

Guidelines for Constant Effort ringing in Europe



Background

Constant effort ringing programmes aim to monitor the population changes of widespread passerine and near-passerine species, through a programme of systematic summer mist-netting in specific habitats. Constant effort ringing programmes in winter, will also yield valuable results, but these may have slightly different requirements and are not covered here explicitly, though some recommendations made here will be relevant (e.g. on data recording). Changes in the total number of adults caught provide an indication of changes in the size of the breeding population, while the proportion of young birds caught is used to monitor changes in overall productivity (measuring the combined effect of changes in breeding success per nesting attempt, in the number of attempts and in immediate post-fledging survival). Between-year retraps are used to monitor the annual survival rates of adult birds.

In constant effort ringing, ringing effort is kept constant at a site on each visit and between years. The same number and placement of nets are used each time, and the length of time that the nets are operated on each visit is kept constant at each site, and the seasonal pattern of visits, is standardised across years and across sites. Thus, all sites within a scheme may undertake to carry out a visit in each of the standard set of 10-day intervals, and although it may vary between sites, each site will always use the same nets, at the same locations for the same duration on each visit.

The British and Irish Ringing Scheme was the first to develop a constant effort ringing programme in the early 1980s. The majority of countries that followed in later years tended to follow the British & Irish protocol, with only France developing a substantially different approach. Constant effort ringing is a valuable monitoring programme because as well as providing an index of adult abundance, (season-long) productivity and survival can also be monitored. Constant effort ringing techniques work particularly well in reedbed and scrub habitats (due to suitable vegetation height), which are often poorly covered by traditional census methods.

At the EURING General Meeting on Helgoland in autumn 1999 there was considerable interest expressed by a number of Ringing Schemes in trying to standardise, as far as possible, CES techniques across Europe, with the ultimate aims of comparing species trends between countries and producing combined trends at the European scale. At the meeting, the British Trust for Ornithology (BTO) agreed to take the lead in developing CES at the European scale (EURO-CES), in collaboration with Romain Julliard and the French Ringing Scheme. There is great potential for developing CES work on a European scale to provide more effective monitoring of bird populations for conservation and ecological research. There is a developing need for Pan-European monitoring of common species to assess the impact of EU-wide policies on the European environment. The European Bird Census Council (EBCC) has recently developed a Pan European Common Bird Monitoring Scheme (Pan-European Common Birds Monitoring Project Workshop 16-19 Sept, Prague, in press) based on existing census schemes in 18 European countries.

The guidelines that follow are intended to help organisers when setting up new constant effort programmes. They comprise two sets of information. The left hand column, headed '*Current protocols*', details the current situation and methods used in Britain & Ireland, many of which are similar across most existing schemes. Brief reasons behind the chosen methods are provided, to give a feel for factors that must be considered if there is a need to deviate substantially from the suggested protocols. This column also includes brief reference to major differences shown by the other European constant effort schemes, as highlighted in questionnaire returns from France, Finland, Germany, Poland, Spain, Sweden and the Netherlands. The right hand column headed '*Recommendations*' provides brief guidance on some of the major issues likely to arise when planning a new constant effort scheme. Cases marked '*' refer to areas in

which some analytical work based on existing or new data might aid the provision of more rigorous, quantitative advice on protocols. We present these guidelines under three major topics: Setting-up sites, Annual catching protocols and Data recording. These recommendations are not definitive, but a developing process, of which this is the first step.

Within these guidelines, there is considerable scope for flexibility in the design of constant effort ringing protocols and we may not be able to provide definitive answers as to which approach is best until further analytical work and/or data collection had been carried out. The most important advice is that whatever protocols are recommended, they must remain constant from one year to the next. The protocols need not be identical across schemes to allow trends to be compared (or combined) but the protocols must ensure that the national trends are representative of true biological changes.

Acknowledgements

We would like to thank Stephen Baillie, Humphrey Crick, Harald Dorsch, Wolfgang Fiedler, Gabriel Gargallo, Romain Julliard and Thomas Petterson for commenting on earlier drafts. Scheme organisers from across Europe generously supplied information about their schemes and we thank Professor Franz Bairlein, Dr Thord Fransson, Gabriel Gargallo, Jukka Haapala, Yvon Leruth, Tomek Mokwa, Jesús Pinilla, Pertti Saurola, Gerrit Speek, Dr Fernando Spina and Didier Vangeluwe for their help.

