

## Observations on Parental and Fledging Behaviour of Buff-breasted Paradise-Kingfishers *Tanysiptera sylvia*

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### Summary

The parental behaviour and fledging of a family of Buff-breasted Paradise-Kingfishers *Tanysiptera sylvia* were observed on the four nestlings' last two days in the nest at Mt Charlton, Mackay, Queensland, on 9-10 February 1994. The nesting territory was visited regularly over the ensuing two months. The nestling period lasted at least 26 days; parental feeding visits averaged 1.6 per hour on the nestlings' last two days, with both sexes contributing almost equally. Fledging occurred over two days. The juveniles remained in the natal territory for a month after fledging, and the adults for a further month during which the presumed female was moulting.

### Introduction

Brief details of the breeding cycle and behaviour of the Buff-breasted Paradise-Kingfisher *Tanysiptera sylvia* have been given previously by Gill (1964) and Forshaw (1983), and summarised by Eastman (1970), Schodde & Tidemann (1986), Fry (1992) and Strahan (1994). Aspects covered by these authors include clutch or brood size, estimated incubation and nestling periods, diet, feeding rate, parental behaviour, calls, fledging behaviour and migration schedule, with general descriptions of juvenile plumage. In January 1994 we made visits to sites at which these kingfishers had nested previously, in terrestrial termite mounds, from 1991 to 1993 at Mt Ossa and Mt Charlton, Mackay, Queensland (Andrews et al. 1991, Andrews 1993). On learning that a newly hatched kingfisher had been sighted in a nesting mound at Mt Charlton on 15 January, we decided to monitor the mound during the day(s) on which young might be expected to leave the nest.

### Study area and methods

The mound was situated in rainforest in the foothills of the Clarke Range at an altitude of almost 200 m. There was little undergrowth and a layer of leaf litter. The habitat was very tall notophyll simple-complex rainforest, with an uneven upper canopy to 30 m of Milky Pine *Alstonia scholaris* with occasional Damson *Terminalia sericocarpa*, Bumpy Ash *Flindersia schottiana* and Glue Fruit *Cordia dichotoma*. Among the tall mid-layer to 25 m were Cheese Tree *Glochidion sumatranum*, Large-leaf Fig *Ficus hispida*, Aglaia *Aglaia brownii* and vines (Native Grape *Cissus oblonga*, Milla Milla *Elaeagnus triflora* and Supplejack *Flagellaria indica*). Some of the sparse ground layer consisted of ferns (*Adiantum hispidulum*, *Doodia aspera* and *Pteris* sp.), Ginger *Alpinia caerulea*, Cunjevoi *Alocasia brisbanensis*, Cordyline *Cordyline murchisoniae* and weeds, including Sida and Inkweed. All observations indicated that the kingfishers appeared to confine themselves to an area of about a third of a hectare (150 m × 33 m at its widest point; Figure 1).

A watch was kept on 9 February, commencing at 0705 h and concluding at 1650 h (E.S.T.). On 10 February observations commenced at 0615 h and concluded at 1230 h. One observer took up a position 6.5 m from the mound with the other observer at 7.2 m from the mound. Both observers could see the mound, the nest perch (perch nearest the mound) and approach perches. One observer used a telescope (20×) and the other a telescope (22×) and Zeiss binoculars (10×40). On both days the weather was hot and humid, with occasional showers on 9 February. The site was also visited 22 times from 14 February to 16 April, the visits varying from two to six hours.

The number of birds was verified by netting and banding carried out by Marion Crouther, an A class bander, with bands supplied by the Australian Bird & Bat Banding Scheme, Australian Nature Conservation Agency. Two adults and four fledglings were banded.

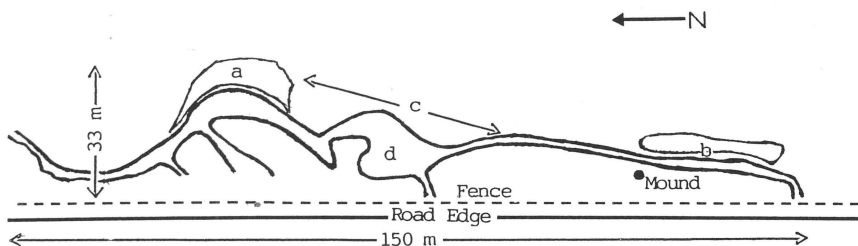


Figure 1. Sketch of study site: a, b and fence area were main feeding areas observed; c was frequently used as a flyway; d is a shallow creek with a deep pool at its widest point.

### Adult behaviour

Two adults fed the young. One, with a discoloured breast, a brood patch and short, slightly misshapen tail-streamers, was designated as adult A (presumed female: tail 74 mm, streamer 78 mm; from banding data). The other, with clean plumage and long, straight tail-streamers, was designated adult B (presumed male: tail 70 mm, streamer 90 mm). It was suspected that a third adult was occasionally present near the mound.

Adult A approached the nest by a flight path different from that of adult B, using different approach perches. Both landed each time on almost the same place on the nest perch. Each paused there for a period lasting from a few seconds to a minute or more. From there each flew to the mound entrance where the young took the prey instantly. The adult immediately flew back to the nest perch, pausing before flying off.

