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Assisted by: Dr I Bainbridge, Professor D Jenkins, Dr M Marquiss, Dr J B Nelson, and R Swann
Business Editor: The Secretary SOC, 21 Regent Terrace Edinburgh EH7 5BT
(tel 0131-556 6042, fax 0131 558 9947, email mail@the-soc.org.uk).

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Roof and ground nesting Eurasian Oystercatchers in Aberdeen

A DUNCAN, R DUNCAN, R RAE, G W REBECCA & B J STEWART

In 1993 Aberdeen had a population of at least 275 pairs of breeding Eurasian Oystercatchers of which 205 nested on roofs. This was probably the highest concentration of roof nesting Oystercatchers in Europe. Productivity for a sample of the roof nesters was 0.8 fledged young per pair. This compared favourably with other ground nesting populations inBritain. Factors possibly facilitating the increase of the population and some of the problems resulting from a wader colonising an urban environment are discussed.

Introduction

The Eurasian Oystercatcher* *Haematopus ostralegus* is a common breeding wader in Britain, with numbers and range having increased during the twentieth century (Cramp & Simmons 1983, Marchant *et al* 1990). It had a chiefly coastal distribution in Britain and Ireland but now also breeds inland in northern England and Scotland (Cramp & Simmons 1983, Dare 1993).

In the early 1990s, there was an estimated 82,500 breeding pairs in lowland Scotland (O'Brien 1996). In north east Scotland it is a widespread bird on most open habitats apart from moors and mountain tops (Buckland *et al* 1990).

Eurasian Oystercatchers normally nest on sparsely vegetated ground or on shingle, but are well known for using unusual sites such as roofs, fence post tops, tree stumps and broken walls (Paton & Willis 1973, Smith 1981, Cramp & Simmons 1983). In Scotland they have even nested in shallow hollows in trees (Smith 1989, Dougall *et al* 1989, Kirk 1991).

Eurasian Oystercatchers were first noted nesting on roofs in Aberdeen in 1966 when a pair reared 2 young on a flat school roof (RR *pers obs*). The earliest published records from Aberdeen were of 4 pairs at separate roofs between 1971 and 1974 (Paton & Willis 1973, Bourne 1975).

The early history of ground (1960s) and roof nesting (1971-75) at one of these locations was described in detail by Mills (1978). In the late 1970s, A Knox estimated about 30 roof nesting pairs in Aberdeen and reported that the population appeared to be increasing (in Marren 1982).

The first attempt to quantify the extent of roof nesting within the urban and suburban areas of Aberdeen took place in 1986, when 109 confirmed or possible breeding pairs were located, of which 74 were confirmed as roof nesters and 23 as ground nesters (Rae *et al* 1986). In 1988 BJS and F Tadhunter organised a similar census as did AD and RD in 1993. This paper presents the results from these surveys, discusses the increase of the population and compares the hatching success and productivity from a sample of the roof nesting pairs with other studies of ground nesting Eurasian Oystercatchers in Britain.

History of roof nesting

A request through the Internet in 1998 for information on roof nesting by Eurasian Oystercatchers and follow up correspondence revealed that the earliest records were from Holland, where pairs used ridged roofs in Texel in 1916 and the flat roof of a hospital in Friesland in 1936 (J Hulscher *in litt*, see also Tekke 1978). Other records from Holland included 10 to 20 pairs in The Hague (W L Janse), at least 25 pairs in Amsterdam

**Scottish Birds* has now adopted the latest BOURC English names (refer to pages 33-49 for the SBRC paper)

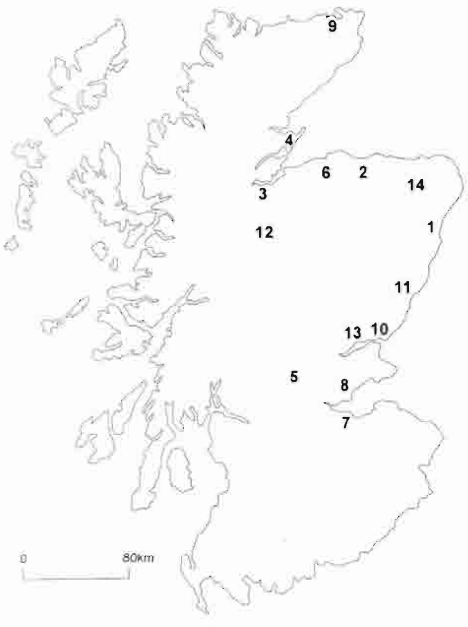
(M Kuiper), 4 to 6 pairs in Groningen (J Allex) and 46 pairs in south Kennemerland following a survey in 1986 (F Cottaar *in litt*). Further records were received from Sweden: 3 towns including about 10 pairs in Stockholm (J Nillson), Norway: 5 towns, Denmark: 7 towns and Germany at least 18 towns (see also Vauk & Mathiske 1980). Single records were received from Riga in Latvia and Ordfordness in Suffolk, south east England.

In Scotland, away from the Aberdeen area, roof nesting has been reported from Elgin in the mid 1970s (Suttie 1996); Inverness, one pair in 1983 and 9 pairs in 1995 (Munro 1984, Crooke & Vittery 1997); Tain and Stirling in 1987 (Nethersole-Thompson 1988 & M V Bell *pers comm* respectively); Forres by the early 1990s (Cook 1992); South Queensferry in 1992 (A Hilton *pers comm*); Inverkeithing and Dunnet in 1993 (P Doyle & N Money *pers comm* respectively); Nethybridge and Montrose in 1995 (Crooke & Vittery 1997 & H Bell *pers comm* respectively); Monifieth in 1994 and Dundee in 1996 (Lynch 1997) and Turriff in 1997 (*per* GWR) (Figure 1). The occurrence of roof nesting would therefore appear to have been fairly widespread in north west Europe by the late 1990s.

Methods

Prior to each survey in Aberdeen a list of known and possible breeding sites was compiled. Fieldwork began in late January to coincide with the return of Eurasian Oystercatchers to their breeding areas. All potential sites ie building complexes with flat roofs and nearby mown grass areas were checked with as many roofs as possible being viewed from vantage points. Between late January and mid April all Eurasian Oystercatchers seen feeding, roosting or displaying near potential breeding sites were noted. Further visits were made as necessary to confirm if pairs were present. As it was not possible to gain access to, or view, all roofs some pairs may have been missed.

Figure 1 ***Map of mainland Scotland and the Western Isles showing the locations of towns or villages with records of roof nesting Eurasian Oystercatchers. Names and the dates first reported are as follows: 1 Aberdeen 1966, 2 Elgin mid 1970s, 3 Inverness 1983, 4 Tain 1987, 5 Stirling 1987, 6 Forres early 1990s, 7 South Queensferry 1992, 8 Inverkeithing 1993, 9 Dunnet 1993, 10 Monifieth 1994, 11 Montrose 1995, 12 Nethybridge 1995, 13 Dundee 1996, 14 Turriff 1997.***



Observations of an incubating bird, eggs, chicks, adults carrying food or alarm calling were classed as confirmed breeding. Two or more sightings separated by at least 2 weeks of a pair of Eurasian Oystercatchers present at, or near a potential breeding site was recorded as possible breeding. For the 1986 and 1993 surveys all confirmed and possible roof nesting pairs within the city boundary

and all the ground nesting pairs in the built up areas were mapped. Between 1988 and 1993 hatching and fledging success was recorded from a sample of the roof nesting pairs. Productivity was measured as the number of young fledged per breeding pair (Harris 1967, Heppleston 1972 & Briggs 1984).

Results

Numbers

The number of confirmed and possible breeding pairs located are shown in Table 1. Between 1986 and 1993 the total increased by 152% (109 to 275) with confirmed roof and ground nesting pairs increasing respectively by 177% (74 to 205) and 30% (23 to 30). In 1988 and 1993 the percentage of roof nesting pairs was the same at 87%.

Distribution and density

Figures 2 and 3 show the distribution of all confirmed and possible breeding pairs in 1986 and 1993 respectively. The highest concentrations were found around large building complexes such as Aberdeen University campus, Foresterhill hospital, large schools and the industrial estates (Figure 3). For example, one school with roofs at varying heights held 6 breeding pairs over an area of 1.03ha of roof and 8.36ha of mown grass, where birds were observed feeding. By 1993, the average density over all of the built up areas was 2.7 pairs per km^2.

Nest sites

Roof sites were generally flat and coated with bitumen, with a covering of small granite chips or other small stones or pebbles. However, in 1993 7 nests were on sloping roofs up to 15° gradient. Nests were usually a hollow shaped out in the gravel but occasionally the gravel was built up into a mound. The height and area of the roofs varied considerably.

The lowest were at 3m on a school shelter and on a small electricity sub station and the highest were approximately 40 to 45m on a university building and on a school. The smallest area of roof was 3m^2 and the largest was approximately 2000m^2. Extraordinary sites included house extensions, dormer windows, busy public houses, as well as Aberdeen fire station and a garage/car salesroom both on a dual carriageway.

Ground nests were largely located in pipe storage yards or derelict areas of stony ground in industrial estates. Other sites included the quadrangles of a hospital and a school, large flower pots, flower

Table 1 ***Minimum number of confirmed and possible breeding pairs of Eurasian Oystercatchers in Aberdeen in the late 1970s, 1986, 1988 and 1993.***

Year	Pairs				Source
	confirmed breeding		possible breeding	total	
	roof (%)	ground (%)			
late 1970s	c30	?	?	c.30	A Knox (in Marren 1982)
1986	74 (76)	23 (24)	12	109	Rae *et al*1986
1988	107 (87)	16 (13)	?	123	this study
1993	205 (87)	30 (13)	38	275*	this study

* Two records in 1993 were of pairs with broods which appeared near buildings but the actual nest sites were not located.

Figure 2 *Distribution of Eurasian Oystercatcher pairs in the urban and suburban areas of Aberdeen in 1986. ● = confirmed breeding, o = possible breeding, number of pairs shown when more than one. _____ _ _____ = Aberdeen City boundary, _ _ _ _ _ _ _ _ = built up areas.*

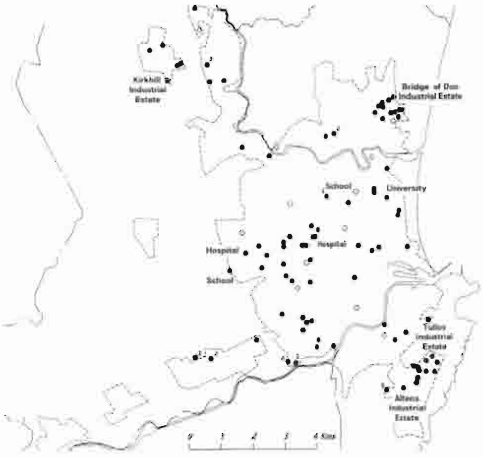
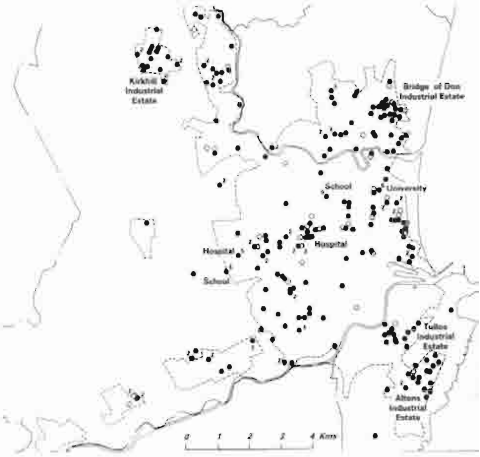


Figure 3 *Distribution of Eurasian Oystercatcher pairs in the urban and suburban areas of Aberdeen in 1993. ● = confirmed breeding, o = possible breeding, number of pairs shown when more than one. _____ _ _____ = Aberdeen City boundary, _ _ _ _ _ _ _ _ = built up areas. note : dots outside the built up areas are roof nesters.*



beds, an ornamental pedestal at drive way entrance, cricket pitch, sports stadium sand pit, centre of football pitch, a car park, under a park bench, base of headstone in cemetery, temporary roundabout (1m diameter) and the gravel edge of a pathway to the main entrance of an office block.

The location of all confirmed breeding attempts in 1993 are detailed in Table 2. The industrial estates, schools, colleges and universities combined held two thirds of the pairs.

Breeding performance of roof nesters

The outcome of 89 roof nests was monitored between 1988 and 1993. The hatching success was 69% from 223 eggs laid and 71 young were fledged giving a productivity of 0.8 fledged young per pair. The percentage of eggs hatching and the productivity were both at the higher end of the range when compared to other studies (Table 3).

Discussion

Numbers and density

There was a large increase in the number of breeding Eurasian Oystercatchers in Aberdeen's urban and suburban environment following the initial colonisation. The population rose from a few pairs in the early 1970s to at least 275 pairs in 1993, with 87% nesting on roofs. Three factors were probably instrumental. Firstly, there was a large number of flat roofs with a layer of gravel. Eurasian

Table 2 ***Nest site location of all confirmed Eurasian Oystercatcher breeding attempts in Aberdeen in 1993.***

	roof	ground	combined total (%)
Industrial Estates	76	15	91 (39)
Schools	31	1	32 (14)
Universities & Colleges	27	4	31 (13)
Hospitals & Research Institutes	18	3	21 (9)
Hotels & Public Houses	17	0	17 (7)
Offices	10	0	10 (4)
Dwelling Houses	10	0	10 (4)
Shops	8	0	8 (3)
Others*	8	7	15 (6)
Totals	**205**	**30**	**235**

* *roof: airport terminal (2), leisure centres (2), fire station, crematorium, garage/car salesroom, covered reservoir*
ground: covered reservoirs (3), market garden (2), cemetery, football stadium car park

Oystercatchers prefer open areas for nesting as an adaptation against the approach of predators (Heppleston 1972) and the gravel on the roofs is similar to the original habitat of coastal shingle. Secondly, there were extensive and frequently cut grass areas throughout the built up areas in the form of playing fields, parks, roadside verges and other ornamental and recreational areas. These provided convenient, apparently invertebrate rich, feeding areas for the birds. Thirdly, Eurasian Oystercatchers are one of the few waders which carry food to their chicks (Cramp & Simmons 1983). Birds were observed flying from the roofs to the grass areas and returning with food for their young. Therefore, it appears that a combination of suitable nesting sites, convenient feeding areas and the ability to carry food to their young made the exploitation of this nesting habitat possible.

Their subsequent colonisation led to relatively high densities in areas where there were complexes of roofs with nearby feeding areas. Interestingly, while nests were sometimes close to each other in terms of distance, no pairs shared a common roof or incubated within sight of one other, although they would have been in sight when flying. This contrasts with the situation found by some other workers, for example, Nethersole-Thompson (1988) quoted several instances where Eurasian Oystercatchers were found nesting as close as 3m apart.

The habit of roof nesting spread during the 1980s and 1990s to other small towns and villages around Aberdeen such as Inverurie (20km), Whitecairns (12km), Ellon (25km) and Stonehaven (20km). In addition, roofs in the midst of farmland, where there would appear to be no shortage of suitable ground for nest sites, have also been adopted, for example the Lairhillock Inn 12km from Aberdeen had one pair in 1993 (Gourmet 1997) and 3 in 1998 and Finzean school (35km) held a breeding pair between 1990 and 1999.

The Scottish, and hence British, population of roof nesting Eurasian Oystercatchers in 1993 was possibly around 250 pairs. In 1998 J Hulscher (*in litt*) considered that nearly every town and village in Holland, within the species breeding range, had roof nesting pairs, with the district of south Kennemerland having the largest concentration with 46 pairs (J Cottaar *in litt*). Aberdeen would therefore appear to have been unique in 1993, with at least 275 urban and suburban pairs of which 205 were roof nesters. This was probably the highest density of roof nesting Eurasian Oystercatchers in Europe.

Table 3 *The breeding success from a sample of roof nesting Eurasian Oystercatchers in Aberdeen during 1988 to 1993 and comparison with other ground nesting studies in Britain.*

locality	number of nests	% eggs hatched	% eggs producing fledged young	number of fledged young per pair	years	source
Skokholm Island (Wales)	98	64	31	0.9	1963-64	Harris 1967
north east Scotland						
coastal	52	47	13	0.4	1966-68	Heppleston 1972
inland	139	50	23	0.7	"	"
north west England						
coastal	112	19	13	0.4	1978-80	Briggs 1984
riparian	202	17	11	0.4	"	"
agrarian	34	42	32	1.0	"	"
Aberdeen, roof nesting	89	69	32	0.8	1988-93	this study

Breeding performance of roof nesters

Productivity from a sample of the roof nesters compared favourably with other ground nesting studies from Britain (Table 3). This was possibly due to a lack of ground predators, convenient food supply and minimal disturbance. Harris (1967) found a similar level of productivity on the Welsh island of Skokholm where there were no ground predators. In Aberdeenshire, Heppleston (1972) found that inland nesting birds had a higher productivity than coastal breeders and reasoned that this was because they exploited a food source nearer to their nest sites and subsequently spent less time away from the chicks and more time being vigilant for predators.

Problems of roof nesting in the city

Roof reared chicks often fall off or are blown from roofs. If they fall when small they often survive, presumably because they are so light, but when they are large this can result in injury or death. Also, once off the roofs they are sometimes killed by traffic or ground predators. Further, although chicks are largely safe from ground predators when on roofs, they have been observed being taken by crows *Corvus spp*, gulls *Larus spp*, Common Kestrels *Falco tinnunculus* and Eurasian Sparrowhawks *Accipiter nisus*.

In the 1990s, leakage at some roofs led to them being resurfaced. Replacement bitumen is laid but the gravel covering is often omitted. Without gravel, the roof is largely unsuitable for nesting, although on some roofs a build up of debris such as

dead moss has resulted in the birds nesting successfully. Some pairs have been encouraged to remain on resurfaced roofs by providing a small amount of gravel or shingle. For example, in 1985 a janitor emptied a bucket of gravel onto a resurfaced roof and it was still in use in 1993.

In 1993, at 2 sites where Eurasian Oystercatchers had previously nested on the roofs and resurfacing had taken place, nests were found nearby on the ground on small areas of gravel. Both failed due to excessive disturbance. Four other former nest sites were lost in 1993, 2 due to buildings being demolished and 2 due to resurfacing during the breeding season.

Problems of ground nesting in the built up areas

The catholic choice of nest sites by ground nesters also leads to problems. Nests on sports pitches or near busy public roads often fail due to repeated disturbance or removal of eggs. However, a nest on the Aberdeenshire Cricket Club pitch in 1986 was successful almost certainly because the groundsman moved the practice wicket.

The future

Aberdeen's population of urban nesting Eurasian Oystercatchers increased rapidly between the 1970s and the mid 1990s. Their adaptation to roof nesting and to other urban and suburban sites and their utilisation of a convenient food source allowed them to fill a previously unexploited niche. A further survey in 1998 showed a slight fall in numbers (A Duncan & R Duncan *unpublished*). Whether this indicates a decline in the population or a levelling off will be revealed by further surveys. The main threats during the 1990s were the resurfacing of roofs and the loss of mown grass feeding areas to building development. However, the provision of gravel or an open box of soil by sympathetic observers has allowed some sites to be maintained after resurfacing. It is intended to continue the study and marking of chicks and adults with coloured and individually numbered Darvic rings begun in 1997.

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Alistair Duncan*, Raymond Duncan, Robert Rae, Graham Rebecca & Brian Stewart
**** Corresponding author - 12 Cairncry Avenue, Aberdeen AB16 5DS.***
E-mail alistair @ cairncry.freeserve.co.uk

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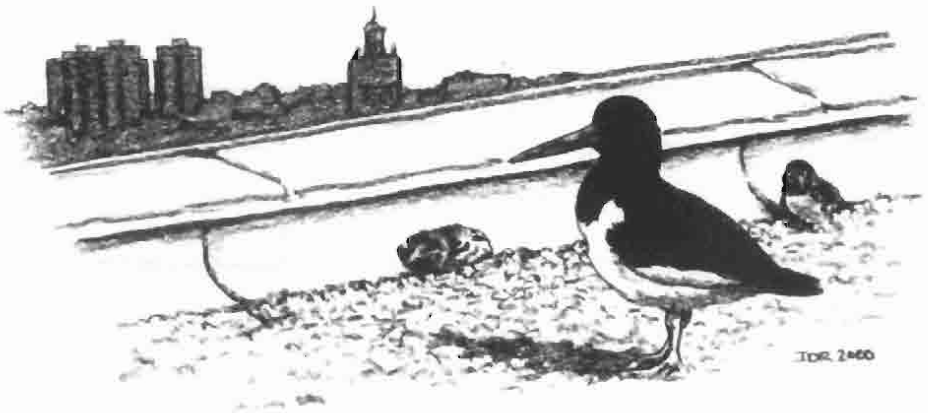


The contrasting status of the Ring Ouzel in 2 areas of upper Deeside, north east Scotland between 1991 and 1998

GRAHAM W REBECCA

In 1998, surveys on 2 areas of upper Deeside, north east Scotland confirmed the findings of a study in 1991 which showed a relatively high density of breeding Ring Ouzels in the Glen Clunie area and low numbers on part of Mar Lodge estate. The contrasting densities in the 2 study areas were probably a result of subtle habitat differences linked to geology, soils and land use. In 1998 the Glen Clunie study area held at least 59 pairs. This represented approximately 1% of the United Kingdom population as estimated in 1999 and in contrast to many other areas of Britain this population was stable or had possibly increased during the 1990s.

Introduction

In 1996 the Ring Ouzel *Turdus torquatus* was included in the Amber List of birds of conservation concern in the United Kingdom, Channel Islands and Isle of Man (Gibbons *et al* 1996[a]). This followed a 27% decline in range per 10km^2 between the 2 British breeding bird atlases covering 1968-72 and 1988-91 (Sharrock 1976, Hill 1993). The range decline was complemented by an assessment of population trends which indicated there had been a small but steady decline in Britain between 1900 and 1995 (Gibbons *et al* 1996[b]). In Scotland, Baxter and Rintoul (1953) reported a serious decrease in the population during the first half of the twentieth century. This trend continued until the early 1980s, particularly south of the Grampians (Thom 1986).

