

## SHORT NOTE

### North Island kokako (*Callaeas cinerea wilsoni*) feed on flax (*Phormium tenax*) nectar on Tiritiri Matangi Island, Hauraki Gulf, New Zealand

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The North Is kokako (*Callaeas cinerea wilsoni*) is an endangered member of the New Zealand endemic wattlebird family (*Callaeatidae*). Typically described as being omnivorous (e.g., Best & Bellingham 1990; Powlesland 1987), kokako eat predominantly fruit and leaves, but flowers, moss, and insects can be important depending on their availability (Innes *et al.* in press) and the time of year (Powlesland 1987). Despite its being widely distributed across the North Island before European settlement (Innes *et al.* in press), the kokako is now restricted to scattered locations on the mainland because of the effects of introduced mammalian pests and competitors, and habitat clearance (Innes *et al.* 2006). Several attempts have been made to introduce kokako to off-shore islands, and 6 kokako were transferred to Tiritiri Matangi I from Mangatutu (via a breeding programme at Mt Bruce National Wildlife Centre) and Mapara in 1997-98 (Innes & Flux 1999). The habitat of Tiritiri Matangi I consists of a mosaic of replanted and regenerating forest, 10-20 years old. The predominant species planted were pohutukawa (*Metrosideros excelsa*), mahoe (*Meliclytus ramiflorus*), cabbage tree (*Cordyline australis*), and New Zealand flax (*Phormium tenax*). In addition, there are 4 small areas of remnant broadleaf coastal forest, whose canopies are dominated by kohekohe (*Dysoxylum spectabile*), pohutukawa (*Metrosideros excelsa*), and taraire (*Beilschmiedia tarairi*). The introduction of

kokako to Tiritiri Matangi was controversial, because the island lacked the large areas of structurally complex forest thought to be necessary to sustain a population of kokako (Jones 2000).

During routine Department of Conservation (DoC) monitoring of kokako breeding attempts, and casual ornithological observation, 10 of 14 individually colour-banded kokako were observed feeding on flax nectar during the spring of 2005. Birds in general feed on nectar either by destructive sampling of flowers, or by entering the corolla of the flower passing by the stigma and stamens (Newstrom & Robertson 2005). The 2nd method results in the transfer of pollen from the flower to the head of the bird, presumably facilitating pollination. We observed kokako feeding directly on flax flowers (Fig. 1), and with flax pollen "caps" on their foreheads. To our knowledge, kokako have not previously been described feeding in this fashion on flax nectar (John Innes, pers. comm.). Their feeding methods appeared to be identical to those used by the recognised native pollinators of flax, tui (*Prothemadera novaeseelandiae*), bellbird (*Anthornis melanura*), both honeyeaters (Meliphagidae), and the stitchbird (hihi: *Notiomystis cincta*) (Craig & Stewart 1988). The stitchbird has recently been transferred to its own family (Notiomystidae), which is perhaps most closely related to the Callaeatidae (Driskell *et al.* 2007).

Before our observations, North Island kokako have been recorded feeding on nectar of rewarewa (*Knightia excelsa*) and puriri (*Vitex lucens*), albeit at very low rates such as 1% of the diet of 19

Fig. 1 North Is kokako (*Callaeas cinerea wilsoni*) feeding on flax (*Phormium tenax*) nectar on Tiritiri Matangi Island. Note pollen on forehead of bird. Photo: S. Fordham.



individuals in Puketi forest (Powlesland 1987). This contrasts with our observations where all birds were seen commonly either actually feeding, or with flax pollen plumage. The floral architecture of flax differs from puriri and rewarewa in that the shape and size of the flowers requires birds to have a long brush-like tongue to access the nectar while making contact with pollen (Craig & Stewart 1988). Although it is not as fine as the brush end of the tongue of the honeyeaters, the tongue of the kokako does end in a 'yard broom'-like brush (McCann 1964), which potential allows kokako to incorporate more nectar in their diet than was previously thought.

Conservation management of kokako has tended to focus on their being primarily a species of mature, complex forest (Innes & Flux 1999), where they are unlikely to encounter flax. However, South Is kokako often came down to vegetable gardens of early New Zealanders (C.E. Douglas *in* Pascoe 1957), and were also observed feeding at forest-scrub edges (McLean 1912) and in subalpine shrubland (Worthy & Holdaway 2002). Although our observations may indicate some behavioural plasticity to novel environments, they also highlight that the species may have inhabited much more varied habitats than where they are now found. Currently there are 18 kokako on Tiritiri Matangi I (having increased from the 6 introduced) and interestingly, they appear to prefer foraging and nesting in areas of replanted and regenerating forest, rather than in the mature remnants (Jones 2000). One of the stated research questions of the kokako recovery plan (Innes & Flux 1999) is to determine what is 'good' habitat for kokako. Our observations that show that

most of the Tiritiri Matangi I population feeds on a hitherto unrecognised food type demonstrates that this species can inhabit low, shrubby, and structurally simple habitat. The observations also highlight the importance of not assuming a species habitat requirements are limited to those where they survive today.

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