

Migration and non-breeding distribution of Icelandic Whimbrels *Numenius phaeopus islandicus* as revealed by ringing recoveries

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From the initiation of bird ringing in Iceland in 1921 to 2014, a total of 6,077 Whimbrels *Numenius phaeopus* have been ringed there, mostly (95%) as unfledged chicks. Of those, 35 have been recovered or sighted outside Iceland and 22 recovered in Iceland. A further four recoveries of Whimbrels ringed abroad have been made in Iceland. We use the distribution of those recoveries in space and time to infer the wintering grounds and migration routes of Icelandic-breeding Whimbrels. Of the 39 recovered Whimbrels, 21 were recovered or ringed in Europe and 18 in Africa. The winter distribution of recovered birds in W Africa ranged from Mauritania in the north to Benin and Togo in the south. Five birds were recovered in Iberia during October–March (two in January), suggesting that some Whimbrels wintering in Iberia may be of Icelandic origin. The distribution of ring recoveries in time suggests that most Icelandic-breeding Whimbrels migrate direct to Africa in the autumn without stopping over in Europe. In spring, several recoveries in Europe, mainly in the British Isles, suggest that stopover during spring migration is more frequent.

Keywords

Icelandic Whimbrel
Numenius phaeopus islandicus
 autumn migration
 band recoveries
 spring migration
 stopover
 wintering

INTRODUCTION

The Whimbrel *Numenius phaeopus* is a long-distance migrant with a wide breeding distribution from boreal to arctic zones in both the Nearctic and Palearctic regions (Engelmoer & Roselaar 1998). Seven subspecies have been identified: five breeding in Eurasia and two in North America (Engelmoer & Roselaar 1998, Tomkovich 2008), four of which are thought to be declining (Brown *et al.* 2014). The W European subspecies *N. p. islandicus* and *N. p. phaeopus* winter mainly in W Africa but knowledge of their wintering grounds is rudimentary. The *islandicus* subspecies is thought to have the largest population size of all the subspecies of Whimbrels (Gunnarsson *et al.* 2006). The core of the *islandicus* population breeds in Iceland with smaller populations in the UK, Faroes and presumably in Greenland (Brown *et al.* 2014). The size of the Icelandic breeding population has been roughly estimated at 250,000 breeding pairs (Thorup 2006). Recent studies show that the Icelandic population is currently very large and support the Thorup (2006) estimate (Johannesdottir *et al.* 2014, Katrinardottir *et al.* 2015).

The key W African wintering grounds of Whimbrels from W Europe are thought to range from Mauritania in

the north to Angola in the south, with smaller numbers elsewhere (Zwarts 1990). The direct (great circle) distance between Iceland and Mauritania (Banc d'Arguin) is 4,850 km, which is a considerable distance for a single flight but well within the currently known limits of non-stop flights for large waders (Gill *et al.* 2009). Whimbrels migrating between Iceland and Africa also have the option of stopping over in Europe, either on the mainland, in the British Isles, or both, though a stopover in W Europe would require a detour of *ca.* 500 km.

Metal-ringing has traditionally been the default method for recording individual movements of migratory birds and thereby reconstructing the migratory routes and patterns of specific populations. This method is still providing invaluable and relatively cheap data on bird migration despite well-known biases in re-encounter probabilities (Clark *et al.* 2009, Korner-Nievergelt *et al.* 2010). The first Whimbrel was metal-ringed in Iceland in 1925, but a systematic analysis of ring recoveries of Icelandic Whimbrels has not previously been undertaken. We provide the first formal account of ring recoveries of Icelandic Whimbrels, which constitute the bulk of the *islandicus* race, to establish the non-breeding distribution of this population.

METHODS

A total of 6,077 Whimbrels have been ringed in Iceland since 1925, including 5,798 unfledged chicks and 279 full-grown birds (Guðmundsson & Auhage 2015). About 150 of these were colour-ringed. We used locations of recoveries of marked birds outside Iceland to infer the winter distribution and migratory routes of Icelandic Whimbrels.

We split the Whimbrel's annual cycle into seasons based on current information on their annual schedules. Most Whimbrels arrive in Iceland in May, breed in June and July, and depart in August (Gunnarsson 2006, 2010). Studies on the Banc d'Arguin in Mauritania during 1986–1988 showed that most Whimbrels departed between mid April and early May (Zwarts 1990). Arrival dates of Whimbrels in Iceland did not change significantly between 1988 and 2009 (Gunnarsson & Tomasson 2011). According to *Birdtrack* records, the spring migration of Whimbrels through Britain takes place between mid April and early May, and the autumn migration is in July and August and into September (Birdtrack 2015), which fits well with the arrival and departure patterns of Whimbrels in Iceland (Gunnarsson 2010). On the basis of this information we have classified recoveries in April–June as spring migration, July–September as autumn migration and October–March as the winter period.

