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Observations at Nests of the Painted Honeyeater *Grantiella picta*

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Summary

Some aspects of the breeding biology of a pair of Painted Honeyeaters *Grantiella picta* were observed during spring and early summer of 1992–1993 near Armidale, New South Wales. After an unsuccessful nesting attempt, which failed during brooding, the (same?) pair fledged one offspring from a subsequent nesting attempt. The incubation period lasted at least 13 days, and the nestling period 20 days. Both sexes incubated and brooded. Sexual dimorphism was slight, with the main gender difference (ventral streaking) being the reverse of that usually considered definitive for males and females. The putative female contributed 33–50% of observed incubation effort (over the two nesting attempts), 76% of observed brooding time and 65% of food items taken to the nest. The nestling diet was 64% mistletoe seeds, with the remainder largely unidentified but including some arthropods. The parental feeding rate was 8.1 feeding visits to the nestling per hour (2.8 per hour by the male, 5.3 by the female). Parental behaviour and vocalisations are described.

Introduction

The Painted Honeyeater *Grantiella picta* is possibly one of the rarest and least known of Australia's nomadic birds. For a bird classified as rare nationally (Garnett 1993), and officially scheduled as rare or vulnerable in several states, there is a paucity of information on its ecology and breeding biology. Austin (1915, 1918), Ramsay (1920), Hindwood (1935) and Chisholm (1936, 1940, 1944) described its behaviour, nests and eggs. Eddy (1961) and Whitmore & Eller (1983) added information about its breeding biology, particularly on sex roles and behaviour in the incubation period. The Honeyeater feeds mainly on mistletoe fruits, but also on nectar (from various species besides mistletoe flowers) and on insects caught by gleaning and hawking (e.g. Longmore 1991, Oliver et al. 1998).

The Painted Honeyeater breeds in simple pairs, with no indication of more than two birds attending the nest. Both sexes build the nest and incubate the eggs; the incubation period lasts 14–15 days, and the nestling period is said to be 12–14 days (Schodde & Tidemann 1986, Longmore 1991). The Honeyeater is usually regarded as slightly to moderately sexually dimorphic, the sexes supposedly differing in the intensity of dorsal colour (black in males, greyer or browner in females) and in the occurrence of ventral streaking (male streaked, female unstreaked; e.g. Pizzey 1980, Schodde & Tidemann 1986, Slater et al. 1986, Simpson & Day 1996, Pizzey & Knight 1998). However, Longmore (1991) implied no gender difference in ventral streaking, and the male in Plate 26 of Eddy (1961) appears essentially unstreaked. Furthermore, Ramsay (1920) and Hindwood (1935) noted that both sexes can be streaked (note also colour plate in Hindwood 1935, which shows female dorsally similar to male).

Oliver et al. (1998) appealed to ornithologists to make available their data on Painted Honeyeaters, so that management of the species might be implemented. We here describe our observations on the breeding behaviour of a pair of Painted

Honeyeaters, particularly in the nestling period, during two nesting attempts in one season. Given the lack of agreement in the literature on gender criteria in this species, we also point out that in the almost monomorphic pair observed by us, the bird performing male-like behaviour was ventrally unstreaked, and the bird performing female-like behaviour was ventrally streaked.

Study site and methods

During the spring and early summer of 1992–1993 a pair of Painted Honeyeaters nested at 'Sunnyside' Travelling Stock Reserve, 15 km north of Armidale (30°30′S, 151°40′E) on the Northern Tablelands of New South Wales. The habitat was disturbed eucalypt grassy woodland dominated by mistletoe-infested Blakely's Red Gum *Eucalyptus blakelyi*, Manna Gum *E. viminalis* and Yellow Box *E. melliodora*. Observations were made intermittently from 17 October 1992, when the first nest was located, until 6 January 1993, one week after successful fledging from the second nest. Fourteen hours of data were collected in one-hour blocks over 12 separate days, and a further seven hours of data during shorter observation periods over another 16 days (Table 1). Only those observation periods of >45 minutes are used in the analysis; periods of 6–20 minutes are excluded from Table 1. We observed breeding activity using hand-held binoculars at 15–20 m from the nest, and noted activity at the nest and times of change-overs, feeding of young etc. to the nearest minute. Data were collected only during fine weather and it appeared that we did not disrupt the routine of the birds.

