



British Birds

March 2020 • Vol. 113 • 129–188



Chiffchaffs wintering in south Devon

Calls of crossbills in Scotland

Two-egg clutches in the Fulmar

White-rumped Swift – new to Britain



British Birds

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Front-cover photograph: Common Buzzard *Buteo buteo*, Norfolk, March 2019. *Robin Chittenden*



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Seeing beyond



British Birds

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The 100th title in the Poyser series (see our review of *The Common Buzzard* on p. 183) is a notable milestone in ornithological publishing. The Poyser series, with their distinctive white dust jackets, are one of the most iconic series of natural history books ever published in Britain (and, with a few exceptions, they are specifically bird books, many of them being monographs). The name reflects the two founders of the series, Trevor and Anna Dorothy Poyser, sadly no longer with us, but the imprint continues under the custodianship of Bloomsbury. Jeremy Greenwood's obituary of Trevor Poyser (see *Brit. Birds* 111: 292–294) provides a good summary of the series. The first Poyser I ever saw was *Bird Observatories* (which I borrowed from my local library and copied out the chapter on Gibraltar Point longhand) and the first one I bought was the first *Breeding Atlas*, now

nicely yellowed with age and slightly tatty. As I'd never had ambitions to collect the whole series, it was a surprise to discover that there are over 80 Poyser books on the shelves in my office; and I bet many *BB* readers have a similar collection and can remember their first too. According to our reviewer, Ian Carter, the 100th volume is a good one. How appropriate that it deals with a species that has increased so dramatically over the publishing lifetime of the Poyser series.

Roger Riddington



British Birds aims to: ❖ provide an up-to-date magazine for everyone interested in the birds of the Western Palearctic; ❖ publish a range of material on behaviour, conservation, distribution, ecology, identification, movements, status and taxonomy as well as the latest ornithological news and book reviews; ❖ maintain its position as the journal of record; and ❖ interpret scientific research on birds in an easily accessible way.

Do taxonomic changes affect conservation?

It wasn't too many years ago that most bird-watchers regarded the species as an entirely stable unit of classification, something approaching a fixed state of being. In the past two decades, however, a steadily increasing number of studies in taxonomy (the way we name, define and classify species), reflecting the availability of new scientific methods and new data to distinguish the differences and relationships between organisms, have eroded that sense of stability. The most common changes consist of 'splitting' a single species into two or more new ones, or 'lumping' two or more species together. Of course, the taxa concerned are not materially affected: they do not disappear as a result of such reappraisals, because the idea of a species is a human concept. You can still go out and find the birds involved, they will simply be classified differently. However, if you are a conservationist, taxonomic rearrangement can pose real problems: how can you protect species if what qualifies as a species is constantly changing?

Between 2014 and 2016, BirdLife International conducted a comprehensive review of the world's birds, using new information, applying new techniques (including the use of genetic information to more accurately distinguish species) and applying a set of objective scoring criteria based on species

traits such as plumage and wing measurements (Tobias *et al.* 2010). This review resulted in over 1,000 new bird species (an increase of more than 10%), the majority of which were identified through splitting one known species into two or more species (and, in the case of the southeast Asian species formerly known as Red-bellied Pitta *Pitta erythrogaster*, into no fewer than 12 species – see fig. 1).

Given that species are often used as the basic units of conservation, any changes to species lists may have a profound impact on our ability to conserve species and prevent their extinction. The taxonomic 'splitting' of one species into two or more inevitably results in the newly recognised species having smaller populations and range sizes, so they would be expected to be more vulnerable to extinction. Also, as a result of having a smaller range, they may have smaller overlap with – or indeed fall completely outside of – site-based conservation networks such as Important Bird and Biodiversity Areas (IBAs) and protected areas.

A common criticism of taxonomic reviews is that they often greatly increase the number of species threatened with extinction, spreading limited conservation funding and resources even more thinly. Consequently, some may think that taxonomy and conservation are at odds with one another.

Taxonomy aims to identify what counts as a species, something that is constantly changing as new methods of definition become available, whereas it could be argued that conservation requires a more-or-less static list in order to pinpoint where to focus effort and resources most effectively. But how realistic is this portrayal of conflict between these two disciplines?

During my masters degree at the University of East Anglia (UEA), I undertook a study in collaboration with Paul

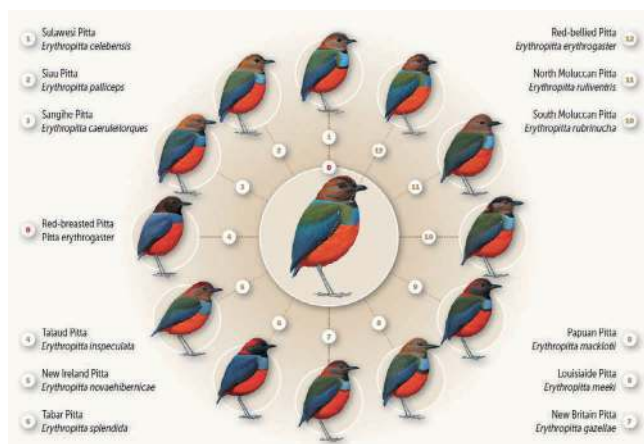


Fig. 1. The Red-bellied Pitta *Pitta erythrogaster* was split into 12 new species following the BirdLife International review.

Donald (BirdLife), Graeme Buchanan (RSPB) and Richard Davies (UEA) to determine the conservation implications of BirdLife's major taxonomic review. We measured how the extinction risk of birds changed following the review, by comparing the IUCN Red List status of species that had been split with those whose status remained unchanged. We also looked at the geographical range of newly split species, in relation to coverage of IBAs and protected areas, and assessed how this had changed compared with their 'parent' species. Finally, we analysed whether existing IBAs and protected areas were sufficient to conserve the new species, and whether any major gaps had emerged.

As you might expect, some species were more threatened following the taxonomic review. More surprisingly, we found that, on average, split species were *less* threatened than those which remained unchanged. This was often because their 'parent' species had an extensive range, and many were classified as being of Least Concern by the IUCN.

Furthermore, on average, split species had the same or sometimes a greater proportion of their range covered by IBAs and protected areas following the review. This included the Izu Robin *Larvivora tanensis*, for which the proportion of its range covered by IBAs and protected areas increased by 90% and 80% respectively. It is worth remembering that this might still not be enough to save a threatened species; nevertheless, it does suggest that site-based conservation can be effective and resilient to taxonomic changes, at least for birds.

Inevitably, we did identify some new species that are missed by or have very low coverage by site-based conservation networks; for example, the Mussau Triller *Lalage conjuncta*, which is listed as Vulnerable by the IUCN, has no coverage by IBAs or protected areas. In addition, some species did have an increased extinction risk as a result of taxonomic splitting, including some of the species split from the Red-bellied Pitta, which incorporate Red List status rankings varying from Least Concern to Endangered. The newly recognised species that are classified as threatened by IUCN and those that are missed and/or had a reduction in coverage by site-based conservation networks should be

prioritised for further conservation action. We also identified three 'hotspots' containing large numbers of newly recognised species but low protected-area coverage: Eastern Amazonia, Java and the Philippines. Similarly, it would therefore be a priority to expand the protected-area network in these areas.

These examples should not detract from the fact that, on average, split species were no more threatened after the review than they were before; and that, again on average, the newly recognised species were similarly or even better covered by IBAs and protected areas. More widely, better knowledge of taxonomy is to be welcomed by conservationists. Without it, a lack of awareness could lead to some species becoming extinct – without us even realising it. Taxonomic progress, based on reliable data and appropriate methods, creates a more accurate list of the world's species. In turn that means that conservationists are better placed to determine extinction risk and prioritise what to conserve, thereby using our limited resources more effectively. Some might argue that splitting benefits conservation, making it easier to find funds and to showcase genetic diversity for species rather than 'mere' subspecies. The counter argument is that too many threatened species makes it even harder to prioritise. Our study reinforces the conclusion that better knowledge and the most accurate taxonomy is the best outcome for conservation, with no bias towards lumping or splitting. And consequently, as new techniques and methods become available to better understand the taxonomy of the world's species, we should embrace them: because to conserve a species, we must first identify it correctly, to avoid the risk of losing it forever.

Readers can find more information about this study at: <http://bit.ly/2Rcmzn9>

Reference

Tobias, J. A., Seddon, N., Spottiswoode, C. N., Pilgrim, J. D., Fishpool, L. D. C., & Collar, N. J. 2010. Quantitative criteria for species delimitation. *Ibis* 152: 724–746.

Ashley Simkins

Ashley Simkins is a Technical Officer in the Global Science team at BirdLife International, working on a range of science projects, particularly on the IBA and Key Biodiversity Area (KBA) programme.

News and comment

Compiled by Adrian Pitches

Opinions expressed in this feature are not necessarily those of *British Birds*

RSPB and Wildlife Trusts urge rethink over HS2

Boris Johnson's green light for the HS2 railway network was greeted with dismay by the RSPB and the Wildlife Trusts.

A detailed analysis by the Wildlife Trusts of the impact on wildlife sites along the route from London to Birmingham and beyond – *What's the damage? Why HS2 will cost nature too much* <https://bit.ly/37nwzyN> – listed the 108 ancient woodlands that will be affected by this £100bn infrastructure project.

The report also highlighted how fragmentation of grassland habitat along the route, with a consequent reduction in the availability of small mammals, could have serious consequences for the Barn Owl *Tyto alba* population in the region. Some Barn Owl nest sites along the route have already been reportedly blocked to prevent the birds nesting near the 400 km/h rail line.

As the RSPB argues in a timely blog (<https://bit.ly/2vldEam>), the biodiversity crisis we're confronting means that HS2 Ltd should be looking to over-compensate for the loss of nature by the project, providing *more* habitat than that which will be lost. This principle of 'net gain' is in the Government's new Environment Bill (see below) but, perhaps with HS2 in mind, net gain is not proposed for large-scale national infrastructure projects.



Simon Litten/FLPA

44. Barn Owls *Tyto alba* could be among the casualties of the decision to back HS2; Norfolk, September 2009.

Agriculture and Environment Bills published

The UK Government has now published both its Agriculture Bill and its Environment Bill, which outline the future for farming and the wider countryside in the post-Brexit landscape. The Environment Bill, the first of its kind for over 20 years, will establish a new structure for managing the environment and will aim to strengthen environmental protections to reverse nature's decline.

The Wildlife Trusts welcomed the publications but stressed that there should be no backsliding in environmental regulations. Joan Edwards, Director of Public Affairs for the Wildlife Trusts, said: 'This much-needed Bill is a crucial step in ensuring we halt the

rapid decline of wildlife and the Government delivers on its pledge to develop the most ambitious environmental programme of any country on earth.

'We know that nature reserves alone are not enough for wildlife's recovery. The natural world is becoming more fragmented and desperately needs reconnecting to create more space for wildlife to recover.'

Sir David Attenborough, president emeritus of the Wildlife Trusts, said: 'A wildlife-rich natural world is vital for our wellbeing and survival. We need wild places to thrive. Yet many of our systems and laws have failed the natural world. We now live in one of the

most nature-depleted places on the planet. Nature urgently needs our help to recover – and it can be done. By joining up wild places and creating more across the UK we would improve our lives and help nature to flourish

– because everything works better when it's connected.' <https://bit.ly/37aypme>

A *BB* eye on the Agriculture Bill is in preparation and will appear sometime in the spring.

Hen Harrier found poisoned in Ireland

A satellite-tagged female Hen Harrier *Circus cyaneus* from the Isle of Man has been found dead in Co. Meath. Its carcass was found alongside an illegal poison bait on land managed for a Common Pheasant *Phasianus colchicus* shoot.

Unlike cases of tagged birds that 'disappear' in the UK, frequently on moorland managed for driven grouse shooting, this bird's corpse was still present when investigators went to check the location of her last satellite 'fix'. This enabled it to be recovered and analysed.

Martin Harper, Global Conservation Director at RSPB, said: 'Here is another Hen Harrier which has failed to make it through its first year, thanks to illegal persecution. Time and time again, satellite tagging is pinpointing illegal persecution – and proving that young Hen Harriers are being killed before they have the chance to breed and bolster the fragile UK population. This cannot continue, and we are calling for urgent and meaningful changes to address this.' <https://bit.ly/2S6tu1k>

General Licences update

Following the legal challenge by Wild Justice last year (*Brit. Birds* 112: 246–247, 310–311), there was a revision of General Licences issued for the control of 'pest' bird species in England – and Wild Justice now have Wales in their sights too <https://bit.ly/2HdSXQq>

Natural England was forced into a wholesale review of General Licences by the Wild Justice legal action and many of the temporary changes made in the spring of 2019 were due to expire on 29th February. (At the time of writing, with a fortnight to go, new licences have yet to be issued.)

Meanwhile, Scottish Natural Heritage has been reviewing its General Licences and the changes will come into effect on 1st April <https://bit.ly/31179ur>

The headlines from Scotland are that all gull species previously on the General Licence (Great Black-backed *Larus marinus*, Lesser Black-backed *L. fuscus* and Herring Gulls *L. argentatus*) are now removed – i.e. protected – and the same is true for the Rook *Corvus frugilegus* and Collared Dove *Streptopelia decaocto*.

Greylag Geese *Anser anser* can now be controlled year-round if a landowner can demonstrate damage to crops, while the five most

common corvids can also be controlled if they threaten crops or livestock (General Licence 2). But SNH has not included the Common Raven *C. corax* in this category. It says: 'Due to significant regional differences in abundance of the Raven and the regionalised demand, we are not proposing to add it to General Licence 2, but we will simplify the process for licence applicants. This will still enable us to monitor the number of Ravens killed and where licences are being used.'

One significant change to the licensing regime in Scotland is the new requirement for traps. Multi-catch cage traps containing bait or a decoy captive crow are used to control corvids on sporting estates. These traps are supposed to be checked every 24 hours and all trapped corvids despatched humanely. These traps do, of course, attract raptors and RSPB Investigations have numerous examples of birds of prey illegally trapped and then killed. However, since many traps may be listed on a single licence for a large estate, it is impossible to identify the gamekeeper responsible for the trap where the criminal acts were carried out.

Not any more... The new Scottish licensing regime will require *individuals* to

apply for a licence to use a cage trap. As SNH says: 'To aid accountability and transparency, individuals will be required to register rather than registering landholdings or farms.'

The RSPB is now calling for a similar regime in England and Wales and made these specific recommendations to Defra: there should be an online unique marking system that allows the authorities to identify individual cage-trap owners when potential offences or problems are identified; there should be a legal requirement for cage-trap

owners to identify trap users (a similar provision already exists in relation to the use of motor vehicles); there should be a requirement for cage-trap users to keep and submit records of birds controlled and any non-target birds released; and there should be a requirement for cage traps to be properly disabled when not in use.

A comprehensive overview of General Licences by the former head of RSPB Investigations, Guy Shorrocks, can be found at: <https://bit.ly/31MzjUQ>

New maps reveal seabird feeding 'hotspots'

RSPB researchers have produced new maps identifying, for the first time, the location of marine hotspots for some of our most threatened seabirds, based on tracking data.

A five-year RSPB project previously tracked the movements of Kittiwakes *Rissa tridactyla*, Common Guillemots *Uria aalge*, Razorbills *Alca torda* and Shags *Phalacrocorax aristotelis* from colonies around the UK during the breeding season. The RSPB has now applied hotspot mapping techniques to this data to identify the most important feeding areas used during this period.

The four seabird species are all classed as Birds of Conservation Concern: Guillemot and Razorbill are Amber-listed while Shag and Kittiwake are both Red-listed as a result of serious population declines. These seabirds are found in internationally important numbers in Scotland but are under threat from climate change, which is causing a reduction in food availability, and also from human activity.

The new research, published in *Biological Conservation* <https://bit.ly/2HfUTHZ> demonstrates the large areas of sea used by seabirds and comes at a time when there is a vital need to understand more about these areas as decisions are made about zoning for fishing, offshore windfarms and oil and gas exploration.

The protection of important areas of land and sea for birds is required by law through the creation of Special Protection Areas. The largest single marine SPA in the UK – the Outer Thames Estuary SPA – covers an area of 3,924 km². However, the new analysis clearly shows that many hotspots are larger than this, and under some of the mapping techniques, exceed the total area covered by all current marine UK SPAs.

The mapping reveals that for Kittiwake, Guillemot and Razorbill, the importance of the Scottish coast (particularly the east coast) was apparent. For Shag, hotspots were smaller than observed in the other three species and were typically found in inshore coastal waters centred on the locations of their breeding colonies.

The results highlight the importance of large areas of Scottish waters for breeding seabirds, demonstrating the urgent need, alongside effectively managed protected areas, for strategic, spatial marine planning and standardised industry-level regulations, to protect wide-ranging seabird species, particularly in the context of increased efforts to decarbonise energy generation in Scottish waters through offshore wind power.

New county recorders

Dorset (which now involves a team of three people):

Shaun Robson (rare breeding birds) shaun.narwhal@btinternet.com

Ian Stanley (rarities) recorder@dorsetbirds.org.uk

Geoff Upton (non-rare) dorsetbirdclub@hotmail.com



Kaoru Fujita

45. A unique gathering of three species of *Haliaeetus* eagles was photographed in Hokkaido, northern Japan, at the end of January. Alongside the Steller's Sea Eagle *H. pelagicus* (right) and White-tailed Eagle *H. albicilla* (centre), species that regularly winter in Hokkaido, is a lone vagrant Bald Eagle *H. leucocephalus* from North America – the first record for mainland Japan.

Red Sixty Seven shows the love on Valentine's Day

A book combining artwork and written pieces about the 67 Red-listed British bird species of conservation concern was published by the BTO on 14th February. The combined efforts of 134 artists (including Carry Akroyd, Keith Brockie and Darren Woodhead) and writers (including Simon

Barnes, Ann Cleeves, Mark Cocker and Chris Packham) is designed to raise awareness of these threatened birds. All the contributors gave their work for free, and all proceeds will fund research on Red-listed species by the BTO and RSPB. <http://bit.ly/RedSixtySeven>

Little Owl 'too fat to fly'

A Little Owl *Athene noctua* found in a ditch unable to fly was taken to an owl sanctuary in Suffolk and weighed in at 245 g, a third heavier than the average healthy weight. Staff concluded it had found so much food in the mild winter that it had overeaten and was too heavy to fly.

Suffolk Owl Sanctuary said the 'soggy' bird was brought in by a landowner. When staff examined the bird, they found it to be

'extremely obese' and 'unable to fly effectively'. Head falconer Rufus Samkin said: 'Where she was found is very productive land, and it's been a mild winter with a lot of food around. We think she's just done incredibly well for herself and overindulged.' The portly owl lost between 20 g and 30 g each week over a fortnight while staff monitored its food intake, before it was released back into the wild. <https://bbc.in/2Oxbj9m>

Gay Birders' Club celebrates 25 years out birding

The Gay Birders' Club (GBC) is 25 years old this year. To mark the anniversary, club members are fundraising to buy 25 acres (a

little over 10 ha) of forest in Mexico as their contribution to tackling the climate emergency.

The GBC was founded in 1995 by a group of ten gay men. Gay women soon joined in and the club grew rapidly; women now slightly outnumber the men. Club Chair Mike Pollard said: 'It was not always so easy, as it is now, to be out at home, at work or when out birding, and GBC provided a wonderfully supportive and sociable "space" for us to connect. We've come a long way since then!'

The Gay Birders' Club www.gbc-online.org.uk is now well established as the UK's foremost meeting place for those in the LGBT+ community who are interested in

wildlife and birdwatching. The Club has 300 members across the UK, runs about 70 birding trips a year, organises holidays and has a quarterly magazine *Out Birding*.

Fundraising for conservation charities has been an important activity for GBC members throughout the club's history and for the 25th anniversary the GBC is joining the World Land Trust in their goal of protecting 1,600 ha of prime wildlife habitat in Sonorro, northern Mexico. GBC is on Twitter [@GayBirders](https://twitter.com/GayBirders) Club; contact rachael.dixey@btopenworld.com

BB Young Birders' Grants

Between 2014 and 2019, the *British Birds* Charitable Trust has awarded a number of grants to young birders. The Trust is again looking for applications from young people aged 16–21 for projects in 2020. The grant could help to fund a small-scale research project, buy nestboxes, support habitat creation at a local patch or fund a stay at a bird observatory. The aim is simply to encourage

young people with their birding. Grants will be up to a maximum of £250. Successful applicants will also receive a free digital subscription to *BB*. You can download an application form at www.britishbirds.co.uk/young-birders-grants-2020 and e-mail the completed form to BBTrust@britishbirds.co.uk The deadline is 31st March 2020.

BB helps fund Bardsey Young Birders' Training Week

And the BBCT is providing financial assistance for Bardsey Bird Observatory's week-long course for young birders in August. The Young Birders' Training Week is a great way for young people to sample life at an 'obs'. The 2020 course

follows a very successful event in 2019. Grants are available from the BTO/Bird Observatories Council to help pay for the stay, while grants from the *British Birds* Charitable Trust will cover transport costs. <https://bit.ly/2unm5C4>

New editor

The March 2001 issue of *British Birds* was the first to be overseen by our current editor, Roger Riddington. It featured articles on the pioneering discoveries by Ian Wallace, Anthony McGeehan and Dave Allen about autumn migration on the west coast of Donegal, and a taxonomic update on Chaffinches *Fringilla coelebs* of the Atlantic islands by Martin Collinson. Since then, Roger has guided readers on many voyages of discovery and enlightenment, all beautifully packaged within the pages of *BB*.

