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SHORT NOTE

Foods of New Zealand dabchick (*Poliocephalus rufopectus*) and New Zealand scaup (*Aythya novaeseelandiae*)

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The endemic New Zealand dabchick (*Poliocephalus rufopectus*) and New Zealand scaup (*Aythya novaeseelandiae*) inhabit still freshwaters where they are active divers and feed mainly underwater.

Little information has been published on the diet of either species. Buller (1888) considered molluscs to be important foods of dabchicks, Buddle (1939) observed dabchick taking freshwater crayfish (*Paranephrops*) and fish (*Gobiomorphus gobiodes*), while Marchant & Higgins (1990) reported them as rarely taking small fish. Storer (1971) reported dabchicks feeding on hatching midges (F. Chironomidae) from the water surface and air.

Foods of New Zealand scaup have gone unreported beyond the remark that they "take chironomid larvae in captivity, gastropods, littoral vegetation and tips of submerged macrophytes in wild" (M.J. Williams pers. comm. in Marchant & Higgins (1990).

In this paper I report on the gizzard contents of 11 dabchick and 19 scaup. These birds, mostly adults and of both sexes, were inadvertent casualties of pest fish eradication operations conducted between 3 October 2001 and 25 March 2002. The dabchicks were caught at Tumurau lagoon (Bay of Plenty, 5 March 2002), Lake Pouarua (Taupo, 25 March 2002), near Levin (Horowhenua, 3 October 2001) and at Marlborough Ridge resort wetland (Marlborough, 5 December 2001); the latter specimen appears to have been only the second South Island record for the past 50-60 years (Turbott 1990). Scaup were caught at Lake Pouarua (Canterbury, 25 March 2002), Woodend Lagoon (Canterbury, 17 December 2001), Lake McLaren (Bay of Plenty, 9 March 2002) and Westmere lake (Wanganui, 6-7 February 2002).

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Most of the specimens were frozen within 24 hours of capture. Upon thawing, their oesophagus and gizzard were removed and preserved in alcohol for later examination. Subsequently, the gizzards were cut open and the contents examined under a stereo microscope at 10x power. Invertebrate fragments were compared against reference specimens and guide books (Winterbourn 1973; Winterbourn & Gregson 1989) and diagnostic fragments counted. Plant material was sorted into like categories but detailed identification was not attempted.

The foods of dabchicks were similar at each locality and different between localities (Table 1). The six birds from Tumurau lagoon all contained water boatmen (*Sigara* sp., O. Hemiptera) and fish (bully, *Gobiomorphus* sp.). Birds from Lake Pouarua and near Levin contained mostly dragonfly nymphs (O. Odonata) and water boatmen. Snails (Gastropoda) were consumed at all three sites. The Marlborough bird had consumed mostly insects (water boatmen, chironomid larvae and beetle imagos (O. Coleoptera). Small quantities of plant material were found in three gizzards.

This diet is similar to that of dabchicks elsewhere e.g., little grebe (*Tachybaptus ruficoilis),* horned grebe *(Podiceps auritus),* red-necked grebe *(Podiceps grisegena),* and hoary-headed grebe (*Poliocephalus poliocephalus*). Their diets are reported to comprise mostly insect larvae, including mayflies, stoneflies, dragonflies, hemiptera, beetles, ants, moths, flies, caddisflies, damsel flies and lacewings (Cramp & Simmonds 1977). Occasional fish are reported in their diets and also some crustacea, mollusca and worms. Fish are common in the diet was higher of great crested grebe (*P. cristatus*) and, in little grebe, changes seasonally by increasing during winter. Plant material was found in the diet of horned grebe and hoary-headed grebe, and possibly incidentally, in little grebe (Cramp & Simmonds 1977; Marchant & Higgins 1990).

The foods of scaup also varied between sites but were similar within sites (Table 2,3). Snails were common foods of all 12 birds from Woodend lagoon in Canterbury (Table 2) and of birds from Lake McLaren in Bay of Plenty (Table 3), but chironomid larvae were a feature of the Woodend diet only. All Lake McLaren birds had consumed Trichoptera larvae whereas only half the birds from Woodend Lagoon retained evidence of having done so, and in lesser quantities. At Westmere lake and Lake Pouarua snail remains dominated the gizzard contents. Small stones were a feature of the gizzard contents at both Woodend Lagoon and Lake McLaren and seeds were common gizzard contents in these two samples also.

