

THE FOOD OF HONEYEATERS (MELIPHAGIDAE) ON LITTLE BARRIER ISLAND

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ABSTRACT

The food of honeyeaters (Stitchbird, Bellbird and Tui) was studied on Little Barrier Island in April by collecting droppings and pollen from mist-netted birds. All three species were taking nectar from puriri and climbing rata. Stitchbirds were the most frugivorous and Bellbirds the most insectivorous of the three species.

INTRODUCTION

Since the Stitchbird (*Notiomystis cincta*) became extinct on the mainland almost 100 years ago, New Zealand's three endemic honeyeaters, the Stitchbird, the Bellbird (*Anthornis melanura*) and the Tui (*Prothemadera novaeseelandiae*) have survived together only on Little Barrier Island (36°12'S, 175°7'E), where they differ in their degree of dependence on different nectar-producing plants and on fruit and insects (Gravatt 1970, 1971). Craig *et al.* (1981) emphasised the need for more data on the food of honeyeaters.

In early April 1980, a joint Wildlife Service/Ornithological Society party visited Little Barrier Island to capture Stitchbirds for transfer 40 km north-west to Hen Island as part of a programme to establish populations on other islands. The opportunity was taken to add to Gravatt's observations by collecting droppings and pollen samples from all three species of honeyeater.

METHODS

All birds were captured by mist-netting within 1 km of the ranger station on the western side of the island. After each bird had been freed from the mist net a microscope slide, thinly smeared with vaseline, was pressed to the bird's crown and then covered with a cover slip. The bird was then placed in a cloth bag for 1-2 minutes for droppings to be collected. The samples were stored in glass vials in 70% alcohol and later examined; seeds were identified by comparison with reference material. Microscope slides were later systematically scanned under a microscope at 100x magnification, pollen grains were identified by comparison with reference slides, and the amount of

pollen of each species was scored on a five-point scale of abundance, as follows:

Category 0 — no pollen found

1 — a few pollen grains noted

2 — few grains at any one place but over slide sometimes several in view

3 — more than in 2, also occurring in clumps, always several in view

4 — many clumps, pollen abundant

5 — continuous skeins of pollen grains across field of view

This scoring system has been used by BMF for birds in the Orongorongo Valley, Wellington (unpub. data).

RESULTS

Pollen samples were taken from eight TuIs, eight Bellbirds and 20 Stitchbirds. Pollen from only two plant species was recorded, puriri (*Vitex lucens*) and one of the Myrtaceae, almost certainly climbing rata (*Metrosideros fulgens*). Both pollens were recorded from all three species of bird (Table 1). Pollen scores of 2 to 4 for puriri were recorded from seven of eight Bellbirds but only seven of 20 Stitchbirds (chi-square with Yates correction = 5.6, $p \leq 0.5$). The difference between Bellbirds and Stitchbirds in pollen scores for climbing rata was not significant. Comparison of pollen scores between bird species or for the same bird species feeding on different plant species is risky as the pollen load carried by a bird depends largely on bird and flower morphology. However, Bellbirds and Stitchbirds are about the same size (Table 2) and so probably pick up similar amounts of pollen from the same species of flower.

The incidence of seed and insect remains in the droppings is shown in Figure 1. Droppings were obtained from 14 Stitchbirds,

TABLE 1 — Pollen scores from TuIs, Bellbirds and Stitchbirds. (Figures refer to the number of birds with the pollen-score rating)

Pollen score	Tui		Bellbird		Stitchbird	
	puriri	rata	puriri	rata	puriri	rata
0	1	0	0	2	7	8
1	5	7	1	4	6	9
2	2	0	3	0	3	3
3	0	0	3	0	2	0
4	0	1	1	2	2	0
5	0	0	0	0	0	0
Total	8		8		20	