Thus, in a year's time, Roger will have

been at the helm for a full 20 years, and has now given notice that he intends to retire from this post early in 2021. The *BB* Directors and Trustees have therefore begun the long process of seeking a new editor, with a view to there being an overlap period starting towards the end of this year. Further information is available at <https://britishbirds.co.uk/new-editor>

At this early stage, we are asking for individuals who may be interested in applying for this post to e-mail Tim Birkhead: t.r.birkhead@sheffield.ac.uk

Chiffchaffs wintering at a sewage works in south Devon

Alan Pomroy



Alan Harris

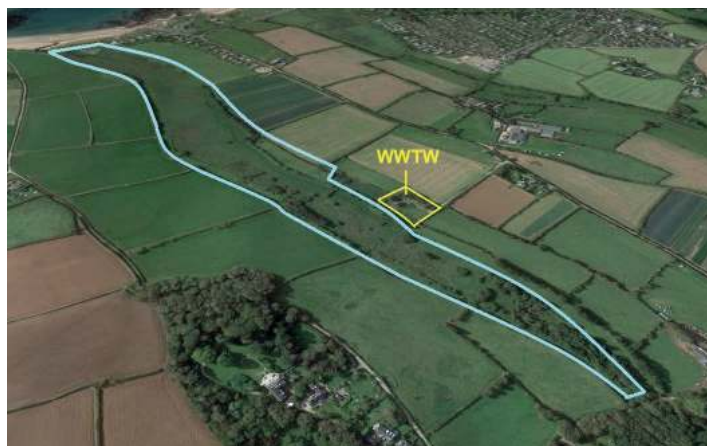
Common Chiffchaff *Phylloscopus collybita*

Abstract Ringing of Common Chiffchaffs *Phylloscopus collybita* during three consecutive winters at a waste-water treatment works in south Devon revealed that the site supported a wintering population of at least 90 birds with capture–recapture models suggesting the true figure could be between 188 and 227. Many birds were site faithful, both within and between winters. This sedentary behaviour may be driven by reliance on the treatment works for continuity of insect prey. Most ringed birds were not encountered again, but retrapped individuals returned from mid October and remained for up to 16 weeks, with the majority departing by mid February. Three of the four birds present until April were identified as ‘Siberian Chiffchaffs’ *P. c. tristis* and these had not completed their pre-breeding moult. An average overnight weight loss of at least 12.4% suggests that the adverse impact of sustained low temperatures on insect availability poses the greatest threat to the birds’ survival.

Introduction

Over 40 years have elapsed since Penhallurick (1978) described the behaviour of Common Chiffchaffs *Phylloscopus collybita* wintering at sewage works in west Cornwall. In that time there has been a substantial increase in the

UK wintering population and a northwards range expansion; most suitable lowland heathlands in southern England held some birds by 2011 (Balmer *et al.* 2013). Winter records of Chiffchaffs in Devon have increased significantly, from 39 birds in 1974 to 298 in 2016,



46. A view northwest across South Milton Ley nature reserve in September 2017; the perimeters of the reserve and waste-water treatment works (WWTW) are marked in blue and yellow respectively.

and the number reported showing characteristics of ‘Siberian Chiffchaff’ *P. c. tristis* also rose, from six in 1978 to 78 in 2016 (Devon Birds 1976–2018).

The national total of Chiffchaffs ringed in winter has risen in parallel, with an average of around 640 birds processed from November to February in each of the five years 2010–14 (Barber 2015). Recent research has focused on the genetics and racial identity of wintering and passage birds and, apart from Greg Conway’s PhD thesis (Conway 2011), little has been published about behaviour or biology, apart from limited information in a variety of ringing group annual reports and online blogs.

South Milton waste-water treatment works (WWTW, sometimes shortened to ‘sewage works’) has its own microclimate where warmer-than-ambient effluent water allows insects to develop and emerge throughout the winter. This attracts a variety of insectivorous birds, principally Dunnock *Prunella modularis*, Robin *Erithacus rubecula*, Wren *Troglodytes troglodytes*, Goldcrest *Regulus regulus*, Pied Wagtail *Motacilla alba* and Grey Wagtail *M. cinerea*, but Chiffchaffs dominate the assemblage numerically. The data collected from birds trapped during three consecutive winters present an opportunity to estimate the wintering population and to describe their use of the site, feeding activity and daily weight gain in comparison with published figures from other latitudes.

Study area and methods

South Milton WWTW is located at 50.26°N 3.84°W in south Devon on the northern boundary of South Milton Ley nature reserve, an 18.2-ha Site of Special Scientific Interest, owned and managed by Devon Birds and containing a freshwater reedbed in a shallow, coastal valley, running inland for 1.5 km. Despite its proximity to the sea, the

valley floor is prone to frost in winter. The treatment works has two bacteriological oxidation filters (circular gravel beds sprayed by revolving arms) and is enclosed and sheltered by mature trees, mostly Ash *Fraxinus excelsior*, Sycamore *Acer pseudoplatanus*, Hawthorn *Crataegus monogyna* and Turkey Oak *Quercus cerris*. The adjacent nature reserve is dominated by Common Reed *Phragmites australis*, containing a mixture of other tall fen species with stands of willow *Salix*. The reserve is also bordered by mature hedgerows with a dense understorey. The works are 1 km inland from the coast at an elevation of 6 m above sea level. The area around the treatment works is the focal point for most of the current ringing activities.

The sea adjacent to the ringing site has the highest annual mean temperature of any sea area around the UK, close to 11–12°C and, since winds are predominantly southwesterly, temperatures at the ringing site reflect this. February is usually the coldest month, with a daily mean temperature of 6.9°C recorded during 2011–17. The first air frost is typically in late November or early December and the average number of days of snow between December and March is one per month. Winter rainfall is lower than for any other part of south Devon with a 30-year (1971–2000) average of 170–250 mm (Met Office 2007).

Ringing took place at approximately 12-day intervals during the three winters from 2015/16 to 2017/18, with a total of 49 capture

sessions between 1st October and 31st March. Birds were trapped using mist-nets opened at dawn and sessions normally lasted for 5–6 hours with the number in any month determined principally by weather conditions. Net lengths were consistent, with 48 m located beside the treatment works, 48 m across the reedbed in the adjacent reserve 0.2 km from the works, and a further 12 m at an intermediate location. Recapture data, collected during an additional 51 ringing sessions between 1st April and 30th September in 2016–18, were used to establish arrival and departure dates for breeding and passage Chiffchaffs to eliminate them from the analyses.

Tape lures playing contact calls of Common and Siberian Chiffchaffs at intervals were employed regularly throughout the winter. Songs were avoided because these can introduce a significant bias in the sex ratio with more males than females being attracted (Lecoq & Catry 2003). Each new bird was ringed and, when possible, age and racial identity determined from plumage characteristics following Svensson (1992). Data recorded included the date, time and location of capture, together with measurements of body mass using a calibrated digital balance and wing length (maximum chord) using a stopped ruler.

Feathers shed incidentally during the ringing process by three birds identified as

Table 1. Formula used in the Schnabel model.

$n = \frac{\sum (Ct Mt)}{\sum Rt}$	Mt = the total number of previously ringed birds at time t
	Ct = the number caught at time t
	Rt = the number of ringed birds caught at time t

Siberian Chiffchaff, two of which showed slight additional yellow and olive (a variation colloquially known as '*fulvescens*'), were used for mtDNA analysis (and all three were shown to have the mtDNA of Siberian Chiffchaff). Birds with '*fulvescens*' traits are treated as Siberian Chiffchaff in this paper (see Dean & Svensson 2005).

The length of stay of ringed individuals was determined by the number of days between first capture and last recapture. This is known to underestimate stopover durations (Schaub *et al.* 2001) and periods reported here should be regarded as minima. Year-specific population estimates were made using the Schnabel (1938) modification of the Lincoln-Petersen capture–recapture model (Krebs 1999). This model (table 1) was developed for situations with multiple capture occasions and uses the ratio of ringed and unringed birds trapped during each ringing session together with the cumulative number of ringed birds to estimate population size. Live recaptures are the basis of the standard model, which requires all birds to have the same survival and capture probabilities and a minimum of three sampling occasions.



Alan Pomroy

47. Filter beds at South Milton treatment works, Devon, August 2018.

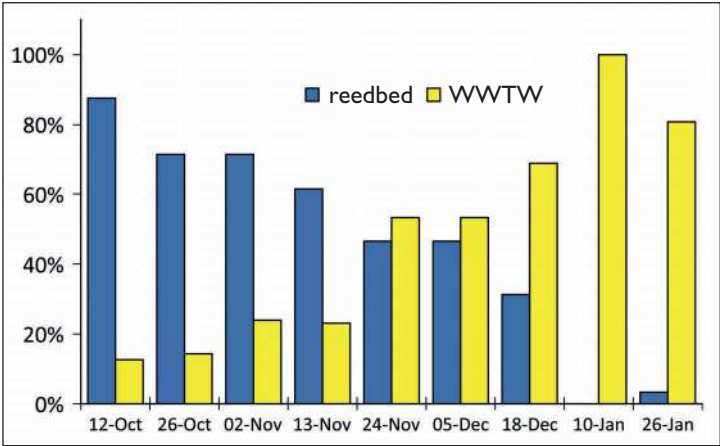


Fig. 1. The percentage of Common Chiffchaffs *Phylloscopus collybita* caught in the reedbed or adjacent to the WWTW at South Milton, Devon, between October 2017 and January 2018.

Results

The original goal of this study was to establish the species, numbers and distribution of birds present at South Milton Ley throughout the year. In the winter of 2015/16, nets were erected at accessible locations along the length of the reserve and the results established both the importance of the area around the treatment works and that Chiffchaffs dominated the assemblage (comprising 37% of the birds caught). In the two subsequent winters, ringing efforts were concentrated in the most productive areas within 200 m of the treatment works.

All the nets at South Milton Ley are effective at intercepting migrants as they move along the valley during spring and autumn. However, nets adjacent to the treatment works can be erected only on its southwest perimeter and in winter the prevailing wind frequently concentrates insects and birds on the opposite, leeward side of the site, often resulting in frustratingly low rates of capture and recapture. The numbers trapped increased on calm days or when the wind had an easterly element. Nevertheless, 541 Chiffchaffs were processed

during 49 ringing sessions between 1st October and 31st March in winters 2015/16 to 2017/18 and a further 443 birds during 51 sessions between 1st April and 30th September 2016–18. The autumn passage of Chiffchaffs through south Devon is protracted, with local breeders departing first. Up to 15 pairs breed annually in the reserve and none of these or their offspring

were retrapped after the beginning of September. Most southward movement occurred from September to early November and no birds ringed before 12th October remained at the site in winter (note that, in this paper, ‘winter’ refers to the meteorological winter, December to February inclusive, unless stated otherwise). Passage birds foraged throughout the reserve, but the majority were trapped in the margins of the reedbed, particularly in nets with adjacent willows. As autumn progresses and invertebrate populations decrease, Chiffchaffs become increasingly dependent on insects emerging from the treatment works (fig. 1).

Lengthy gaps between ringing sessions at the treatment works in 2015/16 prevent the data being used to estimate the wintering population, but they are included in other analyses. In the two subsequent winters, 266 Chiffchaffs were processed between 1st November and 28th February (table 2). Fourteen of these (5.3%) were identified as Siberian Chiffchaffs and mtDNA analysis of three individuals confirmed that the subspecies was being identified correctly.

There is considerable variation in the plumage of Chiffchaffs, plus clines in appearance and biometrics within and between races (Lövei 1983; Dean & Svensson 2005). This, together with exchange of genetic material in contact zones between the Scandinavian *P. c. abietinus* and both nominate *collybita* (Hansson *et al.* 2000) and *tristis* (Shipilina *et al.* 2017), makes the identification of *abietinus*

Table 2. The number of Common Chiffchaffs trapped at South Milton WWTW, Devon, in winters 2016/17 and 2017/18, between 1st November and 28th February.			
	2016/17	2017/18	total
<i>P. c. collybita</i>	135	117	252
<i>P. c. tristis</i>	8	6	14

difficult. Collinson (2018) showed that *abietinus* occurs in (apparently) low numbers in Britain and Ireland on passage and during winter. Single birds with wing length >64 mm were trapped at South Milton Ley in September and February and the possibility remains that data attributed to *collybita* in this study may include some unidentified *abietinus*.

Population and site fidelity

An average of 90 Chiffchaffs were trapped at the treatment works in each of the two winters of 2016/17 and 2017/18 (fig. 2) and an additional (average of) 42 birds during November, suggesting that the winter population was somewhere between 90 and 132 birds. If all November birds were late passage migrants and had continued south, the proportion of unringed birds trapped in the following months would have remained high, but a steady reduction between December and February and retrap data confirmed that many were wintering (figs. 3 & 4) and that the higher population estimate is probably more accurate. Nevertheless, only half the birds caught at the end of February were retraps, indicating that wintering numbers could be even higher. Application of the Schnabel capture–recapture model produced final population estimates of 227 ± 28.4 and 188 ± 25.5 birds for the winters of 2016/17 and 2017/18 respectively.

Site fidelity between winters initially appeared to be low with just 5/58 (8.6%) birds ringed in 2015/16 and 9/108 (8.3%) in 2016/17 retrapped in

the following winter. However, lack of site fidelity cannot be distinguished from mortality and adjusting the totals using annual survival rates of 0.2 for first-years and 0.34 for adults (Conway 2011) raises these figures to 13/58 (22.4%) and 24/108 (22.2%); furthermore, allowing for the proportion of the wintering population captured (47.6% and 48.8% respectively) produces significantly higher final estimated return rates of 28/58 (48.3%) and 50/108 (46.3%).

Only 15.4% of the Chiffchaffs ringed between November and February were retrapped in the same winter, also suggesting limited within-winter site fidelity and that birds were largely itinerant. However, as the probability of recapture was low and since birds marked early in winter have a greater

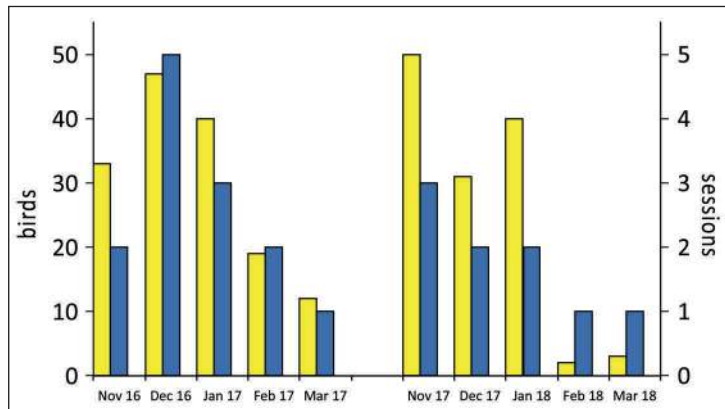


Fig. 2. The number of ringing sessions (blue bars) and Chiffchaffs caught (yellow bars) at South Milton WWTW each month, between 1st November and 15th March, in winters 2016/17 and 2017/18.

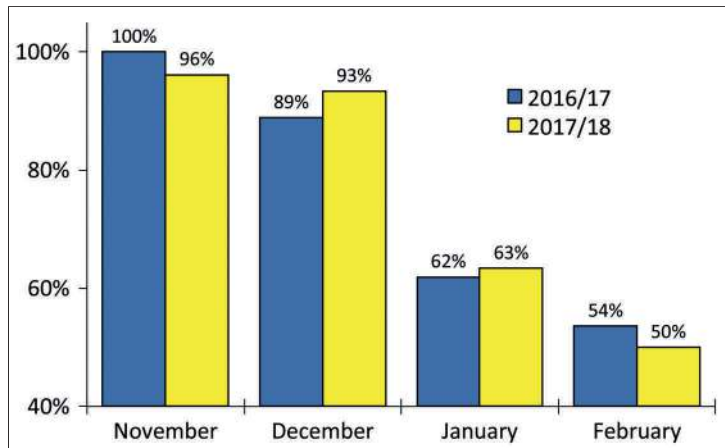


Fig. 3. The percentage of new (unringed) Chiffchaffs caught at South Milton WWTW between November and February in winters 2016/17 and 2017/18.

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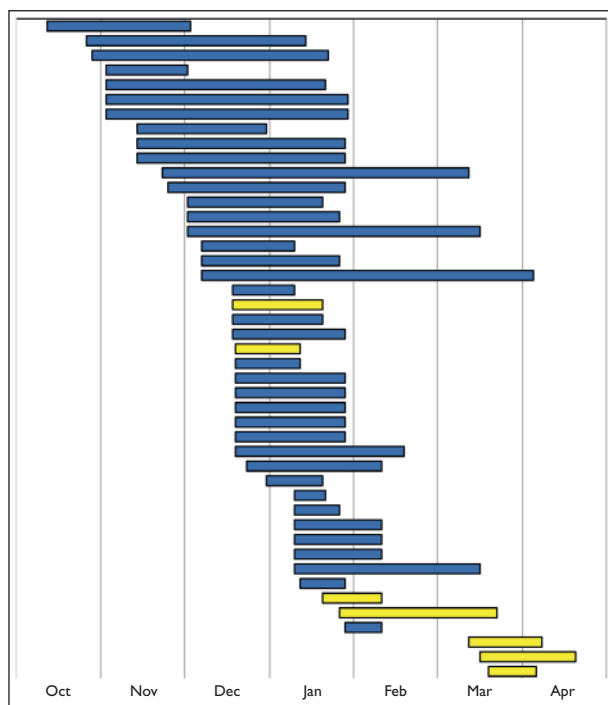


Fig. 4. First and last capture dates of Chiffchaffs ringed and subsequently retrapped at South Milton WWTW in winters 2015/16 to 2017/18 (blue bars = *collybita*, yellow bars = *tristis*; $n=45$).

number of subsequent recapture opportunities, this is not an accurate measure of continued presence. Unlike the major studies of wintering Chiffchaffs in southwest England (Conway 2011) and western Iberia (Catry *et al.* 2003), both of which utilised resightings of colour-ringed birds to establish site fidelity and movements, the current paper relies on

data collected during normal ringing operations and calculation of site fidelity is hampered by the low recapture rates. However, an estimate is still possible by comparing the proportion of marked birds recaptured during a ringing session with the number that might be expected if there was no emigration. For example, if 25% of the population had been ringed previously and 20 birds were caught during the next ringing session, it would be reasonable to expect five (25%) of these to be retraps. Comparison between the actual and expected number of retraps at each ringing session produced site-fidelity figures of $67.8\% \pm 8.5\%$ and $59.9\% \pm 8.1\%$ for the winters of 2016/17 and 2017/18 respectively. This assumes that mortality and emigration rates of marked and unmarked birds are identical, but the output is dependent on the estimated population size. The results above used the

population estimates from the Schnabel capture–recapture model and replacing these with the actual number of birds ringed, which must represent minimum population figures, produces site-fidelity estimates of $34.3\% \pm 4.3\%$ and $32.8\% \pm 4.5\%$.

There was little evidence of emigration, with just four within-winter ringing recov-

eries: one each in 2015/16 and 2017/18, two in 2016/17. Birds moved between the study area and four other freshwater sites or sewage works, all within a 15-km radius. Trapping at these sites was intermittent and opportunistic and the true scale of movement is likely to be underestimated.

Timing and duration

The first wintering Chiffchaffs usually arrive at South Milton in mid



48. A mist-net ride at South Milton treatment works, Devon, November 2018.

October and the first Siberian Chiffchaffs a month later. No Siberian Chiffchaffs trapped before mid December were proven to remain for the winter. New birds continued to be caught throughout the winter period but departure dates were more clearly defined, with the majority leaving in the last week of January and 80% gone by the middle of February (fig. 4). Of eight birds remaining into March and April, four were Siberian Chiffchaffs, three of which had not completed their pre-breeding moult.

In this study, 53% of retrapped birds (24/45) were on site for over a month, with an average of 47 days between captures, but actual arrival and departure dates are unknown (these figures and the intervals plotted in fig. 4 should be regarded as minimum durations). Some 25% remained for 10–16 weeks; all of these long-stayers were identified as nominate *collybita* with only one Siberian Chiffchaff present for more than four weeks.

Age and sex

Out of a total of 225 wintering Chiffchaffs, the age of 201 was established: 151 (75.1%) were first-years and 50 (24.9%) adults. This result is skewed by retrapped birds returning from previous winters; if the analysis is confined to new birds, the percentage of first-years rises to 81.6%.

Chiffchaffs of all races are sexually dimorphic in terms of wing length and there is little overlap between the sexes: *collybita* males 57–64 mm, females 53–61 mm; *abietinus* males 57–67 mm, females 54–63 mm (Svensson 1992); *tristis* males 57–67 mm, females 55–62 mm (Demongin 2016). In this study, all birds with a wing length ≥ 60 mm or ≤ 57 mm were classified as male or female respectively, which enabled 84% to be assigned to a sex. Data from South Milton Ley outside the winter period, between March and November (fig. 5), show two distinct peaks with males making up 56.3% of the total (n=770); yet,

between December and February (fig. 6), the proportion of birds with a wing length of ≥ 60 mm rose to 78.8% (n=238). However, caution is required when assigning a shift in sex ratios since this could relate to changes in origins or racial mix.

Diurnal patterns

The midwinter sun rises above the hills to the east of South Milton Ley an hour after dawn and the adjacent treatment works remain in shadow until this time. Data from December and January show that this is when Chiffchaffs begin to arrive to feed (fig. 7). Numbers peak three hours after sunrise and gradually decline throughout the afternoon. The birds do not roost within the reserve but are thought to favour the woodlands and large private gardens farther inland, where the slightly higher elevation makes them less prone to frost than the valley floor. On calm

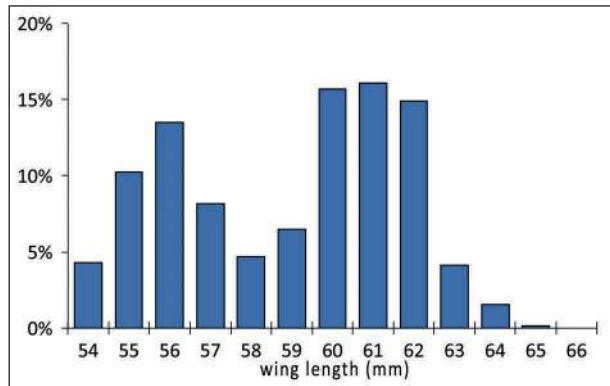


Fig. 5. Wing length of Chiffchaffs trapped at South Milton WWTW between March and November 2016–18 (n=770).