On 9 February an adult was sighted at 0715 h, then several more times near the mound before adult A began feeding the young at 0832 h. Feeding continued at varying intervals until 45 minutes before the first fledgling left the nest at 1140 h. During the morning a trill was heard from the northern side of the mound and a call was heard from the southern side of the mound behind the observers. No other adult calls were heard until 15 minutes after the second fledgling left the nest at 1200 h. Immediately thereafter, one of the observers passed a hand across the tunnel entrance. Calls were heard from young still in the nest, but no odour was detected. For the next 2.5 hours adult birds were near the mound and commenced feeding the young at 1513 h, continuing at irregular intervals until 1624 h. Thereafter, no further sightings of the adults were made up to the end of observations at 1650 h.

On 10 February birds commenced calling at 0625 h. There was much adult kingfisher calling and trilling throughout the morning, most of it in the first 2.5 hours. Adult B commenced an hour's intensive feeding of nestlings at 0907 h. Sporadic sightings of adults occurred in the hour before the third fledgling emerged at 1111 h. A few minutes after the fourth fledgling left at 1204 h, an adult was observed feeding a fledgling near the site where the brood had assembled.

### Calls

During the breeding cycle the adults gave the usual soft trill, the repeated *chuga-chuga-chuga* call and the typical kingfisher screech when chasing intruders (as described in the references previously cited). After the juveniles had left the territory and in the adult pre-migration period (24 March and four subsequent days), adult A was heard giving a soft 'mewing' call like that of a weak kitten a few days old. It was barely audible at a distance of c. 15 m. It was usually, but not always, made

Table 1

**Parental feeding visits to Buff-breasted Paradise-Kingfisher nest on nestlings' last two days in nest, Mt Charlton, Queensland. Adult A = presumed female, B = presumed male.**

<i>Date</i>	<i>Observation time (hrs)</i>	<i>No. visits by adult</i>		
		<i>A</i>	<i>B</i>	<i>Both</i>
9.2.1994	9.75	13	1	14
10.2.1994	6.25	1	11	12
Total	16	14	12	26

with the bill closed. Adult A also twice gave a soft 'cough' series of five notes through closed bill on 13 April. No calls could be attributed to the young after they fledged.

### Prey

Prey brought to the nestlings included earthworms, spiders, cockroaches, crickets, ants, caterpillars, pupae, wasps, grasshoppers, bees, beetles, cicadas, hawk moths, lizards and small frogs (our pers. obs., Peter & Pat Taylor pers. comm. and Peter Taylor's photographic evidence – see front cover, Plate 26). During the two-day nest watch, the most common prey was earthworms.

### Feeding frequency

Adults commenced feeding the nestlings at 0832 h on 9 February and at 0907 h on 10 February. It is possible that there had already been early-morning feedings before the observers arrived.

During the observation period on 9 February, adult A fed the nestlings six times in 2 hr 23 min. in the morning (= one visit every 24 min. during active feeding) and seven times in 50 min. in the afternoon. Adult B fed the young once only, at 1513 h (combined parental visits in the afternoon = eight in 50 min. or once every 6 min.). The total (14 visits in 9.75 hrs, Table 1) represents an average rate of 1.4 visits per hour.

During the observation period on 10 February, adult B fed the nestlings ten times in the 47 minutes before 0945 h (= once every 5 min.) and once at 1045 h. Adult A fed the young once only, at 1012 h (combined = 12 times in 6.25 hr or 1.9 visits per hour, Table 1). Combining both days, the effort of each adult was about equal (A = 14, B = 12 visits in 16 hr, 0.88 and 0.75 per hour respectively; combined total 1.6 visits per hour).

### Nestling period

The incubation period was not ascertained. The young were in the nest for not less than 26 days.

### Fledging

Two fledglings left the nest on 9 February (1140 and 1200 h) and two on 10 February (1111 and 1204 h). On both days they left at approximately the same time of day (around midday), with 20 minutes between the first and second and almost an hour between the third and fourth. They did not call as they left the nest and no calls were heard from them outside the nest on both days. On the first day an adult had been at the nest at 1136 h; the last adult calls before the fledglings left were at 0925 h. On the second day an adult had been at the nest at 1045 h; the last adult calls before the young left were at 1055 h (faint, distant call). There was nothing

to suggest that the adults called the young from the nest. None of the young appeared to struggle to leave the tunnel.

On 9 February fledgling no. 1 was first sighted on the ground almost 2 m in front of the mound. A large lump of earth adhered to the side of its head, clear of its eye. It hopped on to the nest perch but almost immediately overbalanced and fell into a shallow hollow in front of the mound and disappeared from sight. Fledgling no. 2 flew directly from the tunnel entrance to the lower part of the nest perch, a distance of 1.25 m. It remained there for 3 minutes before flying to a branch 1.5 m above the ground and 3 m from the mound. About 10 minutes later, the back of a nestling was clearly visible as the bird backed to the tunnel entrance and discharged white faecal matter which landed almost 0.5 m from the entrance.

