Notornis, 2008, Vol. 55: 38-39
0029-4470

SHORT NOTE

Foot-trembling and beak probing by the shore plover (*Thinornis novaeseelandiae*) on sandy beaches

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The strange leg and foot shaking behaviour, variously described as "foot-trembling," has been recorded for at least ten species of plovers, including lapwing (*Vanellus vanellus*), little ringed plover (*Charadrius dubius*), ringed plover (*C. hiaticula*), Kentish plover (*C. alexandrinus*), golden plover (*C. apicanus*) and three-banded plover (*C. tricollaris*) (Simmons 1961a; Tarburton 1989). In New Zealand, foot-trembling has been described in black fronted dotterel (*C. melanops;* Heather 1977; Tarburton 1989), spur-winged plover (*V. miles;* Keeley 2001), and New Zealand dotterel (*C. obscurus;* Searle 1984). Soper (1977) commented that foot-trembling is characteristic of feeding in the shore plover (*Thinornis novaeseelandiae)* on the Chatham Islands. However, there have been no published observations of the feeding behaviour of this species outside the Chatham Islands. Here I report observations on a translocated population of shore plovers that used foot-trembling and peak probing when feeding on sandy beaches, a habitat that is rare elsewhere in their current range.

Heather (1977) defined "foot-trembling" as the rapid shaking of one leg at a time and "foot-paddling" as the simultaneous rapid movement of both legs, adding that "foot-trembling" could be subdivided into "foot-tapping", where the foot clearly hits the surface, and "leg-shaking", where the foot does not touch the surface. Both Simmons (1961b) and Heather (1977) suggested that foot-trembling may enable a bird to locate camouflaged invertebrates below the surface while feeding. Heather & Robertson (1996) and Marchant & Higgins (2006) report that shore plover on South East Island/Rangatira usually feed amongst the tide-wrack, on wet rocky platforms covered with algae and barnacles, and at freshwater seeps and pools. Both comment that foot-trembling is used by shore plovers when feeding on rock platforms and salt-meadow turf. Beak probing has been reported in the popular literature for black-bellied plover (*Pluvialis squatarola*) and piping plover (*C. melodus*) but not described in detail. Beak probing may also be a feeding method of the shore plover on the Chatham Islands although not been described in the published literature, possibly because sandy beaches are rare and it has not been observed.

I made my observations on captive-bred shore plover that were released as part of a translocation programme to predator-free Mana Island (S 41°05', E 174°47'; 217 ha). Most birds were juveniles and all were banded to aid recognition. The nearest part of the North Island coast to Mana Island is Green Point (S 41°07', E 174°48'), and it lies 2.5 km SE of Mana Island. Several shore plovers, often in groups of up to six but occasionally only a single bird, visited Green Point from Jul to Sep 2007 and provided excellent opportunities to observe their behaviour at close range. I observed birds foraging on five types of coastal habitats: sandy beach, boulder beach, inter-tidal rock stacks, rough grazed pasture, and in a small stream above a boulder beach.

On 9 Aug 2007, a flock of four juvenile shore plover were seen feeding on short grassland at the top of a rocky beach at the western side of Green Point, as well as amongst seaweed piled at the high tide line and on the small intertidal boulder-sandy foreshore. All the birds moved continuously and occasionally they lightly pecked the surface of the firm wet sand with their beaks. The flock then ran 300 m east along a boulder foreshore but stopped and commenced feeding when reaching a sandy beach where the surface sand (about 1 cm) was soft and dry. While observing the flock from 3-15 m with the naked eye and binoculars, three features were noticeable in two birds. Both were males (banded BR-RO & RO-OG; S. Caldwell, *pers. comm*.).

Firstly, the birds would stop after a short walk, stand upright, and rapidly 'foot-tremble' one leg. This was followed immediately by beak-probing the sand at the same spot. Each 'foot-trembling' event lasted 1-2 sec and involved about 8-10 shakes per second. The foot lightly touched the sand during 'foot-trembling' (thus, "foot tapping" under

Received 9 December 2007; accepted 23 July 2008

Heather's [1977] definition) and a slight disturbance to the sandy surface was observed. Secondly, the use of beak probing appeared to be a method of obtaining food from the sandy substrate. This behaviour involved a rapid vertical movement of the head and beak into the sand, five or six times, similar to the movement of a sewing machine needle. I did not see any food objects in the beak but I suspect the birds were feeding as the beach has a high population of small crustaceans just below the surface and they may have been eaten during beak probing. Lastly, following beak probing each bird walked slowly on the sandy beach for 1-2 m, stopped, stood upright and resumed 'foot-trembling.' This time birds used the other leg and again trembling was followed by rapid beak probing. Thus, each successive episode of 'foot-trembling' was carried out using alternate legs.

Feeding on the sandy beach using 'foot-trembling' and beak probing lasted for 15 minutes before the flock left the locality. It did not appear that the presence of leg bands hindered foot-trembling behaviour. Foot-trembling and beak probing was not observed in any of the other habitats between Jul and Sep 2007.

A further observation of similar foraging behaviour was seen by J. Elsworth on 25 Oct 2007. An adult shore plover (banded RW-YW, sex unknown) was observed at the western end of Petone Beach, Wellington Harbour. It was walking on wet sand close to the water's edge and periodically displayed 'foot-trembling' and beak probing, then walked a short distance before repeating this behaviour with the other leg (J. Elsworth, *pers. comm*.). The behaviour appeared similar to what I observed in shore plovers feeding at Green Point.

The observations reported here suggest that 'foot-trembling' and beak probing by shore plovers is consistent with 'foot-trembling' reported in the literature for other plovers and may be a specialised mechanism for feeding on soft sandy beaches. However, further observations are needed to better understand this unusual feeding method and the conditions under which it occurs.

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Keywords Shore plover; *Thinornis novaeseelandiae*; foot-trembling.