a seabird's perspective

Animal-borne cameras shed light on seabird behaviour

Bio-logging – the use of electronic tags to study animal movement, behaviour and physiology – is one of the fastest growing tools in ecology. Its success stems from the growing range of features that can be measured, coupled with ongoing miniaturisation that allows the tags to be attached to ever-smaller animals. Not only can we tell where an animal is, but also how it moves, when it feeds and even with whom it associates.

One of the more fundamental questions in ecology relates to where an animal feeds. It is thus not surprising that bio-logging has been dominated by studies investigating movement patterns. Seabirds have been at the forefront of this work, with researchers using GPS signals to track the birds' location and depth-recorders to surmise how deep the birds dive to locate prey. The latest tool in the bio-loging arsenal is a miniaturised video camera that is small enough to attach to a seabird without having a negative impact on its behaviour.

Tracking seabird movements identifies key areas that are biologically and ecologically important, but doesn't show how an animal perceives its environment or identify the factors driving its behaviour. Animal-borne cameras provide invaluable information on how seabirds interact with other species and also verify behaviours deduced from other loggers. For years biologists have inferred where the birds target prey within the water column from the depth profiles of their dives, and cameras enable us to confirm these results. We have used cameras on three seabird species and in each instance have been rewarded with novel and often unexpected insights.

ALISTAIR MCINNES

An African Penguin deployed with a video camera attached to its back.

PhD student Andréa Thiebault deployed cameras on Cape Gannets to investigate the importance of social interactions between the birds when foraging. One of her key findings was the extent to which these birds make use of conspecifics to locate fish, using the direction of gannets returning to the colony to locate productive feeding areas, then homing in on the highly visible foraging groups (see *African Birdlife* 4(6): 22–30). Dolphins were also used to locate food patches, demonstrating the importance of maintaining an intact community of marine top predators.

In the Falkland Islands, PhD student Jonathan Handley used cameras to explore how Gentoo Penguins feed. To our surprise, we found that one of their most important food items, a small crustacean called a lobster krill, fought back! Several videos clearly show the lobster krill avoiding being caught by flaring their pincers at approaching penguins. The birds avoided dense swarms of lobster krill, targeting instead loosely aggregated swarms. We learnt that penguin–prey interactions can be complex and that the penguins' diet is not a simple reflection of what prey is out there.

African Penguins forage more effectively when they work together in groups.

Back in South Africa, post-doctoral student Alistair McInnes has used cameras to better understand how African Penguins hunt. This is critical research, as a shortage of anchovy and sardine is thought to be the main reason for the recent population crash in this Endangered species. He found that African Penguins at the Stony Point colony are most successful when they forage in groups, corralling fish upwards in the water column and eating those that attempt to leave the bait ball. Foraging success increases when more penguins feed together, which is worrying given the declining numbers of this species. As colonies dwindle, the penguins find it harder to obtain sufficient food to raise their chicks, creating yet another obstacle to the recovery of African Penguin populations.

The use of animal-borne cameras is fast becoming a standard methodology for the study of animal behaviour, helping to answer questions of conservation relevance. However, perhaps the most fascinating results come from being submerged in a poorly known domain. From underwater kleptoparasitism, in which Gentoo Penguins attempt to steal squid from one another, to images of previously unknown animals on the seabed, animal-borne cameras provide an unprecedented view of how birds operate.

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