50.0	0*	12	8
32	Cotes-Du-Nord	0	—	5	—
33	Finistere	16.7	—	6	1
34	Gironde	47.5	40.0	59	25
35	Ille Et Vilaine	—	0	—	3
36	Landes	67.9	57.9	56	19
37	Loire Atlantique	28.6	0	7	1
38	Morbihan	12.5	—	8	—
39	Vendee	42.9	50.0	7	2
40	Charente	100	41.7	4	12
41	Correze	0	—	1	—
42	Creuse	—	—	—	—
43	Deux-Sevres	25.0	0	4	2
44	Dordogne	60.0	0	10	3
45	Haute-Vienne	—	—	—	—
46	Indre	0	0	1	1
47	Indre-Et-Loire	33.3	0	3	1
48	Maine-Et-Loire	100	0	4	1
49	Vienne	25.0	0	4	2
50	Allier	0	—	1	—

51	Ardeche	100	–	2	–
52	Cantal	0	–	1	–
53	Cher	–	–	–	–
54	Haute-Loire	–	–	–	–
55	Loire	–	–	–	–
56	Nievre	–	–	–	–
57	Puy-De-Dome	–	–	–	–
58	Rhone	–	–	–	–
59	Saone-Et-Loire	–	–	–	–
60	Ain	–	–	–	–
61	Basses-Alpes	0	–	1	–
62	Doubs	–	–	–	–
63	Drome	0	–	1	–
64	Hautes-Alpes	–	–	–	–
65	Haute-Saone	–	–	–	–
66	Haute-Savoie	–	–	–	–
67	Isere	33.3	–	3	–
68	Jura	–	–	–	–
69	Savoie	–	–	–	–
70	Ariege	–	–	–	–
71	Aveyron	–	–	–	–
72	Gers	–	–	–	–
73	Haute-Garonne	0	0	1	1
74	Hautes-Pyrenees	50.0	0	2	1
75	Lot	–	–	–	–
76	Lot-Et-Garonne	50.0	50.0	12	2
77	Lozere	–	–	–	–
78	Tarn	0	–	1	–
79	Tarn Et Garonne	20.0	100	5	2
80	Alpes-Maritimes	–	–	–	–
81	Aude	–	–	–	–
82	Bouches-Du-Rhone	16.7	0	6	2
83	Gard	–	–	1	–
84	Herault	33.3	100	3	1
85	Pyrenees-Orientales	0	0	1	1
86	Var	100	–	4	–
87	Vaucluse	100	100	1	1
90	Corse	–	–	–	–

Appendix 4.3   Meadow Pipit - Spain
Regional indices of birds taken.

Dept. No.	Department	Index -79	Index 80+	Sample size -79	Sample size 80+
0	Alava	0	50.0	1	2
1	Coruna	50.0	-	2	-
2	Guipuzcoa	89.1	75.0	64	12
3	Lugo	100.0	0	1	2
4	Orense	0	-	1	-
5	Oviedo	66.7	60.0	9	5
6	Pontevedra	-	0	-	1
7	Santander	89.5	50.0	19	4
8	Vizcaya	82.1	51.9**	67	27
10	Avila	-	-	-	-
11	Burgos	100.0	-	1	-
12	Leon	-	-	-	-
13	Logrono	50.0	0	2	1
14	Palencia	-	-	-	-
15	Salamanca	100.0	-	1	-
16	Segovia	-	-	-	-
17	Soria	0	-	1	-
18	Valladolid	100.0	-	-	-
19	Zamora	-	-	-	-
20	Cuenca	-	-	-	-
21	Guadalajara	-	-	-	-
22	Huesca	-	-	-	-
23	Lerida	-	100.0	-	1
24	Navarra	100.0	66.7	4	3
25	Teruel	-	-	-	-
26	Zaragoza	33.3	-	3	-
30	Barcelona	83.3	75.0	6	4
31	Castellon	100.0	33.3	2	3
32	Gerona	100.0	-	2	-
33	Tarragona	-	100.0	-	2
40	Albacete	-	-	-	-
41	Alicante	50.0	-	8	-
42	Almeria	100.0	-	1	-
43	Murcia	100.0	-	1	-
44	Valencia	75.0	100.0	4	2
50	Badajoz	87.5	47.1**	40	17
51	Caceres	50.0	25.0	8	4
52	Ciudad Real	100.0	100.0	1	2
53	Madrid	50.0	100.0	8	2
54	Toledo	100.0	66.7	1	3
60	Cadiz	84.9	75.0	73	52
61	Cordoba	70.8	85.7	24	7
62	Granada	83.3	-	6	-
63	Huelva	60.0	63.6	10	11
64	Jaen	100.0	66.7	8	2

65	Malaga	75.0	71.4	12	7
66	Sevilla	87.1	55.5***	124	101
70	Ibiz	–	–	–	–
71	Mallorca	60.0	0	5	1
72	Menorca	50.0	–	2	–

note: -79 = period 1900-1979
      80+ = period 1980 onwards

Appendix 5.1   Robin - Belgium:
               Regional indices of birds taken.

Dept. No.	Department	Index -79	80+	Sample size -79	80+
20	Antwerpen	49.4	14.3*	85	14
21	Brabant	31.4	0.0*	51	13
22	Henegouwen	21.0	0.0	38	1
23	Limburg	58.3	40.0	12	5
24	Luik	52.6	25.0	19	4
25	Luxembourg	0.0	0.0	2	3
26	Namen	50.0	0.0	24	4
27	Oost-Vlanderen	40.0	0.0	35	7
28	West-Vlanderen	30.2	23.1	53	13

note: -79 = period 1900-1979
      80+ = period 1980 onwards

Appendix 5.2   Robin - Portugal
              Regional indices of birds taken.

Dept. No.	Department	Index -79	Index 80+	Sample size -79	Sample size 80+
80	Beira Alta	100.0	0.0	10	0
81	Beira Litoral	66.7	100.0	21	2
82	Douro Litoral	75.0	100.0	12	2
83	Minho	10.0	100.0	4	1
84	Tras os Montes	81.8	50.0	11	2
90	Algarve	42.3	66.7	26	9
91	Alto Atlantejo	68.4	100.0	19	2
92	Baixo Atlantejo	82.6	100.0	23	2
93	Beira Baxia	42.9	0.0	14	2
94	Estremadura	60.0	66.7	15	3
95	Ribatejo	58.3	100.0	12	2

note: -79 = period 1900-1979
      80+ = period 1980 onwards

Appendix 5.3 Robin - France
            Regional indices of birds taken

Dept. No.	Department	Index -79	Index 80+	Sample size -79	Sample size 80+
1	Calvados	100	100-	9	4
2	Eure	11.1	33.3	9	3
3	Manche	43.7	0.0	16	2
4	Mayenne	0	-	4	-
5	Nord	18.4	0	38	7
6	Orne	-	0	-	1
7	Pas-de-Calais	16.0	10.0	25	10
8	Seine-Maritime	6.2	0	16	4
9	Somme	18.5	0	27	9
10	Aisne	9.1	0	11	3
11	Ardennes	0	0	2	2
12	Bas-Rhin	22.2	0	9	1
13	Haute-Marne	25.0	-	4	-
14	Haut-Rhin & Belfort	0	0	6	1
15	Marne	33.3	-	3	-
16	Meurthe Et Moselle	33.0	0	6	2
17	Meuse	-	-	-	-
18	Moselle	0	-	5	-
19	Vosges	33.3	-	3	-
20	Aube	25.0	-	4	2
21	Cote D'or	0	0	3	2
22	Eure Et Loire	16.7	0	6	3
23	Loir Et Cher	100	100	7	2
24	Loiret	16.0	0	25	1
25	Oise	0	0	13	5
26	Sarthe	7.1	0	14	1
27	Seine Et Marne	25.0	0	8	2
28	Seine Et Oise & Seine	7.1	0	28	6
29	Yonne	33.3	0	3	3
30	Basses - Pyrenees	37.8	12.5	74	16
31	Charente - Maritime	14.6	0	41	7
32	Cotes-Du-Nord	10.0	0	10	4
33	Finistere	15.8	0	19	1
34	Gironde	18.5	26.3	92	19
35	Ille Et Vilaine	20.0	0	10	3
36	Landes	44.0	25.0	50	12
37	Loire Atlantique	13.4	0	67	7
38	Morbihan	17.1	0	41	5
39	Vendee	32.0	12.5	25	8
40	Charente	20.0	0	10	3
41	Correze	0	0	7	1
42	Creuse	0	-	1	-
43	Deux-Sevres	10.0	0	10	5
44	Dordogne	33.3	50.0	21	2
45	Haute-Vienne	-	0	10	1
46	Indre	16.7	0	6	1
47	Indre-Et-Loire	9.1	0	2	1
48	Maine-Et-Loire	0	0	7	3
49	Vienne	12.5	16.7	8	6
50	Allier	37.5	0	8	1

51	Ardeche	–	0	3	5
52	Cantal	25.0	–	4	–
53	Cher	0	–	3	–
54	Haute-Loire	–	–	–	–
55	Loire	66.7	0	3	2
56	Nievre	50.0	–	4	–
57	Puy-De-Dome	25.0	0	12	1
58	Rhone	–	0	9	3
59	Saone-Et-Loire	37.5	0	8	3
60	Ain	40.0	0	5	3
61	Basses-Alpes	50.0	0	12	2
62	Doubs	100	–	1	–
63	Drome	18.2	50.0	11	2
64	Hautes-Alpes	33.3	–	3	–
65	Haute-Saone	66.7	0	3	1
66	Haute-Savoie	0	–	4	–
67	Isere	33.3	0	18	3
68	Jura	33.3	–	3	–
69	Savoie	0	0	4	1
70	Ariege	0	0	1	1
71	Aveyron	10.0	–	10	1
72	Gers	57.1	–	7	–
73	Haute-Garonne	12.5	0	16	1
74	Hautes-Pyrenees	–	0	6	2
75	Lot	22.2	0	9	1
76	Lot-Et-Garonne	28.6	0	21	5
77	Lozere	0	0	4	1
78	Tarn	11.8	100-	17	1
79	Tarn Et Garonne	25.0	–	12	–
80	Alpes-Maritimes	25.0	0	16	2
81	Aude	21.4	–	14	–
82	Bouches-Du-Rhone	26.1	20.0	46	5
83	Gard	10.0	0	20	2
84	Herault	17.6	0	34	8
85	Pyrenees-Orientales	31.2	–	16	–
86	Var	20.6	23.5	63	17
87	Vaucluse	50.0	0	14	1
90	Corse	41.7	0	24	4

Appendix 5.4 Robin – Italy
Regional indices of birds taken.