RESULTS

Winter distribution

Overall, 35 Icelandic marked Whimbrels have been recovered or sighted outside Iceland, the first one in 1927 and the last one in 2015. Four of these were ringed as adults and the others as unfledged chicks; three were colour-ringed and the rest were metal-ringed. Of the recoveries, 18 were in Africa and 21 in Europe (Table 1). The African recoveries ranged from Mauritania in the North to Benin and Togo in the South (Fig. 1). Most birds were recovered in Guinea-Bissau and Senegal (six in each). Five birds were also recorded in Iberia during the winter months: three in Spain and two in Portugal. Four Whimbrels ringed abroad, including three ringed in France in April and one ringed in Senegal in December, were recovered in Iceland.

Seasonal movements

Only five birds were recovered during the autumn period (July–September). Three had already migrated to Africa but two were located in Europe: one in Britain and one in France. The recovery of a juvenile in Guinea-Bissau in late August shows that migration of juveniles can be completed quite early. Fifteen birds were recovered during the spring migration period (April–June), most on the British Isles (eight) and six in France/Belgium (including three ringed in France), but one second-cycle (third calendar year) bird was still in Guinea-Bissau on 5 April (Table 1, Fig. 1).

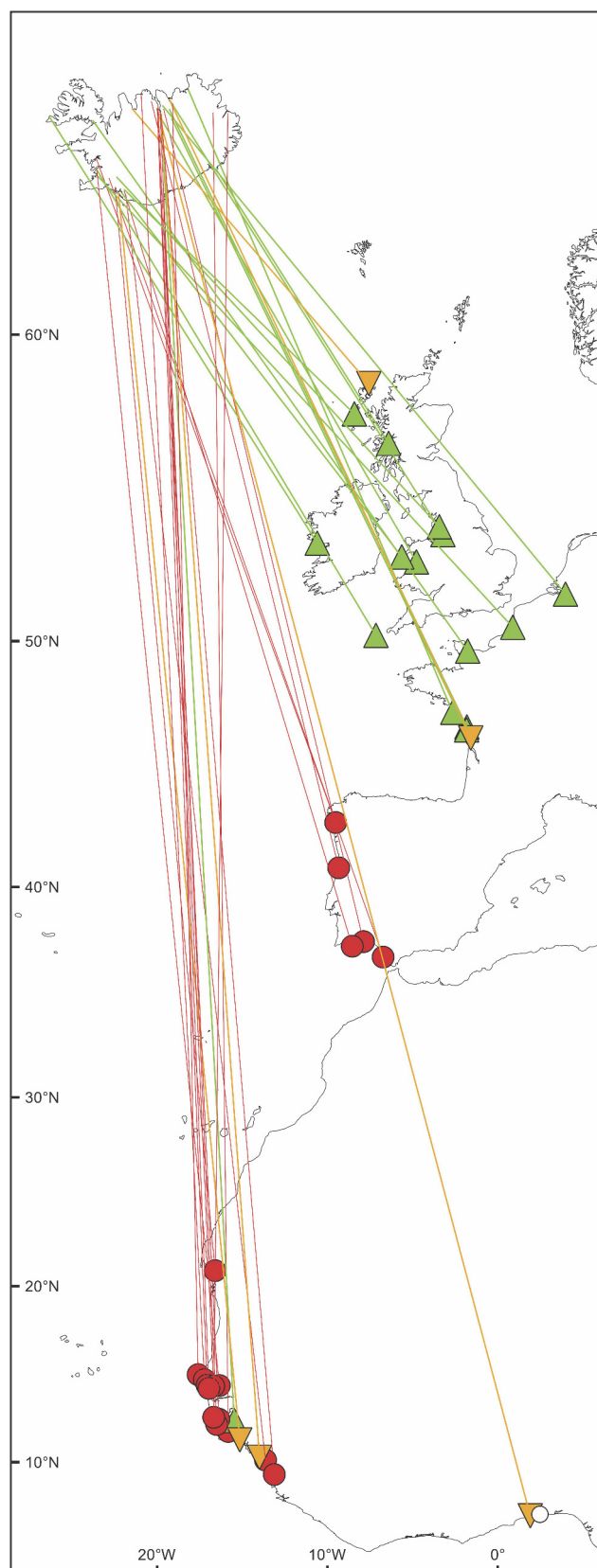


Fig. 1. All foreign recoveries and sightings of Icelandic-ringed Whimbrels ($n = 35$) and ringing sites of foreign-ringed Whimbrels recovered in Iceland ($n = 4$). Winter = red dots (1 Oct–31 Mar), spring = green triangles (1 Apr–30 Jun), autumn = orange triangles (1 Jul–30 Sep) and undated = white dot. The map is a Mercator projection.