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June 2004

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CURRENT PROTOCOLS

RECOMMENDATIONS

Setting up sites

<p>Long-term continuity of coverage</p> <ul style="list-style-type: none"> The major objective of national (and Euro-) constant effort ringing schemes is to monitor long-term demographic changes in breeding bird populations. 	<p>Long-term continuity of coverage</p> <ul style="list-style-type: none"> Always encourage ringers to aim for long-term ringing at their chosen site (5 years or, preferably, much longer). Ensure that long-term access is agreed before a site is incorporated into the constant effort ringing scheme. Ensure that no major vegetation changes are planned by the site owners/managers before starting constant effort ringing there and nets can be deployed in a stable pattern.
<p>Location</p> <ul style="list-style-type: none"> Ringers select their own sites based within habitat guidelines issued by the organising scheme, as ringers know where they can get access to ring and where they are likely to catch sufficient numbers of birds. All current schemes allow ringers to select their own sites; none use a formal sampling strategy. The geographical and habitat distribution of sites will dictate how representative are the results from the scheme of national bird population trends. In Britain & Ireland, site distribution reflects that of ringers, and promotion of the scheme is now concentrated on establishing sites in remoter geographical areas. 	<p>Location</p> <ul style="list-style-type: none"> It is unlikely that it would ever be possible to implement a formal sampling strategy for practical reasons, but, where possible, a good spread of sites across a region/country is desirable Long-term permission and access to sites is essential to ensure continuity. There should be no major land-use changes planned. Suitable sites are often those with limited public access, such as nature reserves, but note that a focus on these may render the results from the scheme non-representative of bird populations in the wider countryside. Sites exposed to strong wind will be less suitable, since some visits may need to be made in less than ideal weather conditions. Consider special promotion initiatives, or incentives to ringers, to encourage the establishment of sites in areas with lower availability of ringers.
<p>Size</p> <ul style="list-style-type: none"> Sites do not need to be particularly large but must catch a reasonable number of birds (for monitoring purposes and to maintain the ringers' long-term interest). Most sites in Britain and Ireland catch in excess of 200 birds per year, some as many as 700 (dependent of number of nets used) See also numbers and distribution of nets (below) 	<p>Size</p> <ul style="list-style-type: none"> Ringers should have prior experience of ringing at a site, so that they know how many birds they can expect to catch, where best to place the nets <i>etc.</i> A trial year may be necessary to assess how large the site needs to be and where to place nets. Generally, if ringers are catching enough birds to retain their long-term interest in the project, then numbers will be sufficient for monitoring purposes.
<p>Bird species composition/richness</p> <ul style="list-style-type: none"> The aim in Britain & Ireland is to monitor as many widespread passerine and near-passerine species as possible, within the habitats that are suitable for constant effort ringing. 	<p>Bird species composition/richness</p> <ul style="list-style-type: none"> Each country might have its own list of priority species for conservation, and might select appropriate sites for these species. However, the greatest value of a set of EURO-CES schemes will be to monitor a suite of widespread species across the range of suitable constant effort ringing habitats. Appendix 2 lists the commonly caught species by seven existing schemes in Europe.
<p>Habitat</p> <ul style="list-style-type: none"> The most common habitats selected for constant effort ringing are reed-bed, dry (thorn) scrub, wet scrub or mature deciduous woodland. <p>Habitat (continued)</p> <ul style="list-style-type: none"> Suitable habitats are those in which the vegetation 	<p>Habitat</p> <ul style="list-style-type: none"> Major habitats used by existing schemes should be covered where possible eg reed-bed, scrub and deciduous woodland. <p>Habitat (continued)</p> <ul style="list-style-type: none"> Coniferous/plantation woodland should be avoided