Dept No.	Department	Index -79	Index 80+	Sample size -79	Sample size 80+
0	Belluno	50.0	0	2	1
1	Bergamo	94.1	80.0	17	5
2	Bolzano	–	–	2	–
3	Brescia	89.5	14.3	19	7
4	Como & Sondrio & Varese	71.4	11.1	14	9
5	Cuneo	–	–	–	–
6	Novara & Vercelli	57.1	–	7	–
7	Torino	50.0	0	4	1
8	Trento	54.5	50.0	11	2
9	Valle D'Aosta	–	–	–	–
10	Allessandria & Asti	–	–	1	–
11	Bologna	–	0	1	1
12	Cremona & Mantova	75.0	–	4	–
13	Milano	66.7	33.3	3	3
14	Modena	–	–	–	–
15	Parma & Reggio N. Emilia	–	0	2	1
16	Pavia	–	0	–	1
17	Piacenza	66.7	–	3	–
18	Verona	57.1	50.0	7	4
19	Vicenza	70.0	66.7	10	3
20	Arezzo	–	–	1	–
21	Firenze	100	–	1	–
22	Genova, Massa Carrara & Spezia	50.0	0	8	1
23	Grosseto	29.4	25.0	17	4
24	Imperia & Savona	57.1	25.0	14	4
25	Livorno & Pisa	45.4	0	22	1
26	Lucca & Pistoia	53.3	50.0	15	2
27	Siena	66.7	–	6	–
28	Terni	100	0	1	1
29	Viterbo	50.0	–	4	–
30	Ancona & Pesaro E Urbino	50.0	–	2	–
31	Ascoli Piceno & Macerata	80.0	50.0		2
32	Ferrara & Rovigo	25.0	–	4	–
33	Forli	80.0	100	5	1
34	Gorizia & Udine	64.3	100	14	5
35	Padova	–	–	1	1
36	Perugia	25.0	–	4	–
37	Ravenna	–	–	1	–
38	Treviso	62.5	–	8	–
39	Venezia	50.0	0	8	1
40	Avellino	–	–	–	–
41	Benevento	–	–	1	–
42	Caserta & Napoli	50.0	66.7	2	3
43	Catanzaro	0	–	1	–
44	Cosenza	0	–	1	–
45	Frosinone & Latina	0	0	1	1
46	Potenza	0	–	–	–
47	Reggio Di Calabria	–	–	–	–
48	Roma	66.7	–	3	–
49	Salerno	0	–	5	–

50	Aquilà D. Abruzzi	–	–	1	–
51	Bari	–	–	–	–
52	Brindisi & Lecce	50.0	66.7	2	3
53	Campobasso	–	–	–	–
54	Chieti	100	–	1	–
55	Foggia	–	–	–	–
56	Matera	–	–	–	–
57	Pescara & Teramo	100	–	1	–
58	Rieti	0	–	1	–
59	Taranto	0	–	1	–
61	Elba	0	–	1	–
62	Sardegna	69.6	0	69	1
63	Sicilia	77.8	0	9	1
65	Pantellaria	–	–	–	–
66	Isole Pelagie	–	–	–	–

note: -79 = period 1900-1979
       80+ = period 1980 onwards

Appendix 5.5 Robin - Spain
Regional indices of birds taken.

Dept. No.	Department	Index -79	Index 80+	Sample size -79	Sample size 80+
0	Alava	100.0	-	2	0
1	Coruna	50.0	-	2	0
2	Guipuzcoa	68.2	100.0	22	1
3	Lugo	50.0	-	2	0
4	Orense	-	-	0	0
5	Oviedo	63.6	50.0	11	6
6.	Pontevedra	66.7	-	3	0
7	Santander	50.0	0.0	4	2
8	Vizcaya	81.8	0.0*	11	3
10	Avila	33.3	-	3	0
11	Burgos	33.3	33.3	3	3
12	Leon	0.0	50.0	1	2
13	Logrono	44.4	100.0	9	3
14	Palencia	-	-	0	0
15	Salamanca	100.0	-	2	0
16	Segovia	-	-	0	0
17	Soria	66.7	100.0	3	1
18	Valladolid	100.0	-	1	0
19	Zamora	-	100.0	0	1
20	Cuenca	-	0.0	0	1
21	Guadalajara	-	-	0	0
22	Huesca	75.0	0.0	8	1
23	Lerida	100.0	100.0	4	1
24	Navarra	60.0	100.0	50	1
25	Teruel	66.7	33.3	6	3
26	Zaragoza	54.5	50.0	11	2
30	Barcelona	30.0	75.0	10	4
31	Castellon	81.5	66.7	27	3
32	Gerona	37.5	60.0	24	5
33	Tarragona	73.5	90.0	34	10
40	Albacete	-	-	0	0
41	Alicante	60.0	100.0	20	3
42	Almeria	77.8	100.0	9	1
43	Murcia	85.7	-	7	0
44	Valencia	61.1	66.7	18	3
50	Badojoz	81.6	75.0	38	4
51	Caceres	55.0	-	20	0
52	Ciudad Real	84.6	50.0	13	2
53	Madrid	43.7	40.0	16	5
54	Toledo	50.0	33.3	2	6
60	Cadiz	77.0	78.1	135	32
61	Cordoba	81.4	89.5	124	19
62	Granada	84.1	0.0*	44	2
63	Huelva	65.2	33.3	23	3
64	Jaen	79.8	50.0	109	8
65	Malaga	76.2	100.0	42	6

66	Sevilla	75.4	87.5	65	16
70	Ibiza	20.0	–	5	0
71	Mallorca	75.4	80.0	126	15
72	Menorca	80.6	75.0	36	4

note: -79 = period 1900-1979
      80+ = period 1980 onwards

Appendix 6.1   Redstart - Spain
Regional indices of birds taken.

Dept. No.	Department	Index -79	Index 80+	Sample size -79	Sample size 80+
0	Alava	100.0	–	3	–
1	Coruna	–	–	–	–
2	Guipuzcoa	66.7	6	–	–
3	Lugo	–	–	–	–
4	Orense	–	–	–	–
5	Oviedo	–	–	–	–
6.	Pontevedra	–	–	–	–
7	Santander	–	–	–	–
8	Vizcaya	50.0	–	2	–
10	Avila	100.0	–	1	–
11	Burgos	80.0	–	5	–
12	Leon	–	–	–	–
13	Logrono	75.0	–	12	–
14	Palencia	–	–	–	–
15	Salamanca	–	–	–	–
16	Segovia	100.0	–	1	–
17	Soria	100.0	–	1	–
18	Valladolid	–	–	–	–
19	Zamora	–	–	–	–
20	Cuenca	100.0	–	1	–
21	Guadalajara	–	–	–	–
22	Huesca	71.4	–	7	–
23	Lerida	77.8	–	9	–
24	Navarra	67.7	50.0	34	4
25	Teruel	0	–	1	–
26	Zaragoza	66.7	–	33	–
30	Barcelona	50.0	–	2	–
31	Castellon	50.0	–	8	–
32	Gerona	100.0	0	1	1
33	Tarragona	66.7	100.0	12	1
40	Albacete	–	–	–	–
41	Alicante	100.0	–	1	–
42	Almeria	100.0	–	9	–
43	Murcia	–	–	–	–
44	Valencia	25.0	–	4	–
50	Badajoz	100.0	–	4	–
51	Caceres	–	–	–	–
52	Ciudad Real	100.0	–	2	–
53	Madrid	40.0	50.0	5	2
54	Toledo	–	–	–	–
60	Cadiz	87.0	100.0	54	4
61	Cordoba	77.3	50.0	22	2
62	Granada	79.0	100.0	19	1
63	Huelva	71.4	–	7	–
64	Jaen	87.0	–	23	–
65	Malaga	50.0	–	14	–
66	Sevilla	91.7	–	12	–

70	Ibiza	--	--	--	--
71	Mallorca	100.0	--	1	--
72	Menorca	100.0	--	1	--

note: -79 = period 1900-1979
      80+ = period 1980 onwards

Appendix 7.1   Fieldfare   - Belgium:
          Regional indices of birds taken.

Dept. No.	Department	Index -79	Index 80+	Sample size -79	Sample size 80+
20	Antwerpen	69.8	–	63	–
21	Brabant	83.3	0	6	2
22	Henegouwen	0	–	7	–
23	Limburg	25.0	0	4	2
24	Luik	100.0	0	2	1
25	Luxembourg	16.7	–	6	–
26	Namen	66.7	100	3	1
27	Oost-Vlanderen	57.1	0	21	4
28	West-Vlanderen	62.5	0	32	2

note: -79 = period 1900-1979
      80+ = period 1980 onwards

Appendix 7.2   Fieldfare - Italy
Regional indices of birds taken.

