food ON THE fly

BARN SWALLOW JOHANN GROBBELAAR

African tigerfish have a well-deserved reputation as voracious predators, their prominent, razor-sharp teeth leaving little doubt as to their feeding habits. Their diet consists almost entirely of other fish species, but recent observations have revealed a surprising addition to the menu: flying birds.

During a study of radio-tagged tigerfish in Mapungubwe National Park's Schroda Dam, researchers noticed unexpectedly high levels of mid-morning activity in open water, well away from the fishes' usual feeding and sheltering areas. This activity, it turns out, coincides with Barn Swallows *Hirundo rustica* flying low over the dam's surface. Tigerfish regularly leap from the water to catch the birds, and as many as 20 swallows are taken at Schroda each day.

The tigerfish hunt swallows in two distinct ways. On some occasions, a fish just below the water surface actively pursues a bird flying overhead, before leaping to grab it. The more successful strategy, however, involves attacks from deep water, the fish rocketing up from the depths and snatching a swallow out of the air. To achieve this, the tigerfish must compensate for the refraction of light at the surface and adjust its trajectory accordingly.

It had long been speculated that predatory fish may occasionally take flying birds, but these remarkable observations provide the first hard evidence of the phenomenon. Perhaps the most surprising aspect is that the behaviour seems to be a regular occurrence, and the number of birds caught in this way is substantial; the researchers estimate that, during their 15-day study, 300 swallows fell victim to tigerfish.

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Reference: *O'Brien, G.C., Jacobs, F, Evans, S.W. and Smit, N.J. 2014. 'First observation of African tigerfish* Hydrocynus vittatus *predating on barn swallows* Hirundo rustica *in flight.'* Journal of Fish Biology *84: 263–266.*

SEEING STARS
Heavenly navigation

How birds orientate themselves when on long-distance migrations has always intrigued birdwatchers and researchers. For a bird to orientate during migration it must have both a 'map' (an idea of where it is and where it wants to go) and a 'compass' (a means by which to orientate itself on its map).

The first demonstration that stars influence the orientation of night-migrating birds was published more than 50 years ago. Juvenile birds were shown to be able to set their migratory direction using a combination of the earth's magnetic field and stars, obviating the need to follow older birds. Subsequent experiments have shown that the star compass is the primary compass system during early development and that the magnetic compass is calibrated using the stars.

But birds have to learn the star compass before they migrate. During their first summer, birds observe the night sky to assess the centre of celestial rotation. Due to the rotation of the earth, this coincides with the geographic north and south poles – with north indicated by the Pole Star in the northern hemisphere. Experiments have since shown that Indigo Bunting chicks can learn to orientate north with a modified celestial environment, and Garden Warblers can use a completely artificial pattern for orientation, even when it consists of just 16 light dots.

Once their stellar compass is established, birds no longer need the sky to rotate, and can orientate themselves with just a glimpse at the starry sky. Recent research by Michalik and colleagues (2014, *J. Ornith.* 155: 225–234) reports that chicks need at least two weeks to learn the star compass. European Robin chicks exposed to a star compass for only seven days were disorientated and failed to correctly calibrate their magnetic compass. It is impressive that chicks only a few weeks old are able to remember the positions of the stars, but one can't help wonder how chicks of species that nest and roost in holes manage to set their internal compass.

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