<p>height, structure and composition will not undergo successional changes through time, or those in which the vegetation can be held approximately constant via regular management (such as reed cutting or coppicing of scrub).</p> <ul style="list-style-type: none"> • Substantial changes in vegetation will make the results from constant effort ringing difficult to interpret because they may alter capture rates or the composition and abundance of species using a site. • Vegetation change on even a small scale can reduce the efficiency of particular net sites. • Although many sites comprise of homogeneous habitat, within national schemes a range of habitat types will be included eg some sites will be reedbed whilst others will be wet scrub etc. It is interesting to establish whether there are differences in species' population dynamics between habitats. • At the European scale, sites in a range of habitat types allow habitat-specific comparisons of trends (or combined trends) to be made. 	<p>because of rapid changes in vegetation height; farmland habitats can be unproductive due to limited netting opportunities (plus potential vegetation changes); catches tend to be higher in wet habitats.</p> <ul style="list-style-type: none"> • In some regions (e.g. Scandinavia), rapid vegetation change may be unavoidable, it may be better to treat sites as new if they are still being used and habitat management has limited effects • Encourage ringers (or site owners) to carry out regular habitat management on their constant effort site (such as coppicing areas in rotation and regular removal of encroaching woody material from reed-beds); this must be agreed with the owner/manager of each site. • Make sure that habitat management will be allowed on a particular site before it is taken on as a constant effort ringing site. • Recommend some annual vegetation cut-back along net lines. • Many sites will out of necessity contain a range of habitat types but those with relatively homogeneous habitat are preferred (for ease of interpretation of habitat-related differences in demography), though ringers may wish mixed sites, in which case good habitat recording will be necessary (see below). • At the European scale, sites with habitat types widespread elsewhere may be the most useful/representative.
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Annual catching protocols

<p>Timing and duration of the ringing season</p> <ul style="list-style-type: none"> • In Britain & Ireland, the constant effort ringing season runs for the months of May to August inclusive. • The aim is to cover the main part of the breeding season for the majority of species (resident and migrant) that are monitored by the scheme, whilst omitting as much as possible of periods when large numbers of migrants may pass through sites. • Other current schemes have defined an appropriate ringing season based on local knowledge of the timing of breeding across a range of species. • Early visits can monitor adult numbers, later visits are required for productivity. It is important to continue for as long as possible to cover the whole breeding season. • Local transient birds (distinct from migrants) will be present throughout the season. The extent to which this affects trends is unquantified. 	<p>Timing and duration of the ringing season</p> <ul style="list-style-type: none"> • Selection of appropriate ringing ‘windows’ may be more problematic in (i) countries in central and southern Europe that receive a large and prolonged influx of migrants during migration periods and (ii) in large countries that span a wide range of latitudes, longitudes and/or altitudes and hence have marked variation in breeding phenology. Countries may implement latitudinal/altitudinal gradients in timing • The timing and duration of the constant effort ringing season should be country- (or region-) specific. It should be determined from the best available information on the timing of breeding and migration in the given country (or geographical region), to avoid main migration periods. The aim is to cover the main part of the breeding season for the majority of species that are to be monitored. • Where a mix of resident and migrant species occur, seasons may be limited on a species specific basis. • In countries where birds are continuously moving through then it might be possible to monitor just those birds with a brood patch or cloacal protuberance to eliminate transients, though this requires further validation.
<p>Number and seasonal distribution of visits</p> <ul style="list-style-type: none"> • In Britain & Ireland, 12 visits through the breeding season (one in each of 12 10-day periods) are recommended. Sites covering just the first six visits (for monitoring adult numbers) are also accepted. Visits span as much of the breeding period as possible to allow for annual variation in breeding phenology and to permit estimation of changes in productivity in addition to population size monitoring. • In Britain & Ireland, sites submitting eight visits in a year, of which four must be in the first half of the year is acceptable. In Sweden, where 12 visits are strongly encouraged, 11 visits in a year are acceptable, but no fewer. Such missing visits can be accommodated analytically. • Other existing schemes recommend 10-12 visits per breeding season, but France allows 3-7 depending on the site (but many more nets are used at sites in France eg 35+). • The number of visits is a compromise between (i) the number that is desirable to catch a high enough proportion of the local breeding birds to monitor the population trends precisely, given other factors (such as density of nets and duration of individual visits – see below) and (ii) the number that ringers can be persuaded to carry out. • In Britain & Ireland, each of the 12 visits is made during a 10-day period; the interval between constant effort visits should ideally be no less than 6 days (and certainly no less than 3 days), to minimise disturbance and potential ‘trap-shyness’ effects. • In Britain & Ireland, visits additional to the 12 	<p>Number and seasonal distribution of visits</p> <ul style="list-style-type: none"> • The total number of visits should be sufficient to span an appropriate period in which to monitor adult numbers (and a longer period in order to also satisfactorily monitor productivity). • We would currently recommend 10-12 visits, if this is feasible for the ringers involved. This will ensure that sufficient visits are made for successful monitoring, even if some visits are missed due to bad weather or other unforeseen circumstances. • If a smaller number of visits is recommended, then the distribution of these visits through the breeding season is important. It may be practical to monitor adult numbers only (through visits in the early part of the breeding season). • Of great importance is that the pattern at each site is repeated across years as far as possible. • Encourage ringers to spread the selected number of visits as evenly through the constant effort season as possible, and keep the site-specific pattern as constant as possible from one year to the next. • Additional visits should not be encouraged but should be allowed under strict limits so as not to discourage regular ringers from running constant effort sites. • Limited additional visits at the end (but not beginning) of the season may also be permissible (and preferable to mid-season visits).