Dept No.	Department	Index -79	Index 80+	Sample size -79	Sample size 80+
0	Belluno	100	–	6	–
1	Bergamo	96.0	100	25	1
2	Bolzano	66.7	100	3	2
3	Brescia	93.8	85.7	16	7
4	Como & Sondrio & Varese	95.2	100	21	5
5	Cuneo	100	–	2	–
6	Novara & Vercelli	88.9	50.0	9	4
7	Torino	100	100	9	1
8	Trento	100	100	20	3
9	Valle D'Aosta	–	–	–	–
10	Allessandria & Asti	100	100	6	1
11	Bologna	94.1	100	17	3
12	Cremona & Mantova	100	100	5	1
13	Milano	88.9	–	9	–
14	Modena	100	100	4	1
15	Parma & Reggio N. Emilia	100	100	6	1
16	Pavia	100	100	3	1
17	Piacenza	100	–	1	–
18	Verona	100	100	20	2
19	Vicenza	84.2	100	19	9
20	Arezzo	83.3	100	6	1
21	Firenze	83.3	0	6	1
22	Genova, Massa Carrara & Spezia	80.0	100	5	1
23	Grosseto	100	–	1	–
24	Imperia & Savona	100	100	8	1
25	Livorno & Pisa	100	–	4	–
26	Lucca & Pistoia	100	–	1	–
27	Siena	100	100	3	1
28	Terni	66.7	–	3	–
29	Viterbo	100	–	1	–
30	Ancona & Pesaro E Urbino	89.5	100	19	3
31	Ascoli Piceno & Macerata	100	100	8	1
32	Ferrara & Rovigo	100	100	13	5
33	Forli	75.0	80.0	12	5
34	Gorizia & Udine	92.3	87.5	26	8
35	Padova	100	–	14	–
36	Perugia	100	100	1	1
37	Ravenna	100	–	11	–
38	Treviso	100	100	13	4
39	Venezia	93.8	100	16	6
40	Avellino	–	–	–	–
41	Benevento	–	–	–	–
42	Caserta & Napoli	100	–	1	–
43	Catanzaro	–	–	–	–
44	Cosenza	100	–	1	–
45	Frosinone & Latina	100	–	2	–
46	Potenza	–	–	–	–
47	Reggio Di Calabria	100	–	1	–
48	Roma	–	–	–	–
49	Salerno	100	–	1	–

		-79	80+	-79	80+
50	Aquila D. Abruzzi	–	–	–	–
51	Bari	100	100	2	2
52	Brindisi & Lecce	100	100	4	1
53	Campobasso	–	–	–	–
54	Chieti	–	100	–	2
55	Foggia	100	–	1	–
56	Matera	–	–	–	–
57	Pescara & Teramo	100	100	2	1
58	Rieti	–	–	–	–
59	Taranto	100	–	1	–
61	Elba	–	–	–	–
62	Sardegna	–	–	–	–
63	Sicilia	–	–	–	–
65	Pantellaria	–	–	–	–
66	Isole Pelagie	–	–	–	–

note: -79 = period 1900-1979
       80+ = period 1980 onwards

Appendix 7.3 Fieldfare - France
Regional indices of birds taken

Dept. No.	Department	Index -79	Index 80+	Sample size -79	Sample size 80+
1	Calvados	63.6	83.3	11	6
2	Eure	77.8	88.9	18	9
3	Manche	83.3	92.3	12	13
4	Mayenne	-	100	-	2
5	Nord	63.9	80.0	36	20
6	Orne	90.0	100	10	2
7	Pas-de-Calais	83.3	90.5	30	21
8	Seine-Maritime	46.2	83.3	13	6
9	Somme	68.2	88.9	22	18
10	Aisne	62.5	66.7	8	3
11	Ardennes	63.6	85.7	11	7
12	Bas-Rhin	0	-	4	-
13	Haute-Marne	100	-	1	-
14	Haut-Rhin & Belfort	50.0	-	4	-
15	Marne	50.0	100	6	2
16	Meurthe Et Moselle	70.0	100	10	1
17	Meuse	100	50.0	4	2
18	Moselle	50.0	0	2	1
19	Vosges	50.0	100	6	2
20	Aube	100	100	3	2
21	Cote D'or	87.5	0	8	1
22	Eure Et Loire	80.0	75.0	10	8
23	Loir Et Cher	62.5	50.0	8	2
24	Loiret	100	50.0	2	2
25	Oise	87.5	80.0	8	5
26	Sarthe	100	100	1	1
27	Seine Et Marne	100	88.9	4	9
28	Seine Et Oise & Seine	85.7	100	14	4
29	Yonne	75.0	66.7	4	3
30	Basses - Pyrenees	68.8	50.0	16	2
31	Charente - Maritime	93.3	100	15	3
32	Cotes-Du-Nord	50.0	100	6	1
33	Finistere	12.5	100	8	1
34	Gironde	84.2	100	38	9
35	Ille Et Vilaine	55.6	100	9	1
36	Landes	85.0	-	20	-
37	Loire Atlantique	83.3	66.7	6	3
38	Morbihan	71.4	100	7	2
39	Vendee	83.3	100	6	4
40	Charente	90.0	66.7	10	6
41	Correze	92.9	-	14	-
42	Creuse	66.7	100	3	1
43	Deux-Sevres	66.7	100	6	4
44	Dordogne	56.0	20.0	25	5
45	Haute-Vienne	100	100	1	1
46	Indre	83.3	100	6	2
47	Indre-Et-Loire	75.0	80.0	4	5
48	Maine-Et-Loire	100	-	3	1
49	Vienne	83.3	75.0	12	4
50	Allier	71.4	100	7	1

51	Ardeche	94.1	71.4	17	7
52	Cantal	100	100	14	5
53	Cher	100	–	5	–
54	Haute-Loire	85.7	66.7	14	3
55	Loire	92.3	100	13	1
56	Nievre	50.0	100	2	1
57	Puy-De-Dome	85.7	100	7	3
58	Rhone	100	100	7	2
59	Saone-Et-Loire	100	–	8	–
60	Ain	80.0	33.3	5	3
61	Basses-Alpes	93.3	66.7	30	3
62	Doubs	70.4	100	31	8
64	Hautes-Alpes	84.6	100	26	6
65	Haute-Saone	80.0	–	15	–
66	Haute-Savoie	80.0	–	10	–
67	Isere	93.3	100	30	1
68	Jura	100	100	9	3
69	Savoie	100	100	6	1
70	Ariege	–	–	–	–
71	Aveyron	86.7	100	15	4
72	Gers	88.9	–	9	–
73	Haute-Garonne	84.6	–	13	–
74	Hautes-Pyrenees	100	–	2	–
75	Lot	90.0	100	10	1
76	Lot-Et-Garonne	81.8	100	22	4
77	Lozere	83.3	100	30	5
78	Tarn	100	100	8	4
79	Tarn Et Garonne	100	100	15	2
80	Alpes-Maritimes	85.7	100	7	1
81	Aude	100	100	4	1
82	Bouches-Du-Rhone	76.2	100	21	1
83	Gard	100	100	30	1
84	Herault	90.9	100	33	3
85	Pyrenees-Orientales	100	–	3	–
86	Var	92.0	100	25	3
87	Vaucluse	87.2	87.5	47	8
90	Corse	–	–	–	–

Appendix 8.1 Song Thrush – Belgium:
Regional indices of birds taken.

Dept. No.	Department	Index -79	Index 80+	Sample size -79	Sample size 80+
20	Antwerpen	43.7	0.0**	48	10
21	Brabant	32.1	0.0*	28	13
22	Henegouwen	50.0	0.0	12	4
23	Limburg	40.0	16.7	5	6
24	Luik	66.7	25.0	21	4
25	Luxembourg	81.2	–	16	0
26	Namen	80.0	0.0	10	1
27	Oost-Vlanderen	33.3	6.7	33	15
28	West-Vlanderen	37.9	21.0	58	19

note: -79 = period 1900-1979
      80+ = period 1980 onwards

Appendix 8.2   Song Thrush - Portugal
Regional indices of birds taken.

Dept. No.	Department	Index -79	Index 80+	Sample size -79	Sample size 80+
80	Beira Alta	84.0	80.0	25	15
81	Beira Litoral	88.6	100.0	44	11
82	Douro Litoral	93.7	–	16	0
83	Minho	88.6	90.0	79	10
84	Tras os Montes	79.1	93.3	43	30
90	Algarve	81.8	72.7	11	11
91	Alto Atlantejo	84.9	93.9	53	66
92	Baixo Atlantejo	89.1	91.7	46	24
93	Beira Baxia	58.8	100.0	17	9
94	Estremadura	92.0	87.5	25	8
95	Ribatejo	91.3	88.0	23	25