Table 1 Numbers and identity of prey in gizzards of New Zealand dabchick

Location		**Tumurau**						**Pouarua**			**Levin**	**Marlborough**
Sex of specimen		m	m	m	m	m	m	f	m	m	f	f
Prey category	Prey identity											
Snails	*Physa acuta*										6	
	Gyraulis sp.										8	
	Potamopyrgus antipodarum		11		3	1	1	2	4	18		
Fish	*Gobiomorphus* sp.	125	5	3	18	5	13					
Dragonflies nymph	*Procordula (grayi?)*							81	80		162	
	Diplacodes (bipunctata?)								1	4	2	
	Aeshna(brevistylus?)										2	
Damselflies nymph	*Xanthocnemis (zelandica?)*								1		15	
	Austrolestes (colensonis?)										1	
Water boatman	*Sigara* sp.	129	169	110	137	60	11	2	1	10	52	74
Backswimmer	*Anisops* sp.	2								48	3	10
Diptera	Chironomidae larvae											42
Beetles	Weevil, sp. unknown	2	3	4	4		1					
	Rhantus pulverosus											3
	Lancetes (lanceolatus?)											2
	Beetle larvae, sp. unknown											1
Trichoptera	Larvae, sp. unknown											1
Lepidoptera	Larvae, sp. unknown		1								9	
Crustacean	*Daphnia* egg											118
Plant	*Lagarosiphon*? leaves										0.5g	<0.5g
	Unknown grass seed											13
	Filamentous algae					<0.5g						
Unknown invertebrates		5		1		1	1				3	2

Table 2 Numbers and identity of prey in gizzards of New Zealand scaup from Woodend Lagoon, Canterbury. (* small (0.4 mm) spores apparently from small branched algal thallus; ** seeds of 7 (apparently terrestrial) plants.

Sex of specimen		f	f	m	f	f	m	f	f	m	?	f	m
Prey category	Prey identity												
Snails	*Gyraulis sp.*								8	3			
	Potamopyrgus antipodarum	16	56	1	138	4	4	2	18	2		1	4
Bivalve	2 species								42				
Water boatman	*Sigara sp.*	1		1	3	3			4	2	13	1	
Backswimmer	*Anisops sp.*	1	1		2	8		1	3	4	25		
Diptera	Chironomidae	35		37		389	56	96	50	67			
Beetle	*Lancetes (lanceolatus?)*	1											
Trichoptera	*Oxyethira albiceps*	5				1							
(nymph)	*Paroxyethira hendersoni*		79		23	1	7						
	Hydroptilidae			1		2							
Crustacean	Daphnia egg	5		5	1	14	4	14	112				
Plant	*Lagarosiphon*? Leaves						3						
	Potamogeton? Seed	3	7	15		1		1	6	8		2	1
	Algae spore, 2 types*	15+	5	1	4	2	1	1000+		4	5		
	Unknown seeds**	14	50	127	7	5	6	20	26	62	3	21	2
Stones (g)		2.5	3.69	1.63		3.58	5.5	4.51	3.93	2.16	0.5	2.39	

Table 3 Numbers and identity of prey in gizzards of New Zealand scaup from Lake McLaren and Westemere lake (North Island) and Lake Pouarua (Canterbury). (* small (0.4 mm) spores apparently from small branched algal thallus; ** seeds of 7 (apparently terrestrial) plants.

Location		Lake Mclaren			Westmere lake			Lake Pouarua	
Sex of specimen		m	f	m	m	f	f	m	f
Prey category	Prey identity								
Snails	*Physa acuta*					20			
	Potamopyrgus antipodarum	4	17	50	6	75	354		4
	Snail, unknown sp.							+	≈50
Dragonflies	*Procordula (grayi?)*								2
Damselflies	*Xanthocnemis (zelandica?)*					1			
Water boatman	*Sigara sp.*			1					
Backswimmer	*Anisops sp.*		1						1
Diptera	Chironomidae				7				
Beetles	*Liodessus plicatus*					1			
	Antiporus sp. larvae					15			
Trichoptera	*Oxyethira albiceps*		7	12	47	78			
(nymph)	*Paroxyethira hendersoni*		13	3	14	39			
	Paroxyethira tillyardi		3	2	6	2			
	Hydroptilidae		11	9	43	11			
	Triplectides sp.					1			
Plant	*Lagarosiphon*? Leaves				1	1	10+		1
	Potamogeton? Seed	1			1		5	1	
	Algae spore, 2 types*								2
	Seeds**	2	1	16	1			14	
Unknown inverebrates			1	37	3				4
Stones (g)			5.39	3.41	5.53	6.34			