Sexing

In museum skins there are no consistent gender differences in plumage; in both sexes, ventral streaks are present in some specimens and absent from others (L. Conole pers. comm.). In view of this, we have tentatively assigned gender to the members of the study pair on the basis of plumage and behaviour. The more immaculate bird, with no ventral streaking and which performed a song-flight, we presume was male, and the other bird, with ventral streaking and which performed most of the brooding and feeding of nestlings, we presume was female. In this paper we treat them as 'male' and 'female' respectively, but always with the implicit qualifier 'putative'.

Results

Incubation

Nest 1. When the first nest was located on 17 October it looked complete and no further nest-building was observed. The nest was located 18.5 m above the ground, suspended within the foliage of a large clump of Box Mistletoe *Amyema miquelii* on the north-eastern side of a Blakely's Red Gum. It was difficult to see the nest through the foliage of the mistletoe, so we could not tell whether incubation had started by 17 October. On 10 November both adults shared what was assumed to be incubation, in a single bout of 30 minutes (female) and two bouts of 12 and 18 minutes (male; Table 1). The nest was occupied for the entire hour, with each bird spending a total of 30 minutes on the nest. The duration of the incubation stage of Nest 1 was not ascertained.

Nest 2. The second nest was located on 28 November, after incubation had started. It was 10 m above the ground and also suspended in the foliage of a large clump of mistletoe on the eastern side of a Blakely's Red Gum. During two separate hours of observation on the mornings of 28 November and 9 December the nest was occupied 98% and 100% of the observation time, respectively. Overall, the male incubated the eggs for about twice as long as the female did (65% versus 34% of observation time). Nest visitation was about equal for both birds, but the length of each incubation bout by the female was generally shorter than bouts by the male. The male incubated in six stints of 5–21 minutes, mean 11.0 minutes, and

The pair of Painted Honeyeaters that nested at 'Sunnyside', Armidale, N.S.W., December 1992: above – putative male (unstreaked bird, in bare branches), and below – putative female (streaked bird, stretching its wing).

Plate 15

Photos: Bob Shepherd

Table 1

Observations at two nests of a pair of Painted Honeyeaters at 'Sunnyside' Travelling Stock Reserve, 15 km north of Armidale, N.S.W. M = putative male, F = putative female.

Date	*Nest phase*	*Start time (h)*	*Duration (min.)*	*Completed bouts (min.)*		*% total time on nest*		
				M	*F*	*M*	*F*	*Total*
Nest 1:								
10.11.92	incubation	0824	60	30	12,18	50	50	100
13.11.92	brooding	1415	60	6,7,4,6	2,2,20	38	40	78
Nest 2:								
28.11.92	incubation	0950	60	5,10,11	5,7,4,5	63	35	98
9.12.92	″	1040	60	21,12,7	10,6	67	33	100
11.12.92	brooding	1415	60	6,3,13	5,11,7,10	37	55	92
15.12.92	″	1130	50	4	5,20,9	28	68	96
16.12.92	″	0915	45	5,2,4	3,6	24	76	100
19.12.92	″	1632	60	1,2	18,21,6	7	75	82
21.12.92	″	1522	60	1	9,18,11	2	72	74
22.12.92	″	1520	60	1	5,10,11	2	43	45
23.12.92	″	0835	60	4,4	2,12,15,4	18	55	73
23.12.92	″	1530	60	1,2,9	2,8,6	20	33	53
24.12.92	″	1545	60	2,4	1,2,6	22	15	37
25.12.92	″	0930	60	6,5,4	9,2,5,2,7	25	42	67
26.12.92	″	1020	60	3	8,19	5	45	50
26.12.92	″	1706	60	0	0	0	0	0
27.12.92	″	1730	40	0	15	0	25	25
28.12.92	″	1735	50	4	2	8	16	24
29.12.92	″	1650	47	0	0	0	0	0
31.12.92	post-fledge	1739	50					

the female in six stints of 4–10 minutes, mean 6.2 minutes (Table 1). The last day of incubation was 10 December, giving an incubation period of at least 13 days.