<p>standard visits are allowed but not within 3 days before a standard visit; birds caught on additional visits are coded differently in the database and excluded from abundance and productivity analyses (although they can be used in survival analyses). Some schemes do not allow any additional visits.</p>	
<p>Number and positioning of nets</p> <ul style="list-style-type: none"> • The total length of netting used and its density generally varies between sites, dependent on the size of sites and the number and abilities of the ringers available. In Britain & Ireland, most sites have 6-12 nets (12m and/or 18m). In some countries (eg France), sites are much larger with many more nets (and more ringers per site). • The positioning of nets will depend on the habitat type and characteristics of the individual sites but should aim to catch a high proportion of the birds breeding within the study area. • The number and positioning of nets must remain constant within a season and from one year to the next, with the aim of keeping capture probabilities constant through time. • In Britain & Ireland, the erection of a small number of additional nets is allowed (if ringers are available to operate them) but the total length of additional nets must not exceed that of the standard nets. Birds caught in additional nets are coded separately in the database and excluded from analyses of abundance and productivity (although they may be used for survival analyses). Additional nets are strictly limited to minimise disturbance and ‘net-shyness’ problems. 	<p>Number and positioning of nets</p> <ul style="list-style-type: none"> • The number of nets used on a particular site must be selected based on the number and ability of ringers available. Prior experience of ringing at the site is recommended. It is important that likely seasonal variation in the number of captures is considered (catches are likely to be lower earlier in the breeding season but potentially much larger when juveniles are fledging). • Prior ringing experience at the site will give guidance as to the most appropriate positioning of nets. Ensure that the distribution is such that they can all be visited regularly enough (at least every 20 minutes). Ringers should produce a map of their site with net positions and use the same positions each year. • If the ringing site is within extensive habitat, a relatively aggregated series of nets should sample the breeding population more effectively than a more linear pattern or series of isolated nets. • Additional nets should not be encouraged but should be allowed under strict limits so as not to discourage keen ringers from running constant effort sites.
<p>Timing and duration of individual visits</p> <ul style="list-style-type: none"> • In most places, bird activity in the breeding season is greatest during the early morning. For this reason, most schemes recommend starting each visit at, or soon after, dawn. • Typical netting sessions last for around 6 hours eg from dawn for 6 hours, or from dawn until a fixed time (eg 12.00). Sessions of less than 4 hours may not produce sufficient captures for analysis and will allow less of a ‘safety margin’ if prevailing weather conditions (eg a cold spell or early fog) delay the start of a morning’s bird activity. Some schemes encourage longer visits (all day). • Evening visits (instead of morning visits) are allowed by most schemes, giving more flexibility for working ringers than having to fit all visits into weekends. • Sometimes a visit may have to be shortened because weather conditions become unsuitable (or for other unforeseen circumstances). It will always be preferable to repeat the visit within the same visit period if at all possible (and record the shortened visit as an additional one (as above)). If a repeat is not possible, in Britain & Ireland the data for a shortened visit is accepted if it was no less than half the duration of a standard visit. Otherwise note if the catch was affected. 	<p>Timing and duration of individual visits</p> <ul style="list-style-type: none"> • Whether morning or evening visits are chosen, and whatever the selected timing of visits, it is essential that the pattern (timing and duration across the season) is repeated from one year to the next. Recommend that the ringers keep a written record of their particular regime. • Recommend that each visit is a minimum of four hours in duration, and preferably longer. Visits of more than 6 hours duration may not be an efficient use of ringers’ efforts because they will generally extend into quieter times of the day for bird activity. • Recommendations about the timing of visits should be based on the conditions in any particular country; for example, evening visits may be more practical in countries with long evenings of daylight but will only work efficiently if bird activity is sufficient at that time of day. • Ringers’ prior experience at a site may indicate the best time for catching birds there. • Always encourage ringers to repeat a visit if at all possible if they have to abandon it due to adverse weather or other circumstances.

