CONNECTING THE DOTS

Tracking Blue Swallow migration patterns

Text by James Wakelin† & Andrew McKechnie

In recent years, the distinctive and charismatic Blue Swallow *Hirundo atrocaerulea* has been the focus of considerably more research effort and media coverage than many other threatened African birds. Despite this, the South African and Swazi population remains precariously balanced on the edge of extinction and is currently thought to number only about 80 breeding pairs (see *Africa – Birds & Birding* 9(6): 42–46). So dire is the plight of the southernmost Blue Swallow breeding population that the species has been red-listed as Critically Endangered within South Africa and Swaziland.

The swallow's troubles arise from the fact that during the breeding season it is a mistbelt grassland specialist and is thus completely reliant on a poorly conserved habitat type that has been decimated by forestry and agriculture. Contributing to the species' decline are its very particular breeding requirements: over most of its range, it nests exclusively in sinkholes or disused aardvark burrows.

Another factor significantly hampering the development of effective conservation strategies for the local Blue Swallow population is a lack of knowledge about the migratory links between the various breeding and wintering populations. Blue Swallows are intra-African migrants and spend the winter in Central Africa, particularly around Lake Victoria and elsewhere in Uganda. Do members of the dwindling South African/Swazi population occupy the same winter quarters in Uganda as individuals that breed in the Eastern Highlands of Zimbabwe? We simply don't know. This dearth of information is reflected in the lack of recoveries of ringed swallows in the Central African wintering range. Until recently, ringing was the only way to link wintering individuals to specific breeding populations. Without this information, it is impossible to coordinate conservation efforts between the areas that individual swallows occupy at different times of year.

Over the past decade, however, biochemical techniques that take advantage of the stable isotopes in birds' feathers (see *Africa – Birds & Birding* 9(4): 17) have revolutionised the study of avian migration, and to a large extent freed ornithologists from having to rely on ring recoveries to understand migration

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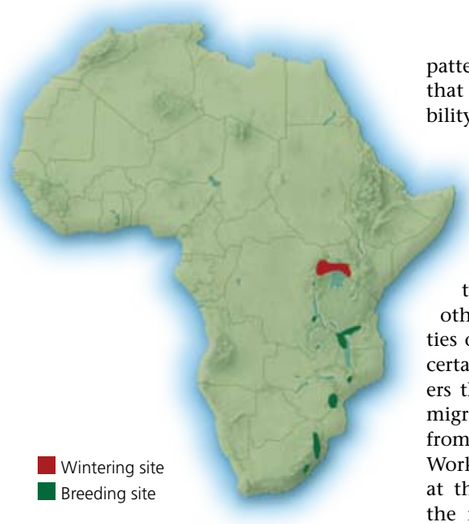
The biochemical properties of this juvenile Blue Swallow's feathers may hold the key to understanding the migration patterns of this threatened species.

WIM DE GROOT



patterns. A few years ago, we realised that these techniques were in all probability the only way to reveal the secrets of the Blue Swallow's migration. We therefore set about obtaining feather samples from South African, Swazi and Zimbabwean swallows, with the intention of establishing whether these populations differ from each other in terms of the isotopic properties of their feathers. In order to make certain that we did not analyse feathers that had grown elsewhere prior to migration, we collected specimens only from nestlings and first-year juveniles. Working with Dr Stephan Woodborne at the CSIR in Pretoria, we measured the relative abundance of two stable isotopes of hydrogen in the feathers. Our initial results were encouraging: the hydrogen stable isotope ratios of feathers from South African and Swazi swallows were distinct from those of Zimbabwean birds, with no overlap in values. This approach can therefore be used to reliably distinguish individuals from these two breeding areas.

The missing link in the puzzle, however, concerned the third major breeding population of Blue Swallows. This population, which is also the largest, inhabits the Nyika Plateau in northern Malawi and the highlands of southern Tanzania. Nyika's montane grasslands alone are thought to hold close to 300 breeding pairs. Fortunately, this population enjoys substantial protection as the entire plateau falls within the borders of the Nyika National Park.

In early 2009, a group of researchers from the Universities of Pretoria and the Witwatersrand visited Nyika with the goal of obtaining feathers from the Blue Swallows there. Analyses of feathers from these Malawian birds would allow us to compare the isotope signatures from each of the three major known breeding populations, and hopefully provide the basis for future studies that identify the origins of wintering birds from their feather biochemistry.