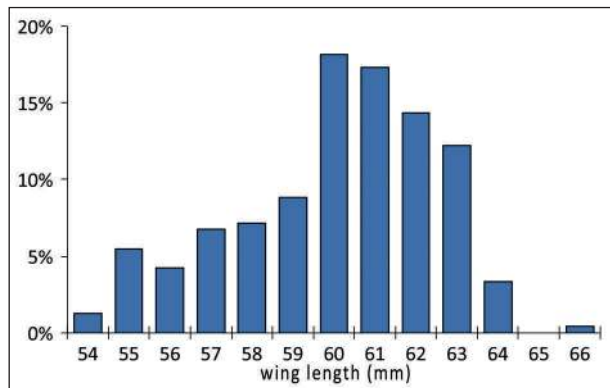


Fig. 6. Wing length of Chiffchaffs trapped at South Milton WWTW between December and February, in winters 2015/16 to 2017/18 (n=238).

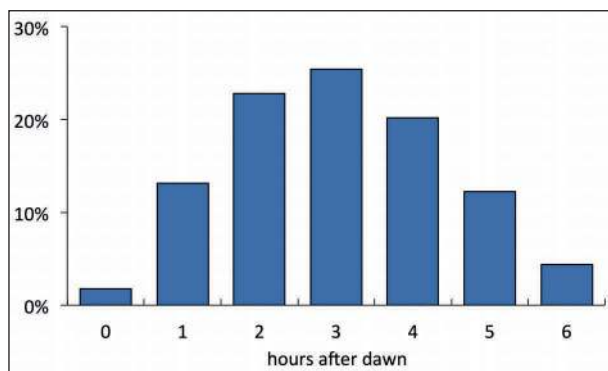


Fig. 7. Time of capture of Chiffchaffs trapped at South Milton WWTW during December and January, in winters 2015/16 to 2017/18 (n=114).

days, birds were frequently seen foraging actively along the network of hedgerows, running parallel to the valley, as they commuted to and from the treatment works.

Changes in body mass

A significant increase in body mass as the day progressed was apparent, rising from an average of 6.93 g at sunrise to 7.91 g six hours later (fig. 8), a difference of 12.4%. The rate of increase was linear for the first four hours but slowed towards the end of the day. There is a relationship between wing length and body mass in Chiffchaffs, with longer-winged males generally weighing more than females, but treating the sexes separately did not improve the fit. Daily gains should reflect the losses of the previous night but, since data were gathered only when the weather was suitable for mist-netting and no ringing took

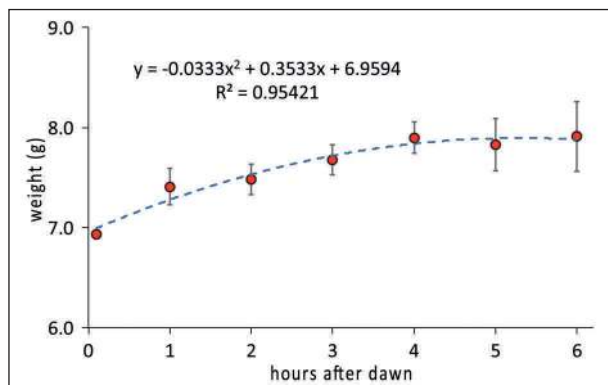


Fig. 8. Average body mass (g) and 95% confidence limits versus hours after dawn of Chiffchaffs trapped during December to February 2015/16 to 2017/18 (n=225). Trendline is a second-order polynomial fit.

place on days that were wet, windy or when temperatures were forecast to remain close to freezing, the rate of body-mass gains in adverse weather may be lower and overnight losses higher.

Discussion

Diet

It was clear that Chiffchaff activity and numbers at the study site increased during the emergence of non-biting midges (Chironomidae) and examination of faeces from trapped birds showed that they were composed predom-

inantly of their exoskeletons. Conway (2011) also found that chironomids dominated the faecal samples of wintering Chiffchaffs collected at 27 sites in southwest England. They are also an important component of the diet of wintering and passage Chiffchaffs in southwest Europe and data from El Hondo Natural Park, southeast Spain, show that the bulk of the winter diet there was composed of midges of 6–10 mm in length, which were found in the contents of all gizzards analysed and represented approximately 95% of all prey (López-Iborra *et al.* 2005). During the winter in Algeria, Chironomidae were found in 38.8% of analysed faeces (Bouaziz *et al.* 2016) and during spring in Denmark they comprised 66% of the diet (Laursen 1978). In Spain, compositional analysis revealed strong prey selection, with Chiffchaffs selecting clumped and less mobile prey such as Chironomidae and avoiding abundant but fast-escaping prey, such as Brachycera (López-Iborra *et al.* 2005).

Chironomids are among the most abundant organisms in aquatic habitats, capable of reaching densities of over 43,000 larvae/m² in nutrient-rich waterbodies, and it is not unusual for several thousand adults/m² to emerge nightly (Apperson *et al.* 2006). In southwest Europe and northwest Africa, higher winter temperatures allow the insects to emerge in natural freshwater habitats, with seasonality of emergence

varying among species and some having multiple generations per season. As a result, swarms can occur several times per year (Failla *et al.* 2015). The frequency is influenced by local environmental conditions and even adjacent, apparently identical habitats can vary considerably, both in timing and in the number

of events (Olsen *et al.* 2009). This important but unpredictable and short-lived food supply may force Chiffchaffs in these regions to adopt a semi-nomadic lifestyle in winter.

In contrast, lower winter temperatures in the UK limit the number of chironomid species with winter emergences, but bacteriological oxidation filters – with warmer-than-ambient waste-water, high nutrient loadings and large surface areas – are attractive breeding sites for several species. Conway (2011) reported that relative abundance of flying invertebrates at treatment works was significantly greater at filter beds compared with external vegetation, and at coastal sites compared with inland sites. This concentration and continuity of prey may well encourage wintering Chiffchaffs in the UK to adopt a more sedentary lifestyle than those farther south. Penhallurick (1978) also noted that Chiffchaff numbers were regulated not by the size and number of filter beds but by the suitability of surrounding habitat. Sites enclosed by trees and shrubs offer shelter and easier feeding opportunities than more exposed sites.

Although temperature must be a factor defining the northern limit of their wintering range, ringing has shown that individual Chiffchaffs can survive 15 consecutive nights with temperatures below freezing (Emmens 2017), implying that it is the effect of prolonged cold periods on the availability of insects rather than temperature per se that has the greatest impact on survival.



Richie Moore

49. Wintering Common Chiffchaff *Phylloscopus collybita* and chironomid midge swarm, South Milton treatment works, Devon, December 2019.

Population and site fidelity

Counts of Chiffchaffs at South Milton WWTW and the adjacent nature reserve suggested a wintering population of 25–30 birds, with a maximum count of 53 in January 2017. Ringing effort showed that the number using the site is considerably higher, with an average of 90 individuals trapped each winter. Similarly, Clark & Eyre (1993) showed that numbers ringed at a sewage works in Hampshire were 70% higher than counts suggested.

The Schnabel capture–recapture model estimated the wintering population to be 227 and 188 birds in winters 2016/17 and 2017/18 respectively. This model is intended for use with closed populations without immigration or emigration, both of which may have occurred at the study site. However, there was little evidence of either, with only four within-winter ringing recoveries from 541 Chiffchaffs processed between 1st October and 31st March in the three study winters, and use of the model is considered appropriate. No Chiffchaffs were known to move more than 15 km between South Milton WWTW and other locations during the same winter; if this distance represents the maximum extent of their winter range rather than the distribution of ringers in suitable habitats, the higher estimates may be realistic. Clement (1995) noted that Chiffchaffs undertake short local movements in response to food shortages.

There are few figures available for

comparison but 50–100 per site were reported at ten locations in southwest England between 1999 and 2009 (Conway 2011); 49 were ringed at Rye Meads, Hertfordshire, in the winter of 2015/16 (Emmens 2017); 125 at Colyton WWTW, Devon, 76 km northeast of the study site, in winter 2016/17 (Kevin Rylands pers. comm.); and 211 were trapped at several sewage works in west Cornwall, including an exceptional 73 birds in one day (22nd January) at Carnon Downs (Grantham 2017).

Conway (2011) reported a high level of between-winter site fidelity across ten sites in England, averaging 10.3%, and thus slightly higher than the return rates of 8.6% and 8.3% recorded in the current study. However, these figures do not take mortality into account. The annual survival rate of breeding Chiffchaffs in Britain has been estimated at 31% (Siriwardena *et al.* 1998), while mean between-winter survival rates of adults and first-years in southern England was 34% and 20% respectively (Conway 2011), and 39% across all ages in northern Iberia (Arizaga 2012). After allowing for the conservative survival rates of Conway (2011) and adjusting for both mortality and the proportion of birds captured, the percentage of surviving birds returning to South Milton WWTW in subsequent winters could be as high as 47%. Breeding Chiffchaffs at South Milton Ley have a similar average return rate of 44.9%.

Significantly lower inter-annual return rates have been recorded across the core

Chiffchaff wintering range: 4.4–8.2% in Portugal (Catry *et al.* 2003), 11% in Gibraltar (Finlayson 1980) and 6.1% in The Gambia (King & Hutchinson 2001), all of which were adjusted to account for mortality.

High levels of within-winter site fidelity were also calculated in the current study, ranging from a conservative 33–34% up to 60–68% depending on the population figure used. Conway (2011) reported within-winter site fidelity of 44.6%, which was similar for adults and first-years, males and females. Perhaps surprisingly, considering the numbers of wintering Chiffchaffs trapped in west Cornwall and east Devon, only one bird, ringed at South Milton Ley in November 2004 and controlled at Gwennap, Cornwall, 94 km to the west, in December 2004, is known to have travelled between the sites in the same winter; there are no records of movement between east Devon and South Milton Ley. In west Cornwall, just one bird has been recorded travelling the 4.5 km between two adjacent sewage works there (Grantham 2017). Out of 1,281 birds marked at ten sites in southern England, only 0.9% were retrapped at one of the other locations, leading Conway (2011) to conclude that ‘once a reliable food resource is located, in an otherwise food-poor environment, it is either beneficial to remain at the site or too costly to move’.

In contrast, Chiffchaffs wintering in southwest Europe and northwest Africa are largely nomadic, based on low local recapture rates and observed movements of colour-

ringed birds: 91.2% of birds ringed in northern Iberia were not retrapped (Arizaga 2012), 80% in southern Spain (Herrera & Rodriguez 1979) and 91% in The Gambia (King & Hutchinson 2001). In Portugal, 69.8% of colour-ringed birds were not resighted (Catry *et al.* 2003).



50. ‘Siberian Chiffchaff’ *Phylloscopus collybita tristis* and chironomid midge swarm, Colyton treatment works, Devon, January 2013.

Karen Woolley

Timing and duration

The earliest wintering Chiffchaffs at South Milton arrived on 12th October, and the earliest Siberian on 13th November. Autumn passage of Chiffchaffs in southern Britain peaks in October but Siberian Chiffchaff is primarily a late-autumn migrant. Dean *et al.* (2010) showed that, in 2008, most Siberian Chiffchaffs arrived in November (53%), many of which soon moved on. The earliest autumn record of Siberian Chiffchaff reported by Collinson *et al.* (2018) was a bird from the Isle of May on 28th September 2015. They found that numbers of *tristis* peaked in October and November, though records from southwest England increased in November–December as wintering birds arrived.

Chiffchaffs that remained at South Milton had a median duration of stay of 39 days ($n=41$), longer than birds in Portugal (median 20 days; Catry *et al.* 2003). Some 26.3% of wintering birds trapped at the study site stayed for over one month compared with 22.2% in The Gambia (King & Hutchinson 2001), a difference that seems likely to reflect continuity of food supplies.

Most wintering birds left the study area in the last week of January, while 80% had departed by mid February. Mortality will account for some of the decline in numbers but there were no adverse weather events likely to have caused significant mortality: mean January temperatures in the three study winters were 2.3°C, 1.1°C and 0.1°C above the 1981–2010 January averages respectively (Anthony Veal pers. comm.). Lack of food was also unlikely to have driven departures, given that Conway (2011) found that biomass increased through the winter, peaking in January–February and beginning to tail off only in March. Clement (1995) also reported that Chiffchaffs wintering at sewage works in Cornwall began to disperse by mid January, despite the weather remaining favourable. This supports a hypothesis that it is the urge to arrive on the breeding grounds early and compete for the best territories that drives this early departure.

There is a strong correlation between winter survival rates and winter severity (Conway 2011). In February 2018, a severe cold-weather event affected the UK, with

heavy snowfall in south Devon on 25th February, and lying snow and temperatures remaining close to or below freezing until 4th March. Although most wintering Chiffchaffs had already departed, they clearly suffered elsewhere and just one ringed bird returned in winter 2018/19.

Of the seven Siberian Chiffchaffs retrapped at South Milton WWTW, four were present in mid March (when locally breeding *collybita* males started to return) and three remained into April. These were probably on early spring passage but had not completed their partial pre-breeding moult, which occurs later than that of *collybita* and *abietinus* (Dean *et al.* 2010).

Age and sex

First-years comprised 81.6% of new birds captured in this study ($n=185$). Moreno-Opo *et al.* (2015) found that age ratio differed significantly according to wintering region, with a higher percentage of first-years in the Iberian Peninsula and Morocco (81.3%, $n=874$) than south of the Sahara (54.7%, $n=185$).

In this study, 199 out of 238 winter birds were sexed by wing length: 78.8% of these were presumed to be male (≥ 60 mm), while the proportion of females (≤ 57 mm) was significantly lower at 21.2%. As referred to earlier, the inclusion of some unidentified female *abietinus* in the male totals is a possibility. In the absence of reliable data on *abietinus*, the percentages were recalculated assuming the same incidence as *tristis* and 14 birds were moved from the male to the female side of the cut-offs, which reduced the percentage of males to 72%. Conway (2011) also concluded that since *abietinus* is infrequently encountered in winter, only a low proportion of wintering individuals will be misclassified to sex.

Similar figures have been reported for the sex ratio of wintering Chiffchaffs in southern England, ranging from 67–76% (Emmens 2017), 78.4% (Conway 2011) to $83.2 \pm 5.3\%$ males (Catry *et al.* 2005). Using data from various latitudes in Europe and Africa, Catry *et al.* presented convincing evidence that female Chiffchaffs move farther south than males. Their results showed that $21.6 \pm 3.5\%$ of birds trapped at 37°N in southwest

Portugal were males and $14.7 \pm 6.3\%$ at 35°N in Morocco.

Catry *et al.* (2005) concluded that the pattern of sexual segregation in the winter quarters supports the body-size (or cold-tolerance) hypothesis, with males better able to overcome harsher conditions owing to their greater body size. Based on studies in Senegal, they also showed differential timing of spring migration, with males leaving the winter quarters considerably earlier than females; again, this points to the importance of males arriving early in their breeding territories.

Diurnal patterns

The roost site of Chiffchaffs wintering at South Milton Ley has not been located but is thought to be in woodland farther up the valley. There was no evidence of birds arriving in flocks, as reported at Colyford WWTW in east Devon, where up to 50 would arrive soon after dawn, presumably directly from their roost (Tyler 2018).

At South Milton WWTW, maximum numbers were present three hours after dawn. Chironomids are active mainly at dusk and dawn, when they fly in swarms, but they settle during the day on vegetation, when they are relatively immobile and easy to catch (López-Iborra *et al.* 2005). Conway (2011) reported a positive relationship between insect biomass and time of day, indicating that prey was less abundant in the mornings, and either explanation may account for peak Chiffchaff numbers being trapped in the middle of the day. A similar pattern of activity was reported during autumn migration in south Wales with a peak 2–3 hours after dawn (Ormerod 1990). There was no evidence of territoriality or intraspecific aggression during the winter in this study and Catry *et al.* (2007) also noted that aggressive interactions were rarely recorded at their wintering site in Portugal with birds often moving in loose flocks.

Changes in body mass

Chiffchaffs require about one-third of their body mass in insects daily (Clement 1995) and winter survival is based on maintaining weight rather than building up reserves

(Reynolds 1978). They need to forage actively to find sufficient insect food, adding 10–15% to their body mass during the day and burning that off overnight (Norman 2008). Overnight weight loss in passage Chiffchaffs on Fair Isle ranged between 15.3% and 22.4% over 16 hours (Browne 1953) and Norman (1987) measured average overnight weight losses of 12.5–13.5% in Willow Warblers *P. trochilus* after adjustment to a 16-hour night.

In Senegal, time of day was an important determinant of body mass, with a significant increase from the early morning to a peak in late afternoon. The estimated difference between wintering birds caught at the beginning of the day and in the late afternoon was 7.0% of mean winter body mass (Vafidis *et al.* 2014). In northeast Spain, as in the current study, the time of day had a greater effect than the date of capture on body mass, while night length was also a major factor governing winter foraging performance (Pagani-Núñez & Hernández-Gómez 2013). In south Devon, night length in midwinter is 16 hours while in Senegal it is 12.75. Adjusting the Senegalese figure to a 16-hour night produces an estimated overnight weight loss of 8.8% compared with the average of 12.4% in this study. It is tempting to speculate that this 3.6% difference is the daily cost of wintering at higher latitudes.

Subspecies origin

Three subspecies of Common Chiffchaff are known to occur in the UK during winter: *collybita*, breeding in southern Scandinavia and western and central Europe; *abietinus*, breeding from northern Scandinavia, the Baltic states and Belarus east to the Ural Mountains in northwest Russia; and *tristis*, which breeds east of *abietinus* in Russia from the Ural Mountains east to the River Kolyma in northeastern Siberia and south to northern Kazakhstan and northern Mongolia. For further information, see Collinson *et al.* (2018) and Raković *et al.* (2019).

In the UK, the BTO's Constant Effort Sites (CES) scheme recorded a 308% rise in Chiffchaffs trapped between 1984 and 2015 (Walker *et al.* 2017), while Balmer *et al.* (2013) mapped a northwards range expansion. A similar increase, coupled with a

change in subspecies composition of Chiffchaffs, is also taking place in Sweden and Finland, with the ecologically different yet morphologically similar *collybita* replacing *abietinus* in some areas. In Finland, *collybita* inhabits broadleaf forests and even shrublands, whereas *abietinus* occurs mainly in conifer forests dominated by Norway Spruce *Picea abies* (Lampila *et al.* 2009). The number of *collybita* Chiffchaffs in southern Sweden has risen by 9.3% per year for the last 20 years (Green *et al.* 2018).

In Denmark, also inhabited by *collybita*, the population increased by 4.6% per year from 1976 to 2017, a total increase of 504% (Moshøj *et al.* 2018). This follows a long-term expansion from the southwest (Bauer *et al.* 2005). The reasons behind this dramatic range expansion and population growth of *collybita* Chiffchaffs are not fully understood but the timing coincides with a significant increase in the numbers wintering in the UK. In Devon, the numbers reported rose from 39 in 1974 to 298 in 2016, an increase of 764% (Devon Birds 1976–2018).

Some of the *collybita* wintering in the UK are likely to be from the country's breeding stock but the majority have probably migrated from southern Scandinavia or continental Europe (Wernham *et al.* 2002; Conway 2011). Since 2002, recoveries of birds that wintered at South Milton Ley have come from across England and Wales, principally from coastal sites, with single birds from France and Belgium. There are few recoveries linking birds wintering in Britain with their breeding locations. Conceivably, the four wintering *collybita* present into March/April were local breeders but there is no evidence to support this.

Many local breeders return in spring with black pollen encrustations, indicating that they have passed through North Africa or Iberia (Wood *et al.* 2014). For wintering birds, a delayed departure would negate the advantages and risks of wintering at higher latitudes and could put them at a competitive disadvantage in establishing breeding territories. Conway (2011) also noted many birds remaining into late March or early April, suggesting that some could be migrating a considerable distance north or east, having to wait until conditions on their breeding

grounds are favourable before departing.

After over a century of ringing, involving more than 900,000 Chiffchaffs up to the end of 2017, just 353 foreign-ringed birds have been recorded in Britain & Ireland and 658 British-ringed birds found overseas (BTO 2018). Some 83 birds have travelled between the UK and the Baltic states and southern Scandinavia, with 90% of these from Denmark, Norway and Sweden (BTO 2018). One bird, ringed in Denmark in October 1998, wintered in 1999 at Hallsands, Devon, 14 km from the current study site (Clark *et al.* 2001); another October bird, from Falsterbo, Sweden, was controlled at Rye Meads in December 2013 (Emmens 2017); a Chiffchaff trapped in Cornwall in January 2004 had been ringed in Norway in September 2003 (Clark *et al.* 2005); and one trapped at Dungeness, Kent, in late September 1994 was controlled in June 1996 at Rybachy, in Kaliningrad Oblast, between Poland and Lithuania on the Baltic Sea coast, 1,399 km ENE (Clark *et al.* 2000).

Birds passing through southern Scandinavia in October will not be local breeders and may have originated farther north or east. Consequently, this cannot be used as evidence that they are *collybita*, although it does make the point that a proportion of wintering Chiffchaffs are not UK breeders. Ringing data indicate a consistent shift in migration directions of Finnish and Swedish Chiffchaffs, from south and south-east in the 1960s and 70s to a more south-westerly direction in 1980–2000 (Lindström *et al.* 2007). Finnish Chiffchaffs have also been captured in January in France and in November in the Netherlands (Lampila *et al.* 2009).

If changes in numbers and subspecific composition in southern Scandinavia can provide a plausible explanation for the increase in wintering *collybita* Chiffchaffs in the UK, the same cannot be said for the parallel increase in the number of Siberian Chiffchaffs. In west Cornwall, as many as 10.4% of Chiffchaffs were identified as Siberian (Grantham 2017) and 5.3% in the current study. A figure of 6.5% was reported for the whole of Devon between 1974 and 2016 (Devon Birds 1976–2018).

Dean *et al.* (2010) concluded that the

origins of Siberian Chiffchaffs reaching Britain and elsewhere in Europe and the reasons for their increasing numbers remain speculative but may be related to evolving migration strategies where individuals have wintered successfully (and to some extent to increased observer awareness). They remain over winter before returning to Siberia, where their migration strategy is inherited by their offspring. Two *tristis* Chiffchaffs have been retrapped in west Cornwall in subsequent winters, adding to the evidence that these are returning wintering birds, not lost vagrants (Grantham 2018). Whatever the correct explanation, this question is unlikely to be resolved by ringing alone.