note: -79 = period 1900-1979
      80+ = period 1980 onwards

Appendix 8.3 Song Thrush - France
Regional indices of birds taken

Dept. No.	Department	Index -79	Index 80+	Sample size -79	Sample size 80+
1	Calvados	41.7	30.0	24	10
2	Eure	57.1	75.0	7	4
3	Manche	52.7	50.0	55	14
4	Mayenne	0	0	6	4
5	Nord	41.1	50.0	56	12
6	Orne	57.1	100	7	2
7	Pas-de-Calais	60.5	65.0	38	20
8	Seine-Maritime	42.3	33.3	26	6
9	Somme	69.7	65.4	33	26
10	Aisne	66.7	-	6	-
11	Ardennes	75.0	85.7	20	7
12	Bas-Rhin	-	-	-	-
13	Haute-Marne	75.0	50.0	4	2
14	Haut-Rhin & Belfort	-	-	-	-
15	Marne	100	50.0	1	2
16	Meurthe Et Moselle	50.0	-	2	-
17	Meuse	66.7	66.7	3	3
18	Moselle	0	-	1	-
19	Vosges	0	100	2	1
20	Aube	77.8	100	9	4
21	Cote D'or	60.0	100	5	1
22	Eure Et Loire	75.0	80.0	12	5
23	Loir Et Cher	66.7	100	21	4
24	Loiret	57.1	57.1	7	7
25	Oise	66.7	80.0	6	5
26	Sarthe	0	100	4	2
27	Seine Et Marne	75.0	-	8	1
28	Seine Et Oise & Seine	31.8	37.5	22	8
29	Yonne	33.3	0	3	1
30	Basses - Pyrenees	80.6	87.2	134	47
31	Charente - Maritime	83.3	83.6	215	55
32	Cotes-Du-Nord	38.2	0	34	2
33	Finistere	21.4	54.5	42	11
34	Gironde	88.3	93.2	495	163
35	Ille Et Vilaine	48.0	50.0	25	4
36	Landes	85.2	89.3	183	56
37	Loire Atlantique	48.1	76.9	54	13
38	Morbihan	39.4	0*	33	8
39	Vendee	81.8	54.5*	33	22
40	Charente	90.0	81.8	50	22
41	Correze	92.3	100	13	2
42	Creuse	100	-	3	-
43	Deux-Sevres	73.3	100*	30	14
44	Dordogne	65.5	77.8	87	18
45	Haute-Vienne	60.0	-	5	-
46	Indre	75.0	100	12	2
47	Indre-Et-Loire	85.7	75.0	14	8
48	Maine-Et-Loire	57.1	66.7	14	9
49	Vienne	80.6	89.5	36	19
50	Allier	60.0	100	5	1

51	Ardeche	73.9	83.3	23	6
52	Cantal	100	100	4	2
53	Cher	77.8	–	7	–
54	Haute-Loire	85.7	–	7	–
55	Loire	85.7	50.0	14	2
56	Nievre	–	0	–	1
57	Puy-De-Dome	69.2	60.0	13	5
58	Rhone	100	100	5	5
59	Saone-Et-Loire	81.8	100	11	1
60	Ain	100	100	16	6
61	Basses-Alpes	85.0	66.7	20	3
62	Doubs	90.9	100	11	1
63	Drome	89.7	100	68	9
64	Hautes-Alpes	50.0	100	4	2
65	Haute-Saone	33.3	100	3	1
66	Haute-Savoie	100	100	1	1
67	Isere	84.0	100	50	4
68	Jura	86.7	100	15	3
69	Savoie	–	–	–	–
70	Ariege	90.0	100	10	2
71	Aveyron	77.8	50.0	18	2
72	Gers	85.4	88.9	48	9
73	Haute-Garonne	94.3	88.9	35	9
74	Hautes-Pyrenees	94.7	83.3	19	6
75	Lot	100	100	9	3
76	Lot-Et-Garonne	91.7	93.3	108	15
77	Lozere	71.4	100	7	1
78	Tarn	96.2	92.3	53	13
79	Tarn Et Garonne	82.8	50.0	29	4
80	Alpes-Maritimes	77.9	100**	68	25
81	Aude	82.0	76.5	39	17
82	Bouches-Du-Rhone	71.4	97.8**	119	46
83	Gard	77.0	89.2	100	37
84	Herault	89.0	91.8	136	49
85	Pyrenees-Orientales	68.7	87.5	32	16
86	Var	87.8	94.2	131	69
87	Vaucluse	77.1	91.1	109	45
90	Corse	93.1	100	29	35

Appendix 8.4   Song Thrush - Italy
Regional indices of birds taken.

Dept No.	Department	Index -79	Index 80+	Sample size -79	Sample size 80+
0	Belluno	100	–	1	–
1	Bergamo	91.4	97.1	35	35
2	Bolzano	–	–	1	–
3	Brescia	91.7	85.7	12	7
4	Como & Sondrio & Varese	88.2	97.0	17	66
5	Cuneo	100	–	3	1
6	Novara & Vercelli	100	100	5	5
7	Torino	100	100	5	1
8	Trento	66.7	100	3	2
9	Valle D'Aosta	–	–	–	–
10	Allessandria & Asti	50.0	–	2	–
11	Bologna	100	100	2	2
12	Cremona & Mantova	100	100	2	1
13	Milano	87.5	100	8	20
14	Modena	–	–	–	–
15	Parma & Reggio N. Emilia	66.7	–	3	2
16	Pavia	100	100	1	1
17	Piacenza	100	–	1	–
18	Verona	100	100	5	1
19	Vicenza	100	100	2	6
20	Arezzo	75.0	100	8	1
21	Firenze	92.3	100	39	6
22	Genova, Massa Carrara & Spezia	92.9	77.8	42	18
23	Grosseto	90.9	100	33	12
24	Imperia & Savona	90.3	85.4	72	41
25	Livorno & Pisa	89.7	95.4	39	22
26	Lucca & Pistoia	89.1	100	55	11
27	Siena	83.3	80.0	12	10
28	Terni	55.6	100	18	6
29	Viterbo	85.7	80.0	7	10
30	Ancona & Pesaro E Urbino	83.3	100	12	1
31	Ascoli Piceno & Macerata	66.7	100	12	4
32	Ferrara & Rovigo	100	0	2	1
33	Forli	42.9	100	7	4
34	Gorizia & Udine	100	100	1	4
35	Padova	100	100	1	1
36	Perugia	81.8	100	11	1
37	Ravenna	87.5	–	8	–
38	Treviso	100	85.7	2	7
39	Venezia	50.0	0	2	1
40	Avellino	100	–	1	–
41	Benevento	100	100	1	1
42	Caserta & Napoli	100	100	3	3
43	Catanzaro	100	–	2	–
44	Cosenza	100	100	1	1
45	Frosinone & Latina	80.0	85.7	15	7
46	Potenza	100	100	2	2
47	Reggio Di Calabria	100	100	2	2
48	Roma	75.0	93.3	24	15
49	Salerno	84.6	66.7	13	3

50	Aquila D. Abruzzi	100	–	1	–
51	Bari	100	100	2	2
52	Brindisi & Lecce	100	100	2	1
53	Campobasso	–	100	–	2
54	Chieti	50.0	–	2	–
55	Foggia	100	66.7	2	3
56	Matera	–	100	–	1
57	Pescara & Teramo	100	100	2	3
58	Rieti	66.7	100	3	1
59	Taranto	–	0	–	1
61	Elba	–	100	–	1
62	Sardegna	84.1	83.9	126	31
63	Sicilia	0	100	1	1
65	Pantellaria	–	–	–	–
66	Isole Pelagie	–	–	–	–

note: -79 = period 1900-1979
       80+ = period 1980 onwards

Appendix 8.5 Song Thrush - Spain
Regional indices of birds taken.

Dept. No.	Department	Index -79	Index 80+	Sample size -79	Sample size 80+
0	Alava	83.3	100.0	6	1
1	Coruna	71.4	50.0	7	2
2	Guipuzcoa	91.1	95.4	56	22
3	Lugo	-	100.0	0	1
4	Orense	100.0	-	1	0
5	Oviedo	80.0	100.0	40	10
6.	Pontevedra	100.0	-	2	0
7	Santander	84.2	42.9*	38	7
8	Vizcaya	86.4	87.5	59	16
10	Avila	100.0	-	2	0
11	Burgos	100.0	100.0	11	3
12	Leon	50.0	100.0	8	1
13	Logrono	92.0	90.0	25	10
14	Palencia	50.0	-	2	0
15	Salamanca	75.0	-	4	0
16	Segovia	100.0	-	1	0
17	Soria	-	-	0	0
18	Valladolid	100.0	-	1	0
19	Zamora	100.0	-	1	0
20	Cuenca	-	100.0	0	1
21	Guadalajara	100.0	100.0	1	2
22	Huesca	100.0	100.0	4	2
23	Lerida	75.0	87.5	8	8
24	Navarra	80.0	70.6	40	17
25	Teruel	80.0	100.0	15	2
26	Zaragoza	90.5	88.9	21	9
30	Barcelona	69.2	100.0	13	13
31	Castellon	84.4	80.8	96	47
32	Gerona	87.5	80.0	24	10
33	Tarragona	71.9	86.7	82	30
40	Albacete	80.0	66.7	5	3
41	Alicante	80.5	71.4	41	21
42	Almeria	66.7	100.0	3	3
43	Murcia	100.0	100.0	3	1
44	Valencia	85.4	92.9	82	28
50	Badojoz	79.4	90.0	34	40
51	Caceres	66.7	100.0	6	9
52	Ciudad Real	66.7	100.0	6	4
53	Madrid	66.7	85.7	9	7
54	Toledo	63.6	81.2	11	32
60	Cadiz	89.1	82.6	55	23
61	Cordoba	82.6	87.0	201	46
62	Granada	85.0	77.8	40	9
63	Huelva	90.9	95.0	33	20
64	Jaen	81.6	92.3	98	26
65	Malaga	87.5	92.9	24	14

66	Sevilla	80.7	92.2	119	51
70	Ibiza	88.9	–	9	0
71	Mallorca	82.6	96.5**	190	58
72	Menorca	75.8	100.0*	33	16

note: -79 = period 1900-1979
      80+ = period 1980 onwards

Appendix 9.1 Redwing - Belgium:
Regional indices of birds taken.