ANDREW McKECHNIE (3)

The trip to Nyika began with an epic six-day drive through Mozambique, with a quick stop in Lilongwe to pick up permits. Visitors to Nyika entering the park by way of the southern Thazima Gate experience a dramatic altitudinal transition between habitats. Beyond Thazima, the road climbs through a belt of pristine miombo woodland, which demands regular stops for bird parties that include Rufous-bellied Tit, Cabanis's Bunting and Miombo Rock-Thrush. The most sudden application of the brakes, however, is reserved for Anchieta's Sunbird, a red, blue and yellow jewel of a bird that is without doubt the highlight of this drive. As the road continues upwards, the miombo abruptly gives way to the rolling grasslands of the plateau. The mean annual rainfall of approximately 1 600 millimetres on the plateau ensures that reaching the main camp at Chelinda in late summer is a lively experience, with many of the roads reduced to muddy tracks that can only be negotiated by a four-wheel-drive vehicle.

The grassland-covered hills of the Nyika plateau stretch from horizon to horizon, providing a vivid backdrop for summer thunderstorms fuelled by evaporation from nearby Lake Malawi. The grasslands are punctuated by patches of afromontane forest, innumerable crystal-clear streams and marshy, bracken-covered wetlands. The Blue Swallows occur throughout the grasslands, but seem to be most common in the deeper valleys east of Chelinda.

During the visit, the team conducted intensive searches of two valleys and found nine active or recently active nests in disused aardvark burrows. Interestingly, the single nest located by a Zambian group during a survey in 2005 was not in an aardvark burrow, but in a shallow sinkhole instead. We visited it and it appeared to still be active, showing signs of having been used earlier in the 2008/2009 breeding season. Our trip, which took place in late February, seemed to have missed the breeding peak, as many of the nests we found were empty and there were large numbers of juvenile swallows foraging in the valleys.

When we did find nests containing chicks, feather collection involved a straightforward, if somewhat muddy procedure. Ben Smit, the most compact member of the team, was assigned the portfolio of feather collector, which involved crawling head first into a burrow until he could gently remove the chick(s) from the nest and pull a single feather from each bird. The fact that Nyika boasts healthy populations of leopards and warthogs, both decidedly partial to denning in aardvark burrows, made Ben's task all the more challenging. The success of the method relied heavily on the continuing goodwill of the other team members, since the near-vertical profile of many of the burrows meant that the only feasible way for Ben to be extricated was to be hauled out in reverse by his boots.

The trip also yielded some interesting observations. On one occasion, a group of approximately 30 Blue Swallows, together with Banded Martins and White-headed Saw-wings, was seen foraging over a marshy area, probably attracted by large numbers of insects. Another observation involved a Blue Swallow very nearly ending up as a meal for a stooping Eurasian Hobby – the swallow lived to see another day only because of some frantic evasive manoeuvres.

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Above *Blue Swallows typically breed in disused aardvark burrows, and reaching their nests can require gravity-defying teamwork.*

Top *Nyika's vast grasslands are dotted with patches of afromontane forest. During the rainy season, storms roll across the plateau almost daily.*

Opposite *Two Blue Swallow chicks in one of the active nests we found at Nyika.*

ADAM RILEY (2)

Above *White-headed Saw-wings* Psalidoprocne albiceps *are common at Nyika, and may be seen foraging in the same habitats as Blue Swallows.*

Right *Bronzy Sunbird* Nectarinia kilimensis *is one of several sunbird species that forage along the edges of Nyika's afromontane forests.*

Besides being a site of major conservation significance to the global Blue Swallow population, Nyika is a rewarding and accessible birding destination. The grasslands and wetlands are home to a number of species that do not occur in southern Africa, including Churring Cisticola, Montane Widowbird, Yellow-browed Seedeater and Baglafecht Weaver. There are also large numbers of Montagu's and Pallid harriers, as well as Denham's Bustards. In addition to this host of grassland specials, Nyika offers stimulating afromontane forest birding. The grasslands are interspersed with patches of primary forest, with the largest and best-known areas located in the western parts of the park along the border with Zambia. Excursions to the gloomy interior of Chowo Forest provide stunning views of Bar-tailed Trogon and Brown-headed Apalis, while walks along the forest edges yield Malawi Batis and Forest Double-collared, Bronzy and Green-headed sunbirds.

After a week of hiking Nyika's valleys and searching several hundred burrows, we had obtained feathers from nine young swallows. These feathers will now be analysed at the CSIR and we are hoping to be able to identify a unique isotopic 'featherprint' for each of the three major breeding populations, namely South Africa/Swaziland, the Eastern Highlands of Zimbabwe, and northern Malawi/southern Tanzania. Population-specific isotopic signatures would provide the basis for a biochemical map of the Blue Swallow's breeding range.

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Once we have such a map, we plan to travel to the swallows' wintering grounds in Central Africa. By collecting and analysing a single feather from any Blue Swallow we mist-net there, we will be able to deduce the breeding area from which it originated and thus identify migratory connections between various breeding and wintering populations. If this approach works for Blue Swallows, it will open the door for similar research on other threatened African species whose conservation is hampered by a lack of knowledge of migration patterns. ☒

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