Brooding and feeding

Nest 1. One hour of observations was made early in the brooding phase, when the heads of two chicks were visible in the nest. The male brooded for four stints of 4–7 minutes, mean 5.8 minutes, and the female brooded for three stints of 2–20 minutes, mean 8.0 minutes (Table 1). Five food items were fed to the chicks during the hour. The food items included one mistletoe seed (see p. 54) brought by the male, and two mistletoe seeds as well as two unidentified items brought by the female. The female removed one faecal sac during the hour. This nest subsequently failed, for unknown reasons.

Nest 2. Ten full hours of data (plus another 3.9 hrs in shorter stints) were collected during the nestling period, which lasted 20 days. Initial clutch-size was not known, but one chick successfully fledged. It was brooded by the adults until two days before fledging.

During all one-hour observations except one (24 December 1992, late in the nestling stage), the female contributed more effort to brooding and feeding than the male did (Tables 1 and 2). From about day 12 of the brooding phase, less time was spent brooding the nestling (Table 1). Instead, the adult birds took turns at

Table 2

Food items brought to the nest by a pair of Painted Honeyeaters at 'Sunnyside' Travelling Stock Reserve, 15 km north of Armidale, N.S.W., during one-hour observation periods on each day of the nestling period (Nest 2). M = putative male, F = putative female.

	Feeds per hour								
	Mistletoe seeds		*Insect*		*Unidentified*		*Total for each sex*		*Total*
Date	*M*	*F*	*M*	*F*	*M*	*F*	*M*	*F*	
11.12.92	2	2	0	1	0	1	2	4	6
19.12.92	0	0	0	1	1	2	1	3	4
21.12.92	2	3	0	0	0	1	2	4	6
22.12.92	3	8	0	0	0	1	3	9	12
23.12.92[a]	4	8	1	1	0	2	5	11	16
24.12.92	4	7	0	0	0	0	4	7	11
25.12.92	1	2	0	0	4	5	5	7	12
26.12.92[a]	1	5	0	0	5	3	6	8	14

[a] Data for these dates are total values for 2 hours of observation.

guarding the nest from a perch nearby. In week 1, the nestling was brooded for 92–100% of observation time over three days; the male brooded for stints of 2–13 minutes, mean 5.3 minutes (n = 7), and the female for stints of 3–20 minutes, mean 8.4 minutes (n = 9). In week 2, the nestling was brooded for 37–82% of observation time over five days; the male brooded for stints of 1–9 minutes, mean 2.8 minutes (n = 11), and the female for stints of 1–21 minutes, mean 8.8 minutes (n = 19). In week 3, the nestling was brooded for 0–67% of observation time over five days; the male brooded for stints of 3–6 minutes, mean 4.4 minutes (n = 5), and the female for stints of 2–19 minutes, mean 7.7 minutes (n = 9; Table 1). Overall, the female contributed 76% of observed brooding time.

The usual pattern for change-overs during brooding was for the sitting bird to leave the nest as the relieving bird, usually carrying food, approached. If it was the female approaching, she usually called while 150–250 m away. The approaching bird landed in the top of the nest-tree and, behaving as though it were foraging, moved down towards the nest. As the arriving bird reached the nest the sitting bird moved slowly upwards, the two adults passing in the mistletoe, the departing bird continuing the foraging 'charade' until it was well up in the tree, then departed. The arriving bird fed the chick after reaching the nest.

During strong winds, when the nest swayed violently, change-overs were slightly modified. Change-overs involved the relieving bird settling on top of the sitting bird and nest after the 'foraging charade'. The sitting bird then slid out from underneath and departed upwards through the mistletoe. Once during windy conditions, the male raised himself to allow the female to feed the chick beneath him. The female then departed and the male settled back onto the nest.

