Short Communications

Observations on the Diet of the Christmas Island Hawk-Owl *Ninox squamipila natalis*

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The Christmas Island Hawk-Owl *Ninox squamipila natalis* is a little known Australian endemic. Although generally classified as a subspecies of the Moluccan Hawk Owl it may be a distinct species (Lister 1888; Olsen & Stokes 1989; S.A. Parker pers. comm.). It is the only owl on Christmas Island, a small isolated island about 135 square km in area situated in the Indian Ocean 360 km from its nearest neighbour, Java. Although originally the island was covered almost wholly in rainforest, nearly a century of phosphate mining has removed one quarter of the forest and left some of the remainder fragmented and degenerating from exposure. Mining ceased in December 1987 and 62% of the island's land area is now managed by the Australian National Parks and Wildlife Service as a national park. The Christmas Island Hawk-Owl is listed as rare and endangered (CITES Resolutions 1976 Appendix 6; Ovington 1978; King 1981) but is probably secure at present (Olsen & Stokes 1989).

The Christmas Island Hawk-Owl is small (total length: males 270 mm, n = 10; females 280 mm, n = 9; weight: males 145 g, n = 3; females 153 g, n = 4) and its main prey is probably large insects (Olsen & Stokes 1989). Small reptiles and birds have been identified in stomach contents (Gibson-Hill 1947) and, occasionally, small mammals may be eaten (Andrews 1900; Stokes 1988; C. Tidemann pers. comm.). Around the settlement, the birds hawk moths attracted to streetlights and prey on introduced House Geckos *Hemidactylus frenatus* and Cockroaches *Periplaneta americana* (Kent & Boles 1984). Little is known of their diet in the primary rainforest.

In August 1989, three Christmas Island Hawk-Owls were discovered roosting together in a *Pongamia pinnata* in the rainforest canopy. A plastic sheet was strung beneath this presumed family group to catch, and protect from scavenging crabs, any pellets ejected. Ten pellets were collected on seven days between 13 September and 3 December, before the birds moved to a different roost. On two other days during the same period, two additional pellets were collected elsewhere. Intact pellets were measured and prey remains in them identified where possible.

Table 1 Diet of the Christmas Island Hawk-Owl determined from 12 pellets collected over seven days in September-December 1989. The size range typical of each insect species is shown in brackets; n is the number of daily samples (out of seven) in which that species was found.

		n
Orthoptera:	Gryllacrididae	
	Gryllacris rufovaria Kirby	4
	Coleoptera: Elateridae	
	Lanelater spp. (29-33 mm)	3
	Tetrigus murrayi Waterhouse (19 -28 mm)	3
	Tenebrionidae	
	Promethis carbonaria (Arrow) (15-18 mm)	1
	Cerambycidae	
	Ceresium nigrum Gahan (10.5 -17 5 mm)	3
	C. quadrimaculatum Gahan (8.3-18.5 mm)	5
	Dihammus nativitalis Gahan (I7-28 mm)	2
	Olenecamptus basalis Gahan (13-19 mm)	2
	Phelipara subvittata Blair (12-16 mm)	1
	Prosoplus banki (Fabricius) (8.8-18.0 mm)	2
	Chrysomelidae	
	Rhyparida rossi Gahan (6-7 mm)	1

The four whole pellets were slightly flattened oval in shape and averaged 17.8 x 9.9 x 9.3 mm (ranges: length 11.4-27.5 mm; greatest width 8.9-11.6 mm; least width 7.6-11.4 mm). All identified prey were arthropods and, apart from a few gryllacridids, all were bee-

tles (Table 1). Most of the beetles were about 2 cm in length and were nocturnal, foliage-dwelling species. Only *Promethis carbonaria* is a ground-dweller, but it is found on logs and tree trunks. Thus, the Christmas Island Hawk-Owl appears to snatch insect prey mainly from the foliage rather than from the ground.

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Hybridisation Between *Malurus lamberti rogersi* and *Malurus lamberti assimilis* in North-western Australia

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Now that the Lovely Fairy-wren *Malurus amabilis* of Cape York Peninsula is treated as a separate species of the Red-shouldered Fairy-wren complex (Schodde 1982), four mainland subspecies of the Variegated Fairy-wren *M. lamberti* are currently accepted: *rogersi* in the Kimberley and adjacent Northern Territory; *dulcis* in Arnhem Land; *assimilis* throughout the arid and semi-arid core of the continent; and *lamberti* in coastal eastern New South Wales and south-eastern Queensland. Males of each subspecies are very similar differing only slightly in colour of rectrices (blue in *rogersi* and greenish blue in *assimilis*) and in side of breast (broadly edged violet in *rogersi* and narrowly edged violet in *assimilis*). Females are blue on the dorsum in *rogersi* and *dulcis* and brown in *lamberti* and *assimilis*. Interactions between contiguous subspecies have not been quantitatively assessed, though it has been established that some intergradation occurs between *lamberti* and *assimilis* (Mack 1934, Schodde 1982) and between *rogersi* and *assimilis* (Harrison 1972, Schodde 1982). In this paper we report on the interaction between *rogersi* and *assimilis* in the Kimberley and adjacent Northern Territory.

Methods

We examined 123 male and 124 female specimens of *Malurus lamberti* in American Museum of Natural History (AMNH), British Museum (Natural History) (BMNH), Australian Museum (AM), Museum of Victoria (MV) and Western Australian Museum (WAM).

Because males of *rogersi* and *assimilis* differ only slightly in colour they were not considered further. The striking differences between females were analysed by devising a scale for each character (Table 1). The character index of the crown and back ranged from 0 in *assimilis* to 5 in *rogersi*, for rectrices from 0 to 2, the uppertail coverts from 0 to 3 and belly and flanks from 0 to 2. The total index score (maximum 12) was meaned for each locality and expressed as a percentage of 12 (0 for pure *assimilis*, 100 for pure *rogersi*).