Dept. No.	Department	Index -79	Index 80+	Sample size -79	Sample size 80+
20	Antwerpen	78.1	0*	105	3
21	Brabant	57.1	-	7	-
22	Henegouwen	66.7	-	3	-
23	Limburg	100.0	-	1	-
24	Luik	63.6	-	11	-
25	Luxembourg	83.3	-	6	-
26	Namen	100.0	-	5	-
27	Oost-Vlanderen	60.9	0**	23	7
28	West-Vlanderen	51.4	0	35	3

note: -79 = period 1900-1979
      80+ = period 1980 onwards

Appendix 9.2   Redwing - Portugal
Regional indices of birds taken.

Dept. No.	Department	Index -79	Index 80+	Sample size -79	Sample size 80+
80	Beira Alta	93.3	93.8	15	16
81	Beira Litoral	95.8	100.0	24	7
82	Douro Litoral	100.0	-	3	-
83	Minho	93.3	96.3	60	27
84	Tras os Montes	93.3	81.8	15	11
90	Algarve	66.7	66.7	3	3
91	Alto Atlantejo	80.7	92.3	45	13
92	Baixo Atlantejo	92.3	81.8	13	11
93	Beira Baxia	75.0	80.0	4	5
94	Estremadura	92.3	100.0	13	8
95	Ribatejo	95.8	100.0	24	16

note: -79 = period 1900-1979
      80+ = period 1980 onwards

Appendix 9.3 Redwing - France
Regional indices of birds taken

Dept. No.	Department	Index -79	80+	Sample size -79	80+
1	Calvados	70.0	60.0	10	10
2	Eure	66.7	100	3	3
3	Manche	45.5	75.0	22	12
4	Mayenne	-	-	-	-
5	Nord	70.6	63.6	17	11
6	Orne	50.0	-	4	-
7	Pas-de-Calais	56.0	79.0	25	19
8	Seine-Maritime	50.0	66.7	8	3
9	Somme	70.6	80.0	17	20
10	Aisne	66.7	-	3	-
11	Ardennes	93.3	100	15	9
12	Bas-Rhin	-	0	-	1
13	Haute-Marne	-	100	-	2
14	Haut-Rhin & Belfort	-	-	-	-
15	Marne	-	-	-	-
16	Meurthe Et Moselle	50.0	-	2	-
17	Meuse	-	100	-	1
18	Moselle	0	100	1	1
19	Vosges	0	100	1	1
20	Aube	100	100	4	5
21	Cote D'or	100	100	3	2
22	Eure Et Loire	50	100	4	2
23	Loir Et Cher	100	-	5	-
24	Loiret	50.0	40.0	8	5
25	Oise	87.5	100	8	2
26	Sarthe	0	-	1	-
27	Seine Et Marne	100	100	1	2
28	Seine Et Oise & Seine	100	100	7	4
29	Yonne	100	100	2	1
30	Basses - Pyrenees	78.3	58.8*	83	34
31	Charente - Maritime	89.3	87.9	56	33
32	Cotes-Du-Nord	16.7	37.5	6	8
33	Finistere	31.6	0	19	3
34	Gironde	91.2	88.4	397	207
35	Ille Et Vilaine	50.0	33.3	10	3
36	Landes	91.7	87.9	108	33
37	Loire Atlantique	42.9	66.7	14	3
38	Morbihan	45.2	0	13	5
39	Vendee	77.8	72.7	9	11
40	Charente	96.6	86.7	29	15
41	Correze	66.7	75.0	3	4
42	Creuse	-	0	-	1
43	Deux-Sevres	83.3	80.0	6	5
44	Dordogne	64.7	75.0	34	12
45	Haute-Vienne	0	0	1	1
46	Indre	50.0	50.0	2	2
47	Indre-Et-Loire	0	50.0	1	2
48	Maine-Et-Loire	100	100	3	1
49	Vienne	100	100	10	4
50	Allier	33.3	100	3	1

51	Ardeche	66.7	100	6	4
52	Cantal	100	83.3	5	6
53	Cher	0	100	1	1
54	Haute-Loire	100	–	1	–
55	Loire	100	–	8	–
56	Nievre	–	100	–	1
57	Puy-De-Dome	100	100	6	1
58	Rhone	100	–	2	–
59	Saone-Et-Loire	100	–	1	–
60	Ain	0	100	1	1
61	Basses-Alpes	91.7	100	12	3
62	Doubs	75.0	–	4	–
63	Drome	94.4	100	18	4
64	Hautes-Alpes	100	100	4	3
65	Haute-Saone	66.7	100	3	2
66	Haute-Savoie	100	–	1	–
67	Isere	83.3		6	–
68	Jura	100	–	5	–
69	Savoie	100	–	1	–
70	Ariege	100	–	1	–
71	Aveyron	83.3	–	6	–
72	Gers	90.7	100	43	11
73	Haute-Garonne	80.0	100	10	2
74	Hautes-Pyrenees	94.1	100	17	1
75	Lot	66.7	100	9	7
76	Lot-Et-Garonne	94.0	83.3	67	18
77	Lozere	100	100	4	3
78	Tarn	100	100	14	6
79	Tarn Et Garonne	100	77.8	11	9
80	Alpes-Maritimes	92.9	100	14	5
81	Aude	93.8	60.0	16	5
82	Bouches-Du-Rhone	82.2	100	45	9
83	Gard	95.8	100	24	17
84	Herault	95.3	94.1	43	17
85	Pyrenees-Orientales	81.8	66.7	11	3
86	Var	100	88.9	47	9
87	Vaucluse	89.2	93.8	65	16
90	Corse	100	100	2	3

Appendix 9.4   Redwing - Italy
Regional indices of birds taken.

Dept No.	Department	Index -79	Index 80+	Sample size -79	Sample size 80+
0	Belluno	50.0	66.7	2	3
1	Bergamo	100	100	15	7
2	Bolzano	-	-	-	-
3	Brescia	100	-	11	-
4	Como & Sondrio & Varese	100	100	8	19
5	Cuneo	-	-	-	-
6	Novara & Vercelli	50.0	-	2	-
7	Torino	100	-	2	-
8	Trento	83.3	50.0	6	2
9	Valle D'Aosta	100	-	1	-
10	Allessandria & Asti	100	-	1	-
11	Bologna	100	100	4	1
12	Cremona & Mantova	100	100	2	1
13	Milano	100	100	2	5
14	Modena	100	100	3	1
15	Parma & Reggio N. Emilia	100	-	5	-
16	Pavia	100	-	3	-
17	Piacenza	-	-	-	-
18	Verona	100	-	8	-
19	Vicenza	100	100	10	5
20	Arezzo	100	66.7	6	3
21	Firenze	100	80.0	19	5
22	Genova, Massa Carrara & Spezia	83.3	100	12	2
23	Grosseto	87.5	100	8	1
24	Imperia & Savona	100	0	14	1
25	Livorno & Pisa	88.5	100	26	4
26	Lucca & Pistoia	91.7	100	24	3
27	Siena	94.7	100	19	1
28	Terni	100	75.0	10	4
29	Viterbo	100	50.0	6	2
30	Ancona & Pesaro E Urbino	91.7	87.5	12	8
31	Ascoli Piceno & Macerata	88.9	66.7	9	3
32	Ferrara & Rovigo	100	-	2	-
33	Forli	100	100	5	4
34	Gorizia & Udine	100	100	4	7
35	Padova	100	-	4	-
36	Perugia	90.0	100	10	2
37	Ravenna	85.7	-	7	-
38	Treviso	100	80.0	4	5
39	Venezia	100	-	2	-
40	Avellino	100	-	2	-
41	Benevento	75.0	-	4	-
42	Caserta & Napoli	66.7	100	3	1
43	Catanzaro	100	-	1	-
44	Cosenza	100	-	4	-
45	Frosinone & Latina	100	100	10	1
46	Potenza	100	100	3	1
47	Reggio Di Calabria	100	-	6	-
48	Roma	100	100	7	1
49	Salerno	100	-	6	-

50	Aquila D. Abruzzi	100	–	1	–
51	Bari	100	66.7	4	3
52	Brindisi & Lecce	100	–	3	–
53	Campobasso	100	66.7	2	3
54	Chieti	–	–	–	–
55	Foggia	100	100	1	2
56	Matera	100	–	1	–
57	Pescara & Teramo	100	–	1	–
58	Rieti	100	100	5	1
59	Taranto	100	100	2	1
61	Elba	100	–	1	–
62	Sardegna	85.7	100	14	1
63	Sicilia	100	100	2	1
65	Pantellaria	–	–	–	–
66	Isole Pelagie	–	–	–	–

note: -79 = period 1900-1979
       80+ = period 1980 onwards

Appendix 9.5 Redwing - Spain
Regional indices of birds taken.