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Calls of crossbills in Scotland: association with bird size and changes over time

Ron Summers



Alan Harris

Abstract Crossbills of different size in Scotland give different flight and/or excitement calls. Generally, crossbills that give a particular flight call also give a particular excitement call, thereby defining ‘call-types’. Here, different calls and their varieties are described for different sizes of crossbill (i.e. species). Also described are the different call-types of Common Crossbills *Loxia curvirostra* of varying average size (wing length and bill size). Using calls to identify crossbills is less subjective than trying to discern small differences in bill size, and the results of this study may help observers who record crossbill calls.

Three species of crossbill breed in Britain: Common Crossbill *Loxia curvirostra*, Scottish Crossbill *L. scotica* and Parrot Crossbill *L. pytyopsittacus* (Gibbons *et al.* 1993; Balmer *et al.* 2013). This is the accepted taxonomy of the British Ornithologists’ Union (following the *IOC World Bird List*; Gill & Donsker 2019) and of BirdLife International (HBW & BLI 2019). Our current understanding of Britain’s breeding crossbills is that the Scottish Crossbill is a resident endemic while Common and Parrot Crossbills result from irruptions (irregular movements of large numbers of birds into areas where they are not normally found) from continental

Europe and western Asia (Nethersole-Thompson 1975; Cramp & Perrins 1994; Newton 2006). Irrupting birds may stay to breed in Britain, but thereafter may return to the continent in subsequent years (Newton 1972, 2006). It is also possible that some Common and Parrot Crossbills are longer-term residents, although they may move about within Britain from year to year. The three species are not easy to distinguish in the field on the basis of morphological features because of their similarity in plumage and overlap in biometrics (Knox 1976, 1990). Measurements of Scottish Crossbills overlap partially with both Parrot Crossbills (the largest of the three species) and Common

Crossbills (the smallest; Knox 1976).

An objective way to distinguish crossbill taxa is from sonograms of diagnostic calls (Groth 1993a). The calls that have provided most interest are the single-note flight and excitement calls that are given by both sexes, although more emphasis has been given to describing flight calls (Groth 1993a). Ten different flight calls have now been identified in North America, each associated with different taxa of Common (Red) Crossbill (Groth 1993a; Benkman *et al.* 2009; Irwin 2010), one of which has recently been shown to represent a distinct monotypic species: Cassia Crossbill *L. sinesciurus* (Benkman *et al.* 2009; Gill & Donsker 2019). Flight calls, as the name suggests, are usually given in flight but are also given when birds are perched, and often prior to flight. The flight call is the commonest call that observers hear from crossbills and is often described phonetically as ‘chip’. The excitement call is heard less frequently but is given in a number of circumstances: during interactions among crossbills, before the male feeds the female on the nest, and at the appearance of a predator (Nethersole-Thompson 1975; pers. obs.). In the last situation, it may be regarded as an alarm call.

Various authors have alluded to differences in the calls of crossbills in Britain (e.g. Knox 1990, Rae 2010) and sonograms have been published that reveal the calls given by the different species in Europe (Nethersole-Thompson 1975; Cramp & Perrins 1994; Robb 2000). A fundamental concern with these publications was the lack of an independent assessment of the species recorded (i.e. based on biometrics). It was not until Summers *et al.* (2002) published sonograms from birds of known bill size and wing length that the calls of the different species were described or confirmed.

The rationale used to relate sonograms to species was as follows. Excluding the morphologically distinct Two-barred Crossbill *L. leucoptera*, there are only two species of crossbill in continental northern Europe, Common and Parrot, which differ in biometrics: there is no overlap in measurements of bill depth, but some overlap in wing length (Knox 1976; Summers *et al.* 2002). Therefore, groups of birds with given calls and biometrics (based on Fennoscandian museum speci-

mens) that fell within the defined ranges of bill depth and wing length of either Common or Parrot Crossbill could be allocated to these species. The same method could not be applied to Scottish Crossbill because its biometrics fall between those of Common and Parrot Crossbill and overlap with both. Therefore, birds with calls different from both Common and Parrot



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51. Head-and-bill profiles of Parrot Crossbill *Loxia pytyopsittacus* (top), Scottish Crossbill *L. scotica* (centre) and Common Crossbill *L. curvirostra*.



52. Conifer plantations in Highland Scotland, April 2008. Most of the conifer woods in the UK are composed of North American tree species, and particularly Sitka Spruce *Picea sitchensis*. They go through a management cycle of planting, thinning and clear-felling to maximise timber production. Common Crossbills *Loxia curvirostra* are often found in Sitka Spruce plantations when the trees are coning.

Crossbills and with biometrics that were intermediate between the ranges of Common and Parrot Crossbills, or overlapped partially with these ranges, were assigned as Scottish Crossbills.

Decisions made about the separation of calls into different categories by Summers *et al.* (2002) were based on qualitative differences in the structure of the calls, visible in sonograms. Support for the classification came from the matching of flight and excitement calls. Birds that gave a particular flight call tended to give a particular excitement call, so that calls could be regarded as paired, and thereby defined as 'call-types'. Each flight call was given a number and each excitement call was assigned a letter. Birds that gave flight call 1 tended to give excitement call A, defining it as call-type 1A. Other call-types were 2B, 3C, 2D (and occasionally 3D) and 4E.

These call-types matched some call-types classified by Robb (2000) from recordings made largely in the Netherlands, with call-type 1A matching his type E; call-type 2B matching his type A; and call-type 4E

matching his type C (see also Constantine *et al.* 2006). Note that not all flight calls are uniquely associated with an excitement call; for example, 2B and 2D share a flight call and 2D and 3D share an excitement call (Summers *et al.* 2002).

By matching calls with biometrics of trapped birds, the call-types were assigned to crossbills of different wing length and bill size, and thereby to species. Birds giving call-types 1A, 2B and 4E fell within the size range of Common Crossbill. Birds in two of these call-type groups differ slightly in average bill size, prompting the suggestion that these may be cryptic species of Common Crossbill (Edelaar *et al.* 2008). Birds giving call-types 2D and 3D were within the size range of Parrot Crossbill while crossbills giving call-type 3C were of intermediate size – this call-type was assumed to refer to Scottish Crossbill (Summers *et al.* 2002).

Recordings of Common Crossbills from continental Europe confirmed the presence there of flight calls 1, 2 and 4, and excitement calls A, B, D and E, but not flight call 3 nor excitement call C (Robb 2000; Summers

2007; and recordings by Jean Roché from the Alps and Jura Mountains, France, and Krister Mild from Sweden). This supports the theory that call-type 3C belongs to the resident Scottish Crossbills.

In North America and Britain, paired crossbills have the same calls (Groth 1993b; Summers *et al.* 2002), suggesting that calls may be important for group cohesion and mate choice. Assortative mating according to call-type and also bill size (Summers *et al.* 2007) maintains the integrity of the call-types, as does the learning of these calls from parent birds (Keenan & Benkman 2008; Sewall 2011). The finding that Common Crossbills paired according to call-type led Edelaar (2008) to argue that birds with different call-types should also be regarded as separate species.

In this paper, a larger number of sonograms are reviewed than in an earlier work (Summers *et al.* 2002); temporal variations within call-types associated with crossbills of different size are described; and biometrics of Common Crossbills with different call-types are examined, now that bill depths have been

found to differ between birds with two call-types (Edelaar *et al.* 2008). Annual variations in the proportions of call-types of Common Crossbills are described, because these may be associated with irruptions from different parts of the Eurasian continent (Marquiss *et al.* 2008, 2012).

Methods

During an initial survey across Scotland from 1995 to 2000, recordings were made by RS and co-workers, mostly using a Marantz tape-recorder with a Pro-sound directional microphone (Summers *et al.* 2002). Thereafter, in 2002 and 2003, a 60-cm parabolic reflector was used with a Sennheiser microphone to record calls onto the Marantz recorder. This was also the equipment used by the surveyors in the 2008 national survey of Scottish Crossbills (Summers & Buckland 2011).

Variations between calls depicted in sonograms can be due to variation in the quality of the recording, making similar basic structures difficult to discern in some recordings. There is also variation in calls within and



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53. Abernethy Forest, Highland, April 2009. Caledonian pinewood is now a rare woodland habitat in Scotland. Most of the woods are at the old-growth stage of forest development and are rarely felled for timber nowadays. In Abernethy Forest, all three species of crossbill can nest in this habitat, but at slightly different times: Parrot Crossbill *Loxia pytyopsittacus* first, then Scottish Crossbill *L. scotica* and finally Common Crossbill *L. curvirostra* when the pine cones open to shed their seeds.

between individual birds. It was also checked whether variation could be influenced by the recording equipment and the software used to prepare sonograms. From 1995 to 2000, sonograms were prepared using the software CANARY (produced by Cornell University), but from 2002 onwards RAVEN software (also Cornell University) was used. There was no difference in the appearance of the sonograms produced by the two software packages. Likewise, when birds were recorded with the two types of microphone, there was no difference in the sonograms of calls.

The appearance of a sonogram depends partly on the scale used to illustrate call frequency (on the vertical axis) relative to time (on the horizontal axis). Some authors (e.g. Groth 1993a) preferred to stretch the time scale, so that the ratio of frequency (kHz) to time (seconds) was 1:40. In most other publications this ratio ranges from 1:7.0 to 1:10.6 (Nethersole-Thompson 1975; Cramp & Perrins 1994; Robb 2000). In this paper, the ratio used is 1:8.5.

The procedure of matching birds of known bill size (length, depth and width) and wing length to calls was updated (Summers *et*

al. 2002). Of the three bill measurements, most emphasis was placed on depth (measured as in Summers *et al.* 2002), which is related to the key conifer species to which each crossbill taxon is adapted (Benkman 1993). Furthermore, bill depth can be measured with a high degree of precision (Summers *et al.* 2007). Maximum wing length is a good measure of body size (Gosler *et al.* 1995). Most measurements of captured birds were made by the author, with a few additional measurements (9%) by others after checking for consistency among observers. Trapping took place from 1995 to 2012, mainly in winter and spring. The baseline data for the biometrics of Common and Parrot Crossbills (also measured by the author) were obtained from museum specimens collected in Fennoscandia, and were therefore unaffected by birds of intermediate size (i.e. Scottish Crossbills) (Summers *et al.* 2002). Most of the matching between bird measurements and calls refers to flight calls because these are readily given when a trapped bird is released, although calls were sometimes partly masked by the sound of the wing flaps of the departing bird. Nevertheless,



54. Mark Gurney preparing to lure and record crossbills in Scotland in January 2008. An excitement call broadcast from the loudspeaker in different directions draws in crossbills from a known radius, so the population density of crossbills can be calculated from the number counted, while the responding calls from the lured crossbills gives identification of the species.

there was sufficient detail to categorise the calls. Matching excitement calls to birds of known size was more difficult. This was achieved mainly by colour-ringing birds that were nesting and, on identifying the bird in the field, playing an excitement call to the bird, which responded with its assumed own excitement calls.

The numbers of the different calls and their varieties were counted for two periods: 1995–2000 and January–April 2008 (the national Scottish Crossbill survey; Summers & Buckland 2011). As with the classification of calls, the separation of varieties of calls was based on qualitative differences, though this was more subjective because varieties graded one into another. Recordings were regarded as independent if they were from different birds at the same place, made in different woods or in different parts (over 1 km apart) of large woods, or at the same location but at least a month apart. It is impossible, however, to exclude the possibility that some birds may have been recorded more than once.

Results

Flight call 1

Flight call 1 is distinguished by the downward leg at the start of the note (fig. 1). This is a minor component of the call, apart from 1iii, which has a prominent initial downward leg. Variant 1ii has an additional separate element (see also flight call 3 below). The lengths of the upward and downward components can vary, with the latter being long in 1iv. Calls 1i, 1iii and 1iv were recorded from birds in the size range of most (95%) Common Crossbills or were slightly smaller (fig. 2).

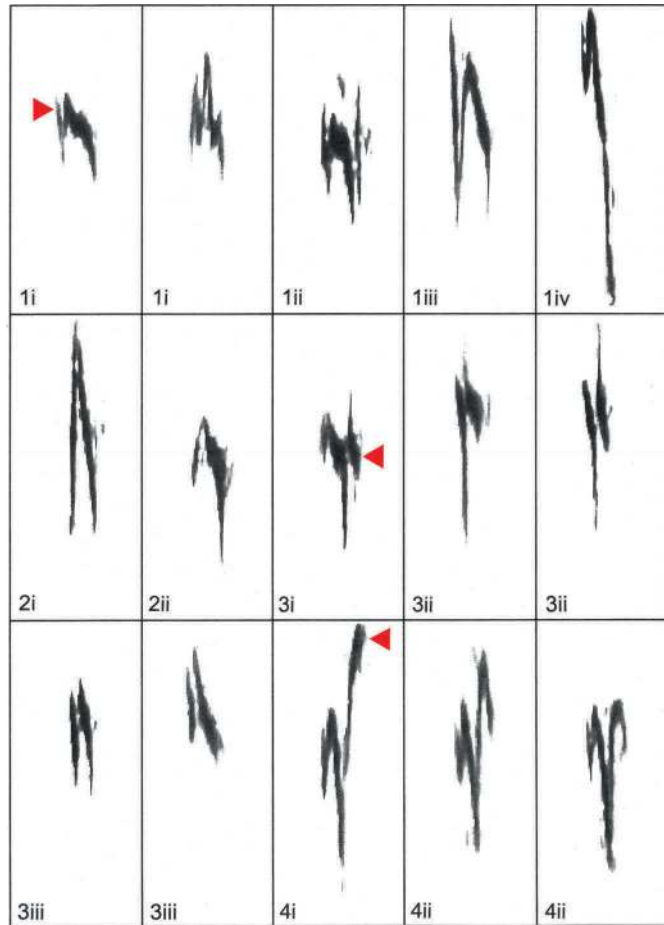


Fig. 1. Examples of the different flight calls given by crossbills in Scotland. Different calls are denoted by numbers 1–4, and their variations by i–iv. The horizontal length of each box represents 0.2 seconds, and the vertical length represents 1–5 kHz. Pointers indicate diagnostic features.

Flight call 2

Flight call 2 consists of only upward and downward components. The two components can be of equal length (2i), though usually the downward component is longer (2ii) (fig. 1). Calls 2i and 2ii were recorded from birds in the size range of Common and Parrot Crossbills (fig. 2).

Flight call 3

The identifying feature of type 3 is the additional element at the end of the call making it bi-syllabic. The first element may be the same size as the second, and the elements can be either offset (3ii) or side by side (3iii). Calls 3i, 3ii and 3iii were recorded by birds in the upper size range of bill depths of Common

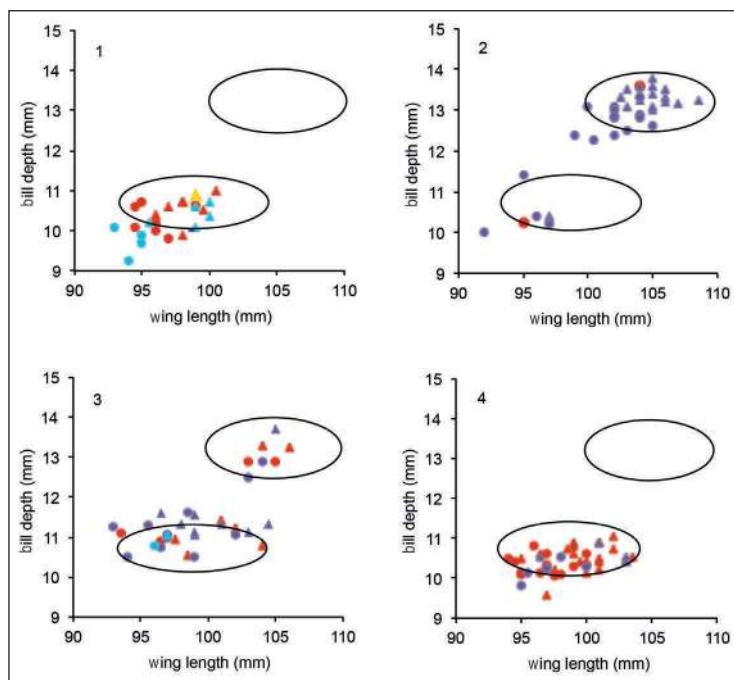


Fig. 2. Bill depth plotted against wing length for crossbills giving flight calls 1 to 4. Colours show variations within the calls: i – red, ii – purple, iii – pale blue, iv – yellow. Circles = females, triangles = males. The ellipses show the 95% ranges for Common *Loxia curvirostra* (lower ellipses) and Parrot Crossbills *L. pytyopsittacus* (upper ellipses) based on measurements of these species from museum specimens in Scandinavia and Finland (Summers *et al.* 2002). There is no corresponding ellipse for Scottish Crossbills *L. scotica* because of uncertainty over their biometrics.

Crossbills, slightly larger than Common Crossbills and occasionally in the size range of Parrot Crossbills (fig. 2).

Flight call 4

Flight call 4 ends in a diagnostic upward component that has a club shape (4i) or hook (4ii) (fig. 1). There is a downward component at the start of the call (like flight call 1). Flight call 4 was given only by birds in the size range of Common Crossbills (fig. 2).

Excitement call A

Excitement calls may be composed of a series of overlaying effects of the fundamental frequency (the component with the lowest frequency) at higher frequencies. In excitement call Ai, the fundamental component is hooked at the start, rises slightly and then falls. The component above the fundamental at a higher frequency is similar in appearance (fig. 3). In excitement call Aii, the higher-frequency component has no initial hook.

Excitement call Aiii lacks the hook on the fundamental but was still classed as an A call because other calls given by the same bird had hooks. Ai calls were given by crossbills in the size range of most Common Crossbills, or slightly smaller (fig. 4).

Excitement call B

Call Bi resembled a series of hoops stacked upon each other (fig. 3). This call was made by birds in the size range of Common Crossbills (fig. 4).

Excitement call C

Excitement call C has a series of overlaying frequencies and an additional low-frequency component

that gave the call a bi-syllabic sound: ‘too-yoop’ instead of a single ‘toop’ note. This additional component is less distinct in Ciii compared with Ci (fig. 3). Ci and Ciii calls were recorded from crossbills in the upper size range of Common Crossbills or intermediate between Common and Parrot Crossbills (fig. 4).

Excitement call D

This call is similar to C but lacks the additional component, giving the call a shorter and sharper sound. Di and Dii calls were recorded from birds in the size range of Parrot Crossbills and occasionally from birds in the size range of Common Crossbills (see Aiii; fig. 4).

Excitement call E

This call is simpler than the other excitement calls. There is an inflected low fundamental frequency and a higher-frequency hooped component (fig. 3). This call was

given only by birds in the size range of Common Crossbills (fig. 4).

Patterns in space and time

The numbers of recordings of each flight and excitement call are shown in table 1. It is notable that the relative frequency with which some calls were recorded changed between the two surveys: in 2008 there were fewer 1i and more 1iv calls; and fewer Ci and more Ciii calls. Some of these differences may reflect the locations where recordings were made. For example, many recordings during 1995–2000 were made in Abernethy Forest, where Parrot Crossbills were relatively common, whereas the 2008 survey was conducted systematically across Highland Scotland and few Parrot Crossbills were recorded. Consequently, excitement call D was rarely recorded in 2008 (table 1).

Associations between flight and excitement calls

Summers *et al.* (2002) showed that each flight call was generally associated with a given excitement call, resulting in five call-types. Using the notation for the varieties, these were 1iAi, 2iBi, 3i/3iiCi, 2ii/3iDi and 4iEi. In the data from 2008, these associations between flight and excitement calls largely remained, but usually involved different varieties (table 2). For example, excitement calls Ai and Aiii were associated with flight call 1iv; Bi was found to be paired with flight call 1iii rather than call 2 (but because the sample size is small, further recordings are required for birds with excitement call B); and excitement call Ciii was mainly associated with flight call 3iii. There were few additional data on 2D and 4E call-types (table 2).

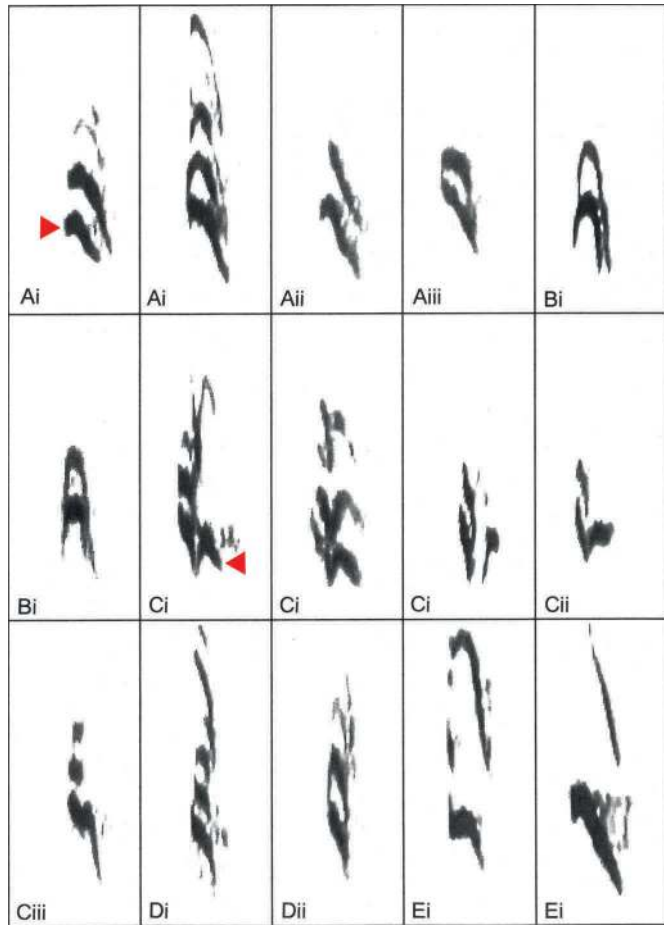


Fig. 3. Examples of the excitement calls given by crossbills in Scotland. Different calls are denoted by letters A–E, and their variations by i–iii. The horizontal length of each box represents 0.2 seconds, and the vertical length represents 1–5 kHz. Pointers indicate diagnostic features.