In the 1990s Ring Ouzels were poorly censused by the British Trust for Ornithology (BTO) annual Common Bird Census and Breeding Bird Survey. By 1997 concerns amongst some Royal Society for the Protection of Birds (RSPB) staff and other ornithologists over reported declines in England and Wales (Appendix 1) and south west Scotland (C J Rollie *pers comm*) led to a survey of 135 traditional nesting sites in south Scotland. The results confirmed serious declines, particularly in Galloway and Ayrshire where there were no records from 29 former sites. In total, breeding was proven or probable at 53 former sites (39%) (Sim 1997). The formation of a national Ring Ouzel study group followed and by autumn 1998 the RSPB, with the help of the group, had produced a Species Action Plan (SAP) with the priority statement indicating the need for conservation action to determine the extent and causes of the declines (RSPB 1998). One main recommendation from the SAP was that a survey was necessary to establish the current breeding population of Britain and Ireland which had previously been estimated at 5680 to 11360 pairs (Hill 1993). This was undertaken in 1999 resulting in a population estimate for the United Kingdom of 6155 probable or confirmed breeding pairs (95% confidence limits of 3586-9369) (Wotton *et al, in prep*). The SAP and the study group also encouraged local studies of this relatively poorly known species.

In north east Scotland Ring Ouzels breed in the upland moors and glens, mainly on upper Donside and on Deeside from the Cairngorms to the Glen Dye and Cairn o' Mount areas. Breeding range per 10km^2 differed little between the first British atlas covering 1968-72 (19 squares) and the north

east Scotland (NES) atlas covering 1981-84 (17 squares) (Buckland *et al* 1990). In 1991 the Joint Nature Conservation Committee (JNCC) moorland bird surveys on upper Deeside at Glen Clunie (GCsa) and Mar Lodge (MLsa) study areas (Figure 1) resulted in 45 and 4 pairs respectively of Ring Ouzels being located (Brown & Shepherd 1991). The density and maximum number of pairs per 1km² in the GCsa were the highest recorded when compared to similar studies in Scotland and England and the average number of pairs in occupied 1km squares was high at 2, and second only to Angus with 2.53 pairs. By contrast, the densities at the MLsa were low and similar to those found in the declining populations in south Scotland (Appendix 2). The NES atlas also showed either low density or no pairs on Mar Lodge estate and higher density in the Glen Clunie area (Buckland *et al* 1990).

This study in 1998 aimed to cover the 1km National Grid squares or part squares to the nearest 1/4, that held Ring Ouzels in 1991, and a random sample of 1km squares which held no Ring Ouzels in 1991. A comparison of distribution and numbers could then be made from the early to late 1990s, a decade in which Ring Ouzel declines were reported from widespread areas of Britain since the 1970s and 1980s (Appendix 1, Francis *et al* 1999).

Methods

In the 1991 survey breeding Ring Ouzels were located within 25 1km squares or part squares in the GCsa comprising 22.5km² and within 4 squares or part squares comprising 3km² in the MLsa (Figure 1). In 1998 the same 25.5km² was surveyed using the same systematic methods over the same number of visits as in 1991, except that the time

Figure 1 ***Map showing the location of the JNCC Glen Clunie and Mar Lodge moorland bird survey study areas in 1991 and 1-km squares or part squares surveyed for Ring Ouzels in 1998,*** ■ ***= squares with Ring Ouzels in 1991,*** □ ***= random squares.***

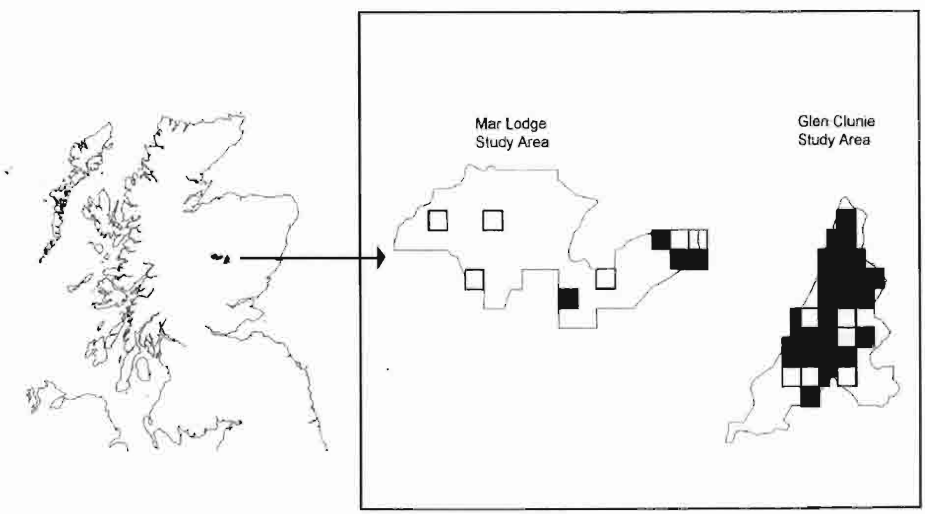
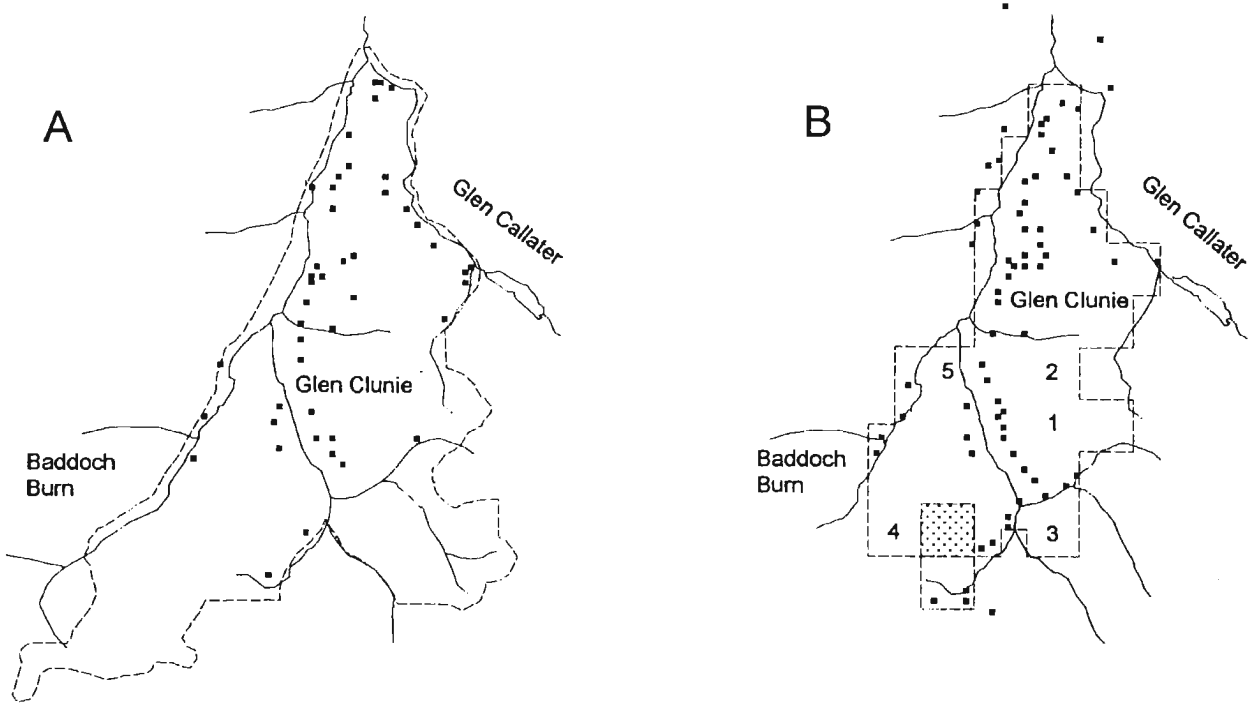


Figure 2 *Distribution of Ring Ouzel pairs in the Glen Clunie study areas from 1991 (map A) and 1998 (map B). Broken lines are the study area boundaries and continuous lines are rivers and tributaries. Numbers 1-5 are centered on the random 1km squares surveyed in 1998. The stippled 1km square was not surveyed.*



period was wider. Each 1km square or part square was divided into 500m x 500m squares (0.25km^2) and surveyed twice in the GCsa and once in the MLsa between 1 May and 14 June (the second visits to 3 1km squares were later, one on 16 June and 2 on 3 July). The JNCC study period of 11 May to 13 June was decided by factors other than biological (A F Brown *pers comm*) and most Ring Ouzels on upper Deeside should have been on territory by late April (Buckland *et al* 1990). In 1991 and 1998 each 0.25km^2 was surveyed for 25 minutes between 0830 and 1800 hours on each visit. The whole area was checked thoroughly by walking about, pausing, scanning and listening such that all parts of the square was visible and was not carried out in strong wind or precipitation more than light rain or when low cloud or fog affected visibility. The location and activities of all Ring Ouzels were recorded separately for each visit on 1:25000 maps and then combined at the end of the study period. Birds were counted as breeding if they were observed in song, courtship display, distraction display, repetitive alarm calling, territorial dispute or were carrying nest material or food or if a nest, eggs or young were found. Pairs were considered to be separate if proven in the field or if the observations listed above were at least 200m apart. To identify if there had been any increase in distribution since 1991, 5x1km squares, with no Ring Ouzels in 1991, were selected at random from each study area in 1998 and surveyed using the same methods and timing (Figures 1 and 2b).

In addition, as part of other studies all 1km squares on Mar Lodge estate were visited at least once in June 1998 to record birds and other fauna and flora (MTMBST 1999 and National Trust for Scotland [NTS] records) and the Ring Ouzel data was made available for this paper. This meant that there was considerably more fieldwork done in 8km^2 in the MLsa in 1998 than in 1991. Further, another 10 pairs were located in Glen Clunie in 1998 during a study of Ring Ouzel breeding ecology (Sim *et al* 2000), 8 were outwith and 2 were in the study area. These 10 pairs are shown in Figure 2b and the latter 2 are also included in Appendix 3.

In 1998 the different habitat types were assessed to the nearest 5 hectares for each occupied 1km square or part square using standard BTO habitat codes to levels 1 and 2 (Crick 1992).

Results

The area surveyed and number of pairs located in 1998 are given in Table 1 and the distribution of pairs in the GCsa are shown in Figure 2b.

Glen Clunie

There were 57 pairs (+2 see above) in the study area, a comparative increase of 12 (27%) since 1991. The 59 pairs were located within 22 1km squares, giving a density for occupied squares and part squares of 3 pairs per km^2 (n = 19.5 km^2). For the 16 complete 1km squares one held 6 pairs, 3 held 5, one held 4, 5 held 3, 3 held 2 and 3 held one (Appendix 3). There were no pairs located in the other 3km^2 nor in the 5 random 1km squares surveyed.

Mar Lodge

Only 2 pairs were located, one of which was in a random square, about 250m from a site occupied in 1991. This represented an overall decrease of 50% but sample sizes were too small to be meaningful.

Habitat

In the GCsa habitat was recorded for 19.5km^2 of which 57% was estimated as dry or wet heath, dominated by Heather *Calluna vulgaris* and *Erica*; 20% was a mixture of semi natural grass moor and grass moor with heather; 18% was cliff, crag, scree or boulder slopes and 5% was apparently

Table 1 ***Pairs of breeding Ring Ouzels in Glen Clunie and Mar Lodge study areas in upper Deeside in 1991 and 1998.***

	1991*			1998		
	Area surveyed (km^2)	Number of pairs	Area with Ring Ouzels to nearest $0.25km^2$	Area surveyed (km^2)	Number of pairs	Change in numbers from 1991 to 1998
Glen Clunie	46	45	22.5	22.5+5 random	57	+12
Mar Lodge	60	4	3	3+5 random	2	-2

* from Brown & Shepherd 1991

improved or unimproved grassland. Habitat on $2km^2$ of the MLsa was estimated as 70% dry or wet heath, 15% grass moor with heather and 15% cliff, crag, scree or boulder slopes (Appendix 3).

Discussion

Numbers and land use

The GCsa held a large number of breeding Ring Ouzels in the early and late 1990s with a relatively high density in comparison to other areas of Britain. There was an apparent increase of 27% between 1991 and 1998 despite birds being absent from $3km^2$ which held 3 pairs in 1991. However, some of the increase may have been a result of this survey having a longer study period and concentrating on a single species whereas the JNCC study covered all upland birds. The earlier start date may have influenced the numbers recorded on the first visits, allowing less time for failed breeding attempts to be missed than in 1991. Regardless of any potential biases between survey methods in 1991 and 1998 the numbers located in the GCsa and nearby in 1998 equate to 1.1% of the estimated breeding population for the United Kingdom in 1999.

The stability, or possibly even increase of the population in the GCsa is of interest to conservationists as there were reported declines, some serious, in many areas of England, Wales and Scotland between the 1970s and 1990s (Appendix 1, Francis *et al* 1999). Stable populations have also been found in Glen Esk, Angus, approximately 30km east of Glen Clunie (D Arthur *pers comm*) and on Dartmoor, south west England (Appendix 1). The mosaic of habitats and the land use in the Glen Esk study area were similar to that in Glen Clunie (Arthur 1994 & *pers comm*) with heather the main plant species and a large proportion of the remaining habitat comprising of grasses and crags, scree and rock debris. The management at the GCsa and Glen Esk, concentrated on producing Red Grouse *Lagopus lagopus* and Red Deer *Cervus elaphus* for sport shooting. Sheep were abundant during spring and summer and Mountain Hare *Lepus timidus* and Rabbit *Oryctolagus cuniculus* were other common herbivores. The drier heather slopes are burnt regularly in strips or patches, to provide fresh shoots for grouse, deer and sheep, resulting in a variety of different age heather stands. Many Foxes *Vulpes vulpes*, Stoats *Mustela erminea* and Carrion Crows *Corvus c. corone,*

known to be predators of Ring Ouzels (Durman 1977, Appleyard 1994) are killed each year by gamekeepers. The level of burning, grazing and gamekeeping during the 1990s (and probably for >10 years earlier judging by the densities from the NES atlas) obviously suited breeding Ring Ouzels. The overall management, land use and habitat in the GCsa appeared to change little between 1980 and 1999 (*pers obs*).

In contrast, at the MLsa Ring Ouzels were found at low density with large areas having no Ouzels. A similar scenario was shown in the NES atlas from fieldwork during 1981 to 1984. The other ornithological surveys in June 1998 covering all of Mar Lodge estate provided further evidence of low numbers of Ring Ouzels, with only another 9 pairs located, giving a total of 11 in approximately 300km^2 of non woodland habitat (MTMBST 1999 and NTS). NTS records from 1996 to 1999 add little to this cumulative total suggesting that the low numbers found in 1998 were probably genuine. The traditional management on Mar Lodge estate was for Red Deer and Red Grouse shooting using similar methods as in the GCsa but there was no sheep rearing between 1995 and 1999.

Soils, vegetation and land capability for agriculture

Glen Clunie has been described as being lime rich (Nethersole-Thompson & Watson 1981) whilst the non woodland area of Mar Lodge estate in 1997 was largely composed of blanket bog and montane plateau (NTS Ecological Zone Map provisional, 1997). Limestone outcrops occur near Glen Clunie and Glen Callater (Geological Survey 1957) and some of the soils there are richer and of better quality than at Mar Lodge estate (Walker *et al* 1982). In the GCsa soils in the valley bottoms have the potential to produce arable crops or permanent pasture (5_1 in land capability map [LCM] in Walker *et al* 1982) and this does occur. The valley slopes are dominated by dry heather moor or acid bent fescue grassland and soils are largely humus iron podzols and brown forest soils with peaty gleys (Walker *et al* 1982 & soil map).

On Mar Lodge estate agricultural potential is limited to rough grazing (6_3 & 7 in the LCM). In the lower areas the dominant vegetation is wet and dry heather moor, bog heather moor and blanket bog and soils are largely peaty podzols and peaty gleys (Walker *et al* 1982 & soil map).

The proportion of grassland and calcareous flushes on the better, less acidic soils in the GCsa is probably one reason why there were large numbers of Ring Ouzels. Less acidic soils contain more earthworms (Oligochaeta), which are one of the main spring and summer foods of the Ring Ouzel (Poxton 1986, Cramp 1988, Tyler & Green 1994, Appleyard 1994). In 1998 the birds were regularly observed foraging on grass and flushes, and earthworms appeared to be the main food item brought to chicks. It would be interesting to compare earthworm abundance from the preferred feeding areas in the GCsa and the Glen Esk study area with samples from the MLsa and those already collected from a declining population in Wales (Tyler & Green 1994).

For whatever reasons the GCsa was clearly a good environment for Ring Ouzels in the 1990s with a relatively dense, and at the least, a stable population. This was in contrast to many other areas of Britain where declines were reported between the 1970s and 1990s. With at least 1% of the estimated breeding population for the United Kingdom in 1999 in parts of Glen Clunie, Glen Callater and the Baddoch Burn the overall area can be considered important for Ring Ouzel in national terms.

Future work

To make further comparisons with other studies in Britain, for example in Angus (Arthur 1994), the Pentland Hills (Durman 1977, Poxton 1986), the

Yorkshire Dales (Appleyard 1994) and Wales (Tyler & Green 1994, Hurford 1996) a detailed study of breeding ecology and population dynamics at Glen Clunie is necessary. This began in 1998 and 1999 and is planned to continue for at least a further 2 years (Sim *et al* 2000). Information on site occupancy, nest location and habitat, egg laying date, clutch size, productivity, diet and growth rate of young, occurrence of double nesting, nest site fidelity and return rate of colour ringed chicks have been collected. It is hoped that some of the results may shed light on the birds breeding ecology relevant to other areas of Britain.

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Graham W Rebecca, RSPB, 10 Albyn Terrace, Aberdeen AB10 1YP

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Ring Ouzel *William Brotherston*

Appendix 1 ***Changes in Ring Ouzel numbers from comparable studies (from RSPB 1998, SAP 1186 Ring Ouzel).***

Country	Location	Year	Pairs	Change (Period)	Source
Wales	Mynydd Hiraethog,	1977	5		
	Denbighshire	1995	0	-100% (1977-95)	RSPB surveys
	Elenydd, Ceredigion	1975	13		
		1995	6	-54% (1975-95)	RSPB surveys
	Mynydd Du,	1978	17		
	Carmarthenshire	1992	8	-53% (1978-92)	RSPB & CCW surveys
		1996	12	-29% (1978-96)	RSPB & CCW surveys
	Glamorgan	1950	3		
		1980	27	-78% (1980-95)	
		1995	6	+100% (1950-95)	Hurford 1996
England	North Staffordshire	1985	61		
		1992	18		Brindley *et al* 1992
		1996	5	-92% (1985-96)	McKnight *et al* 1997
	Haweswater,	1989	21		
	Cumbria	1995	14		RSPB Nature
		1995	11	-48% (1989-97)	Reserve records
	Geltsdale, Cumbria	1975-77	28		
		1987-89	12		RSPB Nature
		1993-95	16	-43% (1975-95)	Reserve records
	Dartmoor (sample)	1979	13		
		1992	17	+31% (1979-92)	RSPB surveys
Scotland	Moorfoot, Pentland	1986	37		Poxton 1987
	& Lammermuir Hills	1997	22		Sim 1997
	Borders & Lothian			-40% (1986-97)	
	Ettrick & Moorfoot	1994	20		local records
	Hills, Borders	1997	13	-35% (1994-97)	Sim 1997
	Glen Esk, Angus	1992	25		
		1996	23	-8% (1992-96)	D Arthur *in litt*

Appendix 2 ***Regional densities in pairs per 1km² of breeding Ring Ouzel from comparable studies (from Brown & Shepherd 1991*).***

Region	Year	Overall density	Density in occupied 1km squares	Maximum number per 1km²
Glen Clunie	1991	0.96	2.00	5
Mar Lodge	1991	0.08	1.18	1
Angus	1989	0.60	2.53	5
Aberdeenshire	1989	0.14	1.33	3
Ayrshire	1989	0.02	1.20	1
South Strathclyde	1990	0.04	1.00	1
Dumfries & Galloway	1990	0.08	1.76	3
North Pennines	1989	0.15	1.14	2
South Pennines	1990	0.17	1.55	5

* Absent from Shetland (1986), Lewis (1987) and Morayshire (1989) during similar studies.

Mike Innes

Appendix 3 ***An estimate of habitat types to the nearest 5 hectares for each one km square or part square in the Glen Clunie (A) and Mar Lodge (B) study areas which held Ring Ouzels in 1998 and the number of pairs in 1991 and 1998.***

A													
1km²	**number of pairs**		**area surveyed**	**habitat (ha) in 1998**									
number	**1991**	**1998**	**km²**	C2	C3	D1	D2	D3	E1	E2	I1	I2	F2
1	4	5	1		5	40			15		40		
2	1	1	0.5	5	20	25							
3	3	3	1		10	70	10				10		
4	3	5	1		10	75			10			5	
5	1	2	1		15	80						5	
6	2	1	0.5					45				5	
7	4	6	1	10		50			10	20	10		
8	2	3	1			80						20	
9	1	1	1					90				10	
10	3	1	0.5					50					
11	4	3	1	5	10	25						60	
12	1	1	0.5	10		30						10	
13	1	2	1		10	55					5	30	
14	1	2	0.75	30						15		30	
15	2	2	1	25	50	20					5		
16	3	5	1			70		10				20	
17	1	1	1	80			5			10		5	
18	1	1	1			65		10			5	20	
19	1	3	1		15	60					15	10	
20	1	4	1	20	45	20				10	5		
21	1	4	0.75			30		15			15	15	
22	1	3	1		10	80						5	5
Totals	**42**	**59**	**19.5**	**185**	**200**	**875**	**15**	**220**	**35**	**55**	**120**	**240**	**5**
				385		**1110**			**90**		**360**		**5**
B													
23	1	1	1		20	50		20				10	
24	-	1	1		10	70					5	15	
Totals	**1**	**2**	**2**		**30**	**120**		**20**			**5**	**25**	
					30		**140**					**30**	

Habitats from BTO codes to levels 1 and 2 (Crick 1992) as follows : C2 semi natural grass moor, C3 grass moor mixed with heather, D1 dry heath and D2 wet heath, both dominated by Heather *Calluna and Erica*, D3 mixed wet and dry heath, E1 apparently improved grassland, E2 apparently unimproved grassland, I1 cliff and crag, I2 scree and boulder slope, F2 ski centre buildings.

The distribution of Crested Tits in Scotland during the 1990s

R W SUMMERS & M CANHAM

The distribution of the Crested Tit was reviewed using records collected during 1992-99. Records were obtained from 114 woods or sites and 79 10km squares. Individual woods were listed, thereby identifying those for potential conservation management. Inspection of the data from the 2 breeding atlas projects, the winter atlas and a previous survey of Crested Tits, compared with the current survey, showed that the distribution has changed little. The differences between numbers of recorded 10km squares in this survey compared with the atlas surveys are probably due to differences in observer effort.

