

For some years beach-washed Short-tailed Shearwaters have been reported from Esperance and other parts of the south coast of Western Australia. The earliest of these is probably that reported by D.L. Serventy (1947), who found the remains of one of these birds on a beach near Hopetoun in November 1946; he indicated that the finding should "occasion little surprise, as birds from the South Australian breeding islands no doubt forage widely westward over the Great Australian Bight..."

Subsequently, other beach-washed specimens were reported. Dr Serventy (1948) found three at Esperance on 23 April 1948 while Storr & Johnstone (1977) reported birds found near Esperance, near Albany and at Yallingup, which is on the western coast south of Cape Naturaliste, in 1976 and 1977. Since then, others (unpublished records) have found derelict specimens at Esperance. I also found two on the beach there in November 1981.

The report by Frith (1978) that Short-tailed Shearwaters had been captured alive near Phuket Island, western peninsula Thailand in May 1977 and the findings reported here indicate that some Short-tailed Shearwaters, probably ones that breed in south-western Australia, may migrate regularly to the northern Indian Ocean.

Although large areas of Figure of Eight Island were not checked during the visit in 1981, only Short-tailed Shearwaters were found in the burrows searched. Four weeks earlier I had banded Great-winged Petrel chicks near Albany; they were still developing feathers at the time. Even if young of this species had been present in the areas searched on Figure of Eight Island before our visit, and already departed, some evidence of their occupation would have been found. Also, only two days

earlier I had banded Flesh-footed Shearwaters in burrows during the day on nearby islands, and did likewise in the following week. Their occurrence on Figure of Eight Island was expected but none was found. However, it is probable that some of the burrows checked may have belonged to this species.

The presence of Short-tailed Shearwaters in burrows, prepared and lined, is a clear indication of breeding, though still some three weeks prior to their normal egg-laying dates. The recorded breeding range is from Broughton Island, New South Wales, to St Francis Island, Nuyts Archipelago, off Ceduna, South Australia. The present record extends this range some 1,100 km west of the previously recorded limit.

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COMMUNAL BEHAVIOUR OF BROWN-HEADED HONEYEATERS

In the most recent review of communal breeding in Australian birds, Dow (1980) lists the Brown-headed Honeyeater *Melithreptus brevirostris* among those species for which this habit has been reported only once or twice. Neither he nor Rowley (1976) could find any information additional to that quoted by Harrison (1969), which refers to three Brown-headed Honeyeaters attending a young Pallid Cuckoo *Cuculus pallidus* at each of two nests (recorded under RAOU Nest Record Scheme). In fact, Boehm (1957) stated that nestlings of this honeyeater in south-eastern South

Australia were fed by "helpers", and suggested that such birds were possibly the progeny of the previous year. Serventy (1958) also reported three birds feeding fledgelings on an RAOU Campout in south-western Western Australia.

Around Armidale, New South Wales, I have noted Brown-headed Honeyeaters in groups of three to eight in most months of the year, and though I have insufficient nesting data, I believe that communal breeding occurs in *brevirostris* at least as often as it does in the

White-naped Honeyeater *M. lunatus* in the New England region. I have observed *lunatus* nesting in simple pairs (one or both birds colour-banded) and presume both species are opportunistic communal breeders (*sensu* Dow 1980). This short paper describes some observations of communal breeding, roosting and other behaviour of the Brown-headed Honeyeater.

In April-May 1981 I observed the contributions of members of a group of five colour-banded Brown-headed Honeyeaters at a nest near my home, 2 km north of Armidale. The group contained four adults and one juvenile, presumably from a brood raised earlier in the same year. Colour band combinations were as follows: GG ♂, RR ♀, WB and DY (unsexed adults), and OW (juvenile). GG and RR were sexed by behaviour during copulation. Nesting observations were unfortunately restricted to the building and incubation periods, as the nest was apparently predated before the eggs hatched.