Crossbill biometrics

It was possible to define species according to calls because different calls were given by birds of different size (figs. 2 and 4). There was uncertainty over birds which gave flight calls 2 or 3, or excitement call D, but this issue was largely overcome by using associations between flight and excitement calls when both were recorded (table 3). Using the calls as a means of identification, mean bill size and wing length were calculated for each species (table 4). The resulting mean measurements were similar to those obtained by Knox (1976), who categorised species according to size.

The biometrics of Common Crossbills

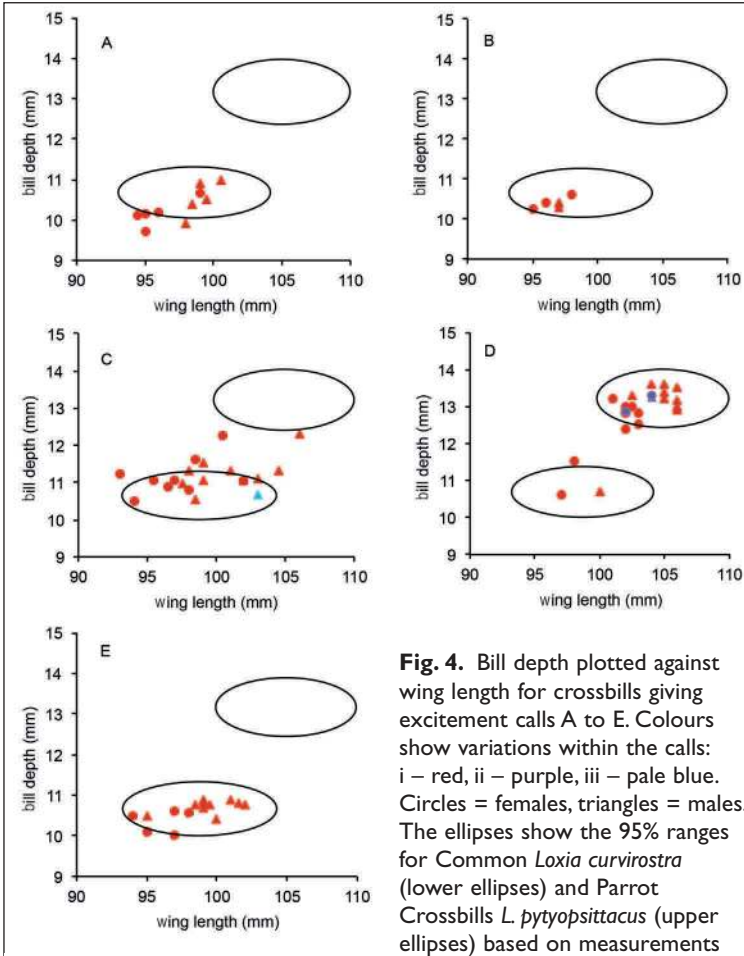


Fig. 4. Bill depth plotted against wing length for crossbills giving excitement calls A to E. Colours show variations within the calls: i – red, ii – purple, iii – pale blue. Circles = females, triangles = males. The ellipses show the 95% ranges for Common *Loxia curvirostra* (lower ellipses) and Parrot Crossbills *L. pytyopsittacus* (upper ellipses) based on measurements

of these species from museum specimens in Scandinavia and Finland (Summers *et al.* 2002). There is no corresponding ellipse for Scottish Crossbills *L. scotica* because of uncertainty over their biometrics.

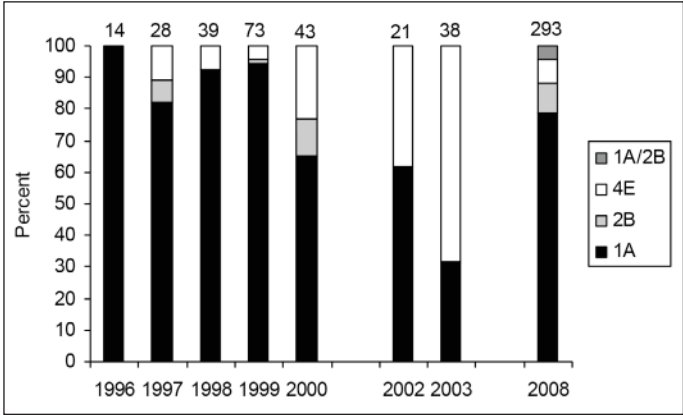


Fig. 5. Percentage of call-types given by Common Crossbills *Loxia curvirostra* in Highland Scotland in different years. The 1A/2B category indicates uncertainty over the call-type recorded. Sample sizes are given at the top of each bar. Irruptions, based on records of over 1,000 birds in the Northern Isles and Outer Hebrides, occurred in 2001 and 2002, and a smaller arrival of several hundred birds occurred in 1999 (Forrester *et al.* 2007).

with call-types 1A and 4E were also compared statistically (table 4). There was a significant difference between the wing lengths of the two groups (2-way ANOVA, $F_{1,69} = 41.3$, $P < 0.001$ for sex and $F_{1,69} = 10.5$, $P = 0.002$ for wing length). The least square means were 96.94 mm (SE = 0.37) for 1A crossbills and 98.46 mm (SE = 0.24) for 4E. There was also a significant difference in bill widths (2-way ANOVA, $F_{1,57} = 15.1$, $P < 0.001$ for sex and $F_{1,57} = 5.7$, $P = 0.02$ for bill width). The least square means were 11.15 mm (SE = 0.084) for 1A crossbills and 11.38 mm (SE = 0.053) for 4E. There were no significant differences in bill depth ($F_{1,69} = 2.8$, $P = 0.10$) or bill length ($F_{1,56} = 0.62$, $P = 0.44$), and no significant interactions between sex and call-type. All measurements in these comparisons were taken by the author, thus ruling out between-observer bias. There were insufficient recordings of Common Crossbills with excitement call B to include in the analyses.

Annual variations in the percentages of call-types of Common Crossbills

During 1996–99, over 80% of Common Crossbills that were sound-recorded were of call-type 1A (fig. 5). During 2000–03, the number of records of call-type 4E increased, and 4E Common Crossbills were found nesting. The percentage of call-type 2B remained uncommon throughout. During the 2008 survey, call-type 1A was again the main call-type recorded (fig. 5).

Discussion

This paper refines our understanding of the relationships between crossbill size (species) and their calls, noting uncertainties and apparent changes in calls. Compared with an earlier study (Summers *et al.* 2002), the increased sample size of recordings of birds of known size confirmed that some of the flight calls (1 and 4) and excitement calls (A, B, C and E) are species-specific, while combinations of flight and excitement calls reinforce the identification of species: 1A and 4E are call-types associated with Common Crossbill (table 3). Call-types 2D and 3D remain the call-types for Parrot Crossbill; it is possible for Common Crossbills to have either flight call 2 or excitement call D/Aiii but perhaps not in combination. There is now uncertainty over call-type 2B for Common Crossbills following the discovery of an association between flight call 1 and excitement call B. Note that flight call 2 can be given by both Common and Parrot Crossbills, so the excitement call is also required from these birds to distinguish the species. Furthermore, flight call 3 is largely but not exclusively given by Scottish

Table 1. Number and percentage (in parentheses) of recordings of different crossbill calls in Scotland. Most recordings were made in winter and spring, between 1995 and 2000, during widespread sampling across Scotland (Summers *et al.* 2002), and during a systematic survey within the range of the Scottish Crossbill *Loxia scotia* in January–April 2008 (Summers & Buckland 2011).

	trapped birds (1995–2012)	non-trapped (1995–2000)	non-trapped (2008)
flight calls			
1i	14 (10.1)	123 (36.6)	6 (2.8)
1ii	0 (0.0)	4 (1.2)	1 (0.5)
1iii	9 (6.5)	15 (4.5)	35 (16.6)
1iv	2 (1.4)	0 (0.0)	55 (26.1)
2i	2 (1.4)	5 (1.5)	2 (0.9)
2ii	36 (26.1)	54 (16.1)	3 (1.4)
3i	12 (8.7)	57 (17.0)	0 (0.0)
3ii	19 (13.8)	66 (19.6)	11 (5.2)
3iii	2 (1.4)	7 (2.1)	90 (42.7)
4i	32 (23.2)	5 (1.5)	5 (2.4)
4ii	10 (7.2)	0 (0.0)	3 (1.4)
total	138	336	211
excitement calls			
Ai	10 (13.5)	110 (32.1)	123 (41.1)
Aii	0 (0.0)	15 (4.4)	5 (1.7)
Aiii	0 (0.0)	0 (0.0)	27 (9.0)
Bi	6 (8.1)	17 (5.0)	28 (9.4)
Ci	19 (25.7)	119 (34.7)	1 (0.3)
Cii	0 (0.0)	0 (0.0)	2 (0.7)
Ciii	1 (1.4)	0 (0.0)	93 (31.1)
Di	20 (27.0)	41 (12.0)	1 (0.3)
Dii	3 (4.1)	21 (6.1)	2 (0.7)
Ei	15 (20.3)	20 (5.8)	17 (5.7)
total	74	343	299

Table 2. The association between flight and excitement calls for single birds or pairs of crossbills recorded during the January–April 2008 survey.

excitement calls	flight calls					
	1iii	1iv	2ii	3ii	3iii	4ii
Ai	0	11	0	0	0	0
Aiii	0	7	0	0	0	0
Bi	3	1	0	0	0	0
Ciii	0	1	0	4	18	0
Dii	0	0	1	0	0	0
Ei	0	0	0	0	0	2

Table 3. Flight and excitement calls of Common *Loxia curvirostra*, Parrot *L. pytyopsittacus* and Scottish Crossbills *L. scotia*, and their combinations, which allow crossbill identification.

	flight calls	excitement calls	combinations
Common Crossbill	1, 4	A, B, E	1A, 1B, 2B, 4E
Scottish Crossbill		C	3C
Parrot Crossbill			2D, 3D

Table 4. The mean measurements (mm) of Common *Loxia curvirostra*, Parrot *L. pytyopsittacus* and Scottish Crossbills *L. scotia* as identified from sonograms of associated call-types and museum specimens (Knox 1976).

sonograms	n	wing length		bill depth		bill length		bill width	
		mean (SD)	range	mean (SD)	range	mean (SD)	range	mean (SD)	range
Common Crossbill (all males)	45	99.3 (2.1)	95–103.5	10.50 (0.31)	9.6–11.1	19.35 (0.85)	17.7–21.0	11.39 (0.41)	10.5–12.4
Common Crossbill (all females)	38	96.3 (1.9)	92–100	10.22 (0.31)	9.3–10.8	18.45 (0.82)	16.8–19.8	11.13 (0.44)	10.2–12.4
Common Crossbill (1A males)	13	98.3 (1.5)	95.5–100.5	10.49 (0.31)	9.9–11.0	19.32 (1.00)	18.0–20.7	11.44 (0.43)	10.8–12.0
Common Crossbill (1A females)	13	95.6 (1.7)	93–99	10.09 (0.40)	9.3–10.7	18.18 (0.86)	16.8–19.5	10.87 (0.42)	10.2–11.4
Common Crossbill (4E males)	26	100.0 (2.2)	95–103.5	10.55 (0.30)	9.6–11.1	19.44 (0.83)	17.7–21.0	11.52 (0.33)	11.0–12.4
Common Crossbill (4E females)	20	97.0 (1.8)	94–100	10.29 (0.24)	9.8–10.7	18.45 (0.81)	16.9–19.8	11.26 (0.27)	10.8–11.7
Scottish Crossbill (3C males)	18	100.5 (2.8)	96.5–106	11.21 (0.40)	10.6–12.3	19.55 (0.73)	18.0–20.7	12.24 (0.62)	11.3–13.3
Scottish Crossbill (3C females)	18	97.9 (3.5)	93–105	11.30 (0.74)	10.5–12.9	19.26 (0.67)	18.3–20.2	12.00 (0.79)	11.1–13.9
Parrot Crossbill (2/3D males)	23	105.1 (1.4)	102–108.5	13.30 (0.23)	12.9–13.8	20.72 (0.62)	19.6–21.6	13.96 (0.58)	12.5–15.3
Parrot Crossbill (2/3D females)	20	102.0 (2.2)	95–105	12.79 (0.46)	11.4–13.6	19.93 (0.77)	18.4–21.8	13.62 (0.64)	12.5–15.0

museum specimens	n	wing length		bill depth	
		mean (SD)	range	mean (SD)	range
Common Crossbill (males)	99	97.7 (2.5)	90–103	10.7 (0.5)	9.5–12.0
Common Crossbill (females)	30	95.3 (1.8)	93–99	10.5 (0.8)	9.5–11.5
Scottish Crossbill (males)	39	99.4 (2.4)	95–104	11.6 (0.6)	11.0–13.0
Scottish Crossbill (females)	21	96.6 (2.5)	90–100	11.5 (0.4)	11.0–12.0
Parrot Crossbill (males)	29	104.7 (2.6)	100–109	13.4 (0.5)	12.5–14.5
Parrot Crossbill (females)	14	101.6 (1.1)	100–103	13.0 (0.4)	12.5–13.5

Crossbills, so excitement call C is required for their identification. It was notable that there were subtle changes in the calls over time, adding further complexity to the process of understanding calls and using them for identification.

The results from the annual percentages of the different call-types of Common Crossbills (fig. 5) add to the mounting evidence that different populations irrupt into Britain and elsewhere in Europe in different years. They are characterised by differences in either bill size (Davis 1964; Herremans 1988; Edelaar & Terpstra 2004) or calls (Edelaar *et al.* 2008). There is also evidence that Common Crossbills with different call-types also differ in size. Edelaar *et al.* (2008) found that 4E birds had deeper (on average by 0.26 mm) bills than 2B birds, while the current study found that 4E Common Crossbills had longer wings (on average by 1.52 mm) and wider bills (on average by 0.23 mm) than 1A crossbills.

Common Crossbills found during irruptions into Britain also vary according to a stable isotope (deuterium) within their body feathers, reflecting the regional environmental levels of this isotope in areas where the feathers were grown. In addition, the bill width of crossbills within different irruptions varies (Marquiss *et al.* 2008). These findings led to the conclusion that different irruptions had different geographical origins. For example, birds in the 2002 irruption had wide bills and deuterium levels that indicated an origin farther northeast than other irruptions (Marquiss *et al.* 2008). The finding in the present study that 4E Common Crossbills have wider bills than 1A Common Crossbills, and that there was an influx of 4E crossbills into the UK in 2002 (fig. 5), is consistent with the results from the study by Marquiss *et al.* (2008).

Sound recordings in Sweden showed that call-types 2B and 4E occur there (Robb 2000; Summers 2007). Given the above finding about 4E Common Crossbills, it seems that these birds were not at their place of origin. Widespread recording across Fennoscandia and Russia would help in our understanding of the geographical spread of the different call-types of Common Crossbill. It is interesting to note that call-

type 1A appears to be rare in continental Europe (three records from the Netherlands; Robb 2000), so it is possible that birds with call-type 1A represent Common Crossbills that are mainly resident within Britain, where they have a strong association with two introduced North American conifers, Sitka Spruce *Picea sitchensis* and Lodgepole Pine *Pinus contorta* (Summers & Broome 2012), the former being particularly profitable as a food resource (McNab *et al.* 2019). The crossbills that are adapted to these conifers in North America have smaller bills than Common Crossbills in Europe (Groth 1993a; Irwin 2010). Given that 1A crossbills have thinner bills than 4E crossbills, perhaps we are seeing an adaptation to these non-native tree species in Britain.

It is recommended that observers try to record calls when attempting to identify crossbills. Ideally, both flight and excitement calls should be recorded to increase the prospect of identification (table 3), and in turn appreciate the vocal complexity among Common Crossbill populations.

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Two-egg clutches in the Fulmar

Tim Birkhead, Jens-Kjeld Jensen, Jamie Thompson, Sjúrdur Hammer, Paul Thompson and Robert Montgomerie

Abstract Members of the seabird family Procellariidae (albatrosses, petrels and shearwaters) typically produce a single-egg clutch. Two-egg clutches have been recorded occasionally in some of those species, but it is not known whether they were laid by a single female. In this study we examined eight two-egg clutches of the Fulmar *Fulmarus glacialis* in the Faroes, to assess whether those eggs may have been laid by the same female. Using data from eggs laid in different years by the same 100 females on Eynhallow, Orkney, we first confirmed that the egg measurements were repeatable from year to year. Second, using egg length, breadth, volume and three indices of shape, we compared the eggs from the eight two-egg clutches with (i) 100 pairs of eggs sampled at random from 111 single-egg clutches from the Faroes, and (ii) eggs laid in different years by 100 females on Eynhallow. Our analyses focused on differences between eggs in each pair. Differences in the eggs of two-egg clutches were more similar to those of pairs of eggs taken at random than to pairs of eggs from the same female in different years. We infer from this that the eggs in two-egg clutches were laid by different females.

Al Procellariiformes (albatrosses, petrels, shearwaters) typically produce a single-egg clutch (Warham 1990), but occasionally two eggs occur at the same nest site. Although it is often assumed that these are laid by two different females (Warham 1990; Ryan *et al.* 2007), it has occasionally been asserted that the two eggs were laid by the same female (reviewed in Tickell & Pinder 1966).

The incidence of two-egg clutches in populations of the Fulmar *Fulmarus glacialis* varies from zero to around 15%. Lockley (1936) reported that in the Vestmannaeyjar (Westmann Islands), Iceland, 10–15% of Fulmar nest sites contained two eggs, although for the same locality Einarsson (cited in Fisher 1952) reported a much lower incidence, of 1.6% (67/4,150 nest sites). Similarly, Jensen (1989) reported that 0.82% (25/3,047) of Fulmar nest sites on the Faroes

contained two eggs. He suggested that these were laid by the same female because: (i) the eggs were similar in shape (assessed visually); and (ii) at one nest site, two eggs had been found in four consecutive years. On the other hand, Fisher (1952), commenting on two-egg clutches in this species, wrote:

In 1947, on a holm in West Shetland, the oologist *Peregrine* [Frank Watmough – Jim Whitaker, pers. comm.] found one of the rare two-egg clutches of the Fulmar. ‘One egg was very long’ he writes, ‘and the other much more round’ and... On landing at the same place in 1948 ‘lo and behold, the Fulmar was in the self-same spot and again with two eggs, one long and the other round’ (Birdland 1948).

The most obvious ways to establish whether or not two-egg clutches in the



55. Participants in the traditional Faroes harvest of Fulmar *Fulmarus glacialis* eggs for human consumption, in May 2010.

Fulmar are laid by the same or two different females would be: (i) to witness the eggs being laid by individually recognisable females (which would be very difficult, but see Tickell & Pinder 1966); or (ii) to use molecular techniques to ascertain the maternity of both eggs by obtaining DNA from the shell membrane, from the shell itself or from the developing chicks (Grealy *et al.* 2019). It is easier to establish that two eggs or offspring have different mothers than it is to demonstrate that they have the same mother, but molecular analyses of either type require: (i) DNA from both the focal eggs and the putative mother as well as the general Fulmar population; (ii) considerable technical skill; (iii) sufficient financial resources to undertake the analyses; and (iv) a sufficient number of molecular markers (Waits *et al.* 2001; Jones & Ardren 2003).

An additional method that may allow us to distinguish between the two hypotheses is to compare the dimensions and shape of eggs in two-egg clutches on the well-verified assumption that individual females typically lay eggs more similar in shape, volume and linear dimensions than two eggs laid by different females (Romanoff & Romanoff 1949; Petersen 1992 and references therein;

Mónus & Barta 2005; Birkhead *et al.* 2017). Thus, we predicted that, if the eggs in two-egg clutches were laid by the same female, they would be less different in all or most of the six size and shape traits than pairs of eggs taken at random from the population.

Methods

The traditional Faroes harvest of Fulmar eggs for human consumption is still undertaken (Jensen 2012) and this local access can provide important insights into the breeding biology of Fulmars. Although two-egg clutches in Fulmars on the Faroes have been known to occur historically, and at low frequency, in 2019 local egg-collectors noted that among 34 clutches found in Byrgisgjógv, Sandavágur, there were five or six two-egg clutches, while on Lonin, Sandoy, collectors reported approximately 15 two-egg clutches among 1,600 eggs.

In 1988 and 1989, JKJ enlisted the assistance of close friends involved in the traditional Faroes Fulmar egg harvest to collect any two-egg Fulmar clutches they encountered. A total of eight two-egg clutches was collected, with each pair of eggs placed immediately in a sealed bag and kept separate from the other Fulmar eggs. These eggs

from the two-egg clutches were later labelled in pencil and then emptied, washed and dried and retained by JKJ. In 2019, we measured (to the nearest 0.1 mm) the maximum length and breadth of these eggs using Vernier calipers and photographed them individually under standardised conditions (see Biggins *et al.* 2018). From these photographs (fig. 1), we used the method described in Biggins *et al.* (2018) to quantify the volume and three shape parameters – elongation, pointedness (sometimes called asymmetry) and polar asymmetry – of each egg. Elongation is length/breadth; pointedness is the degree to which the maximum width of the egg deviates from the midpoint of its length; and polar asymmetry is a measure of the relative size of the two ends of the egg.

To assess whether the eggs from the two-egg Fulmar clutches were more similar to each other than was the case for pairs of eggs taken from other females, we made two comparisons. First, we compared those eggs to pairs of randomly chosen eggs from the same Faroes population. To do this we photographed and quantified (as described above) 111 Fulmar eggs collected haphazardly during 17th–21st May 2019. To simulate two-egg clutches from this sample, we randomly chose two eggs (without replacement) and repeated this 100 times with replacement. If the two eggs in real two-egg clutches were laid by the same female, we would expect them to be more similar, on average, than two eggs that were each selected from a different, randomly chosen female.