Introduction

Within Britain, the Crested Tit *Parus cristatus scoticus* is restricted to parts of the Highlands of Scotland where it inhabits ancient native Scots Pine *Pinus sylvestris* forests and Scots Pine plantations (Cook 1982, Summers *et al* 1999). It is amber listed in the Birds of Conservation Concern because 50% or more of the breeding population is in 10 or fewer sites (Gibbons *et al* 1996). Crested Tits are resident in Scotland, with pairs occupying territories throughout the year (Summers 1998). Young leave parental territories to join other pairs and form social groups through to the next breeding season (Ekman 1979). The movements of the young birds tend to be only a few kms (Deadman 1973). Therefore, any long term shifts in distribution are likely to be due to modification of their habitat or changes in population size.

The Crested Tit's distribution in Scotland is broadly known from the 2 breeding season atlas projects (Sharrock 1976, Gibbons *et al* 1993). The main areas are Strathspey, the coastal plain of Moray and East Ross, the Great Glen and the Beauly catchment. Crested Tits were recorded as being present in 46 10km squares during the first survey (1968-72), and in 51 during the second (1988-91) (Sharrock 1976, Gibbons *et al* 1993). As well as the 11% increase in the number of 10km squares occupied, there were some changes in distribution, including losses from Ross and Sutherland and from around Loch Laggan, and gains in Glen Garry and down the Great Glen towards Fort William (Cook, in Gibbons *et al* 1993).

In addition to the breeding surveys, its winter distribution was mapped by Lack (1986) during 1981/2-1983/4. Forty six 10km squares were recorded as being occupied. When compared with the first breeding atlas, there were 9 10km squares in lower Speyside which had breeding records but no winter records. Cook (in Lack 1986) suggested that poorer coverage during the winter survey explained this gap.

In a single species survey of Crested Tits, Cook (1982) reduced the recording unit to a 5km square. Records were received from 78 5km squares during the breeding season. This comprised 45 10km squares.

Thus, all previous surveys of Crested Tits have

shown a similar distribution and a similar number of occupied 10km squares (46, 51, 46 and 45 respectively).

None of the surveys to date involved recording which woods were occupied by Crested Tits. The aim of the present survey was, therefore, to describe their distribution at the level of different woods, as this is more valuable for the conservation of the species. We also collated information at the 10km scale in order to allow comparisons with the earlier atlases.

Methods

The presence of Crested Tits in woods was obtained from Forest Enterprise and RSPB staff, other birdwatchers and annual *Scottish Bird Reports* (Murray 1992-1999). We used all records made during 1992-99 regardless of season, so did not use records obtained during the latter phase of the second breeding atlas (1990-91).

Specific searches were made of the 10km squares which previously had records. A tape recording of the trill call of the Crested Tit was broadcast with a mini loudspeaker when searching woods.

Results

Crested Tits were recorded from 114 woods or sites and 79 10km squares (Figs 1 and 2, Table 1). If a Crested Tit was recorded in a wood, then the whole wood was marked in Figure 1, even if only part of the wood was suitable for Crested Tits.

Occupied areas included the woodlands of upper Strathspey, particularly the ancient native pinewoods of Rothiemurchus, Inshriach, Glenmore Forest, Glen Feshie and Abernethy Forest. Plantations in lower Strathspey and coastal and inland woods along the south side of the Moray Firth were also occupied. The Bin of Cullen was the furthest east site. In East Ross, many of the woods on the coastal plain were occupied. The most northerly woods were Clynelish Moss on the coast and Shin Forest inland. The other main area was the Great Glen and the glens that run off to the west: Glen Urquhart, Glen Moriston and Glen Garry. Crested Tits were present in most of the glens of the Beauly catchment: Strathfarrar, Glen Cannich and Glen Affric.

The record from the Doire Darach native pinewood in Argyll is exceptional since it is 45 km south of the next occupied wood at Gairlochy. Similarly, the record on the northwest coast of West Ross, from the winter atlas (Lack 1986) is well away (50 km) from the next occupied wood.

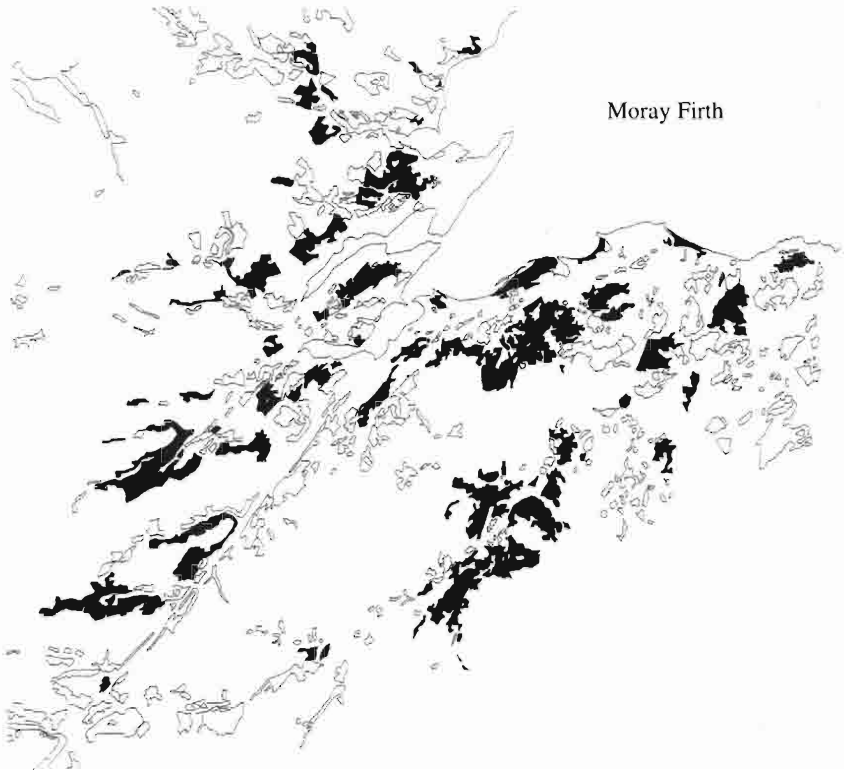
Three birds were recorded at Morrone, near Braemar in 1996 and there was a single bird at the Linn of Dee during 1998 and 1999. These locations in upper Deeside suggested that Crested Tits had moved round the southern part of the Cairngorms. The nearest occupied wood in Glen Feshie was 20 km away.

Not all records were from woodland. Three birds were mist netted in Reed *Phragmites australis* beds. Two were trapped at Loch Eye, East Ross-shire, on 8 April and 25 June 1996, and one juvenile was caught at Loch Spynie, Moray on 22 July 1989. Also, 2 were seen at a garden feeder at Stripside, Mulben west of Keith in July 1996 (I Francis *pers comm*).

Discussion

It is likely that the Crested Tit distribution once matched that of the Caledonian forest which extended over much of Highland Scotland 5000 years ago (Bennett 1988), and its range shrunk as this natural forest was cleared and/or receded naturally when the climate became wetter (Steven & Carlisle 1959, Tipping 1994). Planting of pinewoods, during the twentieth century has allowed the birds to regain some of their former

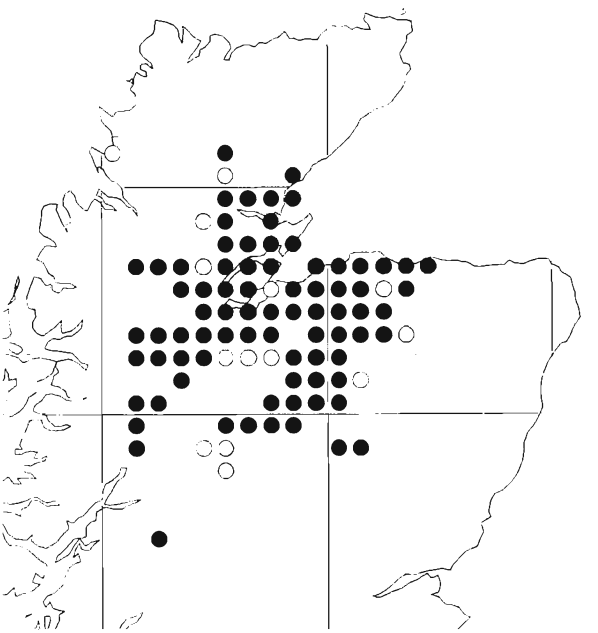
Figure 1 ***The distribution of Crested Tits in Scotland. The outlines are the boundaries of woods in the Highlands. Black indicates woods which had Crested Tits during 1992-99. The records from Deeside and Doire Darach were not included.***



range, and also spread to areas previously unoccupied by pine forests, eg on the dunes where Culbin, Roseisle and Lossie Forests now grow.

The absence of the Crested Tit as a breeding bird in Deeside is one of the noticeable features of the distribution. There have been records during the 1930's, 1950's and 1970s (Knox 1983, Grant 1984) and a few birds in the 1990s, but these colonists have not become established as breeders despite apparently suitable habitat. Presumably the Cairngorms present too great a barrier for sufficient numbers of Crested Tits to cross to become established in Deeside. Another possibility is that Crested Tits could colonise Deeside from the populations currently present in Banffshire. However, the plantations between the coastal forests of Banffshire and Donside are mainly of Sitka Spruce *Picea sitchensis* which are unsuitable for Crested Tits (Summers *et al* 1999). Also, the

Figure 2 ***The distribution of Crested Tits in Scotland. Filled circles indicated occupied 10km squares during 1992-99. Open circles refer to records from any of the previous surveys, but unrecorded in the present survey.***



tits seem to be at a low density in the woods that are occupied in Banffshire (Francis 1996), so the potential for expansion is not great.

Inspection of the data from the 3 atlas surveys shows that although Crested Tits were recorded in a total of 75 10km squares, only 22 were common to all 3 atlases (Table 1). This suggests that the atlases did not provide a complete assessment of the distribution. Our increased effort in searching revealed that Crested Tits were still present in squares which had no records during one or more of the atlas surveys. We failed to find Crested Tits in 14 10km squares where at least one of the past surveys had located birds. We searched all of these except NC01 in West Ross. The only area that appears to have lost Crested Tits since the first atlas survey is the forests around Loch Laggan and Glen Spean (Fig 2).

Table 1 *10km squares with records of Crested Tits during the 2 breeding atlas projects, the winter atlas, the survey by Cook (1982), and the present survey. Records away from woodland were not included.*

10km square	First Breeding Atlas	Second Breeding Atlas	Winter Atlas	Cook	Woods and sites occupied during 1992-99
NC01			3		
NC50			3	1	
NH12	1	1	1	1	Glen Affric
NH13	1		3		Glen Cannich
NH20	3	1			Glen Garry
NH22	1	1	1	1	Glen Affric, Guisachan Forest
NH23	1	2		1	Glen Cannich, Strathfarrar
NH26		2			Strath Bran
NH32		1	3		Fasnakyle, Tomich
NH33	3	1		1	Strathglass, Strathfarrar, Glen Cannich
NH43		1			Boblainy Forest, Polmaily
NH44	3			1	Aigas
NH45				1	Rogie, Kinellan
NH46	1		3		
NH48		2			
NH52		2			
NH53	3	1			Abriachan, Loch Battan
NH54			3		Rheindown Wood, The Aird
NH55	1	1	2	1	Monadh Mor
NH56	1		3	1	Blackrock Gorge
NH57			3		Ardross Forest
NH58	1				Clas a' Bhaid Choille
NH59		1		1	Carbisdale, Shin Forest
NH62	3				
NH63		2	3		Drummossie Muir
NH64		1	3	1	Ord Hill, Craig Phadrig
NH65	3	2	2		Millbuie
NH66	1	1		1	Millbuie
NH67	1			1	Kinrive Wood
NH70	2		2	1	Craigbui Wood
NH72		2			
NH73		2			Meall Mor
NH75		2			
NH76		1			Millbuie
NH77	1	1	2	1	Kinrive Wood, Scotsburn Wood, Lamington Park, Pitmaduthy Moss, Morangie Forest

NH78		2		1	Morangie Forest, Tarlogie Wood, Camore Wood
NH79			3		The Alders
NH80	1	1	2	1	Alvie, Kincraig, Inshriach Forest
NH81	1	1	2	1	Kinveachy Forest
NH82	1	2	1	1	Baddengorm Woods, Inverlaidnan Hill, Beananach Wood
NH84	3				Kirkton of Barevan
NH85	3		2		Carse Wood
NH90	1	1	1	1	Rothiemurchus, Glenmore Forest
NH91	1	1	1	1	Glenmore Forest, Abernethy Forest, Loch Vaa
NH92	1	1	2	1	Carrbridge, Lochanhully, Curr Wood, Lochgorm
NH93			3		Lochindorb
NH94	1	2	2	1	Airdire, Ballindore, Kronyhillock, Dulsie Wood
NH95	2	1	3		Darnaway Forest
NH96	1	1	1	1	Culbin Forest
NJ00		2	3		Glenmore Forest
NJ01	1	1	1	1	Abernethy Forest
NJ02	3	1	2	1	Craigmore Wood, Cromdale, Corriechullie, Grantown Wood
NJ03		1	2	1	Carn Luig, Upper Tomvaich Wood
NJ04		1	3		Feakirk, Glenernie, Braemoray Lodge
NJ05	1	1	3	1	Darnaway Forest, Altyre Woods
NJ06	1	1	3	1	Culbin Forest
NJ11		1			
NJ13		2	3	1	Hill of Dalnapot/ ScootMore
NJ14				1	Elchies Forest
NJ15	2	2		1	Hill of the Wangie, Monaughty Wood
NJ16	2	2	2	1	Burghead, Roseisle
NJ23	3			1	Morinsh
NJ24		2	3	1	Daugh of Edinville, Elchies Forest
NJ25	1			1	
NJ26	1	1	3	1	Lossie Forest
NJ33		1			
NJ35	3	2	3	1	Wood of Ordiequish, Whiteash Hill Wood
NJ36	2		3	1	Bogmoor
NJ46		2	2	1	Bin of Cullen
NN18		1			Gairlochy

NN48	3			1	
NN57	3				
NN58	1		2	1	
NN59	3		3		Black Wood
NN69	1			1	StrathMashie, Carn a' Bhadain
NN79		1	3	1	Drumguish
NN89	1	2	2	1	Glen Feshie, Badan Mosach, Coille an Torr
New 10km squares identified during the 1990s					
NC51					West Shinness, North Dalchork
NC80					Clynelish Moss
NH10					Glen Garry
NH16					Strathbran Plantation
NH31					Inchnacardoch Forest, Inverwick Forest
NH35					Little Scatwell
NH36					Loch Luichart
NH42					Glen Urquhart, Glen Coiltie
NH69					Maikle Wood
NH74					Daviot Wood, Culloden Forest
NH87					Loch Eye (Bogbain Moor)
NH89					Ferry Links
NN19					Glen Garry
NN24					Doire Darach
NO08					Linn of Dee
NO18					Morrone

Notes: First Breeding Atlas: 1, confirmed breeding; 2, probable breeding; 3, possible breeding. Second Breeding Atlas: 1, evidence of breeding; 2, present. Winter Atlas: 1, 9+ birds; 2, 3-8; 3, 1-2. Cook's (1982) survey: 1, present

We cannot be certain that woods with no records of Crested Tits do not contain them. If they are at a low density it is quite possible not to see or hear any during a full day's search in a wood. Therefore, the number of woods known to have Crested Tits is likely to be an underestimate. The total number of 10km squares which have had records in the last 30 years is now 93.

By identifying many of the woods where Crested Tits occur, conservation action can be directed at those sites. Plantations have densities of Crested Tits about 10 times lower than that found in ancient native pinewoods (Summers *et al* 1999), so there is clearly scope to increase densities in plantations through suitable management (Summers 2000).

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Ron Summers, RSPB Scotland, Etive House, Beechwood Park, Inverness, IV2 3BW
Mick Canham, Forest Enterprise, Balnacoul, Fochabers, Morayshire IV32 7LL

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Crested Tit and fledgling *Ernest Ruxton*

Western Capercaillie captures in snares

P COSGROVE & J OSWALD

Details of 17 incidents involving the deaths of 46 birds are recorded. The true figure is likely to be considerably higher. It is recomended that snares are not set under the canopy in areas used by Western Capercaillie.

The snare is a widely used tool in the farmlands, woodlands and uplands of Scotland for controlling a number of pest species, but especially Foxes *Vulpes vulpes*. Snaring is subject to domestic legal restrictions under the Wildlife and Countryside Act 1981. Recently, concern has been expressed about the impact of accidental captures of Western Capercaillie *Tetrao urogallus* in woodland snares (K Kortland *pers comm*). The purpose of this short paper is to detail known instances of Western Capercaillie captures in snares and raise awareness of the potential threat posed by woodland snares to remnant populations of Western Capercaillie.

The Western Capercaillie is a threatened and declining species in Scotland (*UK Biodiversity Steering Group 1995*). Fieldwork carried out in Scotland in 1992-94 suggested a population estimate of c2200birds (Catt *et al* 1998), which declined by 51% to an estimate of 1073 birds in 1998-99 (Wilkinson *et al* 1999). This dramatic decline, which began long before 1992, has been attributed to a number of factors, the most important of which include: loss of native pinewood, collisions with fences, over shooting and human disturbance, inappropriate grazing regimes in woodlands, predation and an increase in adverse weather conditions during the spring. The relative importance of these factors probably varies between forests and even between years (D Baines *pers comm*)

The Fox is a major predator of several species of game bird. However, there are no reliable data from studies of Western Capercaillie in Scotland that permit adequate quantification of their impact. Foxes are managed by a variety of methods, which include snaring, shooting at night, bolting from earths using terriers and hunting with dogs (D Baines *pers comm*). Most Foxes are killed in snares and snares set for Foxes can inadvertently catch and kill Western Capercaillie. For example, Moss (1987) investigated the demography of Western Capercaillie in Northeast Scotland and reported on approximately a dozen birds, most of which had been killed by snaring. No formal recording of snaring incidents is known to have taken place, but we have received a number of anecdotal reports from members of the public, estate workers, and gamekeepers in confidence and would like to thank all those who provided this information.

Although there are few documented accounts of snaring and Western Capercaillie, the information summarised in Table 1 suggests that Western Capercaillie captures in Fox and Rabbit snares may be a widespread and largely under recorded problem. Indeed, some gamekeepers suggested that the data presented in Table 1 was likely to represent the 'tip of the iceberg', as many people would be reticent about supplying information on their accidental snare captures. The most recent incidences were reported after gamekeepers changed pest management practices to include snaring in woodlands. In most examples, the birds were trapped within a very short period of the snares being laid, often within 24 hours. In many of these instances, the gamekeepers immediately stopped snaring in the woodlands and turned to

Table 1 ***Reported records of Western Capercaillie captures in snares in Scotland.***

Location, method and date	Number of birds killed
Strathspey. 1960s. Several Rabbit/Fox snares laid in old Caledonian forest.	7 birds killed. Snares left operating.
Deeside. 1968. 5 Fox snares placed around a midden in Commercial pine plantation.	2 cocks killed on first morning. Snares removed.
Deeside. 1968. 5 Fox snares placed around a midden in old Caledonian forest.	3 cocks killed in a week.Snares removed.
Deeside. 1968. Several Fox snares placed along Fox track in two thicket stage commercial plantations.	1 cock killed on first morning in one wood. 1 cock and 1 hen killed on first morning in other woodland. Snares removed.
Deeside. 1976. Snares set throughout commercial plantation.	1 cock killed. Snares left operating.
Strathspey. 1975-2000. Many Fox snares set throughout commercial plantations and old Caledonian woodland on estate.	At least 6 Capercaillie reported killed in snares.
Deeside. March 1980. 30 Hare snares placed in old Caledonian forest.	3 hens killed on first morning. Snares removed.
Badenoch. 1982. Rabbit snare.	1 cock killed.
Deeside. October 1989. Snares set parallel to a deer fence c400m uphill from a lek site.	1 cock killed.
Deeside. 1992. Several Rabbit snares placed on the edge of commercial plantation.	1 cock killed. Snares left operating.
Deeside. 1990s. No further details.	5 birds killed
Donside. March 1993. Snares set along a deer fence between 2 estates 150m from a lek site.	1 cock killed.
Strathspey. 1993. Several Fox snares set in gaps along a fence by a commercial plantation.	2 cocks killed. Snares left operating.
Deeside. 1996. Snares set in parallel to deer fence c550m from a lek site.	1 cock killed.
Donside. 1997. No further details, 2 cocks killed one spring.	1 cock killed following spring.
Deeside. 1998. Fox snares set along a fence line near to Capercaillie lek in old Caledonian forest.	5 cocks killed and lek wiped out.
Strathspey. 1999. Several Fox snares set in commercial plantation.	1 cock killed.

alternative pest control methods. This suggests that snaring in Western Capercaillie woodlands, even for relatively short periods, may have dramatic, detrimental and unforeseen impacts on local Western Capercaillie populations.

Interestingly, during the research for this short note, the accidental capture of Black Grouse *Tetrao tetrix* in woodlands was reported only once, in Ayrshire. It is not known why Western Capercaillie appear to be particularly susceptible to capture in woodland snares, but it seems likely that their inquisitive nature and extensive use of forest tracks and animal trails has led them into areas where snares have been used. It is difficult to quantify the impact of snaring on Western Capercaillie populations, but even with the relatively small number of incidents reported here (17 known incidents Table 1) it is clear that snaring can be a very effective and quick method of killing birds (46 birds Table 1). The ease at which Western Capercaillie can be snared was used in Strathspey during the 1960-70s when locals caught dozens of birds annually in snares specifically set to catch Western Capercaillie around stooks in oat fields for eating. As Western Capercaillie populations continue to dwindle and become more isolated from one another, the role of chance events, such as dying in snares, may become important in small populations.

In a recent report to the Scottish Executive, Forestry Commission and Scottish Natural Heritage, Petty (2000) recommended extending crow and Fox control to some key Western Capercaillie sites in Scotland. Although this review made passing reference to the impact on non target species, including Western Capercaillie, it suggested that snaring appeared to be one of the most effective Fox control methods available. We consider it very important that this recent guidance does not encourage Fox snaring within Western Capercaillie woodlands. Where Fox control is considered necessary, target specific control methods should be used to avoid the potential problems associated with the accidental snaring of Western Capercaillie. The recent announcement by the British Association for Shooting and Conservation to review the guidance given in their '*Fox snaring: a code of conduct*' BASC 2000 for Western Capercaillie woodlands is good news. It is hoped that other estate and forestry managers will take the lead and eliminate fox snaring inside the remaining Scottish Capercaillie woodlands.

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Peter Cosgrove, 11 The Square, Grantown on Spey, Morayshire PH26 3HG
Jimmy Oswald, Newton Farmhouse, Dinnet, Aboyne, Aberdeenshire AB34 5PE

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Amendments to the Scottish List

RONALD W FORRESTER
for the SCOTTISH BIRDS RECORDS COMMITTEE

The Scottish List of species was first published in Scottish Birds 1994, with subsequent amendments in 1996, 1998 and 2000.