On 10 February fledgling no. 3 flew directly from the mound to a branch 1.5 m high and 6 m from the mound. It remained there for 4 minutes before flying directly and almost vertically to a nearby branch 7 m above the ground. It appeared to be a vigorous bird; its flight was strong and direct. Fledgling no. 4 appeared at the tunnel entrance and instantly flew to a dead branch on the ground 5.5 m behind the mound, a flight path different from that of no. 3. This fledgling also appeared strong and vigorous. Three or four minutes later it flew to the northern side of the mound in the general direction taken by the other three fledglings.

The nest was then examined and found to be empty. Some white pin-feather sheaths were found in the tunnel and on the ground at the entrance. No odour was discernible.

### Description of fledglings

Though there were differences in appearance of the four fledglings, such as more/less buff on the wings and blue on the crown, they were generally similar to one another.

**Crown.** Brownish black with a few pin feathers. Fledgling no. 1 had a small patch of blue on the centre of the crown above the eyes. Fledglings 2 and 3 had a blue collar from behind the eyes round the back of the nape. No. 4 had a crown of brownish-black feathers tipped with bright blue.

**Eyes.** Shiny black with pale grey eye-ring.

**Ear-coverts.** Buff.

**Bill.** Dull brownish black with pinkish-red tip to the upper mandible. On fledgling no. 3 the hook at the tip of the upper mandible was clearly visible.

**Throat.** Dull white.

**Wings.** Primaries dark bluish black. Fledglings 1 and 2 had brownish wings with buff margins to the feathers. No. 3 had bluish-black wings with buff feather margins. No. 4 had less buff on the margins of its bluish-black wing feathers.

**Back and rump.** The centre was off-white.

**Tail.** Short and blunt, dull brownish black, no streamers.

**Underparts.** Fawn with dark bases giving the appearance of irregular black streaking.

**Legs and feet.** Paler than the underparts; claws brown.

### Post-fledging period

Adult A and two fledglings were often seen flying low or on the ground at the northern end of the site. This adult was observed feeding fledglings up to and including the last day on which the fledglings were sighted. Adult B was usually sighted near the mound or the southern end of the site, often in association with one fledgling, both birds keeping to the upper storey. Four fledglings were sighted on 14 March, the last day on which fledglings were seen and 32 days after the last left the nest.

The last sighting of adults was of adult A on 13 April, 30 days after the last sighting of the fledglings. None was seen on 15 and 16 April.

### The mound

The tunnel and the nest chamber remained untouched by termites for several days

after the young fledged, the first indication of termite activity being the partial blockage at the entrance to the nest chamber noted on 26 February. Four days later the tunnel was blocked 9 cm from the entrance. It was noted on 28 March that the tunnel had been completely closed and extended 3.5 cm beyond the existing surface of the mound. Four days later, the termites had extended the new work downwards to the ground in front of the tunnel.

## Moult

Adult A, when netted on 4 March, was in active moult with new feathers above the bill, around the eyes, on the wings and tail, and pin feathers on the brood patch.

## Discussion

Most of our observations agree with the relevant aspects of the kingfisher's breeding cycle as described by previous authors (e.g. parental and fledging behaviour: Gill 1964, Forshaw 1983), with some differences in minor detail including some previously undescribed adult calls in the post-fledging/pre-migration period. The brood size was greater than in many previous records (1 to 3, usually 3 eggs, Forshaw 1983; no more than 3, Gill 1964), but was the same as the upper limit quoted by Schodde & Tidemann (1986). The nestling period was within the range of previous estimates (21-28 days, Strahan 1994; 4-5 weeks, Schodde & Tidemann 1986). The feeding rate was lower than reported for 'young' nestlings (7.5 visits per hour, starting from 0500 h: Forshaw 1983) and the sexes contributed almost equally, unlike the case described by Forshaw (1983) in which the female did most of the feeding of advanced nestlings. The diet was similar to that previously reported (cf. Gill 1964, Strahan 1994). The lack of an odour from the nest contrasts with Gill's (1964) experience of a foul stench. The juvenile plumage differed somewhat from that described in the literature, often loosely, for the juvenile or 'immature', and in particular differed from the juvenile illustrated in Slater et al. (1988). It seemed that the fledglings left our study site before the adults, which is contrary to the generally accepted belief that the adults depart on migration a week or two before the juveniles (Gill 1964, repeated in later reviews).

## Acknowledgements

We are grateful to Marion & Kevin Crouther for the many discussions we had with them concerning the Buff-breasted Paradise-Kingfisher, for the time they spent with us on subsequent visits to the site and for their valuable advice in helping us to prepare and present this report. We thank Peter & Pat Taylor for discussing their observations so fully and willingly, and we are grateful to Peter for showing us his excellent photographs of the kingfishers and their nest on several occasions. Irene Champion graciously offered to conduct a plant survey of the site; we thank her for providing us with the resulting botanical description. We thank Stephen Debus for providing advice and assistance with preparation of the manuscript, and a referee for comments on a draft.

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