Second, we compared the eggs in real

clutches to two eggs laid by the same female in different years. To do this, we analysed the measurements of 200 eggs laid by 100 individually marked females from the long-term study of Fulmars on Eynhallow, Orkney (Michel *et al.* 2003). These data comprised linear measurements of eggs laid by the same marked females in different, though not always consecutive years, during the periods 1975–84 and 2002–05. All but two of the birds laid the two eggs within one of those periods (mean 3 years), but the eggs from two females were collected 18 and 23 years apart. When their second egg was collected, these 100 females were 1–35 years (mean 10.8 years) after their age of first breeding. We used the egg length and breadth to calculate both volume (using the formula in Michel & Thompson 2003) and elongation. We did not have standardised photographs of Eynhallow Fulmar eggs so we were not able to quantify pointedness or polar asymmetry. If the two eggs in two-egg clutches were laid by the same female, we would expect them to be as similar to each other, on average, as two eggs laid by the same female in different years.

We created 100 simulated clutches from the Faroes to match the sample of paired Eynhallow eggs so that the statistical comparisons between the real two-egg clutches and the other two samples would have similar power. We compared the median of the real two-egg clutches to the medians of the other two samples using separate nonparametric Wilcoxon tests to avoid any issues with outliers and non-normal distributions (see fig. 2).

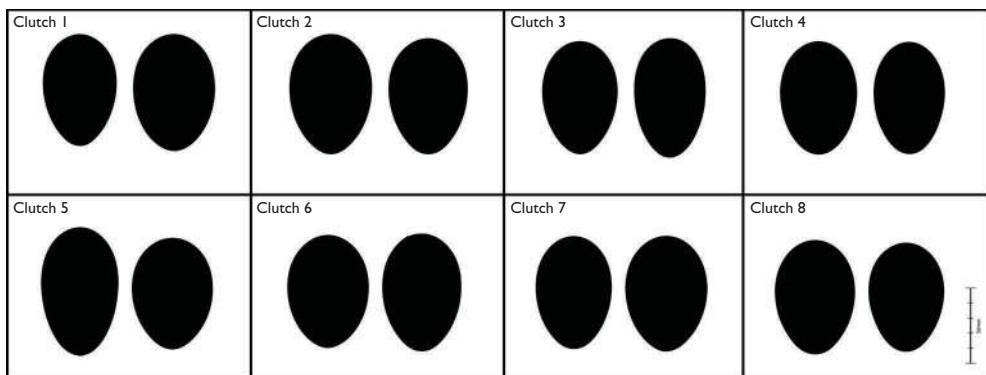


Fig. 1. Silhouettes of the eight pairs of Fulmar *Fulmarus glacialis* eggs collected from the Faroes in 1988–89. The eggs are photographed correctly for shape analysis (see text) and are to scale.

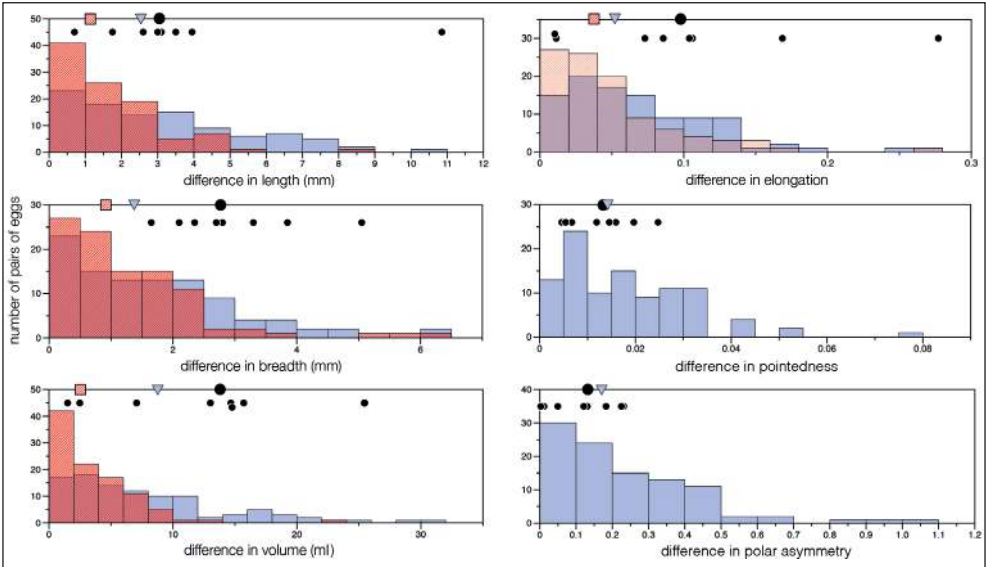


Fig. 2. Differences between pairs of eggs in eight real two-egg Fulmar clutches from the Faroes (black circles), 100 simulated clutches with each egg chosen from a random female on the Faroes (solid blue bars and triangles), and 100 pairs of eggs laid by females in different years on Eynhallow (hatched red bars and squares). Symbols on the top axis of each graph indicate medians (see table 3).

Results

Pairs of eggs laid by the same female on Eynhallow provide some insights into the extent of within-female variation in egg size and shape. The measurements of these eggs

were significantly repeatable within females, with repeatabilities ranging from moderate (0.50) to high (0.75) (table 1). None of these egg measurements varied significantly with the year of laying ($r = -0.04$ – 0.08 , $P = 0.29$ – 0.43 , $n = 200$), or the age of the laying female (relative to age of first breeding) for the second egg measured ($r = -0.08$ – 0.05 , $P = 0.36$ – 0.76 , $n = 100$). Nor did the differences between any of the measurements of the two eggs vary significantly with the number of years between the laying of the first and second egg measured ($r = -0.04$ – 0.11 , $P = 0.29$ – 0.68 , $n = 100$).

Eggs from Eynhallow were significantly smaller than those from the Faroes, although the mean differences were slight and there was no significant difference in elongation (table 2). Furthermore, correla-

Table 1. Repeatability of egg measurements from eggs laid in two different years by each female Fulmar *Fulmarus glacialis* on Eynhallow, Orkney ($n=100$). Confidence limits calculated by bootstrapping; P-value (from likelihood ratio test) tests whether repeatability is different from zero.

variable	repeatability	95% CL	P
length (mm)	0.75	0.65–0.83	<0.0001
breadth (mm)	0.50	0.34–0.64	<0.0001
volume (ml)	0.70	0.59–0.79	<0.0001
elongation	0.59	0.45–0.71	<0.0001

Table 2. Mean [95% CL] measurements of 16 Fulmar eggs in real two-egg clutches on the Faroes ($n = 8$ clutches), 111 random eggs collected in the Faroes and 200 eggs laid in different years by the same 100 females on Eynhallow, Orkney. For each variable, means with same letter superscript are not significantly different (Tukey posthoc tests from linear models).

variable	two-egg clutches	Faroes	Eynhallow
length (mm)	73.7 ^{ab} [73.1–74.0]	74.4 ^a (74.0–75.0]	73.6 ^b [73.1–74.0]
breadth (mm)	50.0 ^{ab} [48.7–51.2]	50.7 ^a [50.4–51.0]	49.7 ^b [49.5–50.0]
volume (ml)	95.1 ^a [89.6–100.6]	99.5 ^b [98.1–100.9]	97.2 ^a [96.3–98.1]
elongation	1.48 ^a [1.43–1.52]	1.46 ^a [1.45–1.48]	1.48 ^a [1.47–1.49]

tions between the differences between eggs laid by the same female and their mean size measurements were small and not significant (for max. length $r = 0.07$, $P = 0.48$; for max. breadth $r = -0.20$, $P = 0.09$; for volume, $r = -0.18$, $P = 0.08$; $n = 100$ pairs of eggs from Eynhallow). Thus, comparisons of differences between the sizes and shapes of pairs of eggs from the Faroes and Eynhallow populations should not have been influenced by the small mean differences in the overall size of their eggs.

The differences (with respect to length, breadth, volume and elongation) between the two eggs in real two-egg clutches were significantly larger than the differences between two eggs from the same female from Eynhallow (table 3, fig. 2). With one exception (maximum breadth), the median differences in size and shape between the eggs in the real two-egg clutches were not significantly larger than the differences between eggs in the simulated two-egg clutches from the Faroes (table 3, fig. 2). Note also that, with respect to each of these differences within pairs of eggs, the real clutches are more similar to the randomly chosen pairs of eggs than they are to the eggs laid by the same females on Eynhallow (tables 3 & 4). Overall, these results suggest that the eggs in the eight two-egg clutches from the Faroes were laid by different females.

Discussion

The data from individually marked female Fulmars on Eynhallow confirmed that individual females lay eggs of similar linear dimensions, volume and elongation in

Table 3. Differences in measurements between the two eggs in eight real two-egg Fulmar clutches on the Faroes, 100 pairs of eggs taken at random from the Faroes, and 100 pairs of eggs from the same female on Eynhallow in different years. Values in parentheses are P-values from Wilcoxon tests for comparisons with the two-egg clutches.

variable	two-egg clutches	Faroes	Eynhallow
length (mm)	3.05	2.30 (0.29)	1.15 (0.008)
breadth (mm)	2.75	1.63 (0.0002)	0.90 (0.0001)
volume (ml)	13.84	8.22 (0.18)	2.60 (0.002)
elongation *	0.095	0.065 (0.09)	0.039 (0.045)
pointedness	0.013	0.015 (0.37)	–
polar asymmetry	0.130	0.23 (0.04)	–

* Note that elongation, pointedness and polar asymmetry are dimensionless values (see Biggins *et al.* 2018).

Table 4. Mean [95% CL] differences in measurements between the two eggs in real two-egg clutches on the Faroes ($n = 8$ clutches), in two eggs sampled at random from the Faroes ($n = 100$ pairs of eggs), and in two eggs laid in different years by the same female on Eynhallow ($n = 100$ pairs of eggs). For each variable, means with same letter superscript are not significantly different (linear models, with length and breadth log10-transformed to normalise residuals).

variable	two-egg clutches	Faroes	Eynhallow
length (mm)	3.68 ^a [1.11–6.25]	2.99 ^{ab} [2.52–3.45]	1.58 ^b (1.30–1.87)
breadth (mm)	2.98 ^a [2.07–3.88]	1.81 ^b [1.53–2.10]	1.21 ^c [0.99–1.43]
volume (ml)	11.83 ^a [5.24–18.43]	8.25 ^{ab} [7.04–9.46]	3.58 ^b [2.91–4.26]
elongation	0.10 ^a [0.03–0.18]	0.07 ^{ab} [0.06–0.08]	0.05 ^b [0.04–0.06]
pointedness	0.013 ^a [0.007–0.019]	0.017 ^a [0.015–0.020]	–
polar asymmetry	0.119 ^a [0.043–0.195]	0.258 ^b [0.219–0.296]	–

different years. Significant repeatabilities show that eggs laid by the same female were more similar than the measurements of randomly chosen pairs of eggs from the same population.

For the two-egg clutches on the Faroes, the fact that these were more different than pairs of eggs laid by the same female in different years on Eynhallow is consistent with the idea that the two eggs in the eight Faroes clutches were laid by different females. This conclusion is further supported by the similarity of differences between eggs in the real and simulated two-egg clutches from the Faroes (table 3).

There is a further, albeit remote, possibility, which is that a Fulmar laying two eggs in the same season does so as the result of a pathological condition that also results in the two eggs being dissimilar in size and shape.

Future researchers may be able to use molecular techniques to further investigate this. While it is certainly possible that any of the two-egg clutches could have been laid by the same female, the most parsimonious conclusion, based on our analyses and knowledge of the breeding biology of this species, is that they were laid by different females.

If two-egg clutches are the product of two females, it remains to be explained why this occurs. There are several possibilities: (i) two monogamously paired females both 'assume' that they own the egg-laying site, and in some cases do so in consecutive years; (ii) egg-dumping, or intraspecific brood parasitism, in which a female deliberately deposits an egg in another's nest to avoid the energetic cost of rearing the chick (although in species laying a single egg and only ever rearing a single chick, egg-dumping seems unlikely); and (iii) some Fulmars form female-female pairs (a situation that occurs in some Laysan Albatrosses *Phoebastria immutabilis* and some gull and tern species) and produce supernormal clutches, some of which contain fertile eggs. As in Laysan Albatrosses (Young *et al.* 2008) and these gulls and terns (Hunt & Hunt 1977; Conover *et al.* 1979), the eggs in some two-egg Fulmar clutches on the Faroes contained developing embryos (Jensen 1989).

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White-rumped Swift in Yorkshire: new to Britain

Lesley Ball

Abstract On the afternoon of 14th October 2018, a swift with a white rump was found at Hornsea Mere, Yorkshire. The bird was initially feeding alone but later joined a group of House Martins *Delichon urbicum* at the western end of the mere, where it showed well and was photographed. After some initial deliberation over its identity, photographs established that this was a White-rumped Swift *Apus caffer*. Many observers were able to enjoy this first for Britain before it disappeared as the light began to fade, and it was not seen again. The record has been accepted by BBRC and BOURC and added to Category A of the British List.

It was raining heavily on Sunday 14th October 2018 and I was doing chores at home in my bungalow, which overlooks Hornsea Mere, in the East Riding of Yorkshire. At 15.00 hrs, I made myself a coffee and headed to the front-room window, which gives extensive views over the southern end of the nature reserve. This means I'm able to enjoy birding my favourite patch from the comfort of home, which is especially welcome when the weather is unpleasant. Gazing through the rain-spattered window-pane across to the reedbed and the mere, and then to the field slightly to the south, I noticed what appeared to be a swallow-sized bird with fluttery flight and jizz. It was quite distant, some 300 m or more, and flying around two Ash trees *Fraxinus excelsior*. At this point I could make out only its overall dark plumage and that it had white flashes somewhere in its plumage. Thinking that it was getting quite late for a Barn Swallow *Hirundo rustica*, I put the record out on our Merebirders WhatsApp group, at 15.15 hrs.

Since the rain had eased, I wandered into the garden and noticed the same bird fly across the field towards the mere. At this point I thought it was worth a second look so I crossed the road, entered the field and walked 100 m towards the mere. When I was about 30 m from the mere, I suddenly saw it again, this time flying just above the reedbed that fringes the edge of the mere. Though the bird was in view for only a few seconds

before disappearing behind a Willow *Salix caprea*, it was coming directly towards me. In this brief view it turned sharply, rose up and almost seemed to come to a halt in mid-air, just 6 m from where I was standing. At this point, I gasped – it had a white rump, instantly making me think of a Red-rumped Swallow *Cecropis daurica*. But its flight and jizz differed, and the overall blackish plumage with a white rump, and the shallow fork in the tail were clearly wrong for Red-rumped Swallow. This was something quite different. The bird clearly was a swift but not a Common Swift *Apus apus*. I judged it to be definitely smaller and more delicate than a Common Swift, and its narrow, scythe-shaped wings and slim body gave it an elegant flight and, to me, an almost cute appearance.

Over the next few minutes I watched it as it flew around the tops of the taller Ash trees where, at times, it towered up then descended in the manner of a Swallow. It also flew low over the reedbed and mere. It was difficult to make out plumage details, other than the striking white rump, but during its closer passes I was able to see that the throat and face were slightly paler and greyer than the darker body, and that the dark eye and short black bill contrasted with this paler area.

The bird then flew out of view across the mere, so I contacted Jon Lamplough (JL) who was birding on the reserve. We discussed possibilities of it being either a House Martin

Delichon urbicum or a Barn Swallow, both species he had already seen on the reserve that morning. I countered each of his arguments with features that were at odds with both of his suggestions and stood firm that this was a swift. All this had happened very quickly. I posted another message on the Merebirders group at 15.24 hrs, alerting members that the bird was a swift with a white rump.

I returned home and began searching through my copies of the *Collins Bird Guide* (Svensson *et al.* 2009) and *A Field Guide to the Rare Birds of Britain and Europe* (Lewington *et al.* 1991). I had just found the pages illustrating White-rumped Swift *A. caffer* when George Bennett (GB) arrived. As

we discussed the various options, JL also arrived and headed into the field where I had last seen the bird. Suddenly a great roar came from GB – the bird had returned. After confirming the features that I had already seen on the bird, they tentatively identified it as a Pacific Swift *A. pacificus* (itself an extreme rarity with just eight accepted UK records at the time) and put the news out as this species.

Birders soon began to descend on the mere and, as the crowd grew, birders with experience of Pacific Swift began to question the identification. Pacific Swift is a large swift, slightly larger than Common Swift, whereas it was generally agreed that the Hornsea bird was smaller and showed a more

Richard Williston



John Hewitt



Tim Jones



Tim Jones



56–59. White-rumped Swift *Apus caffer*, Hornsea Mere, Yorkshire, October 2018.

delicate structure than a Common Swift. Furthermore, some observers noted what appeared to be a narrow white trailing edge to the secondaries – a feature at odds with Pacific Swift but diagnostic for White-rumped Swift. But not everyone could make out this feature, and I hadn't seen it either, despite my earlier good, close views. Photographic documentation was required to establish exactly what was being seen.

The bird then moved to fields closer to the western end of the reserve, where it fed over the mere with a small group of House Martins. GB, in his role as the Wassand estate warden, kindly allowed access to these fields, and photographs taken there clearly showed a white trailing edge to the secondaries – the bird was indeed a White-rumped Swift! The revised identification was broadcast, leaving travelling birders with just 90 minutes of daylight in which to reach the mere. The bird remained in view until 18.10 hrs but as the weather began to deteriorate it drifted away in rapidly failing light. It was not seen again that day nor the following day. I understand that around 150 birders saw the swift before it departed. Many more turned up afterwards and some remained on site throughout the following day.

Description

Structure and size

The bird was similar in size to a Barn Swallow, and smaller than a Common Swift. Its structure was that of a swift, with long, narrow, scythe-shaped wings and a slim body, and it appeared smaller and more delicate than a Common Swift, giving it an elegant appearance in flight. The tail was narrow but distinctly forked.

Plumage

The crown and sides of the head were black and contrasted with the paler, greyish throat, forehead feathering just above the bill and loreal feathering around the bill base. The entire underparts, including the tail and underside of the wings, were dark, appearing blackish. The upperparts were also dark and appeared blackish in the field apart from a conspicuous white band across the rump and a narrow white trailing edge to the secondaries on both wings, formed

by a pale tip to each secondary feather.

Bare parts

The bill was short, typical of a swift, and dark; the eye was also dark. The legs were not seen.

Behaviour

During my initial observations of the swift feeding around the tops of the taller Ash trees, there were times when it towered then descended in the manner of a Swallow, and it appeared to be taking insects flying above the decaying leaves. It later flew towards the mere and began hawking low above the reedbed. Here its flight was slightly undulating; somehow, I thought it seemed languid and steady. As the weather conditions improved, it joined a group of House Martins feeding at the western end of the lake and remained with them until dusk, when it gained height, flew into the distance and was then lost to view.

Previous records in northern Europe

Despite many birders being taken aback by the arrival of this unexpected swift in Yorkshire, sightings of White-rumped Swift in northern Europe are not unprecedented. Earlier appearances include:

- Järvikylä, Pohjois-Pohjanmaa, Finland, on 18th November 1968; apparently found exhausted and later died (Lewington *et al.* 1991)
- Two birds at Eftang, Vestfold county, Norway, on 15th June 1986 (*Vår Fuglefauna* 13: 136)
- Stenshuvud, Skåne, Sweden, on 27th October 2013 (*Fågelåret* 2013: 117–118)

In addition, a small swift with a white rump and forked tail was photographed at North Bull, Co. Dublin, on 25th December 2002, and was considered mostly likely this species (Persson 2003). A final decision on the identification of this bird was postponed but the record is now back in circulation (H. Hussey pers. comm.).

A previously accepted record from Jomfruland, Telemark, Norway, on 18th May 1984 is no longer considered to be acceptable (Geir Mobakken *in litt.*) and following review, a claim from Wein, Austria, on 17th June 2004 remains unproven (Albegger & Laber 2016).

Discussion

The White-rumped Swift is a common and widespread species in sub-Saharan eastern and southern Africa. Farther west it is less numerous and its distribution becomes patchy and more localised. The most westerly regular breeding location is the Parc National du Niokolo-Koba, Senegal. Within Africa birds are believed to be resident or nomadic, although movements are poorly understood. A few pairs breed north of the Sahara in the High Atlas, Morocco, but the size of this population is unknown.

In Europe, it was first recorded in August 1962 near the Laguna de la Handa in southern Spain; at the time, the bird was considered to be a Little Swift *A. affinis*, which breeds commonly in nearby Morocco (Gooders 1971). This was followed in 1964 by up to three birds in the Sierra de la Plata, near the town of Tarifa in Cadiz province. Breeding was first recorded in 1966, when four nests were discovered, all in the disused nests of Red-rumped Swallows. It was not until 1968 that it was finally confirmed that these birds were White-rumped Swifts and not Little Swifts (Gooders 1971). Since this time, its range in Spain has spread east into Almeria and north to Cordoba provinces. The current European breeding population is believed to be in the range of 110–200 pairs (BirdLife International 2017) in southern Spain and Portugal.

Tracking studies have shown that White-rumped Swifts remain in southern Europe until October, generally later than other breeding swifts, and then can take up to six weeks to reach their wintering areas in West Africa (Lomas Vega *et al.* 2019). Birds may occasionally linger in Spain into the winter but this is unusual.

Autumn 2019 proved to be outstanding for southern swifts reaching northwest Europe and the UK. Coinciding with the White-rumped Swift at Hornsea Mere, a Pallid Swift *A. pallidus* was found at Church Norton, Sussex, on 13th October (Holt *et al.* 2019), while in the Netherlands single Pallid Swifts appeared at three locations on 13th, 14th and 15th October (Gelling *et al.* 2019). In November a more concerted arrival of

Pallid Swifts occurred, with at least 14 more arriving in the UK between 10th and 15th November (more submitted records are currently being assessed) and 11 in the Netherlands (Gelling *et al.* 2019). In addition, a Little Swift was found in Cleveland on 11th–12th November (Holt *et al.* 2019). It is thought that swifts may be susceptible to displacement by plumes of warm, fast-moving air extending out of North Africa and into northern Europe at this time of year. The timing of northern European records suggests that late autumn may be the best time to encounter one of these delicate swifts in northern Europe.

