TAGGED!

Technology has revolutionised the way we track birds, as Paul Stancliffe from the British Trust for Ornithology explains

Back in the 80s my first mobile phone only just qualified as being mobile. It was similar in size to a car battery, had an old fashioned handset and an extendable aerial more in common with a transistor radio than a mobile phone. The largest and heaviest part of it – and it was heavy, the whole thing weighed around 10 pounds – was the battery; with the phone side of things taking up very little space and weight. It was also rubbish, hardly useful as a phone at all. I often had to walk long distances to get a signal, occasionally past telephone boxes, and even then conversation was difficult, often breaking up or ending prematurely.

Things have come a long way since then, battery technology has moved on in leaps and bounds and many mobile phones are now tiny in comparison. And this advancement in technology has resulted in many other benefits besides just making mobile phones smaller.

Using these relatively minute components, birds such as Ospreys have been tracked on their journeys to their wintering grounds in West Africa, and Manx Shearwaters have been followed on their mammoth journey to the east coast of South America. Guillemots have been followed during the winter out into the Atlantic, telling us how long they spend feeding underwater and at what depth. However, until now we haven't been able to track anything smaller than a Guillemot for very long, certainly not to their wintering grounds and back.

This all changed recently with the advent of tiny geolocators, designed and built by organisations such as the British Antarctic Survey and the Swiss Ornithological Institute. These devices, no bigger than a shirt button, have an inbuilt electronic calendar, a clock and a light sensor that constantly monitors the daylight against the clock and the calendar and stores that data. Once recovered, scientists are able to work out where on the planet the geolocator was at any given time and date. The whole device weighs just under 1g, making it small enough to fit on a bird around the size of a Robin.

Over the past 25 years, many of our summer migrants have experienced dramatic declines; we have lost four out of every five Spotted Flycatchers, Wood Warblers have vanished from many of our woodlands and Nightingales have declined by 91% in the last 40 years. We know some of the pressures that these birds face here during the summer months, but what is less clear are the pressures they face on their wintering grounds and at stopover sites on migration between the two.

In the spring of 2009 geolocators were fitted by the British Trust for Ornithology on Nightingales in the Cambridgeshire Fens. This was the first time that a geolocation device had been fitted to a small passerine in the UK. Male Nightingales show great site fidelity and the following spring six geolocators were retrieved. The data collected by the devices was downloaded and analysed by scientists at the Swiss Ornithological Institute and the BTO. Five failed to collect any useful data but one did the job and tracked Nightingale OAD – the letters on its device – all the way from the Fens to Africa, and part of the way back, before also failing somewhere in the Sahara. This amazing technology is very much in its infancy and this success will inform the development of the next generation of geolocators.

So what did we find out? Well, Nightingale OAD took a fairly direct south-westerly route through France and passed the western end of the Pyrenees. It then carried on this track to a stop-over site in southern Portugal. It remained ➡

Chas Holt (BTO)

The tiny geolocator tracked this Nightingale to its wintering grounds in Africa

2 May 2010
Nightingale tagged at Rosedene Farm, near Methwold Hythe

Second week in August
Passed west of Paris

Fourth week in August
Passed west end of the Pyrenees

End of fourth week in August
Passed Madrid then turned onto a more westerly heading

1 September
Arrived near Lisbon. Remained here or moved due south until the 19th of September

20 September
Moved this far west, though the latitude is uncertain

End of October
In southern Western Sahara until this time

Mid-November – mid-December
In the central-west Senegambia region for this time

Mid-December onwards
Final location: South-west corner of Guinea. Departure date uncertain

What is a geolocator?

- Devised by the Antarctic and Marine Engineering Group at the British Antarctic Survey and the Swiss Ornithological Institute
- Each device costs £100
- Provided free of charge to the BTO as part of a collaborative project
- Fitted to the lower back of the bird and held in place by two loops around the bird's legs
- Can also be attached to a large bird's leg – consideration given to eliminating discomfort, aerodynamic drag and disruption to normal behaviour
- This Spring BTO scientists hope to attach around 20 geolocators to migrating Nightingales

Very little is known about where Nightingales spend the winter

Roger Tidman (FLPA - Images of Natur)

just south of Lisbon for 19 days before crossing the Atlantic to the west coast of North Africa, moving slowly south during the next six weeks, through Western Sahara. By mid-November it had moved through Mauritania and had arrived in Senegambia, stopping there for around a month before moving south again, through Guinea Bissau, and finally arriving in western Guinea in mid-December. The final departure for the journey from there back to the UK is unclear.

To download all this valuable information that the geolocator had collected, it had to be retrieved, and Nightingale OAD was re-caught in the Fens on 5 May 2010, 50 metres from the spot at which the geolocator had originally been fitted.

Three things stand out on this journey. The stop-over site in southern Portugal, the route via the west coast of North Africa – there are a number of oases along this stretch of coast – and the final destination. All of these sites might be very important, not only for this Nightingale but for Nightingales from the UK in general, and possibly for a host of other UK summer migrants. Being able to identify specific locations will help future investigation and also help to target conservation action more precisely.

So what of the future? Exciting times lie ahead. The Nightingale, while classed as a small migrant passerine, is at the larger end of the scale as far as small passerines go. As these amazing devices become smaller it will be possible to fit them to even smaller birds. The ability to track the migration routes of some of our most declining migrant birds is therefore a very real and exciting prospect. The answers to questions such as where precisely do British Wood Warblers and Spotted Flycatchers spend the winter, what pressures do they face there and where are their important stop-over sites, might be just around the corner.

It is hoped that future developments in geolocating could enable us to follow migrating Swallows in real-time

Alan Williams

And the future could be even more exciting than that. Imagine being able to track some of these migrants in real time using tiny satellite transmitters. Being able to follow a Swallow from a barn in Norfolk to the skies of Pretoria in South Africa, and back, as it undertakes its amazing journey, could have huge implications for the future, not to mention the fascination of knowing more about the lives of our visiting birds. BW

Amongst the difficulties in targeting conservation action for birds like the Nightingale, is our lack of knowledge on where precisely they spend the winter months and how they use the habitats once there. We also need to identify the location of stopover sites, as changes in any of these could have far reaching implications. Work in Africa, funded by the Out of Africa appeal, sees the BTO, alongside the RSPB and Birdlife partners, working to fill in these gaps. The BTO is also launching a Nightingale appeal this spring to help one of our fastest disappearing summer migrants. For more information on both of these, visit www.bto.org