

autumn (Lalas 1979, Millener 1972). We intend to continue monitoring the Pied Shags at Makara to determine their nesting season(s) and whether the number of pairs nesting gradually increases.

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Blackbird (*Turdus merula*) predation on the endemic copper skink (*Cyclodina aenea*)

On 21 September 1996 an adult female Blackbird (*Turdus merula*) was observed preying upon two copper skinks (*Cyclodina aenea*) in a terraced coastal garden at Seatoun Heights, east of Wellington. Under mild, sunny conditions, the Blackbird was observed from a window above the garden through 10x40 Zeiss binoculars at a distance of 12-16 m. The skinks were located by the searching of the Blackbird in litter and wood fragments on a flat terrace from which rotting logs had been removed two hours previously. Two adult copper skinks had been observed as the logs were being removed, but they both escaped into long grass 2-3 m above the site.

The first skink to be preyed upon was seen by G.F. Brackenbury and the author at 14:35 h running from the former log site after being disturbed by the female Blackbird. The lizard was visually identified as a relatively plump (gravid) adult female copper skink. Its snout-vent length (SVL) was approx. 60 mm, which would mean its body weight would be about 4 g, based on September SVL/weight data collected on the species in Lower Hutt (B.D. Bell unpub. data).

Instead of escaping to the long grass, the skink ran onto a lower lawn terrace that had been mown an hour previously. As it did so, it was pursued in the open by the Blackbird which repeatedly pecked at it, tossing it several times up to 10 cm into the air. After a pursuit of 3.5 m, the lizard's tail was shed, but despite vigorous movement of the detached tail, the Blackbird continued to pursue the lizard. After a further 0.5 m the lizard stopped running, presumably as a result of injuries it had sustained from continued pecking (much in the head region) by the Blackbird.

By 14:38 h, after a further 2-3 min pecking, shaking and turning by the Blackbird, the lizard stopped all evident movement. The Blackbird continued to peck it for a further 15 min (to 14:53 h), apart from three pauses of about 30 seconds each. Every 2-3 min the Blackbird would peck at what appeared to be small items of dislodged body tissue, but it did not attempt to eat the whole lizard until 14:53 h, when a head-first swallowing attempt failed. After more pecking and vigorous shaking by the Blackbird, the lizard was finally consumed head-first at 14:55 h - 20 min after first being found. Thereafter, the Blackbird rested, wings and tail down for 4 min, before resuming her feeding activity on the lawn.

During the time spent by the female pursuing and handling the lizard, her mate - a first summer male - foraged on the lawn at 5-10 m distance. At 15:05 h both birds flew into native scrub and trees below the lawn. The opportunity was then taken to inspect (without removal) the discarded skink tail, which was found on the lawn 0.5 m from the site where the lizard was killed and consumed. This confirmed the skink's identity as *Cyclodina aenea*. At 15:30 h the female Blackbird returned to the lawn and within 3 min had located and consumed the skink's tail, which by then had stopped its movement.

The Blackbird pair continued feeding on the lawn until 15:53 h when the female again returned to the upper terrace site where the first skink was found. Within 1 min she had located another copper skink - this time a sub-adult of estimated total length 50-60 mm, after listening with head to one side ca. 50 cm away. This time the Blackbird caught the skink across the mid-body region and flew off with it into the bush below. She returned to the lawn and log sites at 16:10 h.

The Blackbirds were observed until 17:25 h but no further lizard predation was seen, despite both birds feeding where the two lizards had been found. An adjacent Blackbird pair - a first summer female and an adult male - were also observed during this period, but were not seen to take any lizards. Further observations of the birds were made over 15:00 - 17:30 h the following day, but no more predation of lizards was seen.

Discussion

The introduced Blackbird feeds mainly on the ground taking invertebrates, including earthworms, but also fruits in season (Hillstead 1945, Gurr 1954, Snow 1958, Lack 1966, Simms 1978, Perrins 1987). Although of interest, the addition of lizards to the Blackbird's diet is not extraordinary, for Morris (1954) describes the species as "dietetically adventurous".