Acknowledgments

I would like to give special thanks to George Bennett for arranging access to the Wassand estate, and also to Rupert Russell (estate owner) and Mike Jebson (estate manager) for allowing access to this private land adjacent to Hornsea Mere. My thanks also go to Jon Lamplough for help with the identification of this swift, Jeff Cox for facilitating the speedy release of the news via the Merebirders WhatsApp group, and Mark Robinson for his encouragement and guidance during the writing of this article. Geir Mobakken supplied the details of White-rumped Swift records from Norway, Sweden and Finland, and Harry Hussey provided an update of the bird at North Bull, Dublin, in December 2002.

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Editorial comment Paul French, BBRC Chairman, commented: ‘Accepted quickly and unanimously in a single circulation, this was undoubtedly one of the birds of the year for those lucky enough to get to Hornsea Mere in time. And one of the big dips for the unfortunate folk who arrived as the light faded, minutes after it was last seen heading inland. Although the identification was confirmed from photographs, this happened in real time and enabled those within 90 minutes or so of Hornsea to get there and enjoy excellent views of this enigmatic species.

‘As alluded to above, White-rumped Swift has been on the radar of swift watchers for many years, with the recent Swedish record being the wake-up call many were looking for. The identification of our three “white-rumped” swifts (Pacific, Little and White-rumped) is dealt with in the existing literature, and in her account Lesley Ball has also highlighted the rather distinctive, delicate and swallow-like jizz of White-rumped as a feature, as opposed to the more “super-swift” jizz of Pacific Swift. This is likely to be easier to see on distant birds, when confirming the presence or absence of a white trailing edge to the secondaries may be impossible, and may provide future observers of a “white-rumped” swift with enough clues to put news out. An acceptable record would undoubtedly still require the full suite of plumage features to be confirmed, however.

‘One unexpected confusion species comes in the form of Horus Swift *A. horus*, an African species believed to be largely sedentary. However, a recent mystery swift with a white rump seen in the Netherlands in September 2019 is currently being assessed by the CDNA, and Horus seems a realistic possibility https://www.dutchbirding.nl/dbactueel/1558/de_schierzwaluw_stand_van_zaken. A similar outcome has also been suggested by some for the 2002 Dublin bird. Recent observations in Senegal have established that Horus Swift occurs in the north of the country, close to the border with Mauritania – a pretty incredible leap of c. 1,600 km from its previous known range <https://senegalwildlife.wordpress.com/2018/04/10/those-mystery-swifts-horus-new-to-senegal>. Perhaps Horus Swift may be prone to larger movements than previously thought, which adds another species to the swift watcher’s radar.’

James Gilroy, BOURC Chairman, commented: ‘As detailed above, there are multiple recent records of this species in northwest Europe, indicating that, despite its relatively small population size in southern Europe, it is a very plausible natural vagrant to Britain. BOURC was satisfied with the identification, and had no doubts that the bird was of wild origin, given that the species is not currently known in captivity. The timing, location, appearance and behaviour of the Hornsea Mere individual were all consistent with natural vagrancy – the late autumn occurrence falling in line with two of the previous three records in Scandinavia.’



John Hewitt

60. White-rumped Swift *Apus caffer*, Hornsea Mere, Yorkshire, October 2018.

Correction

In last month’s paper on the ‘Population estimates of birds in Great Britain and the UK’ (Woodward *et al.*, *Brit. Birds* 113: 69–104), the population estimate presented for Common Pheasant *Phasianus colchicus* in table 1 on p. 88 was incorrect. The correct figures for the GB and UK breeding estimates are 2.3 million females and 2.35 million females, respectively. Consequently, the estimate of the total number of breeding birds in the UK is about 85 million pairs, and there were 21 species with estimates exceeding one million pairs, contributing around 79% of the total. The authors would like to apologise for this error. Note that this estimate for Pheasant represents individuals alive at the start of the breeding season and hence is considerably smaller than other estimates, which include numbers released into the wild in late summer and early autumn.

Obituaries

Christopher John Naylor (1961–2019)

Chris Naylor was a man of science and Christian faith, the founder and leader (with his wife, Susanna) of A Rocha's work in Lebanon for 12 years. He felt a call, 'to write the gospel in the landscape' and succeeded, despite the challenges in a land that had recently emerged from civil war. Under his leadership, Aammiq Wetland, the fast-shrinking, but biggest and most biodiverse freshwater site in Lebanon, was restored and enlarged and he organised nationwide field-work, which resulted in the declaration of 11 new Important Bird Areas and an impressive ornithological database. In 2001 his team revived the national ringing scheme, which had lapsed in the early 1970s.

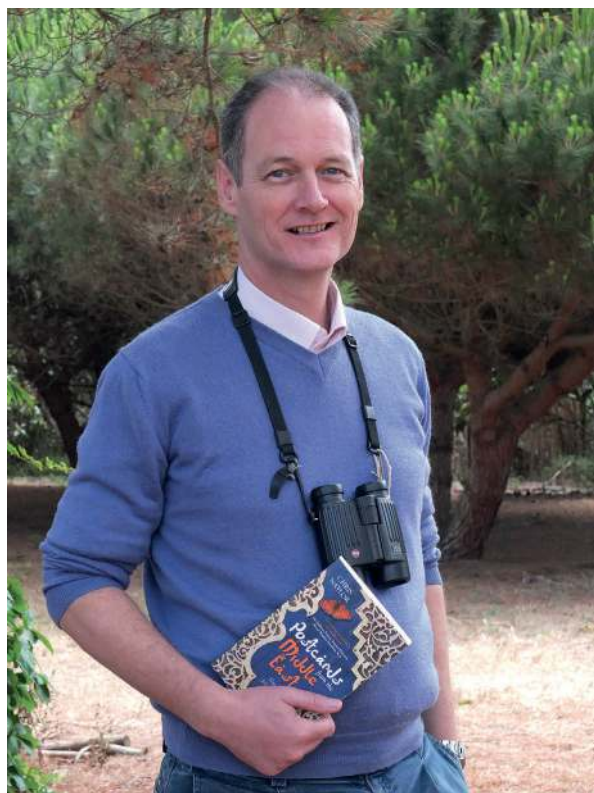
After returning to England, in 2010 Chris became Executive Director of A Rocha International. He and Susanna, and A

Rocha's co-founder, Miranda Harris, died in a car accident on 28th October 2019 whilst visiting A Rocha South Africa.

Chris was uniquely equipped to lead by his training, experience and character. With a Masters in Natural Sciences from Cambridge University, and ten years as a science teacher in the UK, Kuwait and Lebanon, he was a superb communicator and determined that A Rocha's projects would be undergirded by high-quality research. Prior to studying Arabic in Jordan, Chris and Susanna took a course in cross-cultural mission at Redcliffe Bible College, preparing them well for the multi-ethnic Middle East and A Rocha's global work.

Chris's visits to A Rocha national organisations were eagerly anticipated, because, as he once said to me, 'I know how it feels when the team is small, the funding is low and yet the opportunities are abundant.' He prioritised practical conservation, resisting any drift towards general environmentalism. He also encouraged research, which had been so fruitful in Lebanon, where his team (among many studies and surveys) had proven first breeding for Mallard *Anas platyrhynchos*, Garganey *Spatula querquedula*, Marsh Harrier *Circus aeruginosus*, Eagle Owl *Bubo bubo*, Bar-tailed Desert Lark *Ammomanes cinctura*, Desert Lark *A. deserti* and Streaked Scrub Warbler *Scotocerca inquieta*. He also had a passion for environmental education, having seen its impact on thousands of students at Aammiq.

I leave the last words to Richard Storey, a hydrology graduate who volunteered with A Rocha Lebanon for two years: 'You managed to be at once my boss, big brother and friend. I remember your calmness in situations that were far from calm, your patience with people who let you down, and your perse-



Melissa Ong

61. Chris Naylor, with his book, *Postcards from the Middle East*, in 2015. www.arocha.org/en/resources/postcards-from-the-middle-east

verance on a road that was more difficult and dangerous than ordinary people would manage. The way you guided a family and a team of foreigners through all this are still a marvel to me. And your integrity, love and trust in God have remained with me... you've continued to be one of my heroes as you used

those same qualities to lead a global movement.'

A longer obituary for Chris Naylor appears in *Sandgrouse* and there is more at www.arochoa.org/en/people/chris-naylor

Barbara Mearns

Rodney Paul Martins (1957–2019)

Rod Martins, who died in May 2019, was an exceptional field observer, a world birder and a conservationist, who first came to prominence as a young birder from the 'oil boom generation' of Shetland birders from the 1970s. Born and bred in Norfolk (and proud to tell anyone who would listen to that fact), Rod made his home city of Norwich the base for the majority of his life, interspersed with lengthy foreign trips to all corners of the globe – he was one of the first 'world birders'. Rod was one of the most widely travelled birders of his generation and an ornithological pioneer in many respects, making visits to places that many birders nowadays take for granted. For example, his trip to Thailand in 1978 blazed a birding trail across the country that many hundreds of birders have subsequently benefited from.

Following a degree in geography from Leicester University, Rod's strong inclination for travel and his desire to go birding precluded much opportunity for formal employment, although he worked as a bird tour guide during the early part of his career. At that time, Rod was a leading British birder, one of the first to see 400 species in Britain, which included finding a first for Britain (Rüppell's Warbler *Sylvia ruppeli*, on Shetland in 1977; *Brit. Birds* 74: 279–283), but it was his depth of knowledge (gained through voracious reading and study) and his development of a wide social network of birding contacts that marked him out.

Rod was instrumental in helping to establish the 'regional' bird clubs – the African Bird Club (ABC), Neotropical Bird Club (NBC), Ornithological Society for the Middle East (OSME) and the Oriental Bird Club (OBC). During this period, he also played a significant role in helping to unravel the ornithology of the Middle East, specifically Yemen, a country of which he was profoundly fond. Rod was a key member of the inaugural 1985 OSME Ornithological Expedition to north Yemen, spending eight weeks in the field studying Yemen's bird communities, threatened species and endemics. In spring 1993, he was again a full-time member of the second OSME Expedition to Yemen, this time including a visit to Socotra, which he would have savoured as a connoisseur of islands and their endemics. He visited Socotra again in



62. Rod Martins (and a Southern Cassowary *Casuaris casuaris*), Mission Beach, Queensland, Australia, October 2007.

Duncan Brooks

2001. Rod also served for many years on OSME Council, and specialised as Turkey Bird Report (TBR) editor for nearly 20 years. He was responsible for editing or co-editing four TBRs and also co-authored the Turkey Checklist that was published as *Sandgrouse* Supplement 1 in 1999.

Rod harboured a strong interest in the natural world, held forthright opinions on conservation issues of the day and, in his later years, followed up his degree with a self-funded MSc in Conservation Biology from the University of East Anglia. Away from the birding community, Rod made the most of his undoubted business acumen to build a not-insignificant property portfolio, which provided sufficient income to fund a modest lifestyle, the ability to travel at will and also

to contribute financially to the conservation projects he freely participated in.

It was apparent on first meeting that Rod was a knowledgeable, erudite individual with a wealth of birding and conservation knowledge, and he was widely respected among his peers. A critical observer and logical thinker, he melded strong opinions with wit and charm; he was also an extraordinary wordsmith with a questioning mind. As a good friend, mentor, and birding character, widely known and highly regarded throughout the birding community, Rod Martins is sorely missed.

A longer obituary for Rod Martins appears in *Sandgrouse*.

Tony Stones

Letters

Common Sandpiper: shifting baselines

Ron Summers and his co-authors are correct in referring to the Common Sandpiper *Actitis hypoleucos* as ‘a widespread breeding species in the uplands of northern and western Britain’ (Summers *et al.* 2019). Such is their status today, but we must not forget that they were once more widespread.

In 1888, H. G. Bull described the species as ‘common on all the principal streams’ of Herefordshire. In 1899, H. E. Forrest, writing of Shropshire, reported that Common Sandpipers might be found on ‘most of our rivers and brooks, especially near the Welsh border’. And in 1910, T. A. Coward and C. Oldham, writing of Cheshire, stated that the Common Sandpiper ‘abounds in summer on all the streams and reservoirs in the hill country of east Cheshire and on all the meres and many of the rivers of the plain it is common’.

Clearly, this was indeed at one time a ‘common’ sandpiper in these three Midland, and largely lowland, counties. In all of them it is now close to extinction as a breeding species, but we must not lose sight of its former distribution and status. Shropshire

provides a telling example: in 1906, C. S. Meares found five or six pairs and at least four nests on the Cound Brook, south of Shrewsbury, at perhaps 85 m above sea level, where in 1911 his brother, D. H. Meares, saw ‘numerous pairs’, finding three nests and several recently hatched young (Tucker & Tucker 2012). The extent of the reach that they searched is unclear, but it would have been at the very most 12 km long and probably a lot less.

Bird Atlas 2007–11 (Balmer *et al.* 2013) showed a 20% contraction in the breeding range across Britain & Ireland since the 1968–72 *Breeding Atlas* (Sharrock 1976) while *The Birds of Shropshire* (Smith 2019) showed an 83% contraction in the breeding range between 1985–90 and 2008–13 in that county. Today, there would be no hope of finding Common Sandpipers nesting on the Cound Brook, but for this and all declining species we need to keep earlier baselines in mind. Only when we understand what we have lost, can we start to address the question as to why, and then begin to find ways of clawing a little of it back.

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Aerial hunting by a Short-eared Owl

Mick Taylor's note (*Brit. Birds* 113: 55) describing an unusual hunting method by a Short-eared Owl *Asio flammeus* prompts me to record the following. Shortly after midnight on the morning of 19th April 1976, a lighthouse attraction took place in misty conditions at South Bishop Lighthouse, Pembrokeshire. Numbers of *Phylloscopus* warblers were among birds drawn to the light and at around 01.00 hrs a migrant Short-eared Owl appeared suddenly, swooping past the light to snatch a warbler

in flight. During the next hour or so this bird returned several times and showed a good deal of aerial agility, twisting and turning to intercept warblers being carried on the stiff breeze. This observation was recorded by me in *A Lighthouse Notebook* (Michael Joseph, 1985, p. 152), but at the time I had no idea whether this reflected normal behaviour. In the intervening years, however, I have never recorded anything similar. Mick Taylor's description reminded me forcefully of that night.

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Birding in an emergency

Is there a climate and ecological emergency? Reading the December 2019 issue of *BB*, I learnt from Mike Clarke that an estimated 23% of bird species studied so far worldwide are negatively affected by climate change, while Javier Caletrío passed on a warning that without urgent and drastic emission cuts, a third of animal species could be lost by 2070. That sounds like an emergency to me. My Oxford dictionary defines an emergency as 'a serious, unexpected, and often dangerous situation requiring drastic action'.

So, what 'drastic action' are we, the birdwatching community, currently taking? Javier Caletrío is concerned that the Birdfair is 'normalising high-carbon holidays', but should we even perhaps be questioning our attendance at such events? And should we perhaps stop driving out to our WeBS counts or BBS squares to document the climate-related changes in our bird populations to which our

exhaust pipes have just contributed?

But perhaps I have got it wrong. Our political leaders aren't advocating drastic action, aren't planning for the systemic change to which Mike Clarke refers, and they should know best. Perhaps there are degrees of emergency, and this isn't a real one threatening worldwide environmental breakdown. Or perhaps, despite what Pacific islanders and Australians may say, it is not yet current.

But if we *do* think it is real and current, what should we, the birdwatching community, be doing about it? All three of our national organisations, the BTO, RSPB and WWT, have business models which to varying degrees are predicated on the mobility and consumerism of us, their membership, as well as that of the wider bird-loving public. How should they respond? And what about our county societies and bird clubs? And us as individual birdwatchers?

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Reverse mounting by three European *Dendrocopos* woodpeckers

Reverse mounting, whereby the female mounts the male in mock copulation, has been reported for many bird species. In some of these, such as the Shag *Phalacrocorax aris-totelis* (Ortega-Ruano & Graves 1991) and various grebes (Nuechterlein & Storer 1989), this behaviour seems to be relatively common.

Reverse mounting has not been widely documented for woodpeckers (Picidae) except for some members of New World *Melanerpes* species, such as the Red-bellied Woodpecker *M. carolinus* (Hauser 1959; Kilham 1961; Stickel 1965), Red-headed Woodpecker *M. erythrocephalus* (Brackbill 1969; Jackson 1976; Kilham 1977), Lewis's Woodpecker *M. lewis* (Bock 1970) and an island endemic, the Guadeloupe Woodpecker *M. herminieri* (Villard 1999). Whether these examples reflect a genuinely high tendency for the *Melanerpes* to indulge in such behaviour, compared with other woodpeckers, or simply the level of study of these species, particularly in North America, is uncertain.

The literature on this subject for European woodpeckers is limited. For example, there are no references to reverse mounting by woodpeckers in the otherwise comprehensive *Handbuch der Vögel Mitteleuropas* (Glutz von Blotzheim & Bauer 1980). In fact, the only documented European case that I can find concerns the Middle Spotted Woodpecker *Dendrocoptes medius*, a female of which mounted a male after copulation proper had taken place (Günther 1993). Here, I report six observations of reverse mounting by three other European species, all members of the genus *Dendrocopos*.

Great Spotted Woodpecker

On 10th April 1999, in a mixed broadleaf-coniferous woodland in the Slovenský Kras National Park, Košice Region, Slovakia, I observed a pair of Great Spotted Woodpeckers *Dendrocopos major* interacting on a horizontal branch of a Scots Pine *Pinus sylvestris*. The female fluttered her wings in

an apparent precopulatory display, and then mounted the male for a few seconds. The birds then swapped positions, the male mounting and copulating properly with the female. After mating, the male tapped the branch briefly before flying to an adjacent branch, while the female flew to another tree. On 5th May 2010, in a mixed broadleaf forest in the Pilis Hills, Pest County, Hungary, I observed a female Great Spotted Woodpecker calling from a horizontal branch in an oak *Quercus*. A male flew in, sat next to the female and chattered excitedly back to her. Almost at once, the female hopped onto the male's back and briefly indulged in mock copulation. After dismounting, the female fluttered her wings, encouraging the male to mount her. Following a brief copulation, the male showed aggression towards the female, pointing his bill and drumming loudly, before flying to another branch in the same tree.

On 16th April 2018, in a mixed broadleaf woodland in the Buda Hills, Budapest, Hungary, I observed a pair of Great Spotted Woodpeckers perform reverse mounting on a horizontal branch in a Beech *Fagus sylvatica*. After the female dismounted, the two birds sat apart for some seconds, the male calling excitedly and the female spreading herself flat across the branch. The male then mounted the female and copulation occurred in the proper manner. After mating, the male hopped away and began to preen while the female remained motionless for around one minute.

Syrian Woodpecker

On 3rd May 2009, I observed a pair of Syrian Woodpeckers *D. syriacus* in a walnut tree *Juglans* near Apetlon, Burgenland, Austria. After a bout of mutual chattering, the female mounted the male for a few seconds. She then dismounted and lowered herself across the branch, whereupon the male immediately mounted her. After copulation proper, the male hopped away before moving closer

again and then fluttering onto the female's back and copulating once more. After this second copulation, the female began to preen, while the male flew away.

On 6th April 2019, I observed a pair of Syrian Woodpeckers in a cherry tree *Prunus* in a garden in Dabas, Pest County, Hungary. The two birds indulged in an aggressive 'courtship' display, the male calling loudly and the female fluttering her wings. The female then hopped onto the back of the male in mock copulation for a few seconds. After she dismounted, the two immediately changed positions, the male mounting the female, and the pair copulated in the normal way. Once they had separated, the female mounted the male again, in a sequel to copulation, but the male quickly rebuffed her, hopped from under her and moved to the side.

White-backed Woodpecker

On 30th March 2013, I observed a pair of White-backed Woodpeckers *D. leucotos* in a Beech-dominated forest in the Bükk Hills, Borsod-Abaúj-Zemplén County, Hungary. After a prolonged period of drumming by a male on a snag in a dead Hornbeam *Carpinus betulus*, a female flew in. Both birds then hopped onto a horizontal branch. The male tapped the branch several times (but did not drum) and almost at once the female mounted him. After a few seconds the female dismounted, and the male then mounted her and copulation occurred in the proper manner. The male then flew away, while the female remained and began to preen.

Conclusion

The lack of observations of reverse mounting in European woodpeckers suggests that it occurs only occasionally within this group. The examples given here show that it may be regarded as a normal component of courtship behaviour, although its precise function remains unclear. Both woodpecker sexes may initiate copulation, and reverse mounting is one way in which females may do this. By mounting the back of the male

and simulating copulation, in a form of 'soliciting' behaviour, a female can initiate copulation proper (Winkler *et al.* 1995). Indeed, female Common Starlings *Sturnus vulgaris* are known to initiate mating within pairs, while extra-pair mating behaviour was initiated exclusively by males (Pinxten & Eens 1997). Cases of post-copulatory reverse mounting, whereby the female mounts her mate after the two have copulated, suggest that it may also play a role in strengthening pair bonds and encouraging further courtship display and copulation.

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Red-backed Shrike feeding at night

On 6th October 2018, in Yanbu, Saudi Arabia, Simon Parker and I noticed a Red-backed Shrike *Lanius collurio* feeding by a roundabout at about 20.00 hrs – well after dark, although the area was well lit with street lamps. On 8th October, what was presumably the same individual was in the same place and we watched it for a while. Its chosen patch was the central reservation, which widened as the road reached a roundabout. This was triangular in shape, about 10 m long and 3 m at the widest end, with grass and 3–4 small, well-manicured bushes. The bird, a first-winter, could clearly be seen

to be looking down and moving its head as if scanning for food; we did not see it catch anything. It was still present in the dark the following morning at 05.20 hrs, and again that evening at 19.10 and 22.40 hrs, and then again in the twilight at 06.10 the following morning.

Day-time temperatures were reaching up to around 36°C, when most migrating passerines seem to prefer to seek shelter. We assume that the shrike found it more profitable to feed during at least part of the night than during the heat of the day.

