

The Ruff is sexually dimorphic for size. Cramp & Simmons (1983) quote the size range for male Ruff as 26-30 cm, whereas the female Reeve is smaller with a range of 20-24 cm. The Knot has a size range of 23-25 cm.

As this bird was larger than the Knot, we believe that it was a male.

This record, which was accepted by the OSNZ Rare Birds Committee, is the first positive record for New Zealand. The first possible record was of a bird at the Manukau Harbour in April 1964 (Mackenzie & McKenzie) but this was only admitted to the Suspense List in the New Zealand checklist (OSNZ 1970).

We later learned that this bird had been seen nearby by Colin O'Donnell on 30 December 1984, which would be the first actual sighting. On 14 January, two birds, possibly a Ruff and a Reeve, were seen by Ken Hughey but since then only single birds have been seen.

The Ruff has occurred in Australia in most summers since 1962 but from widely scattered localities (Blakers *et al.* 1984).

This recent sighting confirms the addition of Ruff to the New Zealand list.

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### Some foods of Hutton's Shearwater (*Puffinus huttoni*)

Hutton's Shearwaters (*Puffinus huttoni*) breed on steep, tussock-covered slopes of the Seaward Kaikoura Mountains (42° 15'S, 173° 38'W) in the north-east of the South Island (Harrow 1965). They migrate to seas off the north-west coast of Australia during autumn (Halse 1981).

Little is known about the foods of this species. Harrow (1976) reported that Kaikoura residents saw up to 20 000 in the bay on 20 and 21 September 1967 feeding on "shoals of unidentified silver fish about 35-40 mm long". Tarburton (1981) examined nine drowned on 28 August 1980: all had stomachs full of very small fish, one shearwater (fresh weight 466.5 g) having 42.5 g of stomach contents.

#### MATERIALS AND METHODS

The data for this note are from 25 shearwaters drowned in nets at South Bay, Kaikoura, on 20 October 1984. The collector, D.W. Tattle of the University of Canterbury, reported that many thousands of shearwaters were feeding in the bay and numerous small nekton were visible in the calm water. A net of 108-mm mesh set by a local fisherman ensnared at least 50 Hutton's Shearwaters. Although the net was probably set overnight, the birds were

almost certainly caught in the morning because, if they had been in the net all night, nocturnally scavenging isopods may have reduced the carcasses to skeletons by daybreak (W. Davison, pers. comm.). The 25 specimens were collected at 0800 hours and frozen. In November 1984 their stomach contents were removed, and later the birds were deposited at the National Museum. All but one were males.

The stomach and gizzard contents of each bird were carefully washed through a 0.8-mm-mesh sieve. All food items were initially assigned to the following classes: fish skeletons, otoliths, crustaceans, and squid beaks. Fish backbones (up to 10 from each sample), with part of the skull still present and the last vertebra obvious, were measured with vernier calipers, and whole skulls and tail fins were also measured to give an estimate of fish length.

### RESULTS

Only two fish samples were intact enough for tentative identification. Almost all these remains were of a small pelagic clupeid, probably *Sprattus antipodum*. All were juveniles, possibly part of a large shoal of a single age-group. Another fish was tentatively identified as a larval wrasse (*Pseudolabrus* sp.). The measurements of the backbones, skulls, and tails (Table 1) give an average fish length of approximately 40 mm. The female had apparently been feeding on the same-sized prey as the males. Fish counts (Table 2) were based on the number of backbone sections longer than 20 mm.

Very few crustaceans were intact. Counts (Table 2) were made of pairs of eyes, which are more resistant to digestion than the rest of the body. Some samples contained enough broken parts of bodies for identifications to be made.

The squid beaks found in six samples (Table 2) were all very small. Only the most heavily darkened area around the rostrum remained, indicating that they were from juveniles.

When the birds were caught, the flocks were drifting southwards, feeding in the typical shearwater manner. As fishing nets are set at least 0.6 m below the surface and are usually 1.8 m deep (D.W. Tattle, pers. comm.), the shearwaters must have been diving to depths of at least 0.6-2.4 m.

### DISCUSSION

Work by Griffiths (1975) on the rates at which small fish fed to European perch (*Perca fluviatilis*) were digested showed that, after 24 hours, only 4-5% of their dry weight remained in the perch's stomach. Duffy & Laurenson (1983) found that captive Cape Cormorants (*Phalacrocorax capensis*) retained fish otoliths in the stomach for only one day and that, when regurgitated in pellets, the otoliths were severely eroded. Uspenski (1956) had similar results from Thick-billed Murres (*Uria lomvia*). Wilson *et al.* (1985) fed fish and squid to captive Jackass Penguins (*Spheniscus demersus*) and stomach-pumped them to analyse digestion rates. Otoliths were present 4-18 hours after ingestion, but all other parts of fish were completely digested 10-14 hours after a meal; squid took a little longer (18-22 hours). A captive Shy Albatross (*Diomedea cauta*) fed daily on fish and once on squid had no otoliths in its digestive

TABLE 1 — Measurements (mm) of fish skeletons from the stomachs of 25 Hutton's Shearwaters drowned in Kaikoura Bay on 20 October 1984

	All samples			Female only		
	N	Mean	Range	N	Mean	Range
Length of backbone	162	26.2	18.6-37.7	9	26.9	23.3-30.5
Skull length	9	7.0				
Tail length	8	6.4				
Estimated length of fish		39.6				

TABLE 2 — Prey items from the stomachs of 25 Hutton's Shearwaters drowned in Kaikoura Bay on 20 October 1984

Class Order Family Species	Samples with prey item	Number of prey items		
		Total	Mean per 25 samples	Range
Osteichthyes (fish) (intact or backbones)				
Clupeidae <u>?Sprattus antipodum</u>	25	1330	53.2	8-116
Labridae <u>Pseudolabrus</u> sp.	1(+)	1(+)		
(Otoliths only)	3	21	0.85	0-10
Myctophidae <u>Symbolophorus</u> sp. Unidentified		12 9		
Crustacea (intact or pairs of eyes)				
Euphausiacea <u>Nyctiphanes australis</u>	23	2830	113.2	0-447
Mysidacea <u>Tenagomysis</u> sp.	2	3		
Cephalopoda (beaks only)				
Teuthoidea	6	11	0.4	0-5
<u>Nototodarus</u> sp. Unidentified		9 2		

tract after death, although it had eaten fish the previous day; however, squid beaks were present 38 days after ingestion and some must have been present for at least 50 days (Furness *et al.* 1984).

The fish remains from the Hutton's Shearwaters were well digested, mostly with only backbones and a few otoliths intact.

Thus, most of the fish had probably been eaten some hours before the birds died. The myctophids could have been captured about dusk the previous day, but the squids may have been caught days before. The crustaceans, however, were more complete than the fish and possibly pursuit of these had led the birds into the net. Continued digestion after death may account for the general absence of whole animals swallowed just before drowning.

In late October, many male Hutton's Shearwaters would be preparing and defending their burrows in preparation for incubation. They fly into the colony at nightfall and may leave at dawn to feed; many may stay near the coast throughout the day. Most of the females are probably further out at sea at this time. Thus, the birds in this sample could have fed on small fish at dusk, flown into the nesting areas at night and returned at dawn to feed mainly on euphausiids.

These and the earlier findings show that small fish and euphausiids are a major part of the diet of this species, at least from August to October. Examination of more samples collected at other times of the year will provide valuable additional information.

#### ACKNOWLEDGEMENTS

We thank W. Davison for the identification of fishes, and J. Warham, L.H. Field, M.C. Crawley and P.J. Moors for helpful comments on the manuscript.

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