Dept. No.	Department	Index -79	Index 80+	Sample size -79	Sample size 80+
0	Alava	100.0	100.0	2	2
1	Coruna	0	100.0	1	2
2	Guipuzcoa	97.3	90.5	37	21
3	Lugo	-	-	-	-
4	Orense	-	-	-	-
5	Oviedo	76.5	88.2	34	17
6.	Pontevedra	-	-	-	-
7	Santander	92.9	75.0	24	4
8	Vizcaya	77.8	100.0	18	9
10	Avila	-	100.0	-	1
11	Burgos	100.0	100.0	3	2
12	Leon	0	100.0	1	1
13	Logrono	66.7	100.0	3	3
14	Palencia	-	-	-	-
15	Salamanca	-	-	-	-
16	Segovia	-	-	-	-
17	Soria	-	-	-	-
18	Valladolid	-	-	-	-
19	Zamora	-	-	-	-
20	Cuenca	-	-	-	-
21	Guadalajara	-	100.0	-	1
22	Huesca	0	100.0	1	1
23	Lerida	66.7	100.0	3	2
24	Navarra	90.9	70.0	11	10
25	Teruel	50.0	-	2	-
26	Zaragoza	100.0	50.0	3	2
30	Barcelona	0	-	1	-
31	Castellon	71.4	50.0	7	2
32	Gerona	50.0	75.0	2	4
33	Tarragona	71.4	100.0	7	4
40	Albacete	-	-	-	-
41	Alicante	88.9	100.0	9	1
42	Almeria	66.7	100.0	3	1
43	Murcia	100.0	-	3	-
44	Valencia	81.8	66.7	11	3
50	Badajoz	75.0	85.7	4	7
51	Caceres	100.0	-	3	-
52	Ciudad Real	100.0	-	2	-
53	Madrid	66.7	100.0	3	3
54	Toledo	100.0	100.0	2	4
60	Cadiz	88.9	100.0	9	4
61	Cordoba	86.2	75.0	19	8
62	Granada	90.0	100.0	10	6
63	Huelva	100.0	100.0	14	5
64	Jaen	80.0	66.7	10	3
65	Malaga	77.8	75.0	9	4

66	Sevilla	90.0	66.7	30	3
70	Ibiza	–	–	–	–
71	Mallorca	71.4	50.0	7	2
72	Menorca	–	–	–	–

note: -79 = period 1900-1979
      80+ = period 1980 onwards

Appendix 10.1   Reed Warbler – Belgium:
            Regional indices of birds taken.

Dept. No.	Department	Index -79	80+	Sample size -79	80+
20	Antwerpen	87.0	0	23	1
21	Brabant	25.0	0	4	2
22	Henegouwen	100.0	–	1	–
23	Limburg	100.0	0	1	1
24	Luik	100.0	100	1	1
25	Luxembourg	0	–	1	–
26	Namen	–	0	–	1
27	Oost-Vlanderen	–	0	–	5
28	West-Vlanderen	25.0	0	4	1

note: -79 = period 1900-1979
      80+ = period 1980 onwards

Appendix 10.2 Reed Warbler - Portugal
Regional indices of birds taken.

Dept. No.	Department	Index -79	80+	Sample size -79	80+
80	Beira Alta	0	0	1	1
81	Beira Litoral	86.1	100.0	43	1
82	Douro Litoral	71.4	100.0	14	1
83	Minho	85.7	–	7	–
84	Tras os Montes	100.0	–	3	–
90	Algarve	85.0	60.0	20	5
91	Alto Atlantejo	50.0	–	6	–
92	Baixo Atlantejo	12.5	100.0	8	1
93	Beira Baxia	100.0	100.0	2	1
94	Estremadura	68.2	100.0	44	4
95	Ribatejo	66.7	–	9	–

note: -79 = period 1900-1979
      80+ = period 1980 onwards

Appendix 11.1 Blackcap- France
Regional indices of birds taken

Dept. No.	Department	Index -79	Index 80+	Sample size -79	Sample size 80+
1	Calvados	50.0	–	2	0
2	Eure	–	0-0	0	1
3	Manche	0.0	0.0	2	1
4	Mayenne	–	–	0	0
5	Nord	66.7	0.0	3	6
6	Orne	–	0.0	0	1
7	Pas-de-Calais	20.0	0.0	5	5
8	Seine-Maritime	100.0	0.0	1	2
9	Somme	0.0	0.0	2	4
10	Aisne	0.0	0.0	4	1
11	Ardennes	0.0	0.0	3	1
12	Bas-Rhin	0.0	–	3	0
13	Haute-Marne	–	–	0	0
14	Haut-Rhin & Belfort	0.0	–	1	0
15	Marne	0.0	–	1	0
16	Meurthe Et Moselle	0.0	0.0	1	1
17	Meuse	–	–	0	0
18	Moselle	–	0.0	0	1
19	Vosges	–	–	0	0
20	Aube	–	0.0	0	2
21	Cote D'or	0.0	–	1	0
22	Eure Et Loire	0.0	0.0	1	2
23	Loir Et Cher	–	–	0	0
24	Loiret	33.3	0.0	6	1
25	Oise	0.0	–	4	0
26	Sarthe	–	–	0	0
27	Seine Et Marne	–	0.0	0	1
28	Seine Et Oise & Seine	0.0	0.0	4	2
29	Yonne	–	–	0	0
30	Basses - Pyrenees	35.7	0.0	14	3
31	Charente - Maritime	0.0	0.0	5	5
32	Cotes-Du-Nord	0.0	–	2	0
33	Finistere	0.0	0.0	1	1
34	Gironde	4.5	0.0	22	2
35	Ille Et Vilaine	–	–	0	0
36	Landes	21.0	0.0	19	2
37	Loire Atlantique	0.0	0.0	11	2
38	Morbihan	–	0.0	0	2
39	Vendee	0.0	–	1	0
40	Charente	25.0	–	4	0
41	Correze	0.0	–	1	0
42	Creuse	0.0	–	1	0
43	Deux-Sevres	0.0	0.0	1	1
44	Dordogne	0.0	0.0	3	1
45	Haute-Vienne	0.0	–	1	0
46	Indre	0.0	–	2	0
47	Indre-Et-Loire	0.0	0.0	1	1
48	Maine-Et-Loire	0.0	0.0	2	1
49	Vienne	0.0	0.0	1	2
50	Allier	0.0	0.0	3	1

51	Ardeche	0.0	0.0	3	1
52	Cantal	–	–	0	0
53	Cher	0.0	–	2	0
54	Haute-Loire	0.0	–	1	0
55	Loire	0.0	0.0	1	2
56	Nievre	0.0	0.0	2	1
57	Puy-De-Dome	0.0	–	3	0
58	Rhone	0.0	–	3	0
59	Saone-Et-Loire	–	–	0	0
60	Ain	–	–	0	0
61	Basses-Alpes	0.0	–	3	0
62	Doubs	–	–	0	0
63	Drome	0.0	0.0	7	1
64	Hautes-Alpes	–	–	0	0
65	Haute-Saone	–	–	0	0
66	Haute-Savoie	0.0	–	3	0
67	Isere	0.0	0.0	3	1
68	Jura	0.0	–	3	0
69	Savoie	0.0	0.0	2	1
70	Ariege	0.0	100.0	1	1
71	Aveyron	0.0	–	4	0
72	Gers	0.0	–	3	0
73	Haute-Garonne	20.0	–	5	0
74	Hautes-Pyrenees	50.0	–	4	0
75	Lot	0.0	–	1	0
76	Lot-Et-Garonne	33.3	100.0	3	1
77	Lozere	0.0	–	1	0
78	Tarn	–	0.0	0	1
79	Tarn Et Garonne	–	–	0	0
80	Alpes-Maritimes	0.0	0.0	9	1
81	Aude	16.7	0.0	6	1
82	Bouches-Du-Rhone	21.9	20.0	32	5
83	Gard	12.5	0.0	8	1
84	Herault	5.9	0.0	17	6
85	Pyrenees-Orientales	18.2	0.0	11	3
86	Var	25.0	0.0	20	2
87	Vaucluse	0.0	0.0	6	3
90	Corse	75.0	0.0	4	2

Appendix 11.2 Blackcap - Italy
Regional indices of birds taken.

Dept No.	Department	Index -79	Index 80+	Sample size -79	Sample size 80+
0	Belluno	–	–	–	–
1	Bergamo	100	–	12	–
2	Bolzano	–	–	–	–
3	Brescia	71.4	–	7	–
4	Como & Sondrio & Varese	71.4	–	14	1
5	Cuneo	–	–	–	–
6	Novara & Vercelli	66.7	–	3	–
7	Torino	100	–	2	–
8	Trento	100	0	1	1
9	Valle D'Aosta	–	–	–	–
10	Allessandria & Asti	100	–	1	–
11	Bologna	50.0	–	4	–
12	Cremona & Mantova	–	–	–	–
13	Milano	100	100	1	1
14	Modena	–	–	–	–
15	Parma & Reggio N. Emilia	–	–	–	–
16	Pavia	–	–	–	–
17	Piacenza	–	–	–	–
18	Verona	100	–	2	–
19	Vicenza	66.7	–	9	–
20	Arezzo	100	–	2	–
21	Firenze	85.7	–	7	–
22	Genova, Massa Carrara & Spezia	67.4	0	43	1
23	Grosseto	100	0	1	1
24	Imperia & Savona	45.6	0	46	3
25	Livorno & Pisa	75.0	50.0	12	2
26	Lucca & Pistoia	86.4	0	22	2
27	Siena	50.0	0	2	1
28	Terni	100	–	4	–
29	Viterbo	75.0	–	4	–
30	Ancona & Pesaro E Urbino	75.0	–	4	–
31	Ascoli Piceno & Macerata	85.7	–	7	–
32	Ferrara & Rovigo	100	–	1	–
33	Forli	100	–	1	2
34	Gorizia & Udine	100	100	2	1
35	Padova	100	–	2	–
36	Perugia	100	–	3	–
37	Ravenna	75.0	–	20	–
38	Treviso	100	–	3	–
39	Venezia	50.0	–	2	–
40	Avellino	100	–	1	–
41	Benevento	100	–	1	–
42	Caserta & Napoli	80.0	100	5	1
43	Catanzaro	0	–	1	–
44	Cosenza	0	–	1	–
45	Frosinone & Latina	–	0	–	1
46	Potenza	–	–	–	–
47	Reggio Di Calabria	80.0	0	5	1
48	Roma	100	100	3	1
49	Salerno	100	0	6	1

50	Aquila D. Abruzzi	60.0	–	5	–
51	Bari	–	–	–	–
52	Brindisi & Lecce	–	–	–	–
53	Campobasso	–	–	–	–
54	Chieti	0	–	1	–
55	Foggia	100	0	1	1
56	Matera	100	–	1	–
57	Pescara & Teramo	–	–	–	–
58	Rieti	–	–	–	–
59	Taranto	0	–	1	–
61	Elba	–	–	–	–
62	Sardegna	77.8	–	9	–
63	Sicilia	100	–	1	–
65	Pantellaria	–	–	–	–
66	Isole Pelagie	–	–	–	–

note: -79 = period 1900-1979
       80+ = period 1980 onwards

Appendix 11.3 Blackcap - Spain
Regional indices of birds taken.