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Blue Tit feeding a Great Tit brood

On 15th June 2017, in Tammisaari, Finland, in the transition zone between a forest and a clear-fell area (c. 60°00'N 23°30'E), I found a Great Tit *Parus major* brood in a rusty iron pipe among birch *Betula*, poplar *Populus* and spruce *Picea* saplings. The pipe was pointing upwards, leaning slightly towards the north-east, approximately 1.1 m high and 0.1 m in diameter. The nest was located approximately 0.7 m deep in the pipe and contained seven chicks, judged from their plumage to be around 11–12 days old, which were begging loudly.

On 17th June, at least six chicks were left. During observations from 12.45–13.30 and 14.40–14.50 hrs, the brood was fed by a female Great Tit, but also a Blue Tit *Cyanistes caeruleus*. The Great Tit visited at least twice, the Blue Tit visited around eight times. Both adults gleaned invertebrates from the forest edge, and the Blue Tit from the ground in the vicinity of the nest also. The Great Tit's visits were more 'efficient' – it landed on the pipe, went inside immediately and reappeared with a faecal sac. The Blue Tit appeared much more hesitant before entering the pipe and did not remove any faecal sacs. No interactions between the feeding Great Tit and Blue Tit were observed. See www.youtube.com/watch?v=izuGycnx6_c&t=2s and www.youtube.com/watch?v=loj2YH8ccM8

Kees H. T. Schreven, University of Turku, Finland; e-mail kees_schreven@hotmail.com



Kees Schreven

63. The Great Tit *Parus major* brood in their rusty pipe nest, Tammisaari, Finland, June 2017.

On 19th June, only two chicks were alive; the rest had probably died after heavy rain the previous night. During 50 minutes' observation, I did not see the Blue Tit but the chicks were still fed by a Great Tit. On 25th June, one of the two remaining chicks was dead, the other had disappeared and probably fledged.

It is unclear why the Blue Tit was feeding the Great Tit brood; the chicks appeared like typical Great Tit young and not hybrids. The Blue Tit may have been attracted by the loud begging sounds, and the pipe seemed to amplify the volume of the sound.

Reviews

The Common Buzzard

By Sean Walls and Robert Kenward

Poyser (Bloomsbury), 2020

304pp; figures, line-drawings and photographs

Pbk, ISBN 978-1-4729-7208-8, £34.99

Hbk, ISBN 978-1-4081-2525-0, £59.99

The Common Buzzard *Buteo buteo* is a success story. It is an adaptable bird with a varied, flexible diet and, as persecution has become less of a problem, it has been able to take full advantage of our modern landscapes. It is Britain's most abundant raptor and although it may lose its crown in future to the Red Kite *Milvus milvus*, for now it is streets ahead. Here in pastoral mid Devon, I see perhaps five times as many Buzzards as all the other raptors put together.

Sean Walls and Robert Kenward were involved in pioneering work studying Buzzard home ranges, dispersal and survival in Dorset in the 1990s, based on radio-tracking a large number of birds over many years. Despite considerable improvements in tracking technology, their work remains highly relevant today and forms the heart of this book. The research of others is also brought together, including a number of long-running studies from across Britain, making this a comprehensive and well-rounded book.

Both of the authors have flown Buzzards as falconers and whatever your views about holding raptors in captivity, this hands-on experience helps to shed light on aspects of behaviour that are difficult to get to grips with in the wild. It helps to inform an excellent chapter on hunting, which provides real insight into how this bird operates when searching for food. There are plenty of surprises, which may give you food for thought next time you see a bird perched, apparently dozing, on a roadside post, or strutting across a damp field early in the morning.

The final chapter is about human relationships with the Buzzard, including its unexpected role in the long-running conflict

between driven grouse shooting and raptors at Langholm, in southern Scotland. As many as 60 birds were found to be hunting over the moor, adding to the loss of grouse taken by other raptors. Buzzards have also come into conflict with lowland Common Pheasant *Phasianus colchicus* shoots and this issue is explored in detail too. The Buzzard's success has not come without problems in our densely populated and heavily exploited country. Many readers will disagree with the authors' views on these issues but they are well articulated and certainly worth reading. Ultimately, they are a plea for compromise based on sound science, in a debate where entrenched, highly polarised views have tended to dominate.

The book is eminently readable, despite the level of detail provided, and makes good use of figures, line-drawings and photographs. The key 'take-home' points are presented at the end of each chapter, providing a useful overview to return to or a means of deciding which chapters merit closer scrutiny.

This is book number 100 in the long-running Poyser series and the first to be offered in a new softback format, with an attractive card cover (by Alan Harris) and a snugger fit in the hand. Purists will be relieved to learn that it is also available in hardback with the familiar white dust jacket, though they will have to part with an extra £25 in order to stick with tradition. This is, then, a landmark volume for the Poyser series, and the authors have made sure that this is one of the best of the recent additions to the series.

Ian Carter



The Seafarers: a journey among birds

By Stephen Rutt

Elliott & Thompson, 2019

Hbk, 280pp

ISBN 978-1-78396-427-7; £14.99

Stephen Rutt's debut is a captivating story of Britain's seabirds. He starts by escaping the city life of London, aiming to reconnect with nature and discover the well-being that comes with it. North Ronaldsay, in Orkney, might lack spectacular cliffs crammed with seabirds, but it does have plenty of crevices for Black Guillemots ('Tysties') *Cephus grylle* and walls for Fulmars *Fulmarus glacialis*, which was enough to ignite the author's passion for these ocean wanderers. From his sojourn on North Ronaldsay, Stephen began a journey to some of Britain's seabird hotspots, from storm-petrels and skuas in Shetland to Manx Shearwaters *Puffinus puffinus* on Skomer. And it is not just the remote fringes of the UK where you can be wowed by seabirds: a top spot for watching storm-driven Leach's Storm-petrels *Oceanodroma leucorhoa* is the New Brighton seafront in Merseyside, while there is something special about leaning over the Tyne Bridge to look down on a

fluffy Kittiwake *Rissa tridactyla* chick in the middle of Newcastle. The account of his journey is leavened with snippets of information on the lives of seabirds, the history of their colonies and the research that has been carried out.

Stephen has a fantastic ability to capture the atmosphere of the islands he visited, so much so that you feel you could be there, or wish you were. I was hooked from the start by an incredible account of visiting the ancient broch on Mousa, Shetland, to see, hear ('like fairies being sick!') and smell the European Storm-petrels *Hydrobates pelagicus* that breed within its walls. This is a book for anyone who loves seabirds and the edges of land and islands they inhabit.

Nina O'Hanlon



Birds in Winter: surviving the most challenging season

By Roger F. Pasquier

Princeton University Press, 2019

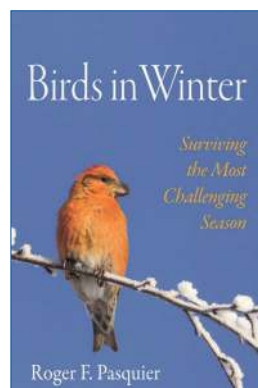
Hbk, 304pp; black-and-white drawings

ISBN 978-069-117855-4; £24.00

Understandably, perhaps, the season that is most challenging for many birds has received far less attention in popular literature than the breeding period. Birds, like other animals, set out to try to rear as many young as they can. But in order to do so, they must find a way to survive until they are old enough to breed and, if they are lucky, to make it through from the end of one breeding season to the beginning of the next. This book reviews the various ways this is accomplished, drawing on published studies from around the world.

The book deals with a vast subject area,

from initial preparations for migration, through to habitat use in the non-breeding season and the diverse range of behavioural and physiological adaptations employed to make it through the winter. One of the most interesting (and under-studied) aspects is how migratory birds interact with residents when they move to



their wintering areas. In this way, 'winter' influences residents in the tropics as they are forced to compete with birds moving in from higher latitudes. Social organisation is well described, highlighting the contrasts between the breeding and non-breeding season in many species. Colonial breeders often disperse widely and live out a solitary existence in winter, while many highly territorial birds gather in vast flocks once the breeding season is over. The range of different survival strategies and adaptations is bewildering.

The material is well organised with a sensible, progressive arrangement of chapters, plenty of subheadings and a useful summary to round off each section. The text is pitched roughly at the level of a 'New Naturalist' volume, bridging the gap between professional ornithologist and interested amateur. It is easy to read and accessible, although the sheer number of studies synthesised can make it feel rather relentless. The bibliography stretches to more than 30 pages. While the information is presented clearly, there simply isn't any space for stories or embellishments to help lighten the load. Ruthless efficiency is the order of the day.

The author is from the USA but this is a truly global review. Inevitably, with such a broad remit and global coverage, the book provides only a brief summary of the issues, with select examples. There are studies of wintering birds in the UK that might easily have been included but miss out through lack of space. Another consequence of tackling such a wide subject area is that, for some topics, more comprehensive reviews are available. To take just two examples, in the chapter on conservation, the effects of human disturbance on wintering birds receives only two pages and the insidious effects of pesticides just a single page. Sensibly, the author opts to restrict coverage of the mechanisms birds use to migrate because this too has been well described elsewhere.

While the book is not lavishly illustrated, there are numerous delightful black-and-white drawings, all by Margaret La Farge, which help to keep the pages turning. This is probably not a book that many will read from cover to cover but it provides a well-organised, accessible and useful reference.

Ian Carter

Birds of Japan

By Otani Chikara

Lynx Edicions/BirdLife International, 2019

Pbk, 392pp; over 1,800 colour illustrations, 540 range maps

ISBN 978-84-16728-12-1; £44.99

This exciting addition to the Lynx/BirdLife International 'Field Guide' series brings together all 740 species recorded from Japan plus a further 30 'hypothetical' species not yet recorded from the archipelago but deemed likely to occur in the future. The softback review copy came in the 'flexibound' cover version – a tough but flexible plastic intended to be waterproof, and sporting a bold cover illustration by Ilian Velikov of a Japanese Night Heron *Gorsachius goisagi*, one of over 20 species endemic to Japan, which are indicated on the maps.

As birders invariably do, I turned straight to

the species accounts, which occupy 337 pages, including 168 colour plates that illustrate all the

species recorded from Japan, its main and outlying islands and the surrounding seas. Almost 25% of the species in this book are vagrants to Japan and more can be expected – but these are unlikely to be encountered by visiting birders on a short visit.

For most species the illustrations face the text and are taken from *HBW* and its spin-offs, and readers will recognise the work of



many of the contributing artists included here; there are 26 in all. Each artist has illustrated particular groups so the style on most plates is generally consistent and pleasing. The illustrations are primarily of adult birds and both sexes are shown where their plumages differ. Breeding and non-breeding plumages are included where these vary and some juvenile/immature plumages are also illustrated, particularly for gulls and terns, but the selection isn't comprehensive. The plates also feature refreshingly large and colourful distribution maps for all the regularly occurring species.

Turning to the accompanying text, each species is introduced by its English, Japanese and scientific names. At this point I realised that I should have delved into the introductory chapters beforehand to fully understand the format. Taxonomy and sequence follow the two volumes of the *HBW/BirdLife International Illustrated Checklist of the Birds of the World* (del Hoyo & Collar 2014, 2016) and subsequent updates adopted by *HBW Alive* and *BirdLife*. The concept of subspecies groups is introduced in this guide, subspecies groups being an informal taxonomic unit used to highlight seemingly monophyletic groups of taxa that at present appear to sit between the species and subspecies levels – although some may merit species rank and may already be treated as such by other taxonomic authorities. Their use in this guide is novel, and the species accounts treat each of these groups separately. Where relevant, these are identified in parentheses, enclosing the species-specific scientific name. For users familiar with IOC and Clements taxonomy, species sequence and English names, there is much here that feels unfamiliar, but this is quickly reconciled by the number of potential bonus birds gained by adopting *HBW/BirdLife* taxonomy.

Each species account begins with a brief statement on status in Japan and its *BirdLife* conservation status, and is followed by a QR code linking to a relevant website page that provides additional audio-visual information. Thereafter, a concise account discusses species

identification and comparison with similar species, and as each subspecies group is treated as a taxonomic unit, each potential split receives equal treatment, which is a refreshing improvement over many guides. Likewise, all vagrants and hypothetical species are treated on a par with the most numerous and widespread species within the body of the text, although these may have been better brought together as a group and separated from the regularly occurring species.

Turning back to the introductory pages, these discuss the history of ornithology in Japan, geographical scope of this guide, climate, key habitats, conservation and endangered species, followed by a review of birding in Japan and a summary of birding hotspots throughout the archipelago. They conclude with an explanation of the terminology and abbreviations used, a key to the distribution maps, and illustration of bird topography.

Overall, I enjoyed using this guide: the images are bold, large and stand out against a pleasing grey background, the maps are clear, colourful and easily understood and the text is adequate for most species. I also prefer the larger format of the Lynx Edicions/*BirdLife* guides (it measures 16 cm x 23.5 cm), with its generally larger illustrations and more detailed maps than its main competitors offer. My only disappointment was the relative sizes that some images are reproduced on the same plate – for example, the crests/kinglets *Regulus* and waxwings *Bombycilla* on p. 323 don't sit comfortably together when they aren't reproduced to scale, and why is the Wryneck *Jynx torquilla* on p. 225 so small compared with the accompanying kingfishers? There are several similar examples, but this is a relatively minor grumble given the overall accuracy of the illustrations. Armed with this guide, visiting birders should encounter few identification issues that can't be overcome on a trip to Japan – it's likely that the language and culture barriers may present greater challenges!

Peter Kennerley



Madeira

By Kees Woutersen and Dirk Hilbers

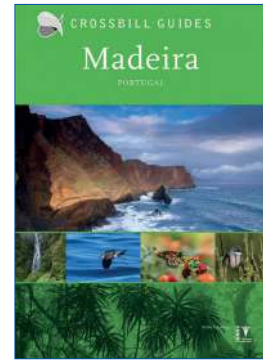
Crossbill Guides Foundation/KNNV Publishing, 2019

Pbk, 224pp; many colour photos

ISBN 978-94-91648-17-5; £26.95

Being just a four-hour flight from the UK and with fares sometimes as little as £40 each way, it is no surprise that Madeira is a popular tourist destination for holidaymakers. By contrast, it has drawn less attention than it deserves among birdwatchers, perhaps because it supports a meagre 47 breeding species. However, these include three endemics: Zino's Petrel *Pterodroma madeira*, Trocaz Pigeon *Columba trocaz* and Madeira Firecrest *Regulus madeirensis*. In addition, you can easily find several of the Macaronesian endemics (such as Canary *Serinus canaria*, Berthelot's Pipit *Anthus berthelotti* and Plain Swift *Apus unicolor*) and there are unique local races of several other species.

Crossbill Guides first appeared in 2004 and all follow the same basic layout. Firstly, the landscape and local history are described, including the impacts on nature conservation. Each of the main ecosystems are explored, along with geological features that affect wildlife. The next section deals with the species that can be encountered – flora, mammals, birds, reptiles, amphibians and invertebrates.



The final section outlines 16 routes that you can follow on foot or by car – varying in duration from two hours to a whole day – and there is certainly enough to keep you busy for at least a week. There are also 14 additional ideas for trips you can make to extra sites. Those wanting to find the recently split Desertas Petrel *P. deserta* will need to read the excursions section as it involves a boat trip to the Desertas Islands – 25 km southeast of Madeira.

For the general naturalist there is plenty to see as well. Madeira's laurel forests and mountain peaks are home to several rare and often endemic plants and animals such as the Madeiran Wall Lizard *Lacerta dugesii*, which is easy to see. There are also great opportunities to view cetaceans offshore and, in particular, Sperm Whales *Physeter macrocephalus* are present all year.

Keith Betton

Recent reports

Compiled by Barry Nightingale and Harry Hussey

This summary of unchecked reports covers early January to early February 2020.

Headlines In a quiet period for new arrivals, three American Herring Gulls in Ireland plus one in Dorset, a Bonaparte's Gull in Cornwall, a Brown Shrike in Co. Cork and a Black-throated Thrush in Lincolnshire were among the highlights. Returning birds from last year included a Pied-billed Grebe in Argyll and a couple of Bonaparte's Gulls in Ireland. Otherwise it was as you were, with the Steller's Eider in Orkney, the elusive Lesser White-fronted Goose roaming Norfolk, White-winged Scoter in Lothian, probably two Pacific Divers in Cornwall (plus a returning bird in Co. Cork), Whipsnade's long-staying Black-throated Thrush (which raised an exceptional c. £62,000 from additional gate receipts), Buff-bellied Pipit in Cornwall and three Eastern Yellow Wagtails.

Cackling Goose *Branta hutchinsii* North Uist (Outer Hebrides), two long-stayers to 26th January; 'new' birds in Argyll, Dumfries & Galloway and North-east Scotland. **Lesser White-fronted Goose** *Anser erythropus* Long-stayer again Walpole St Peter, 9th

January and Burnham Market (both Norfolk), 2nd February. **Blue-winged Teal** *Spatula discors* Man Sands (Devon), long-stayer to 8th February. **Black Duck** *Anas rubripes* Strontian (Highland), long-stayer to 6th February. **Ferruginous Duck** *Aythya*



64. Male Black-throated Thrush *Turdus atrogularis*, Whipsnade Zoo, Bedfordshire, January 2020.

nyroca Records from Essex, Hampshire, Norfolk, Warwickshire and Yorkshire. Lesser Scaup *Aythya affinis* Stithian's Resr (Cornwall), long-stayer to 8th February; Loch Ryan (Dumfries & Galloway), 3rd–4th February. Steller's Eider *Polysticta stelleri* Papa Westray (Outer Hebrides), long-stayer again 24th–25th January and 8th–9th February. King Eider *Somateria spectabilis* Long-stayer, Moray & Nairn, 9th and 12th January; Unst (Shetland), 9th January to 9th February. White-winged Scoter *Melanitta deglandi* Musselburgh/Fisherrow (Lothian), long-stayer to 8th February. Black Scoter *Melanitta americana* Long-stayers Lunan Bay (Angus & Dundee), sporadically to 28th January and Cheswick/Goswick (Northumberland), to 9th February.

Pied-billed Grebe *Podilymbus podiceps* Loch Feorlin (Argyll), returning bird, 7th February.

American Golden Plover *Pluvialis dominica* Ballylongford (Co. Kerry), 3rd–7th February. Semipalmated Sandpiper *Calidris pusilla* Pennington Marshes (Hampshire), long-stayer again 10th–12th January. Long-billed Dowitcher *Limnodromus scolopaceus* Long-stayers Cumbria, Devon and Co. Wicklow; Marshside (Lancashire & N Merseyside), 10th January to 8th February; Tacumshin (Co. Wexford), 25th January to 5th February. Lesser Yellowlegs *Tringa flavipes* Nosterfield (Yorkshire), long-stayer to 9th February; Lough Beg (Co. Derry), 28th–30th January.

Bonaparte's Gull *Chroicocephalus philadelphia* Returning birds Clahane (Co. Clare), 11th January, and Kilmore Quay (Co. Wexford), 16th January to 7th February; Padstow (Cornwall), 9th February. American Herring Gull *Larus smithsonianus* Macedon Point (Co. Antrim), 9th January; Tralee Bay Wetland Centre (Co. Kerry), 15th–16th

January; West Bexington (Dorset), 25th–26th January; Castletownbere (Co. Cork), 6th–9th February. 'Azorean Yellow-legged Gull' *Larus michahellis atlantis* Kildavin (Co. Carlow), long-stayer again 15th January and 8th February.

Pacific Diver *Gavia pacifica* Crookhaven (Co. Cork), long-stayer again 5th February; Pendower/Portscatho, 15th January, 5th and 8th February with same at Maenporth, 16th–19th January; Marazion (all Cornwall), 6th February.

White-billed Diver *Gavia adamsii* At least two in Orkney and one in Shetland.

Cattle Egret *Bubulcus ibis* Ham Wall (Somerset), 164 at roost on 19th January. Purple Heron *Ardea purpurea* Eagland Hill (Lancashire & N Merseyside), long-stayer to 7th February.

Snowy Owl *Bubo scandiacus* Leahill Bog, Adrigole (Co. Cork), 14th January; Abbey Hill (Co. Clare), 4th February.

Brown Shrike *Lanius cristatus* Mallow (Co. Cork), 7th–8th January. Penduline Tit *Remiz pendulinus* Stodmarsh (Kent), 24th January; Lodmoor, 28th January with two on 5th–7th February; Radipole Lake (both Dorset), 1st–2nd February.

Black-throated Thrush *Turdus atrogularis* Whipsnade Zoo (Bedfordshire), long-stayer to 8th February; Grimsby (Lincolnshire), 30th January to 9th February. Siberian Stonechat *Saxicola maurus* Northwich (Cheshire & Wirral), long-stayer to 8th February.

'Black-bellied Dipper' *Cinclus c. cinclus* St Andrews (Fife), again 10th–17th January.

Eastern Yellow Wagtail *Motacilla tschutschensis* Long-stayers Sedgeford (Norfolk), to 8th February; Prestwick Carr (Northumberland), to 9th February, and Havergate Island (Suffolk), again 4th and 7th February. Buff-bellied Pipit *Anthus rubescens* Sennen (Cornwall), long-stayer to 7th February.

Two-barred Crossbill *Loxia leucoptera* North Uist, four long-stayers again 15th January; Lybster (Highland), 10th January. European Serin *Serinus serinus* Seaton (Devon), 4th–5th February.

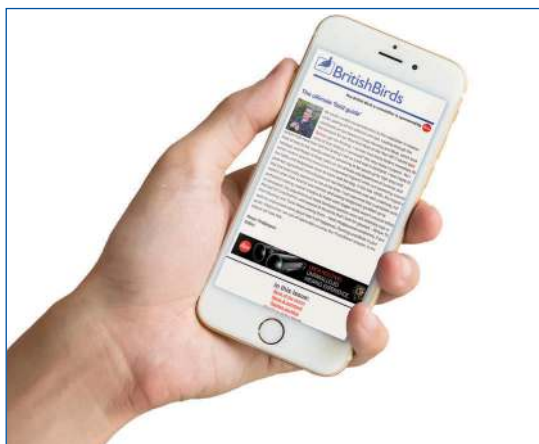
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