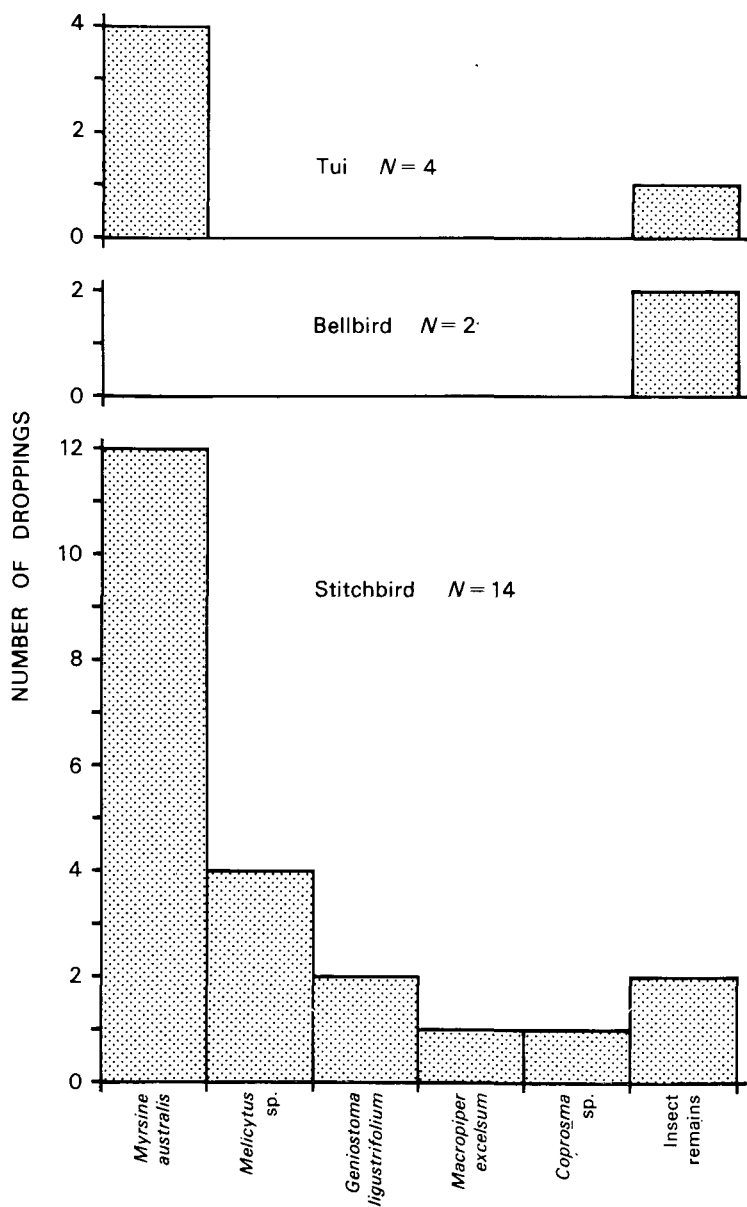


FIGURE 1 — The incidence of seeds and insect remains in droppings collected from honeyeaters on Little Barrier I., April 1980

TABLE 2 — Average measurements of Bellbirds and Stitchbirds (from Gravatt 1971 and Craig et al. 1981)

	Bellbird		Stitchbird	
	♂	♀	♂	♀
culmen length (mm)	13.3	12.6	14.8	14.4
head and bill length (mm)	41.1	38.4	43.6	41.4
weight (g)	30.7	25.0	40.2	30.3

four Tuis and two Bellbirds. All Stitchbird droppings contained seed. Twelve of the 14 contained mapou (*Myrsine australis*) seeds, and eight droppings contained seeds of four other plants: mahoe (*Melicactus* sp.), hangehange (*Geniostoma ligustrifolium*), kawakawa (*Macropiper excelsum*) and *Coprosma* sp. Insect remains were found in only two of the Stitchbird droppings. All four Tui droppings contained mapou seeds and one contained insect remains. The two Bellbird droppings both contained insect remains but no seeds.

DISCUSSION

Although these are small samples taken in only one month, they complement the data of Gravatt (1970, 1971) for that time, especially for Stitchbirds. Gravatt recorded only 14 feeding observations in autumn and only one observation of nectar feeding (on *Metrosideros fulgens*) in April. Our results support the conclusion of Gravatt (1971) that in autumn fruit is eaten much more frequently by Stitchbirds (50% of feeding observations) than by Tuis (27%) or Bellbirds (10%). The pollen and dropping data indicate that Bellbirds feed more on nectar and insects than do Stitchbirds, as shown also by Gravatt (1971).

Other studies report similar findings. On Hen Island, Merton (1966) observed Bellbirds and Tuis feeding in May; of 96 observations of Bellbirds feeding, 53% were taking insects, 46% nectar, and 1% fruit. In comparison, of 93 observations of Tuis feeding, 34% were taking insects, 65% nectar and 1% fruit. In the Orongorongo Valley near Wellington, insect remains were found in significantly more Bellbird droppings than Tui droppings collected throughout the year (chi-square = 3.92, $p < 0.5$) (B. M. Fitzgerald, unpub. data).

Craig et al. (1981) stressed that the proportions of fruit, nectar and invertebrates in the diet of each species of honeyeater vary between seasons and localities, and they caution against broad generalisations. However, they have not shown that the order of preference for fruit, nectar or invertebrates by co-existing species of honeyeater is ever reversed. Our data collected in April support the generalisations by Gravatt (1971) that Stitchbirds are the most frugivorous of the three

species, taking fewer invertebrates and less nectar than Bellbirds, and that Bellbirds are the most insectivorous of the three species. Future studies should be designed to show the conditions under which the species depart from this pattern.

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SHORT NOTES

A DISTANT RECOVERY OF A BULLER'S MOLLYMAWK

Between 1961 and 1977 University of Canterbury Expedition members banded 833 adult Buller's Mollymawks *Diomedea bulleri* and 858 of their chicks at the Snares Islands (48°07'S, 166°36'E). In addition, Dr L. E. Richdale banded 159 breeding birds there in 1948 of which at least one was still ashore in the 1976/77 breeding season.

Recoveries away from the island have been few and all from around New Zealand, but M-19006, a chick banded by D. S. & C. J. Horning on 6 August 1972, has recently been reported as recovered at 12°25'S, 105°06'W on 13 October 1979, caught on a fishing vessel's longline. The bird was some 7460 km north-west of its birthplace and about 2000 km south-west of the Galapagos Islands and rather to the east of the Humboldt Current.

That some Buller's Mollymawks migrate to cold waters off western South America has long been known (cf. Murphy, 1936, *Oceanic birds of South America*: 525) but this appears to be the first report of a marked bird of this species outside New Zealand.

The bird's precise date of birth was not recorded but it would have been about 7 years 7 months old when it died. Age at first breeding has not been determined, but similar-sized petrels like *Diomedea immutabilis* are known to lay at about 8 to 9 years old (Fisher, 1975, *Auk* 92: 433-441) and other birds of the 1972 cohort were noted back on the island in June 1981 by C. J. R. Robertson but none was