Dept. No.	Department	Index -79	Index 80+	Sample size -79	Sample size 80+
0	Alava	-	-	0	0
1	Coruna	-	-	0	0
2	Guipuzcoa	60.0	100.0	5	3
3	Lugo	-	-	0	0
4	Orense	-	-	0	0
5	Oviedo	-	100.0	0	2
6.	Pontevedra	100.0	-	1	0
7	Santander	25.0	-	4	0
8	Vizcaya	81.8	16.7*	11	6
10	Avila	-	-	0	0
11	Burgos	100.0	-	1	0
12	Leon	100.0	-	1	0
13	Logrono	100.0	100.0	1	1
14	Palencia	100.0	-	1	0
15	Salamanca	-	-	0	0
16	Segovia	-	-	0	0
17	Soria	-	-	0	0
18	Valladolid	-	-	0	0
19	Zamora	50.0	-	2	0
20	Cuenca	-	-	0	0
21	Guadalajara	-	-	0	0
22	Huesca	0	-	1	0
23	Lerida	-	50.0	0	2
24	Navarra	60.0	100.0	5	4
25	Teruel	0	100.0	1	1
26	Zaragoza	66.7	-	3	0
30	Barcelona	66.7	16.7	3	6
31	Castellon	63.6	53.3	22	15
32	Gerona	100.0	-	1	0
33	Tarragona	61.8	66.7	34	18
40	Albacete	-	100.0	0	1
41	Alicante	57.1	50.0	7	6
42	Almeria	62.5	0.0	8	1
43	Murcia	0.0	100.0	2	1
44	Valencia	58.8	40.0	17	5
50	Badojoz	70.0	100.0	10	1
51	Caceres	0.0	0.0	1	1
52	Ciudad Real	0.0	-	2	0
53	Madrid	0.0	50.0	3	2
54	Toledo	-	100.0	0	1
60	Cadiz	73.8	73.1	65	52
61	Cordoba	82.1	73.5	140	49
62	Granada	61.1	60.0	18	5
63	Huelva	50.0	40.0	4	5
64	Jaen	77.5	60.0	80	30
65	Malaga	12.5	100.0**	8	5

66	Sevilla	75.0	61.8	28	34
70	Ibiza	100.0	0.0	1	1
71	Mallorca	80.0	42.9	10	7
72	Menorca	100.0	0.0	3	2

note: -79 = period 1900-1979
      80+ = period 1980 onwards

Appendix 12.1 Pied Flycatcher Portugal
Regional indices of birds taken.

Dept. No.	Department	Index		Sample size	
		-79	80+	-79	80+
80	Beira Alta	76.1	100.0	46	1
81	Beira Litoral	76.8	50.0	69	2
82	Douro Litoral	72.4	0	29	2
83	Minho	81.0	100.0	21	2
84	Tras os Montes	67.3	50.0	113	4
90	Algarve	28.6	50.0	14	2
91	Alto Atlantejo	66.7	100.0	9	1
92	Baixo Atlantejo	40.0	100.0	5	2
93	Beira Baxia	85.7	100.0	28	2
94	Estremadura	54.4	40.0	46	5
95	Ribatejo	79.0	100.0	19	1

note: -79 = period 1900-1979
       80+ = period 1980 onwards

**Appendix 12.2 Pied Flycatcher - Italy
Regional indices of birds taken.**

Dept No.	Department	Index -79	Index 80+	Sample size -79	Sample size 80+
0	Belluno	–	–	–	–
1	Bergamo	97.3	0	37	1
2	Bolzano	–	–	–	–
3	Brescia	97.4	0	38	1
4	Como & Sondrio & Varese	88.9	100	9	1
5	Cuneo	–	–	–	–
6	Novara & Vercelli	–	–	–	–
7	Torino	–	–	–	–
8	Trento	–	–	–	–
9	Valle D'Aosta	–	–	–	–
10	Allessandria & Asti	–	–	–	–
11	Bologna	–	–	–	–
12	Cremona & Mantova	100	–	1	–
13	Milano	62.5	–	8	–
14	Modena	–	–	–	–
15	Parma & Reggio N. Emilia	–	–	–	–
16	Pavia	–	–	–	–
17	Piacenza	–	–	–	–
18	Verona	100	0	1	1
19	Vicenza	85.7	–	7	–
20	Arezzo	–	–	–	–
21	Firenze	–	–	–	–
22	Genova, Massa Carrara & Spezia	60.0	–	5	–
23	Grosseto	–	–	–	–
24	Imperia & Savona	–	0	–	1
25	Livorno & Pisa	0	–	1	–
26	Lucca & Pistoia	100	–	2	–
27	Siena	–	–	–	–
28	Terni	–	–	–	–
29	Viterbo	–	–	–	–
30	Ancona & Pesaro E Urbino	100	–	1	–
31	Ascoli Piceno & Macerata	–	–	–	–
32	Ferrara & Rovigo	100	–	1	–
33	Forli	–	–	–	–
34	Gorizia & Udine	–	–	1	–
35	Padova	100	–	3	–
36	Perugia	100	–	1	–
37	Ravenna	–	–	–	–
38	Treviso	50.0	–	2	–
39	Venezia	100	–	1	–
40	Avellino	–	–	–	–
41	Benevento	–	–	–	–
42	Caserta & Napoli	60.0	–	5	–
43	Catanzaro	–	–	–	–
44	Cosenza	–	–	–	–
45	Frosinone & Latina	–	–	–	–
46	Potenza	–	–	–	–
47	Reggio Di Calabria	100	–	1	–
48	Roma	–	–	–	–
49	Salerno	0	–	2	–

50	Aquila D. Abruzzi	–	–	–	–
51	Bari	–	–	–	–
52	Brindisi & Lecce	–	–	–	–
53	Campobasso	–	–	–	–
54	Chieti	–	–	–	–
55	Foggia	–	–	–	–
56	Matera	–	–	–	–
57	Pescara & Teramo	–	–	–	–
58	Rieti	–	–	–	–
59	Taranto	–	–	–	–
61	Elba	–	–	–	–
62	Sardegna	66.7	–	3	–
63	Sicilia	100	100	3	1
65	Pantellaria	–	–	–	–
66	Isole Pelagie	–	–	–	–

note: -79 = period 1900-1979
        80+ = period 1980 onwards

Appendix 12.3 Pied Flycatcher - Spain
Regional indices of birds taken.

Dept. No.	Department	Index -79	Index 80+	Sample size -79	Sample size 80+
0	Alava	33.3	0	6	1
1	Coruna	50.0	60.0	2	5
2	Guipuzcoa	69.0	50.0	29	8
3	Lugo	0	-	1	-
4	Orense	33.3	0	3	1
5	Oviedo	100.0	100.0	2	3
6.	Pontevedra	100.0	50.0	2	2
7	Santander	0	0	2	1
8	Vizcaya	66.7	37.5	33	16
10	Avila	100.0	-	1	-
11	Burgos	33.3	100.0	6	1
12	Leon	80.0	33.3	10	3
13	Logrono	71.4	33.3	28	9
14	Palencia	100.0	0	4	1
15	Salamanca	0	-	3	-
16	Segovia	100.0	-	2	-
17	Soria	75.0	-	4	-
18	Valladolid	100.0	100.0	2	1
19	Zamora	33.3	-	3	-
10	Cuenca	100.0	-	2	-
21	Guadalajara	50.0	-	2	-
22	Huesca	100.0	-	2	-
23	Lerida	-	-	-	-
24	Navarra	70.3	25.0	37	4
25	Teruel	-	-	-	-
26	Zaragoza	78.6	75.0	14	4
30	Barcelona	100.0	-	1	-
31	Castellon	100.0	-	1	-
32	Gerona	0	-	1	-
33	Tarragona	100.0	-	1	-
40	Albacete	-	-	-	-
41	Alicante	66.7	-	3	-
42	Almeria	50.0	-	2	-
43	Murcia	100.0	-	1	-
44	Valencia	-	-	-	-
50	Badajoz	50.0	0	2	1
51	Caceres	100.0	-	2	-
52	Ciudad Real	-	-	-	-
53	Madrid	78.6	100.0	14	7
54	Toledo	0	100.0	2	1
60	Cadiz	70.6	50.0	34	4
61	Cordoba	57.1	0	7	1
62	Granada	100.0	0	8	1
63	Huelva	100.0	0	1	1
64	Jaen	100.0	-	2	-
65	Malaga	75.0	-	4	-

66	Sevilla	50.0	50.0	2	2
70	Ibiza	-	-	-	-
71	Mallorca	-	-	-	-
72	Menorca	-	-	-	-

note: -79 = period 1900-1979
      80+ = period 1980 onwards

Appendix 13.1 Goldfinch - Belgium:
Regional indices of birds taken.

Dept. No.	Department	Index -79	Index 80+	Sample size -79	Sample size 80+
20	Antwerpen	94.4	33.3*	72	3
21	Brabant	70.0	33.3	20	3
22	Henegouwen	82.1	0	78	1
23	Limburg	88.2	-	34	-
24	Luik	92.0	100.0	236	9
25	Luxembourg	79.0	50.0	38	2
26	Namen	92.8	25.0**	69	4
27	Oost-Vlanderen	83.3	0	24	1
28	West-Vlanderen	77.6	64.3	58	14

note: -79 = period 1900-1979
      80+ = period 1980 onwards

Appendix 13.2 Goldfinch - Spain
Regional indices of birds taken.