Artificial attractants for birds

- Tape lures are not permitted on constant effort sites at any time during a visit because they may disrupt normal bird activity.
- Artificial foods should not be offered at constant effort sites at any time during the breeding season, because they may attract individual birds from outside the study area and potentially also influence breeding success and survival if they are supplied over extended periods. Ideally artificial food should not be provided in the winter months either.
- It is also preferable not to offer an artificial water supply at constant effort sites, because this may also attract birds from outside the study area (particularly in countries with hot summer climates).
- Nest-boxes are permitted in and around constant effort sites. However, once a ringing site is in operation, the number of nest-boxes should be kept constant (by regularly repairing them and not adding additional ones). Otherwise, changes in the number of available nest sites could affect the adult population size of target species. In Britain & Ireland, changes to the numbers of nest-boxes are not permitted at or within 400m of a constant effort ringing site.

Artificial attractants for birds

- Recommend no tape-luring or provision of supplementary food or water on constant effort sites. Even the provision of supplementary food at or near the site in winter may artificially influence the over-winter survival of resident species.
- Recommend no change in the numbers of nest-boxes at or near constant effort sites (None are better!). The number of nest-boxes wanted at or near a site must be determined and erected before constant effort ringing is initiated at the site, and then maintained through time.
- As the aim of constant effort ringing is to monitor changes in populations that are representative of those in the wider countryside, these principles of the effects of artificial changes should be made clear to ringers. They should then report any changes to their sites that may compromise this aim to the scheme co-ordinator. For example, the sudden planting of a large number of berry-bearing plants at a site might increase the site's attractiveness to autumn migrants. With enough sites within a scheme, such short-term changes should not lead to long-term systematic biases in the measured trends but it is nonetheless useful if such changes at individual sites are recorded. If there has been substantial change then a new site code should be allocated.

Data recording

<p>Data on individual birds</p> <ul style="list-style-type: none"> • In Britain & Ireland, the following variables are recorded and computerised for every bird:- date, new or retrap, ring number, species, age, sex and sexing method (eg cloacal protuberance, brood patch), brood patch development score (for analyses of timing and length of breeding seasons). • Optional variables are:- wing length, tarsal length, weight, time of capture, net of capture, fat score (all these are not currently computerised within the constant effort scheme data set). • Most other schemes collect most of the obligatory variables and some or all of the optional ones. • If additional nets are erected during a constant effort standard visit, then birds caught in these nets must be noted and coded as such in the data. Similarly for birds caught during additional visits. 	<p>Data on individual birds</p> <ul style="list-style-type: none"> • Recommend that the minimum variables to be recorded are:- date, time, new or retrap, ring number, species, age, sex and sexing method (eg cloacal protuberance, brood patch). See Appendix 3. • Strongly recommend that all schemes also record brood patch development score (giving information on the timing and duration of breeding seasons that may help to validate the choice of ringing season duration; will also provide valuable biological information in its own right), presence of primary moult, wing-length and (where possible) weight. • Strongly recommend that all schemes also record fat score and time of capture for migrant species (potentially giving information on the timing and duration of birds on passage that may help to validate the choice of ringing season duration; will also provide valuable biological information in its own right). • In view of the desirability of biometric details, ringing birds at a central base is preferable.
<p>Habitat information</p> <ul style="list-style-type: none"> • The collection of habitat information about constant effort sites is important (a) for classifying sites into habitat types for specific analyses and comparisons across countries/regions and (b) to monitor any changes in habitat at sites (which may affect capture rates or species composition and abundance at sites). • The above objectives require habitat information at three levels: (i) the whole site and surrounding area, (ii) the sampling area and (iii) around individual net lines. • In Britain & Ireland, we have codes to describe broad habitat classes of the site and its surroundings, and more detailed codes to describe habitat within a 10m band along each net line. We also record habitat structure (percentage canopy and scrub cover) along net lines and the average height of vegetation along net lines. We ask ringers to record this detailed information once every three years. • Most other constant effort schemes incorporate some form of habitat recording. 	<p>Habitat information</p> <ul style="list-style-type: none"> • It is essential that, as a minimum, ringers record some broad-scale habitat information for each constant effort site, so that sites can be grouped by these broad classes for analysis, or habitats can be checked when interpreting national or regional comparisons. • Strongly recommend that all schemes record important habitat changes at sites, so that these can be taken into consideration when interpreting population changes.
<p>Weather information</p> <ul style="list-style-type: none"> • In Britain & Ireland, constant effort ringers record some standard weather variables (rain, wind) on a simple scoring system twice during each visit. They are also to asked to record in a box whether, according to their judgement (as they know the site best), the weather influenced their catch that day. We use this information to assess whether visits should be included in analyses, using a standard set of criteria. 	<p>Weather information</p> <ul style="list-style-type: none"> • The system of simple weather recording has proved useful in Britain & Ireland. • It is unlikely that ringers would be prepared to collect weather information of a quality suitable for biological analyses; in any case, such data are now generally available from other sources.

