

SHORT NOTE

Little shearwaters (*Puffinus assimilis haurakiensis*) as prey for morepork (*Ninox novaeseelandiae*)

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During a survey trip to Motu Muka (Lady Alice Island, 35°53'15.2"S, 174°43'09.2"E) on the 4–7 August 2020, the remains of three North Island little shearwaters (*Puffinus assimilis haurakiensis*) were found on the ground, beheaded and plucked, as is typical of ruru/morepork (*Ninox novaeseelandiae*) predation on birds (Brown & Mudge 1999) (see Fig. 1). Two were freshly killed (night prior to finding), while one was several days old.

Ruru calls from at least two individuals were commonly heard in the vicinity at night during playback surveys to locate shearwater burrows. All three shearwater carcasses were found in a small area (0.3 ha) which may be within the territory of a single ruru (territories vary from 3.5–7.8 ha; Seaton & Hyde 2013). Although generally insectivorous, ruru are known to take vertebrate prey including lizards, mice, and other small bird species (Haw & Clout 1999; Denny 2009; Busbridge & Stewart 2018). Little shearwaters have been recorded previously as ruru prey on the Mercury islands (Anderson



Figure 1. Beheaded and plucked little shearwater carcass, Motu Muka (Lady Alice Island). (Photograph: E.A. Whitehead).

1992), and it was suspected that the depredated birds were fledglings, who may be more vulnerable than adults, particularly when they emerge from their burrows before fledging (in November and December). However, due to the timing of our trip, early August, being the beginning of the incubation period for little shearwaters (Booth *et al.* 2000), those found dead could only be adult birds. Indeed, one was found directly outside a burrow that contained a freshly laid egg, which remained abandoned for the duration of the trip.

Little shearwaters may be an easily captured prey item for ruru due to their nocturnal behaviours, particularly early in the breeding season. During this time little shearwaters are often observed sitting on the ground outside burrows calling, which advertises their location to conspecifics but also to predators. Although little shearwaters are agile tree-climbers (see Fig. 2), they can be slow to respond to disturbances and are vulnerable on the ground to attack from above. Despite their size, small owls are known to have a formidable predatory capacity; little shearwaters weigh on average 240 g (Southey 2013), while ruru are on average 175 g (Seaton & Hyde 2013). In Australia, the close relative of the ruru, the Southern boobook (*Ninox novaeseelandiae*

boobook), has been observed taking prey up to 2.4 times their bodyweight, i.e. a 420 g juvenile common ringtail possum (*Pseudocheirus peregrinus*) (McNabb 2002).

Tuatara (*Sphenodon punctatus*) are the only other possible nocturnal predator of little shearwaters on Motu Muka and are abundant on the island. In this instance the remains of the carcasses showed a pattern typical of ruru predation, so tuatara were ruled out as the cause of death, although they are known to consume seabird eggs, chicks and adults (Fraser 1993). Consumption of adult birds is likely to be scavenging behaviour rather than outright predation, except in the case of larger adult tuatara, which may be capable of killing them (Fraser 1993). The two species regularly come into contact without conflict as tuatara are observed cohabiting burrows with little shearwaters (*pers. obs.*), although it is unknown if this has any impact on breeding success. Tuatara presence in fairy prion (*Pachyptila turtur*, tītī wainūi) burrows delays adult arrival and reduces the time adults spend with their chicks (Corkery *et al.* 2015), but does not significantly impact population-level breeding success through predation (Markwell 1998; Walls 1978). It is also unlikely that little shearwaters fall prey to diurnal



Figure 2. Little shearwater climbing behaviour – leaving the colony pre-dawn on the Poor Knights Islands. (Photograph: E.A. Whitehead).

predators such as Australasian harriers (*Circus approximans*, kahu), as adult shearwaters arrive on the colony well after dark, although disorientated fledglings may be at risk if they do not manage to depart the island prior to dawn.

Nocturnal predators such as ruru should be considered when recruiting small seabirds, e.g. little shearwaters, Cook's (*Pterodroma cookii*, tītī) and Pycroft's petrels (*Pterodroma pycrofti*), common diving petrels (*Pelecanoides urinatrix*, kuaka), white-faced storm petrels (*Pelagodroma marina*, takahikaremoana), and tītī wainui, to new colony sites via acoustic attraction or translocation. Ruru may cue in to the availability of seabirds as prey and take advantage of this during seasonal peaks of activity, such as pre-laying courtship periods when adults are present, and when fledglings exercise outside their burrows prior to departing the colony. Ruru are known to take advantage of seasonal availabilities of prey and thus their diet fluctuates throughout the year (Denny 2009), and similarly southern boobooks can exploit irruptions of rodents by migrating beyond their breeding territories to a transient food resource (McDonald & Pavey 2014). Therefore, it is possible for ruru to exploit seasonal abundances of vulnerable prey such as small seabirds, even outside their normal breeding territories. This may inhibit population growth when the size of recently established or establishing seabird populations is small (Busbridge & Stewart 2018). Assessing ruru densities at translocation sites has been suggested for endangered diurnal bird species such as hihi (*Notiomystis cincta*) (Busbridge & Stewart 2018), and shore plover (*Thinornis novaeseelandiae*, tūturuatu) (Davis & Aikman 1997), and should also be considered for small nocturnal seabirds.

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