

## ABSTRACT OF A G M TALKS: NEW ZEALAND PASSERINES

### BREEDING BIOLOGY OF THE NORTH ISLAND RIFLEMAN

The breeding biology of the North Island Rifleman was studied in the Orongorongo Valley 1973-76. 50-200 nest boxes were available each year and between one and eight were used each season. Breeding began in late September, with an average clutch of 4.5 eggs, the eggs being laid on alternate days. The eggs which weighed 22% of the adult weight were incubated for 19 or 20 days and the young stayed in the nest between 21 and 27 days. During the first three years 77% of the 53 eggs laid resulted in fledged young but in 1976 only 30% of the 37 eggs laid were successful since the others were deserted or preyed on. Only one second clutch was recorded and another pair relaid after their first brood was preyed on. These results were compared with those found for the South Island Rifleman. Daily weighings of the chicks revealed an initial period of rapid weight gain followed by about 12 days when the weight was sustained as the external features developed. During this second growth stage the female chicks remained significantly heavier than the males.

The long period that these birds are associated with the nest is characteristic of hole nesters but, combined with their relatively small clutch, it possibly indicates a scarcity of food available to the young.

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### BREEDING OF THE GREY WARBLER

In the summers of 1976/77 and 1977/78 I examined 77 occupied nests of the Grey Warbler (*Gerygone igata*) at Kowhai Bush, near Kaikoura. Before the breeding seasons I colour-banded adult warblers and found their territories to be 0.6 ha on average. Nearly all banded adults which bred the first year were alive in the second, and few young were recruited into the population, suggesting a low adult (but high juvenile) mortality. Only males sang; only females built nests; incubated and brooded.

Though the breeding season was long (nearly 6 months; August to January) each pair could raise only two successful broods because the breeding cycle was lengthy. Early nests were built and lined in 2-4 weeks, followed by a delay of 2-8 days before laying. Six weeks separated the earliest and latest first clutches. The incubation period was 17-21 days (mean = 19.5) and the nestling period 15-18.5 days (mean = 17.2). Juveniles were fed for up to 5 weeks after fledging, and the interval between fledging of the first brood and initiation of the second clutch was 10 days to 6 weeks.

Eggs of a clutch were laid at 48-hour intervals and the average clutch-size was 3.9 (range 3-5). The fresh egg weighed 1.5 g, or 23% of the adult's weight (6.4 g). Weights of nestling warblers followed a non-sigmoid curve — the maximum was reached at 13-14 days old, on average, and there was a recession in weight before fledging.

Every healthy nestling in every brood exceeded the mean adult weight by up to 40%.

Many facets of the warbler's breeding strategy are extremely unusual for a small song-bird which gleans invertebrates from foliage, and, as with the lengthy breeding cycle, are possibly adaptations to a scarce or unpredictable supply of food. The New Zealand climate lacks marked seasonality, and winters are mild. Even in summer on the east coast, cold southerly winds can develop suddenly. I suggest that the Grey Warbler's food-supply is nearly uniform all year, and that the bird's numbers are set at a high level by the equable conditions of winter. Under such circumstances warblers would have difficulty in obtaining the extra food needed to raise young.

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### SONG AND SOCIAL ORGANISATION OF THE FERNBIRD

For many years it has been known that the two birds of a pair of Fernbirds sometimes call in duet so closely timed one after the other that it sounds like one bird. This has given rise to their name — the "U-tick" bird. However, there has been confusion because, to the unaided ear, the "U-tick" call can appear to come from a single bird.

I have been recording Fernbirds intensively in many North Island sites for two years and sonographic analysis shows that the A caller (presumed male) can have from 1 to 6 notes in its call while the response by the B bird is invariably one note of a very stereotyped form. The B bird never gives that call on its own — it is invariably given as an antiphonal response.

When the birds are highly motivated in defence of territory they also make a clicking sound between their calls.

The gap between the first note of the antiphonal duet and the second (the response) is sometimes as short as 80 milliseconds (0.8 secs). More than one B caller can respond to the one A caller and the A caller often calls without getting a response.

In any one area the A calls are invariably different from one bird to the next and each caller has a repertoire of A calls, from 1 to 4 different types.

There is some tendency towards regional dialects in the B calls but not in the A calls. The purpose of antiphonal singing is generally supposed to be for holding together the pair bond in very thick vegetation.

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### SOCIAL ORGANISATION AND BREEDING STRATEGY OF THE BELLBIRD

The social organisation and breeding strategy of the Bellbird are related to the distribution and predictability of resources, especially food. Bellbirds have a wide diet including nectar, fruit and insects. Immediately before nesting they begin to feed mainly on insects and become more spatially localised although foraging trips to concentrated nectar sources outside their areas still occur. Both sexes announce their presence in their area by singing and they also countersing against

near neighbours. Playback at this time causes birds to move towards the intruder and sing. In border areas, males often join in communal choruses and chases. Females build the nest, lay, incubate, defend and feed the young, although most males assist with the feeding of young. On Tiritiri, many pairs had replacement nests and some were double brooded. After breeding and throughout the non-breeding season, Bellbirds move to concentrated nectar or fruit sources. However, most resident pairs remain on or near their breeding areas where they continue to countersing but only dominate incoming birds, rather than attempt to exclude them.

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#### SOCIAL ORGANISATION AND BREEDING STRATEGY OF THE TUI

As breeding strategy and social organisation can be related to the distribution and predictability of food resources, the opportunistic feeding habits of the Tui greatly influence these. During the breeding season the diet consists mainly of insects and nectar, which are obtained from within an area used exclusively by each pair. The male is primarily involved in defence of this exclusive range by chasing and song. As well as having long range features this song includes elements associated with short range communication, possibly to maintain contact with the female.

Several nests are constructed by the female, but only one is finally used. Incubation and initial care of the chicks is the responsibility of the female. There is a trend (through season) toward increasing involvement by the male with the care and defence of the chicks. The incubation and fledging time is reasonably short which allows both parents and fledglings to move to nectar supplies. After the breeding season, birds become highly mobile, moving to clumped nectar and fruit sources but also taking insects. Access to concentrated food supplies is by dominance hierarchies.

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#### SONG AND BREEDING BEHAVIOUR IN THE PIED TIT

Tomtits of both sexes actively defended the area in which they foraged and reared their young, against other tits of their own sex. One of the most important mechanisms of defence was song, proclaiming the individual's status, its species, and aggressive intention towards intruding males. This was reflected by the male song cycle which was closely linked to the breeding cycle. Spontaneous song and counter-song increased in intensity as the breeding season approached and declined markedly during the post-breeding moult. Males responded aggressively to Tomtit songs which were played back within their own territories. They could distinguish between the songs of their neighbours and non-neighbours and reacted more aggressively to songs of non-neighbours.

Other mechanisms of defence included chases, boundary patrols, and aggressive posturing which included the raising and lowering of the frontal feathers. Actual contact fights between birds were rarely observed.

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