Appendix 1. Summary of CES Schemes in Europe operating at June 2004. Details are given on the average number of sites operating in each year, the number of visits made and nets used at each site, together with an indication of whether they operate over the whole breeding season.

	Year Started	Number of sites	Number of visits	Number of nets	Breeding season monitored?
UK	1983	140	12	6 – 12	Yes
Finland	1987	35	12	6 – 20	Yes
France	1989	30	3	15-50	Early part only
Spain (SYLVIA)	1991	38	10	7 – 15	Yes
The Netherlands	1994	51	12	6 – 12	Yes
Spain (PASSER)	1995	46	10	2 – 13	Yes
Sweden	1996	29	12	3 – 15	Yes
Germany (Hiddensee)	1997	26	12	2 – 11	Yes
Poland	1999	10	12	8 – 10	Yes
Germany	1999	35	12	6 – 20	Yes
Belgium	2002	N.A.	N.A.	N.A.	N.A.
Italy	2002	19	N.A.	N.A.	N.A.
Portugal	2002	10	N.A.	N.A.	N.A.
Czech Republic	2003	1	9	N.A.	N.A.

N.A. – Data not available

Appendix 2 Commonly caught species by constant effort ringing programmes in Europe

Britain & Ireland	Spain	France	Finland	Poland	Sweden	The Netherlands
Acrocephalus scirpaceus	Acrocephalus scirpaceus	Acrocephalus scirpaceus	Acrocephalus schoenobaenus	Acrocephalus scirpaceus	Phylloscopus trochilus	Acrocephalus scirpaceus
Acrocephalus schoenobaenus	Sylvia atricapilla	Sylvia communis	Sylvia communis	Acrocephalus palustris	Erithacus rubecula	Acrocephalus schoenobaenus
Sylvia atricapilla	Cettia cetti	Sylvia borin	Sylvia borin	Acrocephalus schoenobaenus	Acrocephalus scirpaceus	Sylvia atricapilla
Phylloscopus trochilus	Luscinia megarhynchos	Sylvia atricapilla	Phylloscopus trochilus	Sylvia communis	Sylvia atricapilla	Phylloscopus trochilus
Parus caeruleus	Hirundo rustica	Hippolais polyglotta	Ficedula hypoleuca	Sylvia atricapilla	Turdus merula	Troglodytes troglodytes
Troglodytes troglodytes	Serinus serinus	Luscinia megarhynchos	Fringilla coelebs	Sylvia curruca	Sylvia communis	Turdus merula
Prunella modularis	Passer domesticus	Phylloscopus collybita	Parus major	Sylvia borin	Fringilla coelebs	Emberiza schoeniclus
Fringilla coelebs	Carduelis chloris	Turdus merula	Parus caeruleus	Phylloscopus trochilus	Parus major	Parus caeruleus
Turdus merula	Carduelis carduelis	Erithacus rubecula	Emberiza schoeniclus	Parus major	Sylvia borin	Parus major
Pyrrhula pyrrhula	Turdus merula	Parus major	Turdus iliacus	Turdus merula	Emberiza schoeniclus	

Appendix 3 Variables to be computerised

A. Site Record

A provisional list of variables that should be recorded for each site, together with guidance on data format.

