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FORAGING AND FEEDING BEHAVIOUR OF A FLEDGLING MAGELLANIC PENGUIN *SPHENISCUS MAGELLANICUS*

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Penguins feed on pelagic prey generally far from land and at some depth underwater (Croxall & Lishman 1987, Williams 1995). As such, observations of penguin feeding behaviour are scarce. Sir Douglas Mawson, in Zusi (1975), reports how Adélie Penguins *Pygoscelis adeliae* feeding on a swarm of Antarctic Krill *Euphausia superba* 'travelled in a zig-zag course backwards and forwards around the little bay without slackening pace'. Oliver (1955), citing T.M. Roberts, stated that Little Penguins *Eudyptula minor* herd pelagic school fish into a tight circular pack before driving through them. Similar behaviour has been noted by Dove (1910) and Schulz (1987) for Little Penguins. Wilson *et al.* (1986) document evidence that *Spheniscus* penguins also round up their school fish prey into a dense shoal before driving through them from the underneath to capture them.

On 21 March 1995, while at Punta Cuevas (42°47'S, 65°00'W), Puerto Madryn, Chubut, Argentina, I was able to observe a fledgling Magellanic Penguin *S. magellanicus* hunting and capturing pelagic school fish near the coast. The sky was clear and the sea was extremely calm and clear. I observed the penguin at high tide, between 11h15 and 11h45, from the end of a small peninsula as the bird dived in water which I estimated to be 1.5–2.5 m deep. The sea bed was approximately 50% sand and 50% flat rock with scattered boulders *c*. 1 m in diameter. Most of the time I was within 15 m of the bird at a height of *c*. 2 m above the water. I noted that a number of small schools of pelagic school fish (school size estimated to be of diameter 0.5–1 m) were present in the area. These fish appeared to be between 5 and 10 cm long and were likely to be Silversides *Odontesthes incisa* or *O. smitti*, being the commonest pelagic school fish in the area (S. Laurenti pers. comm.).

Generally, the bird dived at an angle estimated to be *c*. 20° to the surface down to close to the sea bed before returning to the surface at a similar, or lesser, angle. However, substantial deviations from this plan were apparent and on a number of dives the penguin simply swam just beneath the water's surface and on others the bird moved up and down the water column a number of times before surfacing. During the dives the bird did not maintain a fixed heading but tended to swim in one direction for a few seconds before abruptly changing course, thus 'quartering' the area. In three dives where there was no indication of prey capture the bird changed direction (>45°) seven times over 22 s, nine times over 26 s and five times over 19 s. Mean dive duration was 21.7 s (SD 3.9, n=17). Interestingly, the penguin appeared to ignore the fish in schools, swimming past them at distances of less than one metre at times without deviating from its course. The fish in such schools reacted violently by bunching together in a polarized (*sensu* Neill & Cullen 1974) group and swimming quickly away. As far as I could ascertain, all attacks were directed at single fish swimming well detached from major schools or small groups of fish (< 10 individuals) loosely associated. Here, the penguin accelerated directly at the prey swimming after it and changing direction often as the fish attempted to escape. On four occasions the prey swam to the surface and repeatedly jumped out of the water to escape capture whereupon the penguin remained below the surface of the water swimming in circles until the fish finally stopped jumping. On one of these occasions I saw the penguin catch the fish, which was swallowed immediately underwater. In the other incidents it was not clear whether the bird caught the prey. The moment of prey capture itself happened so quickly that it was impossible to tell the orientation of the fish with respect to the penguin.

Silversides are an important prey species for Magellanic Penguins (Scolaro & Badano 1986). Pelagic school fish occur in groups in order to reduce the likelihood of them being preyed upon (e.g. Neill & Cullen 1974). In particular, fish in schools adopt a 'polarized' state whereby all individuals act in a cohesive manner which serves to distract predators and reduce hunting success (Neill & Cullen 1974). Adult African or Jackass Penguins *S. demersus* have been documented as feeding on such fish schools by swimming rapidly round them until the fish become 'de-polarized' and thus more easily caught (Wilson *et al.* 1986). This behaviour also appears to occur in *Spheniscus* penguins foraging in groups (Wilson *et al.* 1986 and refs therein). Schulz (1987) documents four different types of feeding manoeuvres in Little Penguins hunting pelagic school fish, three of which involve rapidly circling schools in a diminishing circle before attacking fish from the group directly. A further technique employed by these birds involves direct pursuit of single individuals. Fledgling penguins swim slower than adults and are presumed less apt at catching prey normally taken by adults (Wilson 1985). This may explain why the observed fledgling Magellanic Penguin ignored fish in schools. Rand (1960) had data which suggested that juvenile African Penguins feed on slow-moving pelagic species. Inability to hunt efficiently may make fledgling and juvenile *Spheniscus* penguins particularly susceptible to changes in prey abundance because of their potentially reduced prey spectrum compared to that of adults.

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