After feeding the chick, the tending adult waited for the chick to produce a faecal sac, frequently inspecting its cloaca. If no faecal sac was produced, the adult usually brooded until relieved by the other adult. If the chick produced a faecal sac, the tending adult collected the sac from the cloaca and either ate it or carried it in its beak more than 50 m before dropping it from a perch or wiping it onto the perch. The tending adult usually then returned to the nest to commence brooding. Faecal sacs contained mistletoe seeds, and appeared similar to the seeds embedded in viscid tissue that were fed to the chick. We saw the chick defecate only after being fed. More faecal sacs were eaten early in the brooding phase, whereas later they were usually deposited away from the nest. When adults were observed defecating, they appeared to experience difficulty in passing the mistletoe seeds. Faecal deposits hung from the birds' cloaca by a strand of clear to opaque jelly and remained suspended until the bird either wiped its cloaca on its perch, or removed the deposit with its beak then either dropped the deposit or wiped it onto a branch.

The nestling was fed at an overall rate of 8.1 feeds per hour (2.8 feeds per hour by the male, 5.3 by the female; Table 2). The female's feeding rate was almost twice that of the male (65% vs 35% of feeding visits). On many occasions the male ate food items he brought back to the nest. These items were generally spiders or small green chrysomelid beetles. After perching near the nest for two or three minutes with the food in his beak, or after failing to feed the chick, the male swallowed the item.

Arthropods were identified (by legs visible protruding from the beak of the adult Honyeater) in only 5% of the Honeyeaters' visits to the nest. These included small green chrysomelid beetles, flies, moths and spiders. Most (64%) food items were mistletoe seeds surrounded by viscid fruit tissue (Table 2). We observed the male collecting seeds from the mistletoe plant on several occasions. Using his beak, he removed and dropped the cap and outer rind (wall of the fruit) then took the pearly white seed plus viscid fruit tissue in his beak. This was then either swallowed or carried to the nest. Mistletoe seeds were easily distinguished in the beaks of the adults, but the remaining items were not (Table 2).

Interactions with other birds

During observations at the nest, interactions between the Painted Honeyeaters and other birds were noted. Once, the male Honeyeater left the nest and chased away a Mistletoebird *Dicaeum hirundinaceum*. During another observation period a Grey Shrike-thrush *Colluricincla harmonica* was foraging on bark near the nest as the male Honeyeater was returning to the nest to relieve his partner. He stayed high in the nest-tree, while the female quickly departed from the nest and moved to the next tree. The Shrike-thrush continued probing the bark near the nest while the male Honeyeater watched. The female flew back to the nest-tree and moved toward the Shrike-thrush, as if to displace the bird. The Shrike-thrush pursued the female out of the immediate area, to the nearest neighbouring tree, before the Honeyeater returned to the nest-tree. In the female's absence, the male Honeyeater moved down onto the nest.

Other bird species did not provoke a response from the Painted Honeyeaters. A White-winged Triller *Lalage sueurii* was nesting in a neighbouring tree. Both adult White-winged Trillers visited the Painted Honeyeater nest-tree regularly and the male Triller called from a branch immediately below the nest. However, the Trillers' presence provoked no reaction from the Honeyeaters. There was also no reaction to a Willie Wagtail *Rhipidura leucophrys* visiting the nest-tree.

Vocalisations from the nest by adults

During incubation and brooding at Nest 2, both adult Painted Honeyeaters were observed to call from the nest. The calls made by the female were usually a

Table 3

Vocalisations made from Nest 2 by a pair of Painted Honeyeaters at 'Sunnyside' Travelling Stock Reserve, 15 km north of Armidale, N.S.W., during one-hour observation periods on each day. M = putative male (siren call), F = putative female (*chew-it* call; see text).