The 27th Report of the British Ornithologists' Union's Records Committee *(BOURC)* (*Ibis* 143:171-175) includes the following decisions relating to the British List.

Common Teal *Anas crecca* to be treated as 2 species.
Eurasian Teal *A crecca*
Green-winged Teal *A carolinensis*

Common Redpoll *Carduelis flammea* to be treated as 2 species.
Lesser Redpoll *C cabaret* (monotypic)
Common Redpoll *C flammea* (including
Mealy Redpoll *C f flammea*
Greater Redpoll *C f rostrata*
Icelandic Redpoll *C f islandica)*

Mediterranean Shearwater *Puffinus yelkouan* to be treated as 2 species
Balearic Shearwater *P mauritanicus*
Yelkouan Shearwater *P yelkouan*

Resulting changes to the Scottish List are:
The English name of Common Teal to be changed to Eurasian Teal.
Green-winged Teal to be added to Category A.
Lesser Redpoll to be added to Category A.
The English name of Mediterranean Shearwater to be changed to Balearic Shearwater
Yelkouan Shearwater has not occurred in Scotland.

The British Birds Rarities Committee's *Report on rare birds in Great Britain in 1999*, published in *British Birds* 93:512-567, included the following accepted records:

Royal Tern *Sterna maxima*
Thorntonloch, Lothian, adult, 9 August 1999; and Musselburgh, Lothian later the same day (*British Birds* 93:538)
1st Scottish Record add to Category A

Mourning Dove *Zenaida macroura*
Carinish, North Uist, Outer Hebrides, first winter, 13-15 November 1999 (*British Birds* 93:539)
1st Scottish Record add to Category A

Eurasian Crag Martin *Ptyonoprogne rupestris*
Finstown, Orkney 3 May 1999 (*British Birds* 93:544)
1st Scottish Record add to Category A

The following additional changes also apply:

Short-billed Dowitcher *Limnodromus griseus*
Roseharty, near Fraserburgh, Aberdeenshire, juvenile, 11-24 September 1999 (*Birding World* 12:364-370 and 12:385). Race undetermined. Acceptance of this record appeared as a press release on BOURCs website (www.bou.org.uk) dated 22 December 2000 and will be included within their 28th Report expected to be published in January 2002.
1st Scottish Record add to Category A

Smew has been moved from genus *Mergus* to *Mergellus* and Great Skua from *Stercorarius* to *Catharacta*. BOURC 23rd Report 1996 (*Ibis* 139:197-201).

The category for Pink-footed Goose, Snow Goose, Barnacle Goose, Red-crested Pochard and White-tailed Eagle was previously dual A, D4. The definition for Category D has changed and they are now no longer in this category, although they remain in Category A. They are likely to also feature in Category E once this has been produced for Scotland.

As a result of the above changes, new totals for Scotland are:

Category A	473
Category B	9
Category C	6
	488
Category D	10

Ronald W Forrester, Secretary Scottish Birds Records Committee, The Gables, Eastlands Road, Rothesay, Isle of Bute PA20 9JZ

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Arctic Redpoll (left) and Common (Mealy) Redpoll *Dennis Coutts*

Scottish List - species and subspecies

D L CLUGSTON, R W FORRESTER, R Y McGOWAN & B ZONFRILLO
on behalf of the SCOTTISH BIRDS RECORDS COMMITTEE

The Scottish Birds Records Committee (SBRC) is responsible for maintaining the Scottish List, first published in Scottish Birds in 1994. Until now, the list has been based on the species level of classification. This is the first attempt by SBRC to tabulate all subspecies recorded in Scotland and also introduces status symbols. It is envisaged that this expanded list will form a baseline for future studies, will be of use as a conservation tool and could be used in courts of law.

The species sequence is based on the original Scottish List of species as it appeared when published in 1994, but incorporates amendments contained in subsequent reports, *Scottish Birds* 18:129-131, 19:259-261 and 21:1-5 plus a few additional changes published in a separate paper within this issue of *Scottish Birds*.

In recent years there has been an increasing divergence of opinion on taxonomical matters. We established several principles for the original version of the Scottish List, which we still follow. The British Ornithologists' Union's Records Committee (BOURC) has maintained the official British List since 1883. We decided at the outset to follow their taxonomy, sequence and scientific names for the Scottish List. This approach has now been extended to subspecies and as a result, if for instance BOURC consider a species to be monotypic but some other authorities show 2 or more races, we have followed BOURC. We also use identical categories to BOURC and in no instance is a species placed in a higher category on the Scottish List than it appears on the British List. This principle now also applies to subspecies and therefore we do not include a subspecies on the Scottish List unless BOURC have accepted it for Britain.

One of the advantages in basing the Scottish List on that used by BOURC is that it is compiled in a consistent manner. A consequence of this approach is that conservation agencies can use the list, in the knowledge that a rigorous process is undertaken during its compilation. This may be especially important in advising on legal issues where the status of an individual bird may be discussed in court.

In 1998, BOURC introduced a revised categorisation (*British Birds* 91:2-11). The changes included a new category (Category E) for escapes and a redefining of the existing categories (A-D). We adopted the new categories in our 2000 Report (*Scottish Birds* 21: 1-5), although a list of Category E species is not yet available. We have recently formed a sub-committee, with the intention of publishing a list of Scottish Category E species to supplement the existing Categories A-D. A provisional list will appear on the website once it is available .

When the Scottish List was first published BOURC had recently altered the English names of a large number of species on the British List. Many of these new names were at that time considered controversial and it was decided that the Scottish List should adopt a more traditional

approach. In the intervening period there has been considerable debate and, whilst a few of the names remain disliked by many, most of the English names adopted by BOURC now appear to be accepted by the majority of birders, many of whom are widely travelled, preferring unambiguous and unique English names. We have always followed BOURC in all other respects and adopting their English names is therefore appropriate. Members of SBRC unanimously agreed to use the English names as they appear in the British List for this and all future versions of the Scottish List.

Scotland has 9 endemic subspecies in addition to one endemic species, the Scottish Crossbill. When working on this list we were surprised to note that many of Scotland's endemic races have been almost completely ignored during the last 50 years. It is our intention in the near future to outline known information on status, distribution and identification for our endemic races in an attempt to encourage more study.

The work involved in preparing this list has been undertaken by a sub committee comprising Dave Clugston (Chairman, SBRC), Bob McGowan (SBRC's Museum Consultant), Bernie Zonfrillo (coopted; Chairman, SBRC 1984-1994) and Ron Forrester (Secretary, SBRC).

The SOC website includes the Scottish List and lists of recent decisions. The website is for information purposes only and is not an official document, or part of the permanent record. Any announcements of changes to the Scottish List do not come into effect until published in *Scottish Birds* or the *Scottish Bird Report*, under the authorship of the Scottish Birds Records Committee.

Whilst we now have a robust species list, subspecies and status symbols are appearing in print for the first time and we anticipate that there will inevitably be errors. An appendix at the end of the systematic list shows species and subspecies under consideration for inclusion on the list. We would be grateful for comments, particularly in respect of errors or omissions.

Categories

A Species which have been recorded in an apparently natural state at least once since 1 January 1950.

B Species which were recorded in an apparently natural state at least once up to 31 December 1949, but have not been recorded subsequently.

C Species that although originally introduced by man, either deliberately or accidentally, have established breeding populations derived from introduced stock, that maintain themselves without necessary recourse to further introduction. Category C has been further subdivided by BOURC to differentiate between various groups of naturalised species (C1 naturalised introduction, C2 naturalised establishments, C3 naturalised re establishments, C4 naturalised feral species, C5 vagrant naturalised species.), although we await the allocation of these additional codes.

D Species that would otherwise appear in Category A or B except that there is reasonable doubt that they ever occurred in a natural state. Category D species do not form any part of the species totals and are not regarded as members of the Scottish List.

E Species that have been recorded as introductions, transportees or escapees from captivity and whose breeding populations, if any, are thought not to be self sustaining. Category E species form no part of the Scottish List. A list of Category E species has not yet been produced for Scotland.

RB	Resident breeder	FB	Former breeder
MB	Migrant breeder	WV	Winter visitor
IB	Introduced breeder	PV	Passage visitor
CB	Casual breeder	SV	Scarce visitor

Abbreviated codes are provided for status of each race on the list. We have followed the standard set of codes used by BOURC in *The Status of Birds in Britain and Ireland* 1971, which they also used in *Checklist of Birds of Britain and Ireland*, 6th edition, published in 1992.

Where species are monotypic ie BOURC do not recognise any subspecies, nothing is shown in the subspecies column. If a subspecies has an established English name this is shown in brackets. Species appearing in Category D, all of which have occurred in Scotland on less than an annual basis, are tabulated separately, following the main list, without any further details on subspecies or status.

Subspecies appearing in **bold** are endemic to Scotland.

SYSTEMATIC LIST

Category & Species		Binomen	Subspecies	Status
A	Red-throated Diver	*Gavia stellata*	*stellata*	MB RB WV PV
A	Black-throated Diver	*Gavia arctica*	*arctica*	MB RB WV
A	Great Northern Diver	*Gavia immer*		CB WV
A	Yellow-billed Diver	*Gavia adamsii*		SV
A	Pied-billed Grebe	*Podilymbus podiceps*	*podiceps* (presumed)	SV
A	Little Grebe	*Tachybaptus ruficollis*	*ruficollis*	RB MB WV
A	Great Crested Grebe	*Podiceps cristatus*	*cristatus*	RB WV
A	Red-necked Grebe	*Podiceps grisegena*	*grisegena*	CB WV
	(American)		*holboellii*	SV
A	Slavonian Grebe	*Podiceps auritus*	*auritus*	RB WV
A	Black-necked Grebe	*Podiceps nigricollis*	*nigricollis*	MB/RB WV PV
A	Black-browed Albatross	*Diomedea melanophris*	*melanophris*	SV
A	Northern Fulmar	*Fulmarus glacialis*	*glacialis*	RB MB PV
A	Cory's Shearwater	*Calonectris diomedea*	*borealis*	PV
A	Great Shearwater	*Puffinus gravis*		PV
A	Sooty Shearwater	*Puffinus griseus*		PV
A	Manx Shearwater	*Puffinus puffinus*		MB PV
A	Balearic Shearwater	*Puffinus mauretanicus*		PV
A	Little Shearwater	*Puffinus assimilis*	*baroli* (presumed)	SV
A	Wilson's Storm-petrel	*Oceanites oceanicus*	*exasperatus* (presumed)	SV
B	White-faced Storm-petrel	*Pelagodroma marina*	*hypoleuca*	SV
A	European Storm-petrel	*Hydrobates pelagicus*		MB PV
A	Leach's Storm-petrel	*Oceanodroma leucorhoa*	*leucorhoa*	MB PV
A	Northern Gannet	*Morus bassanus*		MB RB PV
A	Great Cormorant	*Phalacrocorax carbo*	*carbo*	RB MB
			sinensis	SV

A	European Shag	*Phalacrocorax aristotelis*	*aristotelis*	RB
A	Magnificent Frigatebird	*Fregata magnificens*		SV
A	Great Bittern	*Botaurus stellaris*	*stellaris*	FB PV
A	American Bittern	*Botaurus lentiginosus*		SV
A	Little Bittern	*Ixobrychus minutus*	*minutus*	SV
A	Black-crowned Night Heron	*Nycticorax nycticorax*	*nycticorax*	SV
A	Green Heron	*Butorides virescens*		SV
B	Squacco Heron	*Ardeola ralloides*		SV
A	Cattle Egret	*Bubulcus ibis*	*ibis*	SV
A	Little Egret	*Egretta garzetta*	*garzetta*	PV
A	Great Egret	*Ardea alba*	*alba*	SV
A	Grey Heron	*Ardea cinerea*	*cinerea*	RB WV
A	Purple Heron	*Ardea purpurea*	*purpurea*	SV
A	Black Stork	*Ciconia nigra*		SV
A	White Stork	*Ciconia ciconia*	*ciconia*	FB PV
A	Glossy Ibis	*Plegadis falcinellus*	*falcinellus*	SV
A	Eurasian Spoonbill	*Platalea leucorodia*	*leucorodia*	PV
A,C	Mute Swan	*Cygnus olor*		RB
A	Tundra Swan (Bewick's)	*Cygnus columbianus*	*bewickii*	WV
A	Whooper Swan	*Cygnus cygnus*		CB WV
A	Bean Goose			
	(Taiga)	*Anser fabalis*	*fabalis*	WV
	(Tundra)		*rossicus*	PV
A	Pink-footed Goose	*Anser brachyrhynchus*		WV
A	Greater White-fronted Goose			
	(European)	*Anser albifrons*	*albifrons*	PV
	(Greenland)		*flavirostris*	WV
A	Lesser White-fronted Goose	*Anser erythropus*		SV
A,C	Greylag Goose	*Anser anser*	*anser*	RB IB WV
A	Snow Goose			
	(Lesser)	*Anser caerulescens*	*caerulescens*	SV
	(Greater)		*atlanticus*	SV
A,C	Canada Goose	*Branta canadensis*	*canadensis*	IB
			plus race or races undetermined	SV
A	Barnacle Goose	*Branta leucopsis*		WV
A	Brent Goose			
	(Dark-bellied)	*Branta bernicla*	*bernicla*	PV WV
	(Pale-bellied)		*hrota*	PV WV
	(Black Brant)		*nigricans*	SV
A	Red-breasted Goose	*Branta ruficollis*		SV
B	Ruddy Shelduck	*Tadorna ferruginea*		SV
A	Common Shelduck	*Tadorna tadorna*		MB RB WV
C	Mandarin Duck	*Aix galericulata*		IB
A	Eurasian Wigeon	*Anas penelope*		RB WV PV
A	American Wigeon	*Anas americana*		SV
A,C	Gadwall	*Anas strepera*		IB RB MB WV
A	Eurasian Teal	*Anas crecca*		RB WV PV
A	Green-winged Teal	*Anas carolinensis*	*carolinensis*	SV
A,C	Mallard	*Anas platyrhynchos*	*platyrhynchos*	RB WV

A	American Black Duck	*Anas rubripes*		SV
A	Northern Pintail	*Anas acuta*	*acuta*	RB or MB WV
A	Garganey	*Anas querquedula*		MB PV
A	Blue-winged Teal	*Anas discors*		SV
A	Northern Shoveler	*Anas clypeata*		MB WV PV
A	Red-crested Pochard	*Netta rufina*		SV
A	Common Pochard	*Aythya ferina*		MB/RB WV PV
A	Ring-necked Duck	*Aythya collaris*		SV
A	Ferruginous Duck	*Aythya nyroca*		SV
A	Tufted Duck	*Aythya fuligula*		RB WV PV
A	Greater Scaup	*Aythya marila*		CB WV PV
A	Lesser Scaup	*Aythya affinis*		SV
A	Common Eider	*Somateria mollissima*	*mollissima*	RB WV
D			*borealis*	SV
A	King Eider	*Somateria spectabilis*		SV
A	Steller's Eider	*Polysticta stelleri*		SV
A	Harlequin Duck	*Histrionicus histrionicus*		SV
A	Long-tailed Duck	*Clangula hyemalis*		CB WV
A	Black Scoter			
	(Common)	*Melanitta nigra*	*nigra*	RB/MB WV PV
	(American)		*americana*	SV
A	Surf Scoter	*Melanitta perspicillata*		WV PV
A	Velvet Scoter	*Melanitta fusca*	*fusca*	WV PV
A	Bufflehead	*Bucephala albeola*		SV
A	Barrow's Goldeneye	*Bucephala islandica*		SV
A	Common Goldeneye	*Bucephala clangula*	*clangula*	RB WV PV
A	Smew	*Mergellus albellus*		WV
A	Red-breasted Merganser	*Mergus serrator*		RB WV
A	Goosander	*Mergus merganser*	*merganser*	RB WV
C	Ruddy Duck	*Oxyura jamaicensis*	*jamaicensis*	IB
A	European Honey-buzzard	*Pernis apivorus*		MB PV
A	Black Kite	*Milvus migrans*	*migrans*	SV
A,C	Red Kite	*Milvus milvus*	*milvus*	FB IB SV
A	White-tailed Eagle	*Haliaeetus albicilla*		FB IB SV
A	Eurasian Marsh Harrier	*Circus aeruginosus*	*aeruginosus*	MB PV
A	Hen Harrier	*Circus cyaneus*	*cyaneus*	RB MB PV WV
A	Pallid Harrier	*Circus macrourus*		SV
A	Montagu's Harrier	*Circus pygargus*		MB PV
A,C	Northern Goshawk	*Accipiter gentilis*	*gentilis*	FB IB PV
A	Eurasian Sparrowhawk	*Accipiter nisus*	*nisus*	RB PV WV
A	Common Buzzard	*Buteo buteo*	*buteo*	RB
A	Rough-legged Buzzard	*Buteo lagopus*	*lagopus*	WV PV
A	Golden Eagle	*Aquila chrysaetos*	*chrysaetos*	RB
A	Osprey	*Pandion haliaetus*	*haliaetus*	MB PV
A	Lesser Kestrel	*Falco naumanni*		SV
A	Common Kestrel	*Falco tinnunculus*	*tinnunculus*	RB MB PV WV
A	American Kestrel	*Falco sparverius*	*sparverius*	SV
A	Red-footed Falcon	*Falco vespertinus*		SV
A	Merlin	*Falco columbarius*	*aesalon*	RB/MB PV WV
			subaesalon	PV WV

A	Eurasian Hobby	*Falco subbuteo*	*subbuteo*	CB PV
A	Eleonora's Falcon	*Falco eleonorae*		SV
A	Gyr Falcon	*Falco rusticolus*		SV
A	Peregrine Falcon	*Falco peregrinus*	*peregrinus*	RB WV PV
A	Willow Ptarmigan (Red Grouse)	*Lagopus lagopus*	*scoticus*	RB
A	Rock Ptarmigan (Scottish Ptarmigan)	*Lagopus mutus*	***millaisi***	**RB ENDEMIC**
A	Black Grouse	*Tetrao tetrix*	*britannicus*	RB
B,C	Western Capercaillie	*Tetrao urogallus*	*urogallus*	FB IB
C	Red-legged Partridge	*Alectoris rufa*	*rufa*	IB
A,C	Grey Partridge	*Perdix perdix*	*perdix*	FB
			intraspecific hybrids as result of introductions	IB
A	Common Quail	*Coturnix coturnix*	*coturnix*	MB PV
C	Common Pheasant	*Phasianus colchicus*	*colchicus*	IB
			torquatus	FIB
			intraspecific hybrids	IB
C	Golden Pheasant	*Chrysolophus pictus*		IB
A	Water Rail	*Rallus aquaticus*	*aquaticus*	RB PV WV
A	Spotted Crake	*Porzana porzana*		CB PV
A	Sora	*Porzana carolina*		SV
A	Little Crake	*Porzana parva*		SV
A	Baillon's Crake	*Porzana pusilla*	*intermedia*	SV
A	Corn Crake	*Crex crex*		MB PV
A	Common Moorhen	*Gallinula chloropus*	*chloropus*	RB WV
A	Common Coot	*Fulica atra*	*atra*	RB WV
A	Common Crane	*Grus grus*	*grus*	PV
A	Sandhill Crane	*Grus canadensis*	*canadensis*	SV
A	Little Bustard	*Tetrax tetrax*		SV
B	Houbara Bustard	*Chlamydotis undulata*	*macqueenii*	SV
A	Great Bustard	*Otis tarda*	*tarda*	SV
A	Eurasian Oystercatcher	*Haematopus ostralegus*	*ostralegus*	RB MB PV WV
A	Black-winged Stilt	*Himantopus himantopus*	*himantopus*	SV
A	Pied Avocet	*Recurvirostra avosetta*		SV
A	Stone-curlew	*Burhinus oedicnemus*	*oedicnemus*	SV
A	Cream-coloured Courser	*Cursorius cursor*	*cursor*	SV
A	Collared Pratincole	*Glareola pratincola*	*pratincola*	SV
A	Black-winged Pratincole	*Glareola nordmanni*		SV
A	Little Plover	*Charadrius dubius*	*curonicus*	CB PV
A	Ringed Plover	*Charadrius hiaticula*	*hiaticula*	RB MB PV WV
			tundrae	PV WV
A	Killdeer	*Charadrius vociferus*	*vociferus*	SV
A	Kentish Plover	*Charadrius alexandrinus*	*alexandrinus*	SV
A	Greater Sand Plover	*Charadrius leschenaultii*	race undetermined	SV
A	Caspian Plover	*Charadrius asiaticus*		SV
A	Eurasian Dotterel	*Charadrius morinellus*		MB PV
A	American Golden Plover	*Pluvialis dominica*		SV
A	Pacific Golden Plover	*Pluvialis fulva*		SV
A	European Golden Plover	*Pluvialis apricaria*		RB MB WV PV

A	Grey Plover	*Pluvialis squatarola*		PV WV
A	Sociable Lapwing	*Vanellus gregarius*		SV
A	Northern Lapwing	*Vanellus vanellus*		RB MB PV WV
A	Great Knot	*Calidris tenuirostris*		SV
A	Red Knot	*Calidris canutus*	*canutus*	PV
			islandica	PV WV
A	Sanderling	*Calidris alba*		PV WV
A	Semipalmated Sandpiper	*Calidris pusilla*		SV
A	Western Sandpiper	*Calidris mauri*		SV
A	Red-necked Stint	*Calidris ruficollis*		SV
A	Little Stint	*Calidris minuta*		PV
A	Temminck's Stint	*Calidris temminckii*		CB PV
A	Least Sandpiper	*Calidris minutilla*		SV
A	White-rumped Sandpiper	*Calidris fuscicollis*		SV
A	Baird's Sandpiper	*Calidris bairdii*		SV
A	Pectoral Sandpiper	*Calidris melanotos*		PV
A	Sharp-tailed Sandpiper	*Calidris acuminata*		SV
A	Curlew Sandpiper	*Calidris ferruginea*		PV
A	Purple Sandpiper	*Calidris maritima*		CB PV WV
A	Dunlin	*Calidris alpina*	*alpina*	PV WV
			schinzii	MB PV WV
			arctica	PV
A	Broad-billed Sandpiper	*Limicola falcinellus*	*falcinellus*	SV
A	Stilt Sandpiper	*Micropalama himantopus*		SV
A	Buff-breasted Sandpiper	*Tryngites subruficollis*		PV
A	Ruff	*Philomachus pugnax*		PV
A	Jack Snipe	*Lymnocryptes minimus*		PV WV
A	Common Snipe	*Gallinago gallinago*	*gallinago*	RB MB PV WV
			faeroeensis	RB MB PV WV
A	Great Snipe	*Gallinago media*		SV
A	Short-billed Dowitcher	*Limnodromus griseus*	race undetermined	SV
A	Long-billed Dowitcher	*Limnodromus scolopaceus*	SV	
A	Eurasian Woodcock	*Scolopax rusticola*		RB MB PV WV
A	Black-tailed Godwit	*Limosa limosa*	*limosa*	MB
			islandica	MB PV WV
A	Hudsonian Godwit	*Limosa haemastica*		SV
A	Bar-tailed Godwit	*Limosa lapponica*	*lapponica*	PV WV
B	Eskimo Curlew	*Numenius borealis*		SV
A	Whimbrel	*Numenius phaeopus*	*phaeopus*	MB PV
			hudsonicus	SV
A	Eurasian Curlew	*Numenius arquata*	*arquata*	RB MB PV WV
A	Upland Sandpiper	*Bartramia longicauda*		SV
A	Spotted Redshank	*Tringa erythropus*		PV WV
A	Common Redshank	*Tringa totanus*	*totanus*	RB MB PV WV
			robusta	PV WV
A	Marsh Sandpiper	*Tringa stagnatilis*		SV
A	Common Greenshank	*Tringa nebularia*		RB MB PV WV
A	Greater Yellowlegs	*Tringa melanoleuca*		SV
A	Lesser Yellowlegs	*Tringa flavipes*		SV
A	Solitary Sandpiper	*Tringa solitaria*	*solitaria* (presumed)	SV

