

Parental Care and Feeding of Nestlings in the Mistletoebird *Dicaeum hirundinaceum*

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Summary

The nest of a pair of Mistletoebirds *Dicaeum hirundinaceum* was observed on eight days during the 14 day nestling period in February 1987 near Oakey in inland south-east Queensland. Both parents fed the young and disposed of faecal sacs; only the female brooded. The young were first fed on arthropods only, then mistletoe fruits were introduced at 3-4 days old. Fruits and arthropods were fed approximately equally until the young were 6 days old, and thereafter approximately one in five meals consisted of arthropods; the young were fed approximately 10 times per hour.

Introduction

The Mistletoebird *Dicaeum hirundinaceum* is known to feed nestlings an insect diet for the first few days of life, and predominantly mistletoe fruits with some insects later in the nestling/fledgling period (Lawrence & Littlejohns 1916, Littlejohns 1943, Green 1985). Information available, however, does not give the precise age at which mistletoe fruits are introduced into the diet. The mistletoe fruit seems such a large, sticky meal to be fed to such small nestlings.

On 12 February 1987 an opportunity arose to answer this question and to closely observe parental care without disturbing a pair of Mistletoebirds, when their nest was found suspended from a branch 2 m outside a window. The parents were unconcerned by an observer stationed inside the house. The house is situated 15 km west of Oakey, Queensland (27°27'S, 151°37'E). Wilga trees *Geijera parviflora* grow within 40-150 m of the nest site and are parasitised by the mistletoe *Amyema congener* subsp. *rotundifolium*, which fruits in summer. One to three watches each of one hour duration were undertaken on all except two days during the 14 days the nestlings were in the nest. Records were kept of items fed to nestlings on eight days during this period.

Parental care and feeding of nestlings

When the nest was first noticed on 12 February, the female was incubating eggs. The male spent much of this time calling from a dead tree 15 m from the nest, a habit also observed at other Mistletoebird nests by B. Williams (pers. comm.). He was not seen to chase away intruders as observed by Lawrence & Littlejohns (1916). On the morning of 14 February, the female commenced feeding nestlings and also carried off a white object presumed to be an eggshell. Both parents brought insect meals to the one- and two-day-old chicks. The insects were so small that they could be seen in the parent's bill only on some occasions. The male brought a mistletoe fruit to the nest at midday on the third day, but he ate it himself. The female was also seen with fruits later in the day. She obviously fed fruits to the young at the first meals on the fourth day (Table 1) although it required a number of attempts to get the nestlings to take them. The male showed less persistence: if the fruit was not taken in two attempts, he ate it himself.

Once fruits were introduced to the diet, both these and arthropods were fed approximately equally until the nestlings were six days old (Table 1). Thereafter, fruit meals predominated. The size of the arthropods now being fed had noticeably increased, and consisted mostly of spiders. Only the viscin-covered seeds of mistletoe were fed, as the skins of the mistletoe fruits were left on the plant. Most of the feeding was

done by the female, which sometimes returned at 1-2 minute intervals (Table 2). The male did not commence feeding nestlings until mid morning and offered occasional meals until early afternoon. He was not seen to feed nestlings after they were nine days old. In their first week of life, the nestlings were given 6-14 (average 10.2) meals per hour, averaging 5.9 minutes between feeds; these consisted of 6-9 (av. 6.8) fruit meals per hour and 0-8 (av. 3.4) arthropod meals per hour (Table 1). In their second week of life, the two nestlings received 13-14 (average 13.7) meals per hour, averaging 4.4 minutes between feeds; these consisted of 11-12 (av. 11.3) fruit meals per hour and 1-3 (av. 2.3) arthropod meals per hour (Table 1). When the brood was reduced to one, the surviving nestling received 7-11 (average 8.8) meals per hour, averaging 6.8 minutes between feeds; these consisted of 4-8 (av. 6.5) fruit meals per hour and 1-3 (av. 2.3) arthropod meals per hour (Table 1).

On the twelfth day both nestlings were present during the 0530 h watch, but at the 0900 h watch only one remained. At 0948 h the apparent predator, a Pied Butcherbird *Cracticus nigrogularis*, landed near the nest. A quick movement by the observer at the window startled it and it did not return. During that hour the female continued to feed as normal, and by 1000 h the nestling was too full to take the meal offered. At a later watch the female exhibited strange behaviour: although the nestling was begging, she kept offering the meal then quickly withdrawing it, hopping back to a branch and then approaching again, but still reluctant to let the nestling have the food. She appeared to know that this nestling had been fed and that there should be a second one to feed. During observation it had become apparent that both nestlings were usually fed at the same visit, indicating that more than one food item was carried even though not visible in the parent's bill. Later the female seemed to adjust to feeding only one nestling.