During spring migration, stopover or passage of Whimbrels in Britain and Ireland is well known, but numbers are highly variable. Sometimes Whimbrels can occur in thousands at single localities (Ferns *et al.* 1979, Pierce & Wilson 1980). Seven of the spring recoveries of Icelandic birds are from the British Isles. Three spring recoveries were from mainland Europe (France and Belgium) with a further three birds, ringed during spring in France, recovered in Iceland. This pattern of recoveries suggests that stopover of Icelandic Whimbrels during spring migration is frequent along the coasts of W Europe, particularly in the British Isles. However, departure directions of Whimbrels in spring from Banc d'Arguin in Mauritania (Piersma *et al.* 1990) and irregular occurrence of Whimbrels in spring at known Whimbrel stopover sites along coasts

In autumn, three of five recoveries were in Africa. The earliest recovery was on 24 August and the other two were in mid-September. The small number of recoveries in Europe during autumn migration suggests that autumn stopover of Icelandic Whimbrels in Europe is uncommon, in proportion to the size of the population. Either only small numbers stop or stopover duration is short (or both). The scarcity of autumn recoveries in Europe and the recoveries of Whimbrels in Africa in early autumn strongly suggest that most Whimbrels make a direct non-stop flight from Iceland to Africa. Other recent studies of long-distance migratory waders are establishing that single leg journeys of 4,000–8,000 km are almost commonplace for migratory waders (Klaassen *et al.* 2011, Johnson *et al.* 2015). Confirmation of a Whimbrel making a direct flight from Iceland to W Africa comes from a satellite-tagged bird that flew non-stop from Iceland to Guinea-Bissau in late summer 2007. However, in 2005 another satellite-tagged bird took about 30 days to make the same journey, stopping in NW France and other places en route (Whimbrel.info 2015).

The overall recovery rate of marked Whimbrels is low at

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<1%. This probably reflects that most birds were ringed as unfledged chicks and that Whimbrels spend most of the non-breeding period, and a summer or two before sexual maturity, in Africa where re-encounter probabilities and submission of recoveries are probably relatively low due to socio-demographic factors (Korner-Nievergelt *et al.* 2010). A comparable pattern has been found for Icelandic Common Ringed Plovers *Charadrius hiaticula*, which have a similar non-breeding distribution but probabilities of recovering metal rings in Africa are apparently low (Thorisson *et al.* 2014). About half of all recovered birds were taken by hunters; the other half were found dead. Of birds recovered away from Iceland, 80% were hunted before 1970, but <40% were hunted in later years, which suggests that hunting of Whimbrels may have decreased or recovery probabilities declined for some other reason.

Nearly a century of metal ringing of Icelandic Whimbrels has provided good information on wintering locations and some about migration strategies. Major remaining knowledge gaps include the proportional importance of different African countries for Icelandic Whimbrels, whether there is a geographic structure in the non-breeding distribution within the large Icelandic population, and what drives the frequency of stopover along the migration flyway. Recent advances in tracking long-distance migration with light-level geolocators and miniature satellite transmitters are rapidly filling gaps in our understanding of individual species' migrations (Bridge *et al.* 2013). These technologies provide less biased information about species ranges and migration strategies than traditional metal ringing where recoveries are opportunistic, and are likely to become more common in the future.