Date	*Nest phase*	*Calls from nest*		
		M	*F*	*Total*
28.11.92	incubation	4	2	6
9.12.92	"	1	14	15
11.12.92	brooding	0	15	15
19.12.92	"	0	1	1
21.12.92	"	0	0	0
22.12.92	"	0	0	0
23.12.92	"	0	0	0
24.12.92	"	0	0	0
25.12.92	"	0	0	0
26.12.92	"	0	0	0

double *chew-it*, whereas those of the male were similar to the alternating siren-like territorial calls given by Leaden Flycatchers *Myiagra rubecula* (*wee-oo wee-oo* or *fee-oo fee-oo*). During nest change-overs both adults usually gave soft calls as they settled onto the nest, but these were not quantified. Numbers of loud calls made from the nest by the Painted Honeyeaters are presented in Table 3. In general, more calls were made during the early stages of nesting and most calls were made by the female.

On 9 December, near the end of the incubation phase, the female gave a double *chew-it* call from the nest and was answered by the male's siren call as he returned towards the nest-tree. As the male called he flew upwards to nearly twice treetop height, then floated songlark-like (wings out-stretched and swept upwards) into a neighbouring tree from high in the air. This behaviour may have been either a territorial display or a courtship flight and was observed only once.

Post-fledging

A single Painted Honeyeater chick fledged, on 31 December, from the second nest. It was observed late in the afternoon high in the nest-tree, 6 m above the nest. The male adult fed it twice in 50 minutes.

The fledgling was observed three more times until 6 January, one week after fledging. At 7 days it was active and appeared competent. The upperparts were dark grey and the underparts were white. It had a yellow gape and yellow feathers on the wings, and a short tail. Only the male was seen to feed it, on mistletoe seeds. The female was not seen after the chick fledged.

Discussion

Throughout this paper we refer to the two Painted Honeyeater nests as being first and second nests. The pair may have made earlier unsuccessful nesting attempts at 'Sunnyside' or elsewhere. Throughout this paper we have also assigned gender on the basis of probability, according to behaviour, vocalisations and unpublished information (per L. Conole) on plumage characters of the sexes. The siren call and song-flight are typically male characteristics of this species, and ventral streaking is an unreliable gender criterion (L. Conole pers. comm.). Therefore, our assumptions about gender are likely to be correct, despite the conflicting literature. Nevertheless, our conclusions on sex roles must remain tentative until tested by more detailed study of this species.

An easterly or north-easterly aspect for the nests at 'Sunnyside' is consistent with the generally easterly aspect reported by Eddy (1961). The adults' behaviour in the nestling period was generally similar to that reported by Eddy (1961) for the incubation period. An incubation period of 13+ days for the Painted Honeyeater agrees with 14–15 days previously recorded for this species by Eddy (1961), and is within the range of 13–15 days reported for other small honeyeaters by Marchant (1980). However, the nestling period of 20 days observed for Nest 2 is considerably longer than the 12–14 days stated by Schodde & Tidemann (1986) and Longmore (1991) for this species, and determined for other small honeyeaters by Marchant (1980). Twenty days may not be unusual, as Red Wattlebirds *Anthochaera carunculata* may take more than 20 days to fledge (H.A. Ford pers. comm.). A long nestling period, implying slow growth, may also be connected with a frugivorous (low-protein) diet.

Participation of the male in incubation is known for the Painted Honeyeater (Eddy 1961, Whitmore & Eller 1983), but is unusual for honeyeaters in general and confirmed in very few (notably the communal *Melithreptus* spp. and the sexually dimorphic Pied Honeyeater *Certhionyx variegatus*; Noske 1983, Schodde & Tidemann 1986, Longmore 1991). There is little agreement among the last two sources over which species share incubation, and even some disagreement between the narrative texts and the biological synopses for certain species in Longmore (1991) over this point.

Both adult Painted Honeyeaters at 'Sunnyside' contributed equally to incubation during the first nesting attempt. During the second nesting attempt, the presumed female contributed about half the effort of the presumed male. These observations differ somewhat from those of Whitmore & Eller (1983), in which the male contributed 33–50% of total incubation time. However, our observations were brief, spanning one hour on one day in the first nesting attempt and two hours over two days in the second attempt, and may not be typical for the entire incubation period. Ramsay (1920) also noted that both adults incubate, but he found that the male constantly fed the female during this period, a behaviour not observed in this study.