Only the female brooded the nestlings, but when bringing food to the nest the male showed equal care while the nestlings were small. He put his head into the nest apparently to probe and stroke the nestlings with his bill, removing and swallowing small faecal sacs that did not contain mistletoe seeds. The female spent more time at this probing behaviour and besides removing a sac, often returned to the nest to brood for 7-15 minutes, suggesting that she tested the need for extra warmth with her bill before brooding. On a cool, gusty day she brooded the five-day-old nestlings for 25 minutes. This was the last time she was seen in the nest during the day, but she brooded the nestlings at night until they were nine days old, leaving before sunrise at 0538 h and returning before sunset at 1800 h.

Hygiene was attended to by both parents. Small faecal sacs, presumably containing only arthropod remains, were often eaten but large capsules containing mistletoe seeds were carried off, usually by the female. When four days old, the nestlings were already turning in the nest to excrete, enabling the female to take the capsules at the nest opening. At eight days the nestlings protruded the abdomen sufficiently for the faeces to fall clear of the nest. However, the female attended the process for a few days. On one occasion, faeces dropped inside the nest. The female tugged and pulled for over five minutes, fluttering her wings for greater leverage, until she had removed the offending item to her satisfaction. Sometimes the female appeared to make a call which encouraged the nestlings to excrete.

When approaching the nest with a meal, the female often made a soft call to which the nestlings responded eagerly. However, she also approached without calling. During the nestling period an Olive-backed Oriole *Oriolus sagittatus*, a Striped Honeyeater *Plectorhyncha lanceolata* and a female Superb Fairy-wren *Malurus cyaneus* searched on and around the nest. At each of these visits the nestlings made no movement, which

suggests that once the nestlings are well grown they recognise the parent by sight or call rather than movement at the nest.

On the fifteenth day (1 March) at 0943 h, the surviving nestling scrambled over the outside of the nest to the branch above where it spent 20 minutes preening itself before resting. At 1213 h it made its first flight to a branch 60 cm away where it remained in this exposed position even though it was very stressed in the heat of the day. In the cool of the evening it made a second short flight.

Table 1
Items fed to nestling Mistletoebirds during one-hour watches at Oakey, Queensland, February 1987. F=female, M=male.

<i>Date</i>	<i>Age of young (days)</i>	<i>Time watch commenced</i>	<i>Meals</i>		<i>Parent</i>
			<i>fruit</i>	<i>arthropod</i>	
Two nestlings:					
18.2.87	4	0530	6		F
		0952	6	6	F
				1	M
		1505	6	6	F
			2	M	
20.2.87	6	0530	7	1	F
21.2.87	7	1328	8	1	F
			1		M
22.2.87	8	0530	11	3	F
23.2.87	9	0530	11	3	F
25.2.87	11	0530	12	1	F
One nestling:					
26.2.87	12	0900	4	3	F
		1300	6	1	F
28.2.87	14	0837	8	3	F
		1405	8	2	F

Discussion

My observations generally accord with previous accounts on Mistletoebird feeding rates, parental roles, nestling period, and the ratio of insect to fruit meals at different stages in the nestlings' growth (Lawrence & Littlejohns 1916, Littlejohns 1943, Schodde & Tidemann 1986). The most interesting aspect of my observations was the introduction of mistletoe fruit meals when the nestlings were 3-4 days old, even though the large, viscous seed had to be more or less force-fed, at an earlier age than that (>7 days) reported by Lawrence & Littlejohns (1916). Even when the nestlings were much older, large spiders also caused problems but the female persevered, making sure the food was eaten.

The casual, brief involvement of the male was unexpected, but the initiative and energy displayed by the female when a sticky object was found in the nest indicates her greater devotion to parental care. Her temporary confusion when she had only one nestling to feed was a noteworthy incident. Seemingly once programmed to certain actions, the parent may only adjust to changed circumstances after several failures. This is further illustrated by a female Mistletoebird that continued to bring food to the observer's hand after Littlejohns (1943) had held nestlings while they were being fed. As he suggested, the bird is probably governed by habit rather than reasoning power.

The lack of response to the female fairy-wren, a bird of similar size and colour, by the nestlings when it visited the nest suggests that older nestlings know the parent

Table 2
Meal frequency of nestling Mistletoebirds during one-hour watches at Oakey, Queensland, February 1987.

Date	Time watch commenced (h)	Parental visit (h)	Meal		
			fruit	arthropod	
Two nestlings:					
25.2.87	0539	0555	1		
		57	1		
		0601	1		
		05	1		
		10		no food	
		17			1
		19	1		
		21	1		
		28	1		
		30	1		
		32	1		
		39	1		
		One nestling:			
28.2.87	0837	0837	1		
		40	1		
		47		no food	
		48	1		
		50	1		
		0904			1
		06	1		
		09	1		
		22			1
		23	1		
		24	1		
		28			1
		32			1
		37		no food	

by sight. When approaching the nest, the parent always perched on a branch 18 cm in front of the nest before flying on to it to deliver food. The female did not always call when approaching. B. Williams (pers. comm.) suggests that small nestlings usually respond to a call or movement on or near the nest. The nestlings in the nest at Oakey leant out and eagerly gaped while the female was on the nearby branch. When the wren visited the nest along the same route, they crouched back into the nest and made no movement while she was on the branch or when she flew on to and pecked at the nest.

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References

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