A	Green Sandpiper	*Tringa ochropus*		CB PV
A	Wood Sandpiper	*Tringa glareola*		CB PV
A	Terek Sandpiper	*Xenus cinereus*		SV
A	Common Sandpiper	*Actitis hypoleucos*		MB PV
A	Spotted Sandpiper	*Actitis macularia*		CB SV
A	Grey-tailed Tattler	*Heteroscelus brevipes*		SV
A	Ruddy Turnstone	*Arenaria interpres*	*interpres*	PV WV
A	Wilson's Phalarope	*Phalaropus tricolor*		SV
A	Red-necked Phalarope	*Phalaropus lobatus*		MB PV
A	Grey Phalarope	*Phalaropus fulicarius*		PV
A	Pomarine Skua	*Stercorarius pomarinus*		PV
A	Arctic Skua	*Stercorarius parasiticus*		MB PV
A	Long-tailed Skua	*Stercorarius longicaudus*		PV
A	Great Skua	*Catharacta skua*	*skua*	MB PV
A	Mediterranean Gull	*Larus melanocephalus*		PV
A	Laughing Gull	*Larus atricilla*		SV
A	Franklin's Gull	*Larus pipixcan*		SV
A	Little Gull	*Larus minutus*		PV WV
A	Sabine's Gull	*Larus sabini*		PV
A	Bonaparte's Gull	*Larus philadelphia*		SV
A	Black-headed Gull	*Larus ridibundus*		RB MB PV WV
A	Ring-billed Gull	*Larus delawarensis*		PV WV
A	Mew Gull	*Larus canus*	*canus*	RB MB WV PV
A	Lesser-Black-backed Gull	*Larus fuscus*	*fuscus*	PV?
			graellsii	MB PV
			intermedius	PV
A	Herring Gull	*Larus argentatus*	*argentatus*	PV WV
			argenteus	RB
			smithsonianus	SV
	(Yellow-legged)		*michahellis*	SV
A	Iceland Gull	*Larus glaucoides*	*glaucoides*	WV
	(Kumlien's)		*kumlieni*	SV
A	Glaucous Gull	*Larus hyperboreus*	*hyperboreus*	WV
A	Great Black-backed Gull	*Larus marinus*		RB WV
A	Ross's Gull	*Rhodostethia rosea*		SV
A	Black-legged Kittiwake	*Rissa tridactyla*		RB MB PV WV
A	Ivory Gull	*Pagophila eburnea*		SV
A	Gull-billed Tern	*Sterna nilotica*	*nilotica*	SV
A	Caspian Tern	*Sterna caspia*		SV
A	Royal Tern	*Sterna maxima*	race undetermined	SV
A	Lesser Crested Tern	*Sterna bengalensis*	*torresii*	SV
A	Sandwich Tern	*Sterna sandvicensis*	*sandvicensis*	MB PV
A	Roseate Tern	*Sterna dougallii*	*dougallii*	MB PV
A	Common Tern	*Sterna hirundo*	*hirundo*	MB PV
A	Arctic Tern	*Sterna paradisaea*		MB PV
A	Forster's Tern	*Sterna forsteri*		SV
A	Bridled Tern	*Sterna anaethetus*	*antarctica* (presumed)	SV
A	Sooty Tern	*Sterna fuscata*	*fuscata*	SV
A	Little Tern	*Sterna albifrons*	*albifrons*	MB PV
B	Whiskered Tern	*Chlidonias hybridus*	*hybridus*	SV

A	Black Tern	*Chlidonias niger*	*niger*	PV
A	White-winged Tern	*Chlidonias leucopterus*		SV
A	Common Guillemot	*Uria aalge*	*aalge*	RB MB WV
			albionis	RB MB WV
A	Brünnich's Guillemot	*Uria lomvia*	*lomvia* (presumed)	SV
A	Razorbill	*Alca torda*	*islandica*	RB MB WV
			torda	WV
B	Great Auk	*Pinguinus impennis*		Extinct FB
A	Black Guillemot	*Cepphus grylle*	*grylle*	RB
A	Little Auk	*Alle alle*	*alle*	PV WV
D			*polaris*	SV
A	Atlantic Puffin	*Fratercula arctica*	*arctica*	PV
			grabae	RB MB PV WV
A	Pallas's Sandgrouse	*Syrrhaptes paradoxus*		CB SV
A,C	Rock Pigeon	*Columba livia*	*livia*	RB
A	Stock Pigeon	*Columba oenas*	*oenas*	RB PV WV
A	Common Wood Pigeon	*Columba palumbus*	*palumbus*	RB WV
A	Eurasian Collared Dove	*Streptopelia decaocto*	*decaocto*	RB
A	European Turtle Dove	*Streptopelia turtur*	*turtur*	FB PV
A	Oriental Turtle Dove	*Streptopelia orientalis*	*orientalis* (presumed)	SV
A	Mourning Dove	*Zenaida macroura*	*carolinensis* (presumed)	SV
A	Great Spotted Cuckoo	*Clamator glandarius*		SV
A	Common Cuckoo	*Cuculus canorus*	*canorus*	MB PV
A	Black-billed Cuckoo	*Coccyzus erythrophthalmus*		SV
A	Yellow-billed Cuckoo	*Coccyzus americanus*		SV
A	Barn Owl	*Tyto alba*	*alba*	RB
	(Dark-breasted)		*guttata*	SV
A	Eurasian Scops Owl	*Otus scops*	*scops*	SV
A	Snowy Owl	*Nyctea scandiaca*		CB SV
A	Northern Hawk Owl			
	(European)	*Surnia ulula*	*ulula*	SV
	(American)		*caparoch*	SV
C	Little Owl	*Athene noctua*	*vidalii*	IB
A	Tawny Owl	*Strix aluco*	*sylvatica*	RB
A	Long-eared Owl	*Asio otus*	*otus*	RB PV WV
A	Short-eared Owl	*Asio flammeus*	*flammeus*	RB MB PV WV
A	Tengmalm's Owl	*Aegolius funereus*	*funereus*	SV
A	European Nightjar	*Caprimulgus europaeus*	*europaeus*	MB PV
A	Common Nighthawk	*Chordeiles minor*	*minor* (presumed)	SV
A	Chimney Swift	*Chaetura pelagica*		SV
A	White-throated Needletail	*Hirundapus caudacutus*	*caudacutus*	SV
A	Common Swift	*Apus apus*	*apus*	MB PV
A	Pallid Swift	*Apus pallidus*	race undetermined	SV
A	Alpine Swift	*Apus melba*	*melba*	SV
A	Little Swift	*Apus affinis*	*galilejensis* (presumed)	SV
A	Common Kingfisher	*Alcedo atthis*	*ispida*	RB MB
A	Blue-cheeked Bee-eater	*Merops superciliosus*	*persicus* (presumed)	SV
A	European Bee-eater	*Merops apiaster*		CB SV
A	European Roller	*Coracias garrulus*	*garrulus*	SV
A	Hoopoe	*Upupa epops*	*epops*	PV

A	Eurasian Wryneck	*Jynx torquilla*	*torquilla*	CB PV
A	Green Woodpecker	*Picus viridis*	*viridis*	RB
A	Great Spotted Woodpecker	*Dendrocopos major*	*major*	PV WV
			anglicus	RB
A	Lesser Spotted Woodpecker	*Dendrocopos minor*	*comminutus* (presumed)	SV
A	Calandra Lark	*Melanocorypha calandra*	race undetermined	SV
A	Bimaculated Lark	*Melanocorypha bimaculata*	race undetermined	SV
A	Greater Short-toed Lark	*Calandrella brachydactyla*	race undetermined	SV
A	Crested Lark	*Galerida cristata*	*cristata*	SV
A	Wood Lark	*Lullula arborea*	*arborea*	SV
A	Sky Lark	*Alauda arvensis*	*arvensis*	RB MB PV WV
A	Horned Lark	*Eremophila alpestris*	*flava*	CB WV
A	Sand Martin	*Riparia riparia*	*riparia*	MB PV
A	Eurasian Crag Martin	*Ptyonoprogne rupestris*		SV
A	Barn Swallow	*Hirundo rustica*	*rustica*	MB PV
A	Red-rumped Swallow	*Hirundo daurica*	*rufula*	SV
A	House Martin	*Delichon urbica*	*urbica*	MB PV
A	Richard's Pipit	*Anthus novaeseelandiae*	*richardi*	PV
A	Blyth's Pipit	*Anthus godlewskii*		SV
A	Tawny Pipit	*Anthus campestris*	*campestris*	SV
A	Olive-backed Pipit	*Anthus hodgsoni*	*yunnanensis*	SV
A	Tree Pipit	*Anthus trivialis*	*trivialis*	MB PV
A	Pechora Pipit	*Anthus gustavi*	*gustavi*	SV
A	Meadow Pipit	*Anthus pratensis*	*pratensis*	MB RB PV WV
			whistleri	MB or RB
A	Red-throated Pipit	*Anthus cervinus*		SV
A	Rock Pipit	*Anthus petrosus*	*petrosus*	RB
	(Scandinavian)		*littoralis*	PV WV
A	Water Pipit	*Anthus spinoletta*	*spinoletta*	PV WV
A	Buff-bellied Pipit	*Anthus rubescens*	*rubescens*	SV
A	Yellow Wagtail			
	(Blue-headed Wagtail)	*Motacilla flava*	*flava*	CB PV
	(Yellow)		*flavissima*	MB PV
	(Ashy-headed)		*cinereocapilla*	SV
	(Sykes's)		*beema*	SV
	(Grey-headed)		*thunbergi*	SV
	(Black-headed)		*feldegg*	SV
	(Eastern Blue-headed)		*simillima*	SV
A	Citrine Wagtail	*Motacilla citreola*	race undetermined	SV
A	Grey Wagtail	*Motacilla cinerea*	*cinerea*	RB MB PV
A	White / Pied Wagtail			
	(White)	*Motacilla alba*	*alba*	CB PV
	(Pied)		*yarrellii*	MB RB
A	Cedar Waxwing	*Bombycilla cedrorum*		SV
A	Bohemian Waxwing	*Bombycilla garrulus*	*garrulus*	WV
A	White-throated Dipper			
	(Black-bellied)	*Cinclus cinclus*	*cinclus*	SV
	(British)		*gularis*	RB
	(Irish)		*hibernicus*	RB
A	Winter Wren	*Troglodytes troglodytes*	*troglodytes*	WV PV

	(Shetland)		***zetlandicus***	**RB ENDEMIC**
	(Fair Isle)		***fridariensis***	**RB ENDEMIC**
	(Hebridean)		***hebridensis***	**RB ENDEMIC**
	(St Kilda)		***hirtensis***	**RB ENDEMIC**
			indigenus	RB
A	Hedge Accentor (Continental)	*Prunella modularis*	*modularis*	PV WV
	(Hebridean)		*hebridium*	RB
	(British)		*occidentalis*	RB
A	Alpine Accentor	*Prunella collaris*	*collaris*	SV
A	European Robin	*Erithacus rubecula*	*rubecula*	PV WV
			melophilus	RB MB
A	Thrush Nightingale	*Luscinia luscinia*		SV
A	Common Nightingale	*Luscinia megarhynchos*	*megarhynchos*	SV
			hafizi	SV
A	Siberian Rubythroat	*Luscinia calliope*		SV
A	Bluethroat			
	(Red-spotted)	*Luscinia svecica*	*svecica*	CB PV
	(White-spotted)	*cyanecula*	SV	
A	Red-flanked Bluetail	*Tarsiger cyanurus*	*cyanurus*	SV
A	Black Redstart	*Phoenicurus ochruros*	*gibraltariensis*	PV WV
A	Common Redstart	*Phoenicurus phoenicurus*	*phoenicurus*	MB PV
A	Whinchat	*Saxicola rubetra*		MB PV
A	Stonechat	*Saxicola torquata*	*hibernans*	RB MB
	(Siberian)		*maura*	SV
			maura or stejnegeri	SV
A	Isabelline Wheatear	*Oenanthe isabellina*		SV
A	Northern Wheatear	*Oenanthe oenanthe*	*oenanthe*	MB PV
	(Greenland)		*leucorhoa*	PV
A	Pied Wheatear	*Oenanthe pleschanka*	*pleschanka*	SV
A	Black-eared Wheatear	*Oenanthe hispanica*	*hispanica*	SV
A	Desert Wheatear	*Oenanthe deserti*	*deserti*	SV
			homochroa	SV
			atrogularis	SV
A	Rufous-tailed Rock Thrush	*Monticola saxatilis*		SV
A	Blue Rock Thrush	*Monticola solitarius*	race undetermined	SV
A	White's Thrush	*Zoothera dauma*	*aurea*	SV
A	Siberian Thrush	*Zoothera sibirica*	race undetermined	SV
A	Hermit Thrush	*Catharus guttatus*	race undetermined	SV
A	Swainson's Thrush	*Catharus ustulatus*	*swainsonii*	SV
A	Grey-cheeked Thrush	*Catharus minimus*	*aliciae* (presumed)	SV
A	Veery	*Catharus fuscescens*	race undetermined	SV
A	Ring Ouzel	*Turdus torquatus*	*torquatus*	MB PV
A	Common Blackbird	*Turdus merula*	*merula*	RB MB PV WV
A	Eyebrowed Thrush	*Turdus obscurus*		SV
A	Dusky Thrush	*Turdus naumanni*	*eunomus*	SV
A	Dark-throated Thrush	*Turdus ruficollis*	*atrogularis*	SV
A	Fieldfare	*Turdus pilaris*		CB WV PV
A	Song Thrush	*Turdus philomelos*	*philomelos*	PV WV
			clarkei	RB MB PV WV
	(Hebridean)		***hebridensis***	**RB MB ENDEMIC**

A	Redwing	*Turdus iliacus*	*iliacus*	MB/RB WV PV
			coburni	WV PV
A	Mistle Thrush	*Turdus viscivorus*	*viscivorus*	RB MB PV WV
A	American Robin	*Turdus migratorius*	*migratorius*	SV
A	Cetti's Warbler	*Cettia cetti*	*cetti*	SV
A	Pallas's Grasshopper Warbler	*Locustella certhiola*	*rubescens*	SV
A	Lanceolated Warbler	*Locustella lanceolata*		SV
A	Common Grasshopper Warbler	*Locustella naevia*	*naevia*	MB PV
A	River Warbler	*Locustella fluviatilis*		SV
A	Savi's Warbler	*Locustella luscinioides*	*luscinioides*	SV
A	Aquatic Warbler	*Acrocephalus paludicola*		SV
A	Sedge Warbler	*Acrocephalus schoenobaenus*		MB PV
A	Paddyfield Warbler	*Acrocephalus agricola*	*brevipennis* (presumed)	SV
A	Blyth's Reed Warbler	*Acrocephalus dumetorum*		SV
A	Marsh Warbler	*Acrocephalus palustris*		CB PV
A	Eurasian Reed Warbler	*Acrocephalus scirpaceus*	*scirpaceus*	MB PV
A	Great Reed Warbler	*Acrocephalus arundinaceus*		
			arundinaceus	SV
A	Thick-billed Warbler	*Acrocephalus aedon*	*aedon* (presumed)	SV
A	Olivaceous Warbler	*Hippolais pallida*	*elaeica*	SV
A	Booted Warbler	*Hippolais caligata*	*caligata*	SV
	(Sykes's)		*rama*	SV
A	Icterine Warbler	*Hippolais icterina*		CB PV
A	Melodious Warbler	*Hippolais polyglotta*		PV
A	Marmora's Warbler	*Sylvia sarda*	*sarda* (presumed)	SV
A	Dartford Warbler	*Sylvia undata*	*dartfordiensis*	SV
A	Subalpine Warbler	*Sylvia cantillans*	*cantillans*	SV
			albistriata	SV
A	Sardinian Warbler	*Sylvia melanocephala*	*melanocephala*	SV
A	Ruppell's Warbler	*Sylvia rueppelli*		SV
A	Orphean Warbler	*Sylvia hortensis*	race undetermined	SV
A	Barred Warbler	*Sylvia nisoria*	*nisoria*	PV
A	Lesser Whitethroat	*Sylvia curruca*	*curruca*	MB PV
	(Siberian)		*blythi*	SV
A	Common Whitethroat	*Sylvia communis*	*communis*	MB PV
A	Garden Warbler	*Sylvia borin*	*borin*	MB PV
A	Blackcap	*Sylvia atricapilla*	*atricapilla*	MB PV WV
A	Greenish Warbler	*Phylloscopus trochiloides*	*viridanus*	SV
A	Arctic Warbler	*Phylloscopus borealis*	*talovka* (presumed)	SV
A	Pallas's Leaf Warbler	*Phylloscopus proregulus*	*proregulus*	PV
A	Yellow-browed Warbler	*Phylloscopus inornatus*	*inornatus*	PV
A	Hume's Leaf Warbler	*Phylloscopus humei*	*humei* (presumed)	SV
A	Radde's Warbler	*Phylloscopus schwarzi*		SV
A	Dusky Warbler	*Phylloscopus fuscatus*	*fuscatus*	SV
A	Western Bonelli's Warbler	*Phylloscopus bonelli*		SV
A	Eastern Bonelli's Warbler	*Phylloscopus orientalis*		SV
A	Wood Warbler	*Phylloscopus sibilatrix*		MB PV
A	Common Chiffchaff	*Phylloscopus collybita*	*collybita*	MB PV WV
			abietinus	PV WV
	(Siberian)		*tristis*	PV WV

			fulvescens	PV WV
A	Willow Warbler	*Phylloscopus trochilus*	*trochilus*	MB PV
			acredula	MB? PV
A	Goldcrest	*Regulus regulus*	*regulus*	RB PV WV
A	Firecrest	*Regulus ignicapillus*	*ignicapillus*	PV
A	Spotted Flycatcher	*Muscicapa striata*	*striata*	MB PV
A	Red-breasted Flycatcher	*Ficedula parva*	*parva*	PV
A	Collared Flycatcher	*Ficedula albicollis*		SV
A	Pied Flycatcher	*Ficedula hypoleuca*	*hypoleuca*	MB PV
A	Bearded Tit	*Panurus biarmicus*	*biarmicus*	RB? PV
A	Long-tailed Tit	*Aegithalos caudatus*	*rosaceus*	RB
			caudatus	SV
A	Marsh Tit	*Parus palustris*	*dresseri*	RB
A	Willow Tit	*Parus montanus*	*kleinschmidti*	RB
			borealis	SV
A	Crested Tit			
	(Scottish)	*Parus cristatus*	***scoticus***	**RB ENDEMIC**
A	Coal Tit	*Parus ater*	*ater*	PV
			britannicus	RB
A	Blue Tit	*Parus caeruleus*	*caeruleus*	SV
			obscurus	RB
A	Great Tit	*Parus major*	*major*	SV WV
			newtoni	RB
A	Wood Nuthatch	*Sitta europaea*	*cacsia*	RB
A	Eurasian Treecreeper	*Certhia familiaris*	*familiaris*	SV
			britannica	RB
A	Eurasian Golden Oriole	*Oriolus oriolus*	*oriolus*	CB PV
A	Brown Shrike	*Lanius cristatus*	race undetermined	SV
A	Isabelline Shrike	*Lanius isabellinus*	*phoenicuroides*	
			(presumed)	SV
A	Red-backed Shrike	*Lanius collurio*	*collurio*	CB PV
A	Lesser Grey Shrike	*Lanius minor*	*minor*	SV
A	Great Grey Shrike	*Lanius excubitor*	*excubitor*	WV PV
A	Southern Grey Shrike	*Lanius meridionalis*	*pallidirostris*	SV
A	Woodchat Shrike	*Lanius senator*	*senator*	PV
A	Eurasian Jay	*Garrulus glandarius*	*rufitergum*	RB
A	Black-billed Magpie	*Pica pica*	*pica*	RB
A	Spotted Nutcracker	*Nucifraga caryocatactes*	*macrorhynchos*	SV
A	Red-billed Chough	*Pyrrhocorax pyrrhocorax*	*pyrrhocorax*	RB
A	Eurasian Jackdaw	*Corvus monedula*	*monedula*	WV
			spermologus	RB WV
A	Rook	*Corvus frugilegus*	*frugilegus*	RB WV
A	Carrion / Hooded Crow			
	(Carrion)	*Corvus corone*	*corone*	RB WV
	(Hooded)		*cornix*	RB WV
A	Common Raven	*Corvus corax*	*corax*	RB
A	Common Starling	*Sturnus vulgaris*	*vulgaris*	RB WV PV
	(Shetland)		***zetlandicus***	**RB ENDEMIC**
A	Rosy Starling	*Sturnus roseus*		SV
A	House Sparrow	*Passer domesticus*	*domesticus*	RB