Lovegrove (1981) briefly reports a Blackbird feeding in September-October on skinks which were common on South East Island, while Blackbirds in New Zealand have also been observed eating frog tadpoles (*Litoria* sp.) from the edge of a pond (Carson 1995) or in a dried-up pond (P.C. Bull, pers. comm.). In Britain, Witherby *et al.* (1943) record no instances of Blackbirds eating lizards. More recently, however, European Blackbirds have been recorded taking lizards (sand lizard *Lacerta agilis*, viviparous lizard *Lacerta vivipara*, slow-worm *Anguis fragilis*), as well as small fish, newts (*Triturus* sp.), frogs and tadpoles, a snake (*Natrix* sp.), nestling birds and (apparently) a mouse (Simms 1978; Frazier 1983; Cramp 1988; A.P. Bell, pers. comm.). In one attack on an adult slow-worm (a legless lizard) only the detached tail was consumed (A.P. Bell, pers. comm.). In Europe, Song Thrushes (*Turdus philomelos*) may also take viviparous lizards (Chater 1965), and can kill slow-worms (Husband 1967).

As a common forager on lawns, in gardens, and in ground litter beneath scrub and forest in New Zealand, the Blackbird is likely to quite frequently encounter and consume native lizards, especially in coastal areas and/or on islands where such lizards may be more common (*e.g.* see Lovegrove 1981). The female Blackbird observed here was clearly capable of capturing and killing the relatively small copper skink, although this involved a prolonged handling time before consumption (15-20 min). This suggests that the skink may have been a relatively large prey item for the Blackbird. Unlike some soft-bodied invertebrate prey, the lizard (apart from the tail) did not readily fragment as a result of pecking and shaking, although it was rendered motionless (and probably lifeless) after only three minutes.

The nutritional reward to the Blackbird - approx. 4 g of lizard - may have compensated for the protracted handling time, a possible protein advantage for the female just prior to her egg-laying (a half-built Blackbird nest was found within 10 m of the predation site on 23 September but was abandoned a week later before completion). The tail-drop predator-avoidance tactic of the copper skink was insufficient to distract the Blackbird in this case, where the lizard remained in full view on the recently mown lawn. With the lizard more hidden - *e.g.* in denser vegetation or under other cover - such an anti-predator device may be more successful.

The smaller sub-adult lizard was captured and initially handled in a manner similar to the bird's handling of large spiders the same day: it was held in the bill then the bird flew with it into adjacent bush. As consumption of the second lizard was not seen, the handling time before this presumed consumption is not known.

Three lizards occur at the Seatoun site at which these observations were made - the copper skink *C. aenea*, the common skink *Oligosoma nigriplantare polychroma*, and the common gecko *Hoplodactylus maculatus*. *C. aenea* is active throughout the

day, tending to prefer to move under the cover of rocks, logs or vegetation, rather than basking in the open like *O. n. polychroma*. Both skink species would be at some predation risk from the Blackbird, although in the present case predation was opportunistic - the skinks had been under the log pile moved earlier in the day. The general impact of the Blackbird and Song Thrush on lizard populations in such suburban situations is not clear, though it is likely to be less than that of introduced mammalian predators, such as the domestic house cat (Fitzgerald 1990). The common gecko reaches a larger size and girth and is more nocturnal than the skinks so it may be at less risk from *Turdus* predation. The only other bird seen preying upon lizards at the site over recent years was the New Zealand Kingfisher *Halcyon sancta* which periodically caught skinks, apparently basking *O. n. polychroma*. However, in the Wellington area the domestic fowl *Gallus gallus* has also been recorded taking common and copper skinks (pers. obs.).

Whitaker and Thomas (1989) cite at least 23 bird species preying upon lizards in New Zealand, but only one citation (Lovegrove 1981) refers to the Blackbird, and none refer to the Song Thrush. The Kingfisher heads the list (31% citations), followed (in decreasing order) by Weka *Gallirallus australis* (11%); Australasian Harrier *Circus approximans*, Morepork *Ninox novaeseelandiae*, Long-tailed Cuckoo *Eudynamis taitensis* and New Zealand Falcon *Falco novaeseelandiae* (5-8%); Laughing Owl *Sceloglaux albifacies*, Kakapo *Strigops habroptilus*, Australasian Bittern *Botaurus stellaris*, Little Owl *Athene noctua* and Magpie *Gymnorhina tibicen* (2-5%); Black-fronted Tern *Chlidonias hybrida*, Pukeko *Porphyrio porphyrio*, Starling *Sturnus vulgaris*, Banded Rail *Rallus philippensis*, Kookaburra *Dacelo gigas*, Black-backed Gull *Larus dominicanus*, Blackbird, goose *Anser* sp., Myna *Acridotheres tristis*, New Zealand Pipit *Anthus novaeseelandiae*, Red-billed Gull *Larus novaehollandiae* and White-faced Heron *Ardea novaehollandiae* (0.5-2.0%).

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