Dept. No.	Department	Index -79	Index 80+	Sample size -79	Sample size 80+
0	Alava	100.0	100.0	11	1
1	Coruna	100.0	0	1	2
2	Guipuzcoa	83.5	100.0	85	7
3	Lugo	-	-	-	-
4	Orense	100.0	-	1	-
5	Oviedo	-	0	-	2
6.	Pontevedra	100.0	100.0	3	1
7	Santander	85.7	100.0	7	2
8	Vizcaya	80.4	-	46	-
10	Avila	100.0	-	3	-
11	Burgos	88.2	100.0	17	4
12	Leon	100.0	-	2	-
13	Logrono	76.5	-	17	-
14	Palencia	100.0	100.0	5	1
15	Salamanca	100.0	-	2	-
16	Segovia	88.2	100.0	17	1
17	Soria	85.7	50.0	7	2
18	Valladolid	75.0	0	8	1
19	Zamora	75.0	-	4	-
20	Cuenca	83.3	100.0	18	1
21	Guadalajara	100.0	-	6	-
22	Huesca	90.0	60.0	10	5
23	Lerida	60.0	100.0	5	1
24	Navarra	88.1	100.0	84	9
25	Teruel	66.7	-	3	-
26	Zaragoza	81.3	33.3	16	3
30	Barcelona	90.9	60.0	33	5
31	Castellon	90.9	100.0	11	1
32	Gerona	66.7	100.0	3	1
33	Tarragona	100.0	-	5	-
40	Albacete	100.0	50.0	1	2
41	Alicante	75.0	-	4	-
42	Almeria	-	-	-	-
43	Murcia	100.0	-	2	-
44	Valencia	84.2	75.0	19	4
50	Badojoz	88.2	100.0	17	1
51	Caceres	83.3	-	6	-
52	Ciudad Real	68.4	80.0	19	5
53	Madrid	94.7	85.7	57	7
54	Toledo	100.0	100.0	4	2
60	Cadiz	93.9	100.0	33	9
61	Cordoba	88.9	-	18	-
62	Granada	80.0	100.0	5	1
63	Huelva	90.9	100.0	11	1
64	Jaen	94.4	100.0	18	2
65	Malaga	89.5	60.0	19	5

66	Sevilla	91.7	50.0	12	4
70	Ibiza	–	–	–	–
71	Mallorca	–	0	–	2
72	Menorca	–	–	–	–

note: -79 = period 1900-1979
       80+ = period 1980 onwards

Appendix 14.1   Linnet – Belgium:
Regional indices of birds taken.

Dept. No.	Department	Index −79	Index 80+	Sample size −79	Sample size 80+
20	Antwerpen	84.6	37.5**	319	8
21	Brabant	76.5	33.3*	68	6
22	Henegouwen	85.2	0*	101	2
23	Limburg	61.9	−	42	−
24	Luik	90.2	83.3	225	6
25	Luxembourg	100.0	−	1	−
26	Namen	90.9	0*	11	2
27	Oost-Vlanderen	94.2	0***	104	4
28	West-Vlanderen	86.7	64.3*	240	14

note: −79 = period 1900-1979
      80+ = period 1980 onwards

Appendix 14.2 Linnet - France
Regional indices of birds taken

Dept. No.	Department	Index -79	Index 80+	Sample size -79	Sample size 80+
1	Calvados	0	–	2	–
2	Eure	0	–	1	–
3	Manche	0	–	3	–
4	Mayenne	–	–	–	–
5	Nord	32.0	0	25	1
6	Orne	–	–	–	–
7	Pas-de-Calais	0	0	11	2
8	Seine-Maritime	0	0	1	1
9	Somme	37.5	–	8	–
10	Aisne	–	–	–	–
11	Ardennes	0	–	2	–
12	Bas-Rhin	0	–	1	–
13	Haute-Marne	–	0	–	1
14	Haut-Rhin & Belfort	–	–	–	–
15	Marne	0	–	5	–
16	Meurthe Et Moselle	66.7	–	3	–
17	Meuse	–	–	–	–
18	Moselle	–	–	–	–
19	Vosges	100.0	–	1	–
20	Aube	0	–	1	–
21	Cote D'or	–	–	–	–
22	Eure Et Loire	0	–	1	–
23	Loir Et Cher	0	–	4	–
24	Loiret	0	–	2	–
25	Oise	0	0	2	1
26	Sarthe	0	–	1	–
27	Seine Et Marne	–	–	–	–
28	Seine Et Oise & Seine	28.6	0	7	2
29	Yonne	–	0	–	2
30	Basses - Pyrenees	83.2	0*	107	2
31	Charente - Maritime	17.7	0	17	1
32	Cotes-Du-Nord	0	–	3	–
33	Finistere	33.3	–	3	–
34	Gironde	69.8	20.0*	202	5
35	Ille Et Vilaine	0	–	2	–
36	Landes	83.8	14.3***	346	7
37	Loire Atlantique	0	–	5	–
38	Morbihan	18.2	–	11	–
39	Vendee	0	–	6	–
40	Charente	60.0	100.0	10	1
41	Correze	100.0	–	2	–
42	Creuse	0	–	1	–
43	Deux-Sevres	45.5	–	11	–
44	Dordogne	20.0	–	15	–
45	Haute-Vienne	–	–	–	–
46	Indre	42.9	–	7	–
47	Indre-Et-Loire	0	–	2	–
48	Maine-Et-Loire	66.7	–	3	–
49	Vienne	16.7	–	18	–
50	Allier	0	–	1	–

51	Ardeche	100.0	–	2	–
52	Cantal	–	–	–	–
53	Cher	–	–	–	–
54	Haute-Loire	–	–	–	–
55	Loire	–	–	–	–
56	Nievre	0	–	1	–
57	Puy-De-Dome	–	–	–	–
58	Rhone	50.0	–	2	–
59	Saone-Et-Loire	–	–	–	–
60	Ain	–	–	–	–
61	Basses-Alpes	100.0	–	1	–
62	Doubs	0	–	2	–
63	Drome	57.1	–	7	–
64	Hautes-Alpes	–	–	–	–
65	Haute-Saone	–	–	–	–
66	Haute-Savoie	0	–	1	–
67	Isere	66.7	–	3	–
68	Jura	–	–	–	–
69	Savoie	–	–	–	–
70	Ariege	–	–	–	–
71	Aveyron	0	–	1	–
72	Gers	100.0	–	2	–
73	Haute-Garonne	42.9	–	7	–
74	Hautes-Pyrenees	100.0	–	5	–
75	Lot	0	–	2	–
76	Lot-Et-Garonne	56.5	–	46	–
77	Lozere	–	–	–	–
78	Tarn	0	–	3	–
79	Tarn Et Garonne	54.6	–	11	–
80	Alpes-Maritimes	–	–	–	–
81	Aude	33.3	–	3	–
82	Bouches-Du-Rhone	73.9	–	46	–
83	Gard	20.0	–	5	–
84	Herault	40.0	–	5	–
85	Pyrenees-Orientales	0	–	1	–
86	Var	71.4	–	7	–
87	Vaucluse	33.3	–	39	–
90	Corse	–	–	–	–

Appendix 14.3 Linnet - Spain
Regional indices of birds taken.

Dept. No.	Department	Index -79	Index 80+	Sample size -79	Sample size 80+
0	Alava	100.0	–	12	–
1	Coruna	100.0	–	1	–
2	Guipuzcoa	93.3	100.0	30	4
3	Lugo	–	–	–	–
4	Orense	–	–	–	–
5	Oviedo	0	–	2	–
6.	Pontevedra	–	–	–	–
7	Santander	71.4	–	7	–
8	Vizcaya	83.0	100.0	53	2
10	Avila	100.0	100.0	4	1
11	Burgos	66.7	100.0	6	2
12	Leon	–	–	–	–
13	Logrono	40.0	100.0	5	1
14	Palencia	0	–	1	–
15	Salamanca	–	–	–	–
16	Segovia	88.2	100.0	17	1
17	Soria	50.0	–	2	–
18	Valladolid	100.0	–	1	–
19	Zamora	50.0	–	2	–
20	Cuenca	100.0	–	8	–
21	Guadalajara	100.0	–	3	–
22	Huesca	83.3	100.0	6	1
23	Lerida	50.0	100.0	6	1
24	Navarra	85.7	–	14	–
25	Teruel	66.7	–	3	–
26	Zaragoza	80.0	75.0	15	4
30	Barcelona	87.5	100.0	40	2
31	Castellon	92.9	100.0	28	8
32	Gerona	100.0	–	5	–
33	Tarragona	66.7	100.0	9	1
40	Albacete	69.2	0	13	2
41	Alicante	83.4	100.0	22	1
42	Almeria	83.3	–	6	–
43	Murcia	88.9	100.0	9	2
44	Valencia	96.4	100.0	55	4
50	Badojoz	75.0	–	4	–
51	Caceres	–	–	–	–
52	Ciudad Real	100.0	66.7	13	3
53	Madrid	82.4	66.7	34	6
54	Toledo	33.3	–	6	–
60	Cadiz	90.7	71.4	43	7
61	Cordoba	90.9	0	11	1
62	Granada	100.0	100.0	13	1
63	Huelva	100.0	–	5	–
64	Jaen	100.0	100.0	26	3

65	Malaga	77.8	100.0	18	3
66	Sevilla	80.0	60.0	20	5
70	Ibiza	100.0	–	2	–
71	Mallorca	77.8	–	18	–
72	Menorca	–	–	–	–

note: -79 = period 1900-1979
      80+ = period 1980 onwards