A	Spanish Sparrow	*Passer hispaniolensis*	*hispaniolensis* (presumed)	SV
A	Eurasian Tree Sparrow	*Passer montanus*	*montanus*	RB PV
A	Red-eyed Vireo	*Vireo olivaceus*		SV
A	Chaffinch	*Fringilla coelebs*	*coelebs*	WV PV
			gengleri	RB
A	Brambling	*Fringilla montifringilla*		CB WV PV
A	European Serin	*Serinus serinus*		SV
A	European Greenfinch	*Carduelis chloris*	*chloris*	RB WV
A	European Goldfinch	*Carduelis carduelis*	*britannica*	RB MB
A	Eurasian Siskin	*Carduelis spinus*		RB MB WV PV
A	Common Linnet	*Carduelis cannabina*	*cannabina*	WV
	(Scottish)		***autochthona***	**RB MB ENDEMIC**
A	Twite	*Carduelis flavirostris*	*pipilans*	RB MB
A	Lesser Redpoll	*Carduelis cabaret*		RB MB
A	Common Redpoll			
	(Mealy)	*Carduelis flammea*	*flammea*	WV PV
	(Greater)		*rostrata*	SV
A	Arctic Redpoll	*Carduelis hornemanni*	*hornemanni*	SV
			exilipes	SV
A	Two-barred Crossbill	*Loxia leucoptera*	*bifasciata*	SV
A	Common Crossbill	*Loxia curvirostra*	*curvirostra*	RB MB WV PV
A	Scottish Crossbill	*Loxia scotica*		**RB ENDEMIC**
A	Parrot Crossbill	*Loxia pytyopsittacus*		[RB?] SV
A	Trumpeter Finch	*Bucanetes githagineus*	race undetermined	SV
A	Common Rosefinch	*Carpodacus erythrinus*	*erythrinus*	CB PV
A	Pine Grosbeak	*Pinicola enucleator*	*enucleator*	SV
A	Common Bullfinch	*Pyrrhula pyrrhula*	*pyrrhula*	SV
			pileata	RB
A	Hawfinch	*Coccothraustes*	*coccothraustes*	RB PV
A	Evening Grosbeak	*Hesperiphona vespertina*	*vespertina* (presumed)	SV
B	Black-and-white Warbler	*Mniotilta varia*		SV
A	Tennessee Warbler	*Vermivora peregrina*		SV
A	Yellow Warbler	*Dendroica petechia*	*aestiva*	SV
A	Chestnut-sided Warbler	*Dendroica pensylvanica*		SV
A	Blackburnian Warbler	*Dendroica fusca*		SV
A	Cape May Warbler	*Dendroica tigrina*		SV
A	Yellow-rumped Warbler	*Dendroica coronata*	*coronata* (presumed)	SV
A	Blackpoll Warbler	*Dendroica striata*		SV
A	American Redstart	*Setophaga ruticilla*		SV
A	Ovenbird	*Seiurus aurocapillus*	*aurocapillus*	SV
A	Common Yellowthroat	*Geothlypis trichas*	race undetermined	SV
A	Hooded Warbler	*Wilsonia citrina*		SV
A	Savannah Sparrow	*Passerculussandwichensis*	race undetermined	SV
A	Song Sparrow	*Melospiza melodia*	race undetermined	SV
A	White-crowned Sparrow	*Zonotrichia leucophrys*	race undetermined	SV
A	White-throated Sparrow	*Zonotrichia albicollis*		SV
A	Dark-eyed Junco	*Junco hyemalis*	*hyemalis*	SV
A	Lapland Longspur	*Calcarius lapponicus*	*lapponicus*	CB PV WV
A	Snow Bunting	*Plectrophenax nivalis*	*nivalis*	RB PV WV
			insulae	RB PV WV

A	Pine Bunting	*Emberiza leucocephalos*	*leucocephalos*	SV
A	Yellowhammer	*Emberiza citrinella*	*citrinella*	SV
			caliginosa	RB
A	Cirl Bunting	*Emberiza cirlus*	*cirlus*	SV
A	Ortolan Bunting	*Emberiza hortulana*		PV
A	Cretzschmar's Bunting	*Emberiza caesia*		SV
A	Yellow-browed Bunting	*Emberiza chrysophrys*		SV
A	Rustic Bunting	*Emberiza rustica*	*rustica*	SV
A	Little Bunting	*Emberiza pusilla*		SV
A	Yellow-breasted Bunting	*Emberiza aureola*	*aureola*	SV
A	Reed Bunting	*Emberiza schoeniclus*	*schoeniclus*	RB PV WV
A	Pallas's Bunting	*Emberiza pallasi*	*polaris* (presumed)	SV
A	Black-headed Bunting	*Emberiza melanocephala*		SV
A	Corn Bunting	*Miliaria calandra*	*calandra*	RB PV WV
A	Rose-breasted Grosbeak	*Pheucticus ludovicianus*		SV
A	Bobolink	*Dolichonyx oryzivorus*		SV
A	Brown-headed Cowbird	*Molothrus ater*	race undetermined	SV
A	Baltimore Oriole	*Icterus galbula*	*galbula*	SV

CATEGORY D

D	Greater Flamingo	*Phoenicopterus ruber*
D	Falcated Duck	*Anas falcata*
D	Baikal Teal	*Anas formosa*
D	Saker Falcon	*Falco cherrug*
D	Asian Brown Flycatcher	*Muscicapa dauurica*
D	Daurian Starling	*Sturnus sturninus*
D	Chestnut Bunting	*Emberiza rutila*
D	Red-headed Bunting	*Emberiza bruniceps*
D	Blue Grosbeak	*Guiraca caerulea*
D	Indigo Bunting	*Passerina cyanea*

Category A	473
Category B	9
Category C	6
Total	488

Category D	10

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Appendix

Species under consideration, but not yet accepted include:

Yellow-legged Gull	There are now approaching 20 accepted records of *michahellis* in Scotland, but BOURC still treats this as a subspecies of Herring Gull.
Caspian Gull	There are 7 Scottish records under consideration. BOURC still treat this as a subspecies (*cachinnans*) of Herring Gull.
Booted Eagle	*Hieraaetus pennatus* North Ronaldsay, Orkney 22 May 2000
Canvasback	*Aythya valisineria* Loch of Rummie, Sanday, Orkney 21-23 June 2000
Swinhoe's Storm-petrel	*Oceanodroma monorhis* Cove, Aberdeenshire 5 August 2000 and from Larne-Stranraer ferry (off Galloway) September 2000
Semipalmated Plover	*Charadrius semipalmatus* Uisaed Point, Argyll 6 July 2000
Hooded Merganser	*Lophodytes cucullatus* North Uist, Outer Hebrides 23-31 October 2000
Long-tailed Shrike	*Lanius schach* South Uist, Outer Hebrides 3-4 November 2000

Subspecies claimed in Scotland, but not yet accepted for Britain by BOURC include:

Little Shearwater	*elegans*	Musselburgh Lagoons 9 December 1990 (specimen found above tide line)
Canada Goose	*hutchinsii, minima* and *parvipes* - many claimed records, but none yet accepted	
Solitary Sandpiper	*solitaria*	Fair Isle 1992 (photographic evidence points to this race)
Mew Gull	*brachyrhynchus*	Lerwick, Shetland 25 January 1994 – 19 March 1994
Atlantic Puffin	*naumanni*	Sule Skerry (date?)

Greater Short-toed Lark	*brachydactyla*	Flannan Isles 1904 (specimen at NMS)
	longipennis	Fair Isle 1907 (specimen at NMS) – BOU say 'race undetermined, 2 types'.
Sky Lark	*cinerea* synonym for *dulcivox*	
		Flannan Is 1906 (specimen at NMS)
Eurasian Reed Warbler	*fuscus*	Fair Isle 15 –16 June 2000, Fife Ness 2000 (Caspian Reed Warbler)
Lesser Whitethroat	*minula* or *margelanica*	
		Fair Isle 25-27 June 1999 (Desert Lesser Whitethroat)
Common Whitethroat	*icterops*	Fife Ness 2000
Garden Warbler	*woodwardi*	Isle of May 15 May 1998
Jackdaw	*soemmerringii*	Veensgarth, Shetland 27 January 1998 – 17 March 1998, with 2 on 28 January and 8 February. BOURC have said in their 25th Report that owing to 'plumage characters of Jackdaws (being) so variable (the race) can be accepted as new to Britain only if a breeding bird or pullus ringed within its normal breeding range is recovered in Britain and shows the characters of the race.'

Subspecies accepted for Britain by BOURC with Scottish records under consideration by SBRC/ BBRC include:

Common Redstart	*samamisicus*	Grutness, Shetland 24-26 September 2000

Subspecies which have probably occurred in Scotland, but for which SBRC can find no acceptable records, include:

Common Guillemot	*hyperborea*	(tideline specimens for Britain Category D)
Coal Tit	*hibernicus*	
Eurasian Jay	*hibernicus* and *glandarius*	
Twite	*flavirostris*	

Subspecies recorded in Scotland but which we have been unable to fully substantiate:

Northern Goshawk	*atricapillus*	The only Scottish record is Schiehallion 1869, origin doubtful, meanwhile placed in Category E

Address for correspondence:
Ronald W Forrester, Secretary, SBRC,
The Gables, Eastlands Road, Rothesay, Isle of Bute PA20 9JZ

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Numbers, distribution and breeding biology of Ring Ouzels in upper Glen Esk, 1992-98

D S C ARTHUR & S A WHITE

Breeding Ring Ouzels were studied during 1992-98 in upper Glen Esk, Angus. The number of confirmed breeding pairs was similar at the beginning and end of the study period with 53 in 1992 and 56 in 1998. Mean inter nest distance was 406m. Of 144 nest sites described, the mean height above ground was 4.9m and mean altitude was 420m. Nests were built almost exclusively on, under or against rock, usually associated with Heather and usually on crags or steeply sloping ground. The annual earliest egg laying date varied between 12 and 23 April. The peak 2 day period of first egg laying date for first clutches was 29-30 April and for second clutches was 27-28 May. The mean clutch size was 4.01 (n 75), while the mean brood size was 3.37 (n 140) with a mean of 3.31 (n 140) chicks fledged. Annual nest success rates varied from 0.50 to 0.77 with most losses at the nestling stage.

Introduction

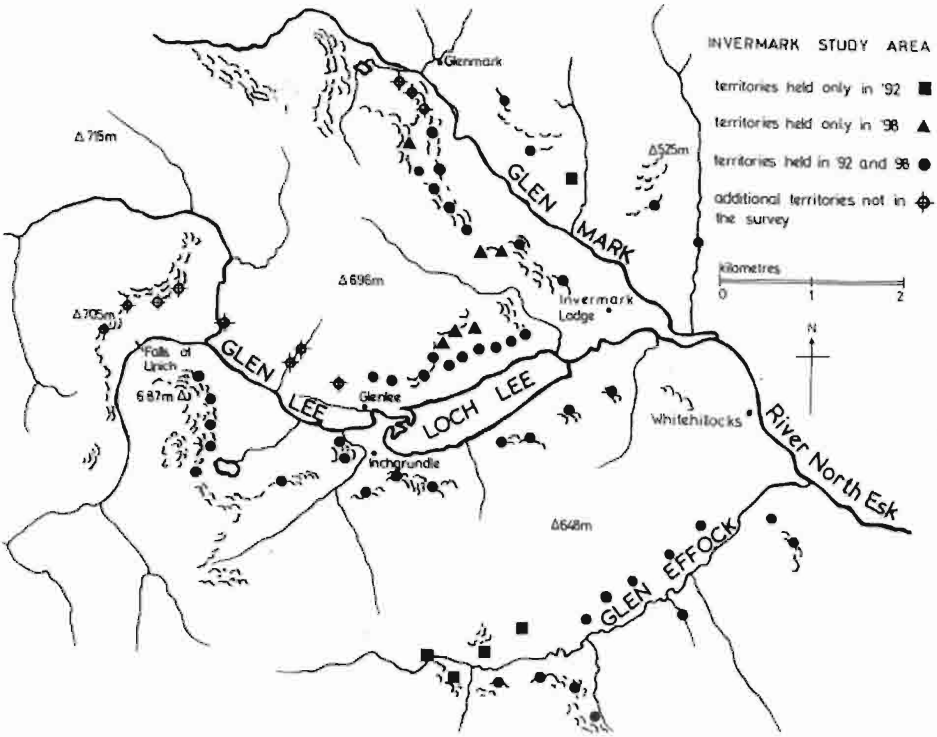
The Ring Ouzel *Turdus torquatus*, has long thought to have been in decline in the British Isles, and apart from the recent study in Glen Clunie (Rebecca 2001), about 30km west of Invermark, there is little knowledge of the status of Ring Ouzels in north Scotland. South of Angus there have been studies in the Pentland Hills (Durman 1977 Poxton 1986,1987), the Yorkshire Dales (Appleyard 1994), Wales (Tyler and Green 1994, Hope Jones 1979) and Dartmoor (Jones 1996). In Angus, our intentions were to quantify the numbers of Ring Ouzels, map the distribution of their territories and describe aspects of their breeding biology and habitat in parts of upper Glen Esk.

Study area

Glen Esk is situated in north east Angus, north of the Highland Boundary fault. The study area on Invermark Estate includes Glens Effock, Lee and Mark (Figure 1). Steep sided slopes with cliffs, crags, boulder fields and scree slopes are the predominant features of these glaciated valleys and corries. The glens are drained by numerous small burns of the River North Esk. Native woodland is sparse in the glens due to the grazing pressure of Red Deer *Cervus elaphus*, Roe Deer *Capreolus capreolus*, Mountain Hare *Lepus timidus*, Rabbit *Oryctolagus cuniculus* and Sheep *Ovis sp*. However, small areas of Birch *Betula sp*, and Rowan *Sorbus aucuparia* occur, the latter providing important food in early autumn. Aspen *Populus tremula*, Scots Pine *Pinus sylvestris* and occasional Juniper *Juniperus communis*, all remnants of ancient woodland, occur on inaccessible ledges of cliffs and crags. A number of small shelter belt coniferous plantations occur. The glen floor and lower slopes are a mosaic of Heather and upland pasture, before they merge with the Heather (*Calluna vulgaris*) line and are used as feeding areas by Ring Ouzels.

Heather communities predominate with *Calluna vulgaris - Erica cinerea* heath and *Calluna vulgaris - Vaccinium myrtillus* heath providing most of the ground cover. Woodland succession is generally prevented by grazing and burning. Grasses are the next most important plants with

Figure 1 Map of the study area in upper Glen Esk 1992-98.



Bent (*Agrostis*) and Fescue (*Festuca*) species widespread with Bracken *Pterydium aquilinum* also common. Other low level shrubs covering large areas of the glen sides are Crowberry *Empetrum nigrum*, Cowberry *Vaccinium vitis-idaea*, and Blaeberry *Vaccinium myrtillus*, the berries of the latter providing an important food source for Ring Ouzels in late summer. Areas of Bog Myrtle *Myrica gale* grow in the lower wetlands. (Ingram and Noltie 1981).

Methods

Fieldwork was carried out from mid March to July in the years 1992-98. Annual coverage varied, as days with poor visibility due to rain or mist were avoided.

Territories were first located by traversing the glen sides using sheep and deer tracks where possible, at an altitude of approximately 350-450m. The altitude range of 250-550m includes 82% of nests on BTO nest record cards covering 1944-70 (Flegg & Glue, 1975). Some slopes were terraced and required 2 observers, although other slopes could be easily surveyed from lower down. In the early years a hand held micro cassette recorder playing Ring Ouzel song was used at 150-200m intervals to locate birds (Arthur 1994).

The criteria used for determining confirmed breeding (A-C) and probable breeding (D) pairs were coded as follows and mapped.

A Nest, eggs or young located.
B Adult or adults carrying nesting materials or food.
C Adult bird or pair alarming, territorial dispute.
D Singing male.

As males generally do not incubate, nest finding involved locating feeding females and then watching their return to the nest, usually within 15 to 20 minutes.

The following nest details were recorded: position, altitude, height above ground, habitat immediately around the nest and whether it was well hidden, partly hidden or exposed. Nest site classification fell into 4 main categories: cliff, crag, boulder field and moorland. Nests were visited regularly at intervals to record contents and to take measurements of eggs or chicks.

The date of laying of the first egg in incomplete clutches was recorded; this could be done to an accuracy of one day. For full clutches the first egg dates were calculated by presuming an incubation period of 14 days and that one egg was laid per day.

In nests that were discovered with chicks, an estimate of their age was made using photographs of known age chicks found in earlier years. In addition, weights gathered by a study of *Turdus torquatus alpestris* in the Carpathian Mountains in the Ukraine by Marisova & Vladyshevsky (1961) were also used and calculated to an accuracy of 3 days.

Known or suspected nest sites were marked on a map and the inter nest distances (IND) calculated using Scion Image computer software.

Nest success rates for each year were calculated using the Mayfield Maximum Likelihood Estimate (Mayfield, 1975). In this method the proportion of nests successful at each of the 3 stages (egg, hatchling and nestling) is multiplied together to give an overall success rate.

Results

Distribution of territories

Figure 1 shows confirmed and probable breeding sites in Glens Lee, Mark and Effock in 1992 and 1998. Inter nest distances were measured and associated standard deviations calculated for the whole study area in an attempt to measure densities of Ring Ouzel breeding territories. In Glen Effock the mean inter nest distance (IND) was 489m ± 144, range 318-750m; in Glen Mark mean IND was 389m ± 239, range 182-954m and in Glen Lee 376m ± 218, range 159-909m. ANOVA showed no significant difference between INDs in the 3 glens ($F=1.58$, $p=0.214$, df 2,63). In the core study area around Loch Lee nests were spaced at a mean distance of 207m ± 57.0, range 159-363m along the north side of the loch. Nest sites were found to be significantly further apart on the south side (2 sample T-test, $t=3.43$, $p=0.011$, $df=7$), where the IND was 463m ± 206, range 182-886m (Fig 1). In Glen Mark on the north east side of the glen, nests were spaced at a mean distance of 750m ± 188, range 568-954m. Nest sites were found to be significantly closer together on the south west side (2 sample t-test, $t=4.79$, $p=0.017$, $df=3$) where the IND was 278m ± 104, range 182-591m.

Nest site characteristics

Out of 144 nests located 122 were built on rock and 22 in Heather. The vegetation immediately surrounding nests was usually Heather, (123 nests), 2 were surrounded by grass and one was in the lower reaches of a tree. Fourteen nests had no vegetation around them (Table 1).

Table 1 ***Nest site details of Ring Ouzels in Glen Esk.***

Situation of nest	**Rock or crag**		**Heather**		
Total number of nests	122		22		
Vegetation surrounding nests	**None**	**Heather**	**Grass**	**Tree**	**Dead**
0-5m up crag	9	93	2	1	4
5-60m up crag	5	30	0	0	0

A total of 73 nests were on crags or ledges, 64 on steeply sloping ground and 7 on flat or gently sloping ground and 18 were well hidden, 106 were partly hidden and 20 were in the open. Fifteen nests were measured with mean and standard deviation for the outside diameter of 110mm ± 9.9 and for the depth from top to base of 62mm ± 6.2.

Of 12 nests dissected, the materials used were identified as the following: Heather, Bracken, grasses and moss. All nests were bound together with mud with an inner lining of fine grasses similar to those in nests in Yorkshire (Appleyard 1994). Nest dimensions and materials were also similar to those recorded for the subspecies *Turdus torquatus alpestris* from Romania (Korodi Gál 1970).

Figure 2 shows the frequency distribution of nest heights up crags, with the vast majority of nests between 0 and 5 metres off the ground, with a mean of 4.90m and a range of 0 to 60m. Figure 3 shows the frequency distribution of nest altitude in 25m bands. This shows a mean of 420m with nests ranging from 310 to 550m.

Figure 2 ***Frequency distribution of Ring Ouzel nest heights up crag 1992-98.***

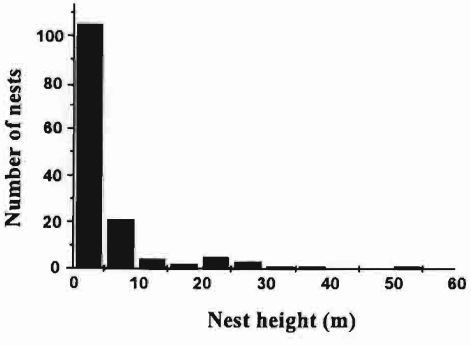
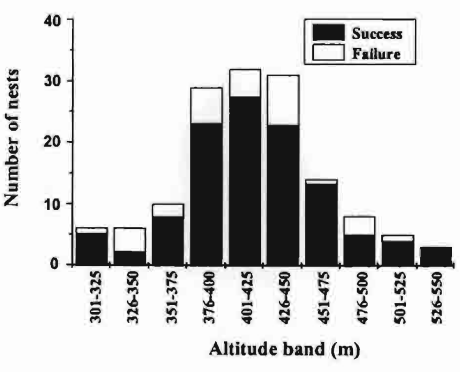


Figure 3 ***Frequency distribution of Ring Ouzel nest altitudes 1992-98. The open section of each column shows the proportion of nests unsuccessful in each band.***



Re use of nest sites

Evidence so far from colour ringed birds returning to the study area seems to indicate low nest site fidelity as several territories were used in subsequent years by different individual pairs. Although the sample was small, no colour ringed bird has been found to occupy a territory for consecutive years. There seems to be a strong, natal site fidelity. Out of 24 sightings of colour ringed birds, 21 birds returned for their first summer, 2 for their second summer and one for its third summer.

Egg laying dates

Figure 4 shows the distribution of first egg laying dates for all clutches over the study period. From inspection of Figure 4, a cut off point was drawn at 14 May and all nests after that were taken to be second broods. The peak 2 day period for first clutches was 29-30 April and for second clutches 27-28 May.

Table 2 lists the mean dates of laying of the first egg of first and second clutches for the 6 years of the study, where known. The overall mean for first clutches was 27 April, ranging between 24 and 29 April. The mean for second clutches showed more variation, ranging between 18 May and 5 June. The laying dates for first clutches were taken and compared with nest altitude. No significant relationship was found between altitude and laying date ($r = 0.103$).