Participation of the male in brooding has not previously been reported for the Painted Honeyeater, nor confirmed for any other honeyeater although suspected in the communal Striped Honeyeater *Plectorhyncha lanceolata* (Moffatt et al. 1983). Among Australian honeyeaters generally, only the female builds the nest, incubates the eggs and broods the nestlings, while the male assists the female in feeding the nestlings and fledglings (Schodde & Tidemann 1986, Longmore 1991). However, Noske (1998) found that in the Rufous-banded Honeyeater *Conopophila albogularis* the male contributes to nest-building. Noske (1983) also found for the Brown-headed Honeyeater *Melithreptus brevirostris* that individuals other than the primary female brood. As warned by Whitmore & Eller (1983), conclusions on gender roles in sexually monomorphic honeyeaters (including the Painted) should be cautious until confirmed by individual marking of birds.

In honeyeaters, the male's main responsibilities in the breeding cycle appear to involve territorial display and defence against potential predators (Longmore 1991). In keeping with this, the presumed male we observed was more audible than the presumed female when he called either from the nest or more usually while away foraging.

The problem of nest sanitation, discussed by Hindwood (1935) and Longmore (1991), is resolved by the adults' diligent disposal of nestling faecal sacs, which appeared identical to the mistletoe seed plus viscid tissue fed to the nestling. Kuijt (1969) noted that seeds pass through the digestive tract in almost the same condition as when swallowed, as recorded for the Mistletoebird by Green (1985). Ramsay (1920) noted, for Painted Honeyeaters, the similarity between defecated and ingested seeds. He also observed adults removing a faecal sac from one nestling and immediately feeding it to another nestling.

The behaviour of the adult Painted Honeyeaters during nest change-overs in windy conditions probably minimised the risk of eggs or nestlings from being blown from the nest. Austin (1918) and Hindwood (1935) both remarked on the ability of the chicks to hang on in windy conditions. However, some chicks are blown from the nest (Hindwood 1935, Eddy 1961).

The parental feeding rate was much lower than that reported by Ley & Williams (1998) for the endangered Regent Honeyeater *Xanthomyza phrygia*, but similar to that reported by Ballingall (1990) for the Mistletoebird. Our observations show that for mistletoe fruit fed to nestlings, it is the single seed embedded in the viscid tissue within the fruit that is actually collected, not the whole fruit as reported or implied by most authors. In this respect, also, the Painted Honeyeater resembles the Mistletoebird (cf. Ballingall 1990). Our data for proportions of arthropods taken to the nest are few, so we cannot confirm Eddy's (1961) observation of a high-protein diet fed to nestlings early in the brooding stage compared with a mostly carbohydrate diet from mistletoe fruit later in the brooding stage. The types of arthropod prey are consistent with previous conclusions, by Longmore (1991) and Oliver et al. (1998), on gleaning and hawking capture methods.

Interactions between the Painted Honeyeater and a potential competitor (Mistletoebird) or nest-predator (Grey Shrike-thrush) were predictable. The larger Honeyeater is likely to exclude the smaller Mistletoebird from a food resource. The interaction between the Shrike-thrush and the smaller Honeyeater was perhaps an attempt by the Honeyeater to entice the Shrike-thrush away from the nest area. The White-winged Triller and Willie Wagtail are not competitors for the same food or nest-site resources, nor are they nest-predators, and hence interaction with the Honeyeater is less likely.

Our observations add a little to the scant information about the Painted Honeyeater. Most observations of this species to date have been opportunistic. More valuable information could be obtained from future opportunities by focussing attention on specific aspects of behaviour, collecting data in a co-ordinated and systematic fashion, and quantifying observations. In particular, gender criteria and sex roles require further elucidation. All observations on this species should be published.

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