The diets of overseas relatives of scaup are a mixture of aquatic plants (seed, rhizome, bud, shoot, leaf, tuber) and animals (crustacea, mollusca, worms, insects, amphibians, fish) (e.g., hardhead (*Aythya australis*), pochard (*A. farina*)) but may be plant-dominated (e.g., white-eyed pochard (*A. nyroca*)) or animal-dominated (e.g., tufted duck (*A. fuligula*)). Diet composition has been recorded as varying between season, locality and availability and to also include fish, tadpoles, annelids, insects (dragonflies, hemiptera, caddisfly, water beetles and flies) (Cramp & Simmonds 1977; Marchant & Higgins 1990). Diet of lesser scaup (*A. affinis*) was predominantly invertebrates (amphipods, leeches, chirnomid larvae, ostracods, Pelecypoda, Trichoptera, gastropods, hemipterids) (Dirschl 1969; Gammonley & Heitmeyer 1990). Molluscs and Pelecypoda, clams and snails may dominate at some sites (Thompson 1973; Hoppe *et al*. 1986) and aquatic plants and seeds have been recorded as seasonally important (Dirschl 1969; Thompson 1973; Hoppe *et al*. 1986; Gammonley & Heitmeyer 1990).

The prey identified from the gizzards of the 30 birds in this study included both benthic and water-column dwellers, implying that dabchicks and scaup may have similar feeding strategies. However, foods of dabchick were generally more mobile than those of scaup, and the scaup had also included seeds. The absence of other plant matter in the scaup gizzards may be a consequence of its rapid digestion and/or a reflection of the sites sampled rather than of deliberate avoidance.

A limitation with analysing diet from gizzard contents is that the importance of foods with hard fragments is greatly over-estimated. The data presented in the tables should not be taken to represent the relative importance of each taxon in the diet. Furthermore, without concurrent sampling of the benthic fauna, it is not possible to comment on any selectivity in the diet. However, a compositional difference in diet between dabchicks and scaup can be inferred. Dabchicks in this study ate fish and insects, predominantly water boatmen and dragonfly nymphs whereas scaup were more variable in their range of prey, and clearly consumed more snails. This general difference in diet was reflected in the birds' gizzards; scaup gizzards were appreciably larger, more muscled and contained small stones to aid the grinding of the harder foods.

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LITERATURE CITED

Buddle, G.A. 1939. Some notes on the breeding habits of the dabchick. *Emu* 39: 77-84.

Buller, W. L. 1888. *A history of the birds of New Zealand*. The author, London.

Cramp, S.; Simmonds, K.E.L. (eds.). 1977. *Handbook of the birds of Europe, the middle east and north Africa: The birds of the western palearctic, Volume 1*. Oxford University Press, Oxford.

Marchant, S.; Higgins, P.J. (coordinators). 1990. *Handbook of Australian, New Zealand and Antarctic birds, Volume 1*. Oxford University Press, Melbourne.

Dirschl, H.J. 1969. Foods of lesser scaup and blue-winged teal in the Saskatchewan river delta. *Journal of wildlife management 33*: 77-87.

Gammonley, J.H.; Heitmeyer M.E. 1990. Behaviour, body condition, and foods of buffleheads and lesser scaups during spring migration through the Klamath basin, California. *Wilson Bulletin 102*: 672-683.

Hoppe, R.T.; Smith, L.M.; Wester, D.B. 1986. Foods of wintering diving ducks in South Carolina. *Journal of field ornithology 57*: 126-134.

Storer, R.W. 1971. The behaviour of the New Zealand dabchick. *Notornis 18*: 175-86.

Thompson, D. 1973. Feeding ecology of diving ducks on Keokuk pool, Mississippi river. *Journal of wildlife management 37*: 367-381.

Turbott, E.G. (convener). 1990. *Checklist of the birds of New Zealand and the Ross Depenency, Antarctica*. OSNZ/ Random House, Auckland.

Winterbourn, M.J. 1973. A guide to the freshwater mollusca of New Zealand. *Tuatara 20:* 141-159.

Winterbourn, M.J.; Gregson, K.L.D. 1989. Guide to the aquatic insects of New Zealand. *Bulletin of the Entomological Society of New Zealand 9*.

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