Figure 4 ***Frequency distribution of egg laying dates 1992-98 combined in 2 day intervals.***

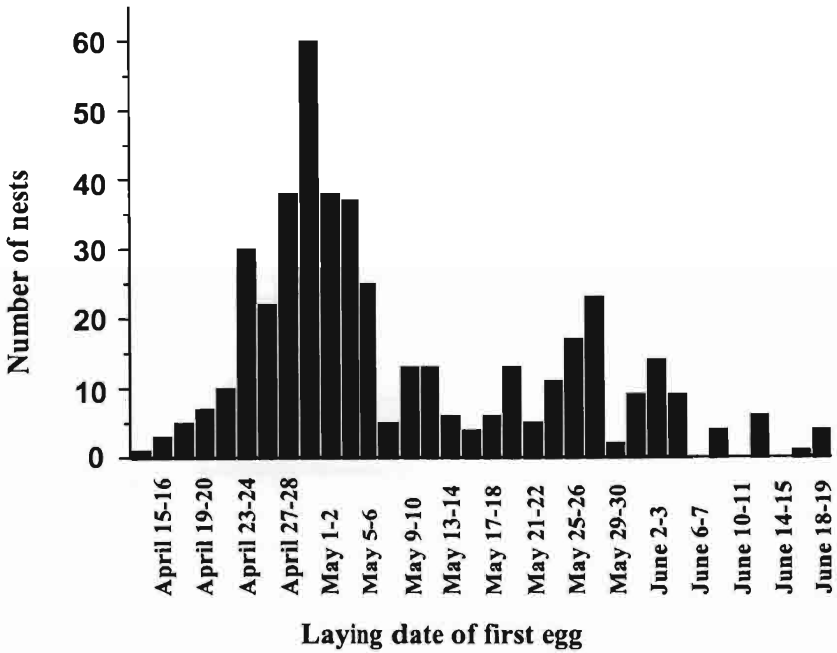


Table 2 *Mean dates of laying of first egg of first and second clutches.*

Year of clutches	Mean first	Number of clutches	Mean second clutches	Number clutches
1993	27 April	9	31 May	8
1994	29 April	9	27 May	8
1995	26 April	21	-	-
1996	24 April	9	18 May	5
1997	27 April	13	20 May	9
1998	29 April	25	5 June	10

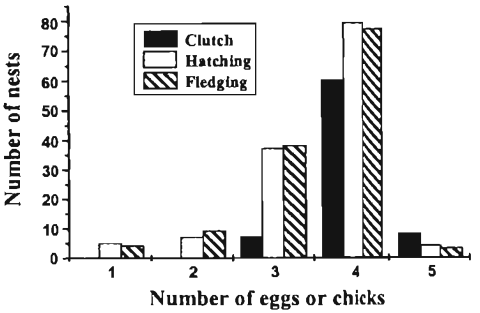
Clutch and brood sizes

Table 3 shows the annual means for clutch size and brood size at both hatching and fledging. Clutch size may have been underestimated as not all nests could be monitored at the start of laying and any losses prior to this would not be recorded. Mean hatchling and fledgling numbers are less likely to be biased in this way. Figure 5 shows the frequency distribution over the whole study period of clutch size and brood size at both hatching and fledging.

Table 3 *Mean dates of laying of first and second clutches.*

Year	Mean clutch Size ± SD(n)	Mean number of chicks hatching ± SD (n)	Mean number of chicks fledging ± SD (n)
1992	4.00 ± 0.76 (7)	3.30 ± 1.27 (10)	3.20 ± 1.17 (10)
1993	4.14 ± 0.64 (7)	3.18 ± 1.29 (17)	3.12 ± 1.32 (17)
1994	3.90 ± 0.30 (7)	3.29 ± 0.82 (17)	3.18 ± 0.98 (17)
1995	4.00 ± 0.00 (12)	3.45 ± 1.03 (22)	3.41 ± 1.03 (22)
1996	4.00 ± 0.58 (6)	3.54 ± 0.63 (13)	3.54 ± 0.63 (13)
1997	4.00 ± 0.67 (9)	3.41 ± 1.07 (22)	3.41 ± 1.07 (22)
1998	4.00± 0.29 (24)	3.39± 1.08 (39)	3.34 ± 1.10 (39)
All years	4.01± 0.46 (75)	3.37 ± 1.06 (140)	3.31 ± 1.08 (140)

Figure 5 ***Frequency distribution of clutch size and brood size at hatching and fledging 1992-98.***



Nest success rates

Table 4 shows nest success rates for each year calculated using the Mayfield Maximum Likelihood Estimate (Mayfield, 1975). This method was designed to enable success rates to be calculated from incomplete data, as in the present study when not all nests were found at the beginning, or could not be followed to a conclusion. Losses of complete nests and losses of individual eggs or young nestlings are taken into account and success rates can be calculated for each stage. The proportion of successful nests at each stage is multiplied together to give the overall success rate. Most losses were at the nestling stage with losses at the egg stage occurring in only 1995. Over the course of the study the annual success rate varied from 0.50 to 0.77 with a mean of 0.61.

Discussion

Although numbers of Ring Ouzels are thought to be stable throughout most of its breeding range in western Europe (Tucker and Heath, 1994) the species has undergone a long term decline in Britain.

Baxter and Rintoul (1953) reported large decreases in Scotland for the first half of the twentieth century, a trend confirmed up to the 1980s by Thom (1986). Sharrock (1976), using data from 1968-72, estimated that there were 8-16,000 breeding pairs in Britain and Ireland and Gibbons et al, (1993) calculated 5,680-11,360 breeding pairs in 1988-1991. The more recent 1999 Ring Ouzel survey estimates there are between 6155 to 7550 territories for the UK, a reduction of around 40% (Wotton *in prep*). Suggested reasons for regional declines are climate change (Gibbons 1993), overgrazing, increased predation and interspecific competition with Common Blackbirds *Turdus merula* (Williamson 1975, Simms 1978) or Mistle Thrushes *Turdus viscivorus* (Durman

Table 4 ***Nest success rates for Ring Ouzels during the current study.***

Year	Egg stage	Hatching stage	Nestling stage	Overall
1992	1.00	0.80	0.66	0.53
1993	1.00	0.80	0.65	0.52
1994	1.00	1.00	0.50	0.50
1995	0.73	0.98	0.94	0.67
1996	1.00	0.81	0.92	0.75
1997	1.00	0.87	0.68	0.59
1998	1.00	0.95	0.78	0.77

1977) although no interspecific interaction with the above species was observed in our study area.

During the study period and set against the situation of decline elsewhere, the similarity in the numbers of breeding territories within the study area, suggests a stable breeding population. A comparable study in nearby Glen Clunie also found evidence of a stable population (Rebecca, 2001).

Distribution of territories

After the first 2 seasons' work it became clear that territories were generally traditional and occupied annually, although not necessarily by the same birds. How boundaries between territories were defined was difficult to assess due to the terrain. The main features were the crags and cliffs. Territory boundaries were vigorously defended at the pair bonding, nest building and incubation stages, especially by the male. A much smaller area around the nest was defended once the eggs hatched, probably because of the demands of feeding the chicks.

Because of the difficulties and time required to delineate territories accurately, inter nest distances (IND) were used as a means of defining the densities of birds.

Figure 1 clearly shows that Ring Ouzel nest sites were fairly regularly spaced throughout the study area, although this spacing varies according to site (mean IND for the whole study was 406m). The core study area around Loch Lee shows marked contrast in the spacing. Birds on the north side had a mean IND of 207m compared with 463m on the south side. The higher density on the north side may be due to the availability of nest sites adjacent to large areas of good pasture. This south facing grassland has a base rich soil which is likely to support a higher earthworm population than the surrounding more acid soils (Tyler and Green 1994) and therefore provides the best feeding areas. The south side had very few grassy areas which were of poor quality and hence supported fewer pairs. Glen Mark also shows great contrast, with the north east facing slopes supporting more birds, with an IND of 278m as against 750m on the opposite side of the glen. As in the Loch Lee area, the densest parts had large areas of more base rich grassland and this, allied to aspect, provided better feeding areas able to support more birds.

Immediately north and south of the Falls of Unich are 2 other areas of high density where there are extensive areas of good pasture. In Glen Effock the density of birds is moderate, with an IND of 489m. Although the pasture is fairly extensive it is of poor quality, due to more acidic soils.

Nest characteristics

The study found that nests were built on crags, cliffs, boulder fields or in Heather, with the associated vegetation generally Heather. This agrees with the work of both Flegg and Glue (1975) and Appleyard (1994) who found the vast majority of nests to be on crags, in gorges or associated with Heather and grass. In a study area in the Pentland Hills, 95 nests were located with 88 in or under Heather, 4 were in Bracken and three were on exposed ledges (Durman 1977, Poxton 1986). In Glen Esk the vast majority of nests were found on steep slopes, cliffs or crags with only a few on more accessible ground. Most nests were at least partially hidden. All the studies noted so far and those of Tyler and Green (1994) in Wales and Jones (1996) on Dartmoor have found nest sites to be on steep slopes, crags and gullies, particularly if there is good coverage of Heather.

Flegg and Glue (1975) found that 82% of nests from all over Britain were between an altitude of 230 and 530m; 74% the of nests in this study area were within 375-475m.

Laying dates

In the 6 years where it was possible to calculate the mean date for first clutches there was little variation (Table 2). The earliest date was 12 April 1995, and the latest 23 April 1998. The earliest eggs recorded in Yorkshire (Appleyard 1994) were on 13 April. It is possible that first laying date is correlated with arrival date. When the birds first arrive back they feed for a few days before breeding commences. Arrival date itself may be affected by a number of factors including the weather and overwintering conditions in North Africa. Data of temperature and rainfall collected from Whitehillocks in the east of the study area, were analysed but no correlation with first egg laying was found. Day length may also be a factor in first laying date, as may be the availability of insects, which itself can be affected by the weather. From the regularity of mean laying dates it would appear that day length is the most reliable indicator of when laying will occur.

Egg laying reached a peak at the end of April, followed by a smaller peak of second clutches on 27-28 May. Appleyard (1994) found the peak of first clutches in Yorkshire to be around a week earlier on 22 April. He identified a second peak due to replacement clutches from the 11-15 May and a third peak due to second clutches from the 26-30 May. Flegg and Glue (1975) and Poxton (1986) similarly found peaks in late April/early May and mid May/early June.

Clutch sizes

The mean clutch size of 4.01 eggs is similar to that of Appleyard (1994) who found a mean clutch size of 3.93 eggs from a total of 85 clutches. Similarly Flegg and Glue (1975) had an overall mean of 4.1 from 79 clutches and Durman (1977) 4.05 from 19 clutches. Clutches of 4 eggs were the commonest, with a few of 3 or 5 eggs. Durman (1977) noted that clutches of 5 were more common in wet years, perhaps linked to the greater ease of catching earthworms, a favoured prey of the Ring Ouzels. The frequency of clutches with 5 eggs in this study was too low for any effect of weather to be noticed. Korodi Gál (1970) found a clutch size of 5 to be commonest in the subspecies *Turdus torquatus alpestris*, breeding in Romania.

Nest success rates

The figures of between 50-77% for nesting success are comparable with those quoted by Appleyard (1994) who found between 38 and 80% of nests were successful in the Yorkshire Dales. Losses were higher in the nestling stage than the egg stage which agrees with the findings of Durman (1977). However Flegg and Glue (1975) found losses to be higher at the egg stage. We compared the nest success rates of open, partly hidden and hidden nests but no significant differences were found. We also compared nest success rates for different slopes and vegetation types but again there were no significant differences.

The reduced number of mammal predators ie Stoat *Mustela erminea*, Weasel *Mustela nivalis*, Fox *Vulpes vulpes* and corvids due to game control may have increased nesting success in our study area. Once the young have fledged, they are vulnerable to predation. Colour rings from a few Ring Ouzel chicks have been found in the eyries of Peregrine Falcons *Falco peregrinus*; recently fledged Ring Ouzels may be easy prey for these raptors.

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D S C Arthur, 12 Dundee Street, Carnoustie, Angus, DD7 7PD
Stewart White, Division of Environmental and Evolutionary Biology, Graham Kerr Building, University of Glasgow, G12 8QQ

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SHORT NOTES

Late nineteenth century breeding records of Osprey and White-tailed Eagle

The Major William Stirling of Fairburn egg collection has been previously referred to as it contains the first British breeding records for Slavonian Grebe *Podiceps auritus* (McGhie 1994, *Scottish Birds* 17:166-167) and Brambling *Fringilla montifringilla* (McGhie & Moran 1998, *Scottish Birds* 19:300-301), The collection is also outstanding on account of its series of Greenshank *Tringa nebularia*, Eurasian Siskin *Cardeulis spinus* and crossbill *Loxia curvirostra/ scotica*.

In the course of work on the collection HM and SM came across 2 clutches of eggs of Osprey *Pandion haliaetus*, each containing 2 eggs, and 2 clutches of eggs of White-tailed (Sea) Eagle *Haliaetus albicilla*, each containing 3 eggs. The eggs are typical of each species and there is no question about identification. We are inclined to accept the provenance of the eggs as the collection is of high quality and there is no evidence of the forgery of information elsewhere. The Osprey eggs were marked in the manuscript catalogue as having been collected in Sutherland on 4 May 1896 and Ross on 7 May 1897. The White-tailed Eagle eggs were marked as having been collected from Sutherland on 11 May 1896 and Ross on 16 May 1899.

There may have been 10-20 pairs of Osprey in Scotland at the turn of the twentieth century, but after 1860 information is only available for several sites in Speyside, Loch Arkaig and Loch Loyne in Invernessshire and for Loch Luichart in Rossshire (Brown P 1976. *The Scottish Ospreys*. Heinemann, London). There is little information available from Luichart, which is strange considering the ease of access from the Inverness to Kyle railway line. Ospreys are known to have returned annually to Luichart for '*several generations*' until 1892 and they '*always brought out young*' (Harvie-Brown J A & Buckley T E 1895. *A vertebrate fauna of the Moray Basin*. David Douglas, Edinburgh). Ospreys possibly bred at Luichart sometime between 1902 and 1940 but there is no firm evidence. (Witherby H F, Jourdain F C R, Ticehurst N F & Tucker B W 1940. *The Handbook of British Birds*. Witherby, London). The clutch in the Stirling Collection constitutes the last confirmed breeding record for Ross shire and may well have originated from Luichart as this was the only known Rossshire site for the species in the 1890s. Cameron of Lochiel (1943, *British Birds* 36:184) recorded that at Luichart '*the nest was regularly robbed every year*', and this would have been sometime around the 1890s . Another source, writing in 1902, considered the Luichart Ospreys to have been '*welcome visitors*', but noted that the nest had been robbed on a few occasions in the mid 1890s and that this may have been responsible for the birds deserting the site (Harvie-Brown manuscripts). The Sutherland clutch would represent the first known breeding record of Osprey in that county since St John famously slaughtered the last birds in Assynt in 1848.

There is likewise little information available on White-tailed Eagle in north Scotland for the end of the nineteenth century (Love J A 1983. *The Return of the Sea Eagle*. CUP, Cambridge). The only Ross shire eyrie know to be in use after 1890 was that on Beinn Gobhlach on the south side of Loch Broom. An immature bird sent to Macleay, the Inverness taxidermist, from Ullapool in 1893 (Buckley T E 1893. ASNH 3:179) and an adult trapped at Lochinver in 1899 may have come from this eyrie (Harvie-Brown J A & Macpherson H A 1904. *A vertebrate fauna of the North-west Highlands and Skye*. David Douglas, Edinburgh). The Ross shire clutch represents the last known breeding record for the county. In Sutherland it

was certainly very rare by the 1880s but there is a late unconfirmed record for 1901 (Harvie-Brown J A & Buckley T E 1887. *A vertebrate fauna of Sutherland, Caithness and West Cromarty*. David Douglas, Edinburgh; Bannerman D A 1956. *The Birds of the British Isles*. Oliver & Boyd, Edinburgh). Eagle Clarke (in Bannerman 1956 *op cit*) considered that White-tailed Eagles ceased to breed on the Scottish mainland in 1899 but did not give a last locality. The Sutherland clutches were both collected by someone with the initials HM and the Ross shire clutches by someone called JM; both of these people supplied other clutches from East Ross to the collection and they may been tenants of Major Stirling.

Henry McGhie, c/o Nurse's House, West Road, Muir of Ord, Ross Shire IV6 7TD
Stephen Moran, Inverness Museum & Art Gallery, Castle Wynd, Inverness IV2 3ED
Bob McGowan, National Museums of Scotland, Chambers Street, Edinburgh EH1 1JF

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Rook persecution in Orkney in the 1950s and the establishment of the first colony in Shetland

In *The Birds of Orkney*, 1984 Orkney Press, Stromness Booth, Cuthbert & Reynolds give an account of the early history of the Rooks *Corvus frugilegus* nesting and mention that changes in distribution were probably due to persecution. They quote Baxter and Rintoul's *Birds of Scotland* 1950 Oliver & Boyd, Edinburgh figure of 583 nests in 1945 and a count of 720 pairs in 1950 from Venables's *Birds and Mammals and Shetland* 1955 Oliver & Boyd, Edinburgh with a comment '*Unfortunately it has not been possible to obtain further details of these counts*' apparently as G T Arthur's notes are no longer available.

While transcribing some papers which the late Pat Venables passed on to me, I came across a letter from George Arthur dated 1 May 1952 sent in response to Pat's request for information on the status of Rooks in Orkney. Rooks had been unusually abundant in Shetland between February and April of that year, and on 27 April the Venables found 9 nests in plantations at Kergord, Weisdale, the first recorded breeding for the country. In his letter Arthur says '*Orkney possessed at Berstane a main rookery with one outlying small one on Hoy and several odd ones here and there. Six hundred pairs used to nest at Berstane with 65 in the north end of Hoy and perhaps 40 or so elsewhere. New proprietors came at Berstane several years ago and immediately started a blitz, aided and abetted by agricultural interested (parties) down south prepared to do anything to keep their jobs and salaries. I managed to put a spoke in their wheel but not in the proprietors*'. After this Rooks began to move elsewhere, '*300 arrived in Hoy and every tree in Kirkwall had 2 or 3 pairs, which were persecuted in their turn. Their attempts at nesting have been difficult so I suppose they decided to look elsewhere hence Shetland.*'

I wondered why Venables gave an Orkney total of 720 pairs, when Arthur's figures only add up to 705 pairs. Subsequently I found a list of birds seen in Orkney by Venables in April 1949. The first entry is: '*Rooks: 28 occupied nests around cathedral and Earl's Palace. George Arthur says 720 breeding pairs in Orkney. Numbers going to be reduced.*'

George Arthur's original letter will be deposited in the Shetland Archive, Lerwick.

Pete Kinnear, 20 East Queen's Street, Newport on Tay, Fife DD6 8AY

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Pilot Whale apparently playing with moulting Common Eiders

Leitch's account of Bottle-nosed Dolphins *Tursiops truncatus* chasing birds (*Scottish Birds* 21:51-52), and his statement that he had not heard of cetaceans '*playing with birds apparently just for fun*', made me recall an incident on 27 August 1978. I was trying to count a fairly tight flock of 1,200 moulting Common Eiders *Somateria mollissima* off the south east side of Skelda Ness in the West Mainland of Shetland when the flock suddenly split into 2 halves; a lone Pilot Whale *Globicephala mela* had surfaced in the middle of the flock. The Common Eiders quickly reformed into one flock but then the same thing happened again, the whale surfacing in the middle of the birds causing them to scatter in panic. This went on for about 30 minutes with the Pilot Whale surfacing perhaps 6 or 7 times before the ducks began to swim into the wind around the tip of Skelda Ness and the whale vanished. I cannot be sure why the whale did this, but, given the reaction of the Common Eiders and the fact the whale waited until the flock reformed before resurfacing, I think it was simply having fun. Flocks of moulting Common Eiders are certainly very nervous of the approach of pods of Killer Whales *Orcinus orca*, although I have not seen Killer Whales or any other cetaceans show any active interest in them.

Martin Heubeck, Sumburgh Head Lighthouse, Virkie, Shetland ZE3 9JN

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Prey species attacked and captured by Eurasian Sparrowhawks outside the breeding season

During studies of the winter diet of Merlins *Falco columbarius*, Hen Harriers *Circus cyaneus* and Peregrine Falcons *Falco peregrinus* in west Galloway (Dickson 1992, *Scottish Birds* 16:282-284; 2000, *Scottish Birds* 21:116-117; 1994, *Transactions Dumfries and Galloway Natural History Society* 69:3-6; 1997, *British Birds* 90:359-360), I also saw Eurasian Sparrowhawks *Accipiter nisus* attacking and killing prey in winter in these same open habitats. The following is based on observed Eurasian Sparrowhawk attacks between August-March, 1970-2000.

Table 1 gives the number of attacks by adults and juveniles in winter in west Galloway. Most hunting techniques used by both classes were the same as those described in Newton (1986, *The Sparrowhawk*, Calton) but the most common technique in open country was the 'short stay hunting perch'. Of the 21 species attacked, most were birds normally associated with low ground and open country in winter but attacks occurred in many habitats from the coast to the uplands (see Dickson 1992. *The Birds of Wigtownshire*. Wigtown). Finches *Fringillidae* (41%), were the most frequent targets followed by Sky Larks *Alauda arvensis* (13%) but if all passerines are combined they constitute about 88% of all species (Table 1). Only 4 species formed more than 5% of kills: Sky Larks, Common Starlings *Sturnus vulgaris* and Chaffinches *Fringilla coelebs*, Common Linnets *Carduelis cannabina*. Expressed by weight finches emerged as the most important (23%) with Common Starlings providing 16% of kills by weight and Sky Larks 6%.

Little information is available on Eurasian Sparrowhawks' attack success (Newton 1986). In this study, however, the overall success rate of all hunts in winter was 14% (19.6% by adults, 4.6% by juveniles), which is not significantly

different from the 12% of kills on passage migrants recorded by Rudebech (1950, *Oikos* 2:64-88), or of the 21% and 12% on winter wader populations on the East Lothian coast (Whitfield 1985, *Ibis* 127:544-558; Cresswall 1996, *Ibis* 138:684-692), or the 21% by an adult female Eurasian Sparrowhawk in a winter woodland garden (Wilson & Weir 1989, *Scottish Birds* 15:126-130). In winter, too, Eurasian Sparrowhawks regularly and often attacked birds at their winter roosts, mostly Starlings. These attacks are not included in Table 1 but of the 60 attempts to catch Common Starlings there, 54, (90%) were unsuccessful (Dickson 1979, *British Birds* 72:186-187). Although most studies of winter diet of Eurasian Sparrowhawks have been made in continental Europe (eg see Opdam 1978, *Ardea* 66:137-155), the only other quantitative study of winter diet in Britain seems to be that of Newton (1986). He noted prey remains found at nest sites in his study area in Dumfriesshire between September and March where he recorded 36 bird species of which passerines constituted about 87% of all items, the same as the percentage of small passerine species attacked and killed in winter in this study.