Minimum requirement

Site Identifier to identify site	[6 col. Alphanumeric]	Three initial characters to identify scheme, three digits
Site Co-ordinates	[15 col. Alphanumeric]	Latitude then Longitude as quadrant (+/- for N/S and E/W respectively) then degrees, minutes and seconds (all 2 col. Numeric) e.g. Thetford, England is 52°25'26" N 0°44'49" E and would be coded as +522526+0004449
Habitat Type	[2 col. Alphabetic]	The British and Irish scheme uses "WS" wet scrub, "DS" dry scrub and "WD" wood for example.

[Do we need to separate years, for e.g. habitat change and habitat management]

[Additional habitat variables?]

B. Visit Record

A provisional list of variables that should be recorded for each site, together with guidance on data format.

Minimum requirement

Site Identifier to identify site	[6 col. Alphanumeric]	Three initial characters to identify scheme, three digits
Visit Identifier	[2 col. Numeric]	
Date	[8 col. Numeric]	In the format 01012001
Start Time	[4 col. Numeric]	
Finish Time	[4 col. Numeric]	
Total Net Length	[4 col. Numeric]	Total length of standard nets (metres)
Quality Code affected e.g. by weather	[1 col. Numeric]	0 if catch 'typical' of place and season, 1 if adversely affected

Recommended

Additional Net Length	[4 col. Numeric]	Total length of additional nets (metres)
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[Do we want to include simple weather vars i.e. the rain wind vars we record?]

C. Capture Record

A provisional list of variables to be included in each capture record, together with guidance on data format. This is derived from the Euring exchange code, which should be followed where possible. Note these are intended to represent a minimal common set of data, individuals are free to record extra variables, e.g. additional biometrics or presence of ectoparasites. Note birds caught in extra visits, or nets additional to those normally used should not be included.

Minimum requirement

Date	[8 col. Numeric]	In the format 01012001
Site Identifier to identify site	[6 col. Alphanumeric]	Three initial characters to identify country, three digits
Ring number	[10 col. Alphanumeric]	
Ring Type Identifier retrap)	[1 col. Numeric]	1 Metal ring added, 4 Metal ring already present (i.e.
Species	[5 col. Numeric]	Euring code number
Sex	[1 col. Alphabetic]	M(ale), F(emale), U(nsexed)
Sexing method P(lumage)	[1 col. Alphabetic]	Typically B(rood patch), C(loacal protuberance),
Age	[1 col. Numeric]	Euring code

Strongly recommended

Time of capture	[4 col. Numeric]	In the format 0900
Brood patch state	[1 col. Alphanumeric]	See Table below
Moult state	[1 col. Alphabetic]	See Table below
Wing length	[3 col. Numeric]	to nearest 1 millimetre
Weight	[5 col. Numeric]	to nearest 0.1g

Optional

Net of capture	[2 col. Numeric]	
Primary moult score (old) - 5 (new) scale	[10 col. Numeric]	One col. For each primary feather, state of which on 0
Fat score	[1 col. Numeric]	Following the ESF scheme
Pectoral muscle Score	[1 col. Numeric]	On a 0-3 scle

Coding for variables (Moult and Brood Patch state) not found in Euring exchange code – following Redfern, C.P.F. & Clark, J.A. (2001) *Ringers's Manual*, 4th ed. BTO, Thetford.

Code	Moult State
J	Wholly Juvenile plumage
P	Active post-juvenile body moult
B	Active body-moult (not PJ)
O	Old plumage
S	Starting body moult
E	Ending body moult
N	New plumage following recent moult
M	Active wing/tail moult
A	Arrested wing moult
T	Partial PJ moult involving tail/tertials

Code	Brood patch state
0	Absent
1	Starting
2	Well-defined, muscle still visible
3	Skin of belly opaque with broad wrinkles
4	Skin of belly has thin wrinkles, but muscle visible again
5	Feathering over
P	Present