winging it

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Swifts are born to eat and sleep in the air

Nearly 100 species of swift are completely adapted to a life in the air. That is the conclusion of researchers after having studied three of the species and observing that some individuals did not land for more than three months.

'They eat and sleep while they are airborne. This is something that researchers have believed since the 1950s and now we can show that it's true,' noted Anders Hedenström, professor at the Department of Biology at Lund University in Sweden.

Three years ago, the same research team at Lund University observed that there were Common Swifts that lived in the air for up to 10 consecutive months without landing – a world record for being airborne. A different research team has shown that the Alpine Swift could also live primarily in the air.

In the current study, Hedenström and his colleagues at Lund University and Giovanni Boano from Italy monitored four Pallid Swifts. The results showed that the birds remained airborne for between two and three and a half months, depending on the individual.

Using micro-dataloggers attached to the birds, the researchers measured movement when the wings flapped. The loggers recorded activity every five minutes and the bird's location once a month. Using this method, the researchers have been able to ascertain that the birds live in the air for months at a time during winter, the time of year when they are in West Africa after the breeding season in Italy.

'They land when they breed under a roof tile or in a hole, otherwise they live in the air. They eat insects while in flight and when they have reached a high altitude and start gliding, they actually sleep for short periods,' said Hedenström.

The reason why Pallid Swifts cannot fly for as many consecutive months as the Common Swift (that is, 10 months) is that they lay two clutches during the breeding season, whereas the Common Swift lays only one.

'However, it doesn't actually matter if a species spends three or 10 months in the air. Both these swift species are adapted to live in that element, they are designed to fly with maximum energy efficiency, regardless of whether they are flapping or gliding,' Hedenström reported. 'It's always been said that flying is birds' most energy-intensive activity. I have calculated that a Common Nightingale, which doesn't "live" in the air in the same way, expends as much energy as a Pallid Swift, which is constantly in the air.'

Common Swifts can remain in the air for up to 10 consecutive months without landing, a world record for being airborne.

Swifts have a high survival rate compared to many other birds. The researchers believe that this is a consequence of swifts being airborne for such a large part of their lives, with the result that predators cannot surprise them in the same way as if they were on the ground or in a nest. By the same token, when airborne they are not affected by parasites to the same extent as more terrestrial birds are.

SCIENCE DAILY

Reference

Hedenström A. et al. 2019. 'Flight activity in pallid swifts *Apus pallidus* during the non-breeding period.' *Journal of Avian Biology* 50 (2) doi: 10.1111/jav.01972

hands ACROSS THE seas

Another Africa–New Zealand link

The adzebills (Aptornithidae) were large, flightless birds that went extinct before the arrival of European settlers in New Zealand. Their subfossil remains were initially confused with small moas, but they had even smaller wings and a giant, curved bill. They stood more than half a metre tall and weighed as much as 20 kilograms, and stable isotope analysis of their bones confirms that they were predators or scavengers, not herbivores, that probably fed on birds, reptiles and even mammals. Whereas bats are now New Zealand's only native terrestrial mammals, Miocene fossils indicate that the islands supported a more diverse mammal fauna some 15 to 20 million years ago.

WIKIMEDIA

An adzebill skeleton on display in the Canterbury Museum, New Zealand. Among the giant bird's closest living relatives are the tiny flufftails from Madagascar and Africa.

Two species of adzebills were found, one on each of New Zealand's main islands. They evolved on South Island, where fossils have been found dating back more than 16 million years, and dispersed to North Island 1.5 to 2 million years ago, when a land bridge existed between the two islands. They were largely confined to lowland areas and both species went extinct fairly soon after the Maori colonised New Zealand, probably through a combination of hunting pressure, predation by introduced dogs and Polynesian rats, and clearing of the dry lowland podocarp forests.

Given their unique morphology, there has been considerable debate as to the affinities of the adzebills. They are usually placed within the Gruiformes, with possible links to the Kagu from New Caledonia. However, molecular evidence now shows that the Gruiformes as traditionally recognised are not a natural group. The Kagu is related to an entirely different avian radiation that, among living birds, only includes the Sunbittern and tropicbirds.

The Gruiformes now comprise two superfamilies: the cranes, trumpeters and Limpkin (Gruoidea), and the rails and their allies (Ralloidea). Initial analyses based on DNA taken from adzebill bones suggested that they fell within the Ralloidea, but their exact affinities remained unresolved. Now Alexander Boast and colleagues (*Diversity* 11: 24) have been able to show that the adzebills are most closely related to the flufftail family (Sarothruridae), which is confined to Africa and Madagascar.

Until recently, the flufftails were placed in the Rallidae with the rails, crakes, coots and gallinules. However, multiple lines of genetic evidence indicate that they, together with the two Madagascar wood rails, are more closely related to the finfoots (Heliornithidae) than they are to the rest of the Rallidae. The adzebills are sister to the flufftails, with both nesting with the finfoots, separate from the rest of the rails and crakes. Interestingly, the paper also shows that the Grey-throated Rail of lowland rainforest in West and central Africa is not sister to the Madagascar wood rails and belongs in the Rallidae, not the Sarothruridae. This means that the Sarothruridae comprises just

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A White-winged Flufftail caught at a breeding site in Ethiopia. These diminutive rail-like birds are the closest relatives of the much larger adzebills.

11 species: nine flufftails and two wood rails.

The adzebills shared a common ancestor with the flufftails about 35 to 40 million years ago, long after New Zealand split away from other land masses. This indicates that they had flying ancestors and only became flightless after reaching New Zealand. They presumably also evolved their large size there too; the largest living sarothrurid weighs less than 300 grams.

This is not the first group of New Zealand flightless birds to have an African link. The kiwis are related to the extinct elephant birds from Madagascar (see 'Flying ostriches', *African Birdlife* 2(5): 18). Perhaps even more surprisingly, New Zealand's moas are more closely related to the South American tinamous – medium-sized flying birds that resemble gamebirds – than they are to the other ratites (ostriches, rheas, emus and allies). The link between adzebills and flufftails lends further support to the conclusion that the ratites all evolved from flying ancestors after the demise of the dinosaurs, some 66 million years ago.

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