R C Dickson, Lismore, New Luce, Newton Stewart, Wigtownshire DG8 0AJ

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Table 1 ***Percentage frequency of prey species attacked and killed by Eurasian Sparrowhawks in winter in west Galloway, 1970-2000. Success of juveniles shown in brackets in last column.***

	Number of attacks			
	Adults	**Juveniles**	**% frequency**	**Success (j)**
Pigeons (1)	2	-	1.3	1
Waders (2)	11	-	6.9	-
Black-headed Gull	1	-	0.6	-
Eurasian Teal	1	-	0.6	-
Gamebirds (3)	-	4	2.5	-
Sky Lark	15	6	13.1	2 (1)
Barn Swallow	1	1	1.3	-
Meadow Pipits	5	2	4.4	-
Thrushes (4)	6	-	3.7	2
Common Starling	11	1	7.5	3
Finches (5)	42	24	41.3	8
Other passerines (6)	7	2	5.6	2 (1)
Unidentified passerines	14	3	10.6	5
Rabbit	1	-	0.6	-
Totals	117	43		25

(1) includes Common Wood Pigeon, Eurasian Collared Dove; (2) includes Eurasian Golden Plover, Northern Lapwing, Dunlin, Common Snipe; (3) includes Common Pheasant, Grey Partridge; (4) includes Redwing, Eurasian Blackbird, Northern Fieldfare; (5) includes Common Chaffinch, European Greenfinch, Common Crossbill, Common Linnet, Twite; (6) includes Pied Wagtail, House Sparrow, Reed Bunting. - *Scientific names omitted for reasons of space.*

Eurasian Oystercatcher nesting in a greenhouse

Roof nesting Eurasian Oystercatchers *Haematopus ostralegus* have bred at Monifieth High School, Angus for over 10 years. Initially only one pair attempted breeding but over the last 3 years, 3 pairs have regularly bred on the school's flat roofs. During May 2000 essential roof repair work had to be carried out and this was completed during the last few days of May. About a week later the roofs were then cleaned and the personnel involved in this work reported 2 nests containing clutches of 2 and 3 eggs on the 2 storey part of the school and one chick on a lower roof over the single storey science/technical block.

On Monday 12 June one of the janitors reported that he had found 'a nest' in the school greenhouse and he was sure it was "one of those noisy black and white birds" !! I was able to confirm that a Eurasian Oystercatcher was incubating a clutch of 3 eggs in the middle of the greenhouse, under the staging, in a nest constructed from small pink 'Balmullo' gravel chips. The door had been left open for sometime and the bird had only ever used this opening as its means of entry and exit. A pane of glass at ground level at the opposite end of the greenhouse was removed and one of the birds was seen using this opening when returning to incubate. The greenhouse is situated in a very enclosed part of the school grounds and close to 2 frequently used doorways. Disturbance was unavoidable throughout the school day. When the nearer of the 2 entrances was used the adult on the rim of the flat roof usually alarmed, while the incubating adult ran out of the greenhouse door, jumped onto a low wall, ran along the top of the wall and then flew up to join the other adult on the roof. After the person(s) had left the area the incubating bird quickly returned to its nest.

The nest at Monifieth High School

Bruce Lynch

School broke up for the summer holidays on 28 June when the clutch of 3 eggs was still being incubated. The head janitor reported that the bird was still present on 9 July and the clutch intact. However, around this date the 2 permanent members of the janitorial staff went on holiday and a relief janitor was left in charge. I visited the nest site on 18 and 24 July and found the clutch reduced to 2 eggs which were cold to the touch and presumed to be deserted. There were no signs of damage to the remaining eggs, the missing egg was not in the immediate vicinity and there was no sign of adults. The nest had clearly failed.

Eurasian Oystercatchers have been breeding on roof tops, especially in the Aberdeen area, for up to 30 years. They have also been reported nesting in enclosed situations in forestry plantations (G Shaw, *Scottish Birds* 1996 18:183) However, I can find no reference to this species having nested inside a structure in an enclosed area in a suburban location.

Bruce M Lynch, 27 Luke Place, Broughty Ferry, Dundee DD5 3BN

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Observations of predation of Hen Harrier nestlings by Hooded Crows in Orkney

Compared with other raptors, Hen Harriers (*Circus cyaneus*) are unusual, because they are often simultaneously polygynous with males having harems of up to 5 females (Picozzi N 1984, Breeding biology of polygynous Hen Harriers *Circus c cyaneus* in Orkney. *Ornis Scandinavica* 15:1-10). Clear hierarchies in female reproductive success have been observed, with primary females producing significantly more fledglings than later settling secondary females (Picozzi N *op cit*). Simmons *et al* (Simmons R E, Smith P C and MacWhirter R B 1986, Hierarchies among Northern Harrier *Circus cyaneus* harems and the costs of polygyny. *Journal of Animal Ecology* 55:755-771) found that this reduced productivity was associated with lower provisioning rates by male harriers to their secondary females. Both Simmons et al and Picozzi recorded higher rates of predation for secondary female nests. They suggested that this might result from females being forced to hunt for themselves in order to compensate for the low provisioning of their males, and thereby leave their nests unattended and more vulnerable to predators.

The Orkney Hen Harrier has declined dramatically since the 1970s (Meek E R, Rebecca G W, Ribbands B and Fairclough K 1998, Orkney Hen Harriers: a major population decline in the absence of persecution. *Scottish Birds* 19:290-298), despite the absence of human persecution. One explanation for the decline is a shortage of prey available during the breeding season. Lower provisioning rates by male harriers may lead to reduced breeding success, as found for secondary females in harems and populations of Northern Harriers *C c hudsonius* in the USA during poor vole years (Hamerstrom F, Hamerstrom F N and Burke C J 1985, Effect of voles on mating systems of harriers in a central Wisconsin population of harriers. *Wilson Bulletin* 97:332-346; Simmons R, Barnard P, MacWhirter R B and Hansen G L 1986, The influence of polygyny, productivity, age and provisioning of breeding Northern Harriers: a 5 year study. *Canadian Journal of Zoology* 64: 2447-2456). An alternative explanation for the decline is an increase in numbers of Hooded Crows (*Corvus corone cornix*) which are considered to be the main egg predator of Hen Harriers in Orkney (Picozzi N *op cit*). Here we describe 2 incidents of crows attacking Hen Harrier nestlings, suggesting that low food availability and predation may interact in Orkney to reduce harrier breeding productivity.

Seven Hen Harrier nests were watched from hides in June and July 1999 on West Mainland, Orkney. Hides were placed 20-30m from the nests and moved over a one week period to a position 5m from the nest. A successful predation attempt by a crow on a harrier nestling was observed on 15 June during a watch on a brood of 4 Hen Harrier chicks (aged 13, 14, 15 and 16 days). The female harrier was seen to leave the nests at 1612 hrs presumably to hunt. At 1719 hrs a Hooded Crow alighted on the edge of the harrier nest, picking up a nestling (aged 15 days) by the head, dragged it out of the nest and pecked it to death. The female harrier arrived back at the nest before the crow had started to consume the nestling, and the crow flew off. During the period that the crow was present at the nest site, the harrier chicks displayed typical defensive behaviour of huddling together and giving alarm calls. The female harrier fed the dead chick to the other nestlings. Another predation attempt by a Hooded Crow was observed on 1 July, during a watch at a different nest containing a brood of 4 nestlings (aged 12, 18, 18 and 19 days). At 1325 hrs the female departed from the nest. At 1330 hrs a crow was seen to dive twice at one of the harrier chicks (aged 12 days), briefly landed twice on the nest, but took off immediately after landing each time. It dived for a third time at a different chick (aged 18 days), and again landed on the nest. At this point the female Hen Harrier returned and dived at the crow on the nest, landing on the chicks but missing the crow, and then chased the crow away from the

nest. The entire attack by the crow lasted less than 30 seconds from the time the crow first landed at the nest until the time that the female harrier returned to protect the nestlings. Picozzi (*op cit*) described Hooded Crows as the main predator of Hen Harrier eggs. Our observations suggest that Hooded Crows may also be important predators at the nestling stage, killing chicks at least up to the age of 15 days. To our knowledge, this is the first time that a Hooded Crow has been confirmed as having killed a Hen Harrier nestling. Our observations suggest that females that leave their nests unattended for extended periods of time expose their chicks to risk of predation. The adult female harrier was absent for 67 minutes prior to the attack when the crow successfully killed the nestling. The observation from the second nest suggests that if the female is present in the vicinity of the nest, she may be able to actively protect her chicks and prevent crow predation. The fact that Hooded Crows were observed attacking 2 of 7 nests that were watched suggests that these may not be isolated incidents. Predation risk may be increased in nests of secondary females or in areas where food is limiting during the nestling stage, due to the female harrier spending prolonged time periods foraging away from the nest site. Further investigation into the relationship between female attentiveness, provisioning rates and breeding success are required if this hypothesis is to be explored further.

We thank Kerry Lock for help with fieldwork and Xavier Lambin and Steve Redpath for useful comments on this manuscript.

Arjun Amar, Centre for Ecology and Hydrology, Hill of Brathens, Banchory, AB31 4BW & Department of Zoology, University of Aberdeen, Tillydrone Avenue, Aberdeen, AB24 2TZ

Sarah Burthe, Department of Zoology, University of Aberdeen, Tillydrone Avenue, Aberdeen, AB24 2TZ

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The number of pairs and breeding success of Common Ravens on Mainland, Orkney 1983-2000

Mainland is the largest of the Orkney islands with an area of approximately 490km^2 and a coastline of 234km, with 50km (21%) consisting of cliffs over 15m in height (Mather *et al* 1975, An Introduction to the Orkney coastline. In, Goodier R (ed). The Natural Environment of Orkney. Nature Conservancy Council, Edinburgh). The number of pairs of Common Ravens *Corvus corax* attempting to nest on Mainland together with their breeding success has been monitored annually during the period 1983 to 2000.

Common Ravens were found nesting on sea cliffs ranging from 3 to 100m in height and at a variety of inland sites. The inland sites included quarries both active and disused, pylons and ruined buildings, trees and an inland cliff. A nesting attempt was recorded if a lined nest or a nest with eggs or young was found. A nest was considered to have been successful either where the young were known to have fledged or if the young were within a week of fledging. The annual number of breeding pairs and their success is shown in Table 1.

It was found that, although there were fluctuations, the number of pairs attempting to nest annually rose from 27 in 1983 to 47 in 2000 (Table 1), an increase of 74%. In 11 of the years there were also pairs on territory that did not breed. The percentage of successful pairs varied from year to year (range 44.8% to 69%) with a mean of 56.8%. During the study period there was an increase in the proportion of pairs utilising inland sites. Seven pairs (25%) nested inland in 1983 including 4 in quarries and single pairs using building, tree and inland cliff sites. In 2000 there were 18 pairs (38%) occupying inland sites, with 6 in quarries, 6 on buildings, including a pylon, 5 in trees and one on an inland cliff.

Table 1 ***Number of pairs and breeding success of Common Ravens, Mainland, Orkney 1983-2000.***

Year	Pairs attempting to breed	Pairs successful	% pairs successful	Pairs on territory but not breeding	Nests at inland sites	% nests at inland sites
1983	27	16	59.3	0	7	25
1984	28	14	50	0	6	21
1985	27	17	62	0	7	25
1986	24	14	58	0	6	25
1987	26	18	69	2	8	30
1988	29	14	48	3	10	34
1989	28	17	60.7	2	9	32
1990	28	16	57	0	10	35
1991	29	17	58.6	1	10	34
1992	29	13	44.8	0	11	37.9
1993	28	14	50	2	8	28
1994	35	21	60	1	9	25.7
1995	33	17	51.5	0	8	24
1996	33	22	66.6	4	9	27
1997	35	18	51.4	4	11	31
1998	38	21	55.3	4	14	36.8
1999	43	23	53.5	5	17	39.5
2000	47	30	63.8	6	18	38

Note: the number of non breeding pairs on territory includes 4 that built unlined nests

Table 2 ***Breeding success of Common Ravens at sea cliff and inland sites, Mainland, Orkney 1983-2000.***

Type of site	Pairs attempting to nest	Pairs successful	% pairs successful	Young reared	Number of young reared per successful pair
Sea cliff	389	205	52.7	600	2.9
Inland site	178	117	65.7	352	3

Pairs nesting at inland sites appeared to be more successful with 65.7% rearing young compared with 52.7% of pairs using sea cliffs (Table 2). The mean number of young fledged per successful attempt however was very similar for both types of site. Despite the increase of breeding pairs of Common Ravens on Mainland, the number of pairs on other Orkney islands has apparently remained stable.

C J Booth, 34 High Street, Kirkwall, Orkney, KW15 1AZ

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Common Raven nest on collapsed roof beams and stone slabs *C J Booth*

Common Ravens nesting near a roost

In 1984 a roost of Common Ravens *Corvus corax* was established on a stretch of cliff in St Ola, Mainland, Orkney. This roost has been occupied throughout the period 1984 – 2000, with counts ranging from 53 to 146 birds. Since 1987, Common Ravens have nested at 3 sites in close proximity to this roost.

In 7 of the years between 1987 and 1995 a pair of Common Ravens attempted to nest on a cliff 400m to the west of the road, successfully rearing young in 4 of the years. In 1999, a pair built an unlined nest just 25m from the roosting ledges. On 1 April 2000 this nest had been built up and lined and a pair of Common Ravens was present, calling and very agitated. One of the birds appeared to come off the nest as I arrived at the site. On a further visit on 22 April the nest was deserted with the lining disturbed and no sign of the birds. On a cliff 400m to the east of the roost, another pair of Common Ravens, one of which was ringed, attempted to nest in both 1998 and 1999 but failed. This was possibly due to interaction with Northern Fulmars *Fulmarus glacialis*. In 2000, using the same nest site as in the previous 2 years, they successfully reared 4 young. Common Ravens are strongly territorial when breeding, so it seems surprising that pairs would attempt to nest so close to a well established roost.

C. J. Booth, 34 High Street, Kirkwall, Orkney, KW15 1AZ.

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Correction

Prey captured and attacked by Merlins in winter

In R C Dickson's note in *Scottish Birds* 21:116 the fifth paragraph should read:

'In 1992-2000 only 4 species formed more than 5% of kills: Skylarks, Meadow Pipits, Chaffinches and Linnets/Twites *Carduelis flavirostris*. Expressed by weight Linnets/Twites emerged as the most important of kills (87%) with Skylarks providing (6%) of kills by weight, Chaffinches 4% and Meadow Pipits 3%'

Egg sizes of crossbills in Scotland

Due to an oversight several errors appeared in our recent paper (McGhie H A & Summers R W, Scottish Birds 21:85-87). I apologise for this confusion and amend them here.

H A McGhie

Results

There were significant differences in length and breadth between the 3 groups of crossbills (Table 1). Parrot Crossbill eggs were significantly longer and broader than those of Common Crossbills (t=4.9, P<0.001 and t=4.0, P<0.0001, respectively), though there was overlap (Table 1). Likewise, the lengths and breadths of crossbill eggs from Scotland were significantly different from those of Parrot Crossbills (t=4.9, P<0.001 and t=2.7, P=0.007, respectively) but not from Common Crossbills (t=0.85, P=0.4 and t=1.29, P=0.2). The mean length of the Scottish eggs was actually smaller than the Common Crossbills. A similar pattern emerged using indices of egg volume. Egg volumes of Parrot Crossbills were significantly greater than those from Common Crossbills (t=5.32, P<0.001) and from crossbills in Scotland (t=4.51, P<0.001), but there was no difference between eggs from Common Crossbills and those from Scotland (t=0.55, P=0.59 Table 1).

Discussion

The egg measurements of the Common Crossbills and crossbills from Scotland were similar to those quoted by Nethersole-Thompson (1975. *Pine Crossbills* Poyser, Berkhamsted) and confirmed that those from Scotland were not intermediate between Common and Parrot Crossbills.

Table 1 ***Lengths, breadths (mm) and indices of volume (length x breadth^2 (cm^3)) of eggs from Parrot and Common Crossbills and crossbills from the Highlands of Scotland.***

		Parrot Crossbill	Common Crossbill	Highland crossbills
Number of clutches		20	79	105
Length	Mean	22.96	21.96	21.84
	SD	0.79	0.83	0.96
	Min	21.71	20.27	18.77
	Max	24.19	24.18	24.37
Breadth	Mean	16.44	16.00	16.10
	SD	0.50	0.43	0.52
	Min	15.72	14.75	14.78
	Max	17.46	17.03	17.29
Index of volume	Mean	6.22	5.63	5.67
	SD	0.49	0.43	0.50
	Min	5.51	4.53	4.21
	Max	7.31	6.59	6.85

ANOVA on egg length: $F_{(2,201)} = 13.3$ P<0.001
ANOVA on egg breadth: $F_{(2,201)} = 6.5$ P<0.002
ANOVA on egg volume: $F_{(2,201)} = 13.1$ P<0.001

Henry McGhie, c/o Nurse's House, West Road, Muir of Ord, Ross Shire IV6 7TD

Obituary

William Brackenridge
1952 - 2000

A tragic car crash on the A9 ended Bill's life. He was returning from the SOC Conference. Birds had been his first and continuing love but, over the years, he developed and honed his skills in field identification, trained in ecology and became a leading light in the environmental movement in central Scotland. Billy, as most of the 'old hands' in Ayrshire knew him, was an almost unique character. Always keen to involve himself, and share his knowledge with others, Billy was a key figure within many local wildlife organisations in Ayrshire during the late 1960s and 70s. He always strove for perfection in survey work and did not suffer sloppy fieldwork gladly, especially if he suspected it could have been more thorough. The image of Billy, which remains for some of us to this day, is of a young, very keen birder, kitted out in sports jacket and tie (almost always!), striding up Carn Ban Mor one evening just to say that he'd forgotten to bring his tent, and would come back up in the morning so we could carry out a day's birding on the plateau.

As leader of the Ayrshire YOC his patience with young children was equal to that he showed towards adults in the SOC. His work with the local branch of the SWT involved him as one of the main contributors to the very thorough coastal survey, much of which is still a major reference in the county. It was the conservationist in Billy which most of us will remember. When a rare bird showed up anywhere he was, of course, eager to see it, but he was always able to see beyond this aspect of birding.

Bill joined North Lanarkshire Council in 1996 as an Ecologist after a spell as Countryside Ranger for Stirling District.

The Scottish Wildlife Trust got the right person when they chose Bill to kickstart the proposed Jupiter Wildlife Garden project at ICI, Grangemouth. He converted a tract of species poor grassland into arguably Scotland's most biodiverse wildlife garden, now producing thousands of wildflower plants annually for other wildlife gardens. Another successful project master minded by Bill was the conversion of the old sand and gravel quarries into the Doune Ponds, now an SWT reserve, popular with birds and visitors alike.

In North Lanarkshire he successfully launched the Local Biodiversity Action Plan targeting key habitats and species in a partnership effort across many agencies, which could not have been achieved without Bill's knowledge, commitment and persistence.

As a field ecologist he was forever finding something new, or rare, or at least unheard of by planners and developers! It was Bill who discovered the rare Blue Fleabane thriving on the industrial dereliction of Ravenscraig, and the even rarer Yellow wort in the grounds of the proposed Law Hospital. His surveys found new sites for Fritillaries, Water Voles, Otters, Black Grouse, Moonwort and Fragrant Orchids. One important outcome is that North Lanarkshire now has a comprehensive map of over 300 Sites of Importance for Nature Conservation approved by the Council and offered presumption against damaging development.

Bill was also a champion of wider environmental issues, recycling, renewable energies, environmental education for children and adults, all in the cause of a sustainable future. He had a low tolerance threshold of anyone who deliberately caused waste or pollution. On more than one occasion, while out on field surveys, he came across a council van, engine idling, going

nowhere. To the astonishment of the occupants Bill would reach in and simply switch off the ignition. Then followed a friendly but firm lecture on air pollution. None argued, many learned. Just days before his death, Bill was interviewed by the BBC Environmental Correspondent on the effects of global warming on Scotland's wildlife.

The division between work and play for Bill was seamless. As well as his SWT commitments, he was Membership Secretary for Biological Recording in Scotland (BRISC), Scottish coordinator for Countryside Jobs Monthly, Conservation Officer for West Scotland Butterfly Conservation, Assistant Editor of the Forth Naturalist and Historian, member of the Bean Goose Working Group and, of course, a regular contributor on Biodiversity for CSCT's New Leaf. His many trips abroad became exotic field surveys, broadening his knowledge and deepening his commitment to the natural world.

In memory of Bill, his family and friends have started to consider ideas on how a living memorial could be created. Several conservation agencies have promised their support and individual donations have been arriving. RSPB has offered to act as the 'bank' for the donations, which are ring fenced for this project. All contributions welcome. Cheques should be made out to RSPB and posted **c/o Bill Brackenridge Fund, Conservation and Greening Unit, Palacerigg House, Cumbernauld G6 3HU.**

A fine example to any young naturalist who wants to learn as much as he can from nature, Billy was an outstanding figure in the world of both Scottish birdwatching and conservation.

Bruce Forrester, Angus Hogg and Brian Thomson

Bill Brackenridge at the 2000 SOC Annual Conference. *Ray Murray*

Advice to contributors

Authors should bear in mind that only a small proportion of the *Scottish Birds* readership are scientists and should aim to present their material concisely, interestingly and clearly. Unfamiliar technical terms and symbols should be avoided wherever possible and, if deemed essential, should be explained. Supporting statistics should be kept to a minimum. All papers and short notes are accepted on the understanding that they have not been offered for publication elsewhere and that they will be subject to editing. Papers will be acknowledged on receipt and are normally reviewed by at least 2 members of the editorial panel and, in most cases, also by an independent referee. They will normally be published in order of acceptance of fully revised manuscripts. The editor will be happy to advise authors on the preparation of papers.

Reference should be made to the most recent issues of *Scottish Birds* for guidance on style of presentation, use of capitals, form of references, etc. Papers should be typed on one side of the paper only, double spaced and with wide margins and of good quality; 2 copies are required and the author should also retain one. We are also happy to accept papers on disk or by email at: mail@the-soc.org.uk, stating the type of word processing package used. If at all possible please use Microsoft Word 97. Contact the Secretary on 0131 556 6042 for further information.

Headings should not be underlined, nor typed entirely in capitals. Scientific names in italics should normally follow the first text reference to each species unless all can be incorporated into a table. Names of birds should follow the official Scottish List (*Scottish Birds* 2001 Vol 22:33-49). Only single quotation marks should be used throughout. Numbers should be written as numerals except for one and the start of sentences. Avoid hyphens except where essential eg in bird names. Dates should be written: ...on 5 August 1991...but not ...on the 5th... (if the name of the month does not follow). Please **do not** use headers, footers and page numbers. Please note that papers shorter than c700 words will normally be treated as short notes, where all references should be incorporated into the text, and not listed at the end, as in full papers.

Tables, maps and diagrams should be designed to fit either a single column or the full page width. Tables should be self explanatory and headings should be kept as simple as possible, with footnotes used to provide extra details where necessary. Each table, graph or map should be on a seperate sheet, and if on disc each table, graph, map etc should be on a separate document. Please **do not** insert tables, graphs and maps in the same document as the text. Maps and diagrams should be either good quality computer print out and in black and white (please **do not** use greyscale shading) or drawn in black ink , but suitable for reduction from their original size. Contact the Secretary on 0131 556 6042 for further details of how best to lay out tables, graphs, maps etc.

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