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REFERENCES

- Alves, J.A., M. Dias, T. Country, H. Costa, P. Fernandes, R. Martins, F. Moniz & A. Rocha. 2010. Monitoring waterbird populations on the Tagus and Guadiana Estuaries: 2009 report. *Anuário Ornitológico* 8: 16–26.
- Birdtrack 2015. Accessed 4 Nov 2015 at: <http://blx1.bto.org/bt-dailyresults/results/s202-20-14.html>.
- Bridge, E.S., J.F. Kelly, A. Contina, R.M. Gabrielson, R.B. MacCurdy & D.W. Winkler. 2013. Advances in tracking small migratory birds: a technical review of light-level geolocation. *Journal of Field Ornithology* 84: 121–137.
- Clark, J.A., K. Thorup & D.A. Stroud. 2009. Quantifying the movement patterns of birds from ring recoveries. *Ringing & Migration* 24: 180–188.
- Engelmoer, M. & C.S. Roselaar. 1998. *Geographical variation in waders*. Kluwer Academic Publishers, Dordrecht. 331 pp.
- Ferns, P.N., G. Green & P. Round. 1979. Significance of the Somerset and Gwent Levels in Britain as feeding areas for migrant whimbrels *Numenius phaeopus*. *Biological Conservation* 16: 7–22.
- Gill, R.E., T.L. Tibbitts, D.C. Douglas, C.M. Handel, D.M. Mulcahy, J.C. Gottschalck, N. Warnock, B.J. McCaffery, P.F. Battley & T. Piersma. 2009. Extreme endurance flights by landbirds crossing the Pacific Ocean: ecological corridor rather than barrier? *Proceedings of the Royal Society B: Biological Sciences* 276: 447–457.
- Guðmundsson, G.A. & S. Auhage. 2015. *Fuglamerkingar 2014 (Bird ringing in Iceland 2014)*. Available at: http://www.ni.is/sites/ni.is/files/atoms/files/ISRS_Fuglamerkingar_2014.pdf [In Icelandic]
- Gunnarsson, T.G. 2006. Monitoring wader productivity during autumn passage in Iceland. *Wader Study Group Bulletin* 110: 21–29.
- Gunnarsson, T.G., J.A. Gill, G.F. Appleton, H. Gíslason, A. Gardarsson, A.R. Watkinson & W.J. Sutherland. 2006. Large-scale habitat associations of birds in lowland Iceland: Implications for conservation. *Biological Conservation* 128: 265–275.
- Gunnarsson, T.G. 2010. Contrasting the flexibility of schedules in related species with different migration strategies: Black-tailed Godwits and Whimbrels breeding in Iceland. *Wader Study Group Bulletin* 117: 46–50.
- Gunnarsson, T.G. & G. Tomasson. 2011. Flexibility in spring arrival of migratory birds at northern latitudes under rapid temperature changes. *Bird Study* 58: 1–12.
- Johannesdottir, L., O. Arnalds, S. Brink & T.G. Gunnarsson. 2014. Identifying important bird habitats in a sub-arctic area undergoing rapid land-use change. *Bird Study* 61: 544–552.
- Johnson, O.W., R.R. Porter, L. Fielding, M.F. Weber, R.S. Gold, R.H. Goodwill, P.M. Johnson, A.E. Bruner, P.A. Brasseur & N.H. Brasseur. 2015. Tracking Pacific Golden-Plovers *Pluvialis fulva*: transoceanic migrations between non-breeding grounds in Kwajalein, Japan and Hawaii and breeding grounds in Alaska and Chukotka. *Wader Study* 122: 4–11.
- Katrinardottir, B., J.A. Alves, H. Sigurjonsdottir, P. Hersteinsson & T.G. Gunnarsson. 2015. The effects of habitat type and volcanic eruptions on the breeding demography of Icelandic Whimbrels *Numenius phaeopus*. *PLOS One*. DOI: 10.1371/journal.pone.0131395.
- Klaassen, R.H., T. Alerstam, P. Carlsson, J.W. Fox & Å. Lindström. 2011. Great flights by great snipes: long and fast non-stop migration over benign habitats. *Biology Letters* 7: 833–835.
- Korner-Nievergelt, F., A. Sauter, P.W. Atkinson, J. Guélat, W. Kania, M. Kéry, U. Köppen, R.A. Robinson, M. Schaub & K. Thorup. 2010. Improving the analysis of movement data from marked individuals through explicit estimation of observer heterogeneity. *Journal of Avian Biology* 41: 8–17.

- Lecoq, M., P.M. Lourenço, P. Catry, J. Andrade & J.P. Granadeiro. 2013. Wintering waders on the Portuguese mainland non-estuarine coast: results of the 2009–2011 survey. *Wader Study Group Bulletin* 120: 66–70.
- Pearce-Higgins, J.W. *et al.* *In prep.* Drivers of population change and conservation priorities for the Numeniini populations of the world. *Royal Society for the Protection of Birds & International Wader Study Group*.
- Pierce, S. & J. Wilson. 1980. Spring migration of Whimbrels over Cork Harbour. *Irish Birds* 1: 514–516.
- Piersma, T., L. Zwarts & H. Bruggemann. 1990. Behavioral aspects of the departure of waders before long-distance flights: flocking, vocalizations, flight paths and diurnal timing. *Ardea* 78: 157–184.
- Thorisson, B., V. Eyjólfsson, A. Gardarsson, H.B. Alberts-dóttir & T.G. Gunnarsson. 2014. The non-breeding distribution of Icelandic Common Ringed Plovers. *Wader Study Group Bulletin* 119: 97–101.
- Thorup, O. (compiler). 2006. Breeding waders in Europe: a year 2000 assessment. *International Wader Studies* 14. 131 pp.
- Tomkovich, P. 2008. A new subspecies of the Whimbrel (*Numenius phaeopus*) from Central Siberia. *Zoologicheskyy Zhurnal* 87: 1092–1099.
- Velasco, T. & L. Alberto. 1993. Numbers, main localities and distribution maps of waders wintering in Spain. *Wader Study Group Bulletin* 70: 33–41.
- Whimbrel.info. 2015. Accessed 4 Nov 2015 at: www.whimbrel.info.
- Zwarts, L. 1990. Increased prey availability drives pre-migration hyperphagia in Whimbrels and allows them to leave the Banc d'Arguin, Mauritania, in time. *Ardea* 78: 279–300.
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