Building was first noted on April 26 and was observed at least once each day until May 5. Between these dates, I saw RR ♀ take material to the nest thirty-five times and although GG ♂ accompanied her on most occasions, I never saw him carry nest material. Much of this material was hair, obtained from a black and white calf; the female perched on the back or side of this animal plucking three or more white hairs from its body, completely avoiding the black patches of hair. This preference for white hairs has been noted by others (for example, Hyem 1937; Lord 1956). After taking hair to the nest, the bird usually returned to the calf and repeated the procedure several times. During the building stage, I saw GG ♂ feed RR ♀ four times. The female continued to bring material to the nest during the incubation period, and was the only bird observed to do so.

Incubation began between May 6 and May 8. On the latter day, I saw GG ♂ relieve RR ♀ on the nest after

he had fed and copulated with her beside the nest. The nest was watched for one to two hours each day from May 9 to May 16 (total watch = 707 minutes). All hours between 08:00 and 16:00 were sampled for at least sixty minutes over this period, to remove any possible bias associated with diurnal variation in incubating behaviour. The incubating birds were identified for 94% of the total watch; identity was unknown for nearly 5% of the time, and the eggs were left unattended for the remaining 1%.

All birds incubated except the juvenile, which rarely visited the nest-tree though it always foraged with the other group members. The contribution of the primary pair amounted to approximately 73% of the time for identified sittings, while DY sat for only 3% of that time (Table I). Although GG ♂ incubated fewer times than RR ♀, it tended to sit for longer periods and its total contribution was slightly greater than that of the female. The longest periods of attendance recorded were 41.5 (GG ♂) and 31.5 minutes (WB).

RR ♀ was fed while sitting on nine occasions: three times by both GG ♂ and WB, and twice by DY (once unidentified). On another two occasions, WB and DY fed RR immediately after she had flown from the nest. I never saw any bird other than RR being fed during this period, despite the participation of the other adults in incubating, often for longer periods. On at least ten occasions, birds arrived at the nest with food items (including RR twice) but the sitter flew before the food could be offered. The newly-arrived bird then sat, presumably eating the food itself.

From October 4 to 10 1980, in the same area, I made brief observations of another nest, which contained two or three young. At least four adults, two colour-banded (OO and YG) and two with aluminium bands only, fed the nestlings. The last two birds often foraged together with OO, and although indistinguishable from each

TABLE I

Attendance of incubating birds at nest of Brown-headed Honeyeaters near Armidale, NSW.

Identity	Total Contribution (%)	Total No. of sittings	\bar{x} period* of attendance	Coefficient of variation (%)	Max. period of attendance#
RR ♀	35.1	24	9.8	64.8	25
GG ♂	37.7	19	13.9	78.6	41.5
WB +	23.7	13	12.1	65.0	31.4
DY +	3.5	5	4.5	80.7	9.5

+ sexes unknown

* only fully-timed periods (to nearest 0.5 minutes) used in these calculations.

Minimum period of attendance was 1 or 2 minutes for each bird.

other, twice fed the nestlings in quick succession. However, YG appeared to forage separately from these birds, sometimes accompanied by another (unbanded) individual. During one 20-minute watch, OO fed the nestlings seven times, the two non-colour-banded birds eight times and YG twice. At least two birds including OO, brooded on the first day.

Occasionally when two adults met at the first nest, the approaching bird quivered its wings vigorously, rather like fledgelings of some species do when begging for food. I saw WB wing-quiver three times when it arrived at the nest while GG ♂ was sitting, but the reverse occurred once also. DY wing-quivered at WB while the latter was sitting and though the former had brought food, it was not offered to the sitter and was eaten by DY. RR ♀ was never observed to quiver its wings.

The significance of wing-quivering was not clear, but it seemed most likely to be an appeasement gesture, indicating that some form of dominance ranking may have been present. Agonistic interactions at the roost provide some support for this order. During the nest building period, I saw GG ♂ repeatedly attack and chase WB (and once, DY) from the roost-site. WB also chased DY once. A possible explanation for the aggressiveness of GG ♂ at this time was that he was guarding his mate (RR ♀) to avoid being cuckolded. RR ♀ and the juvenile (OW) remained huddled at the roost-site during these altercations which continued until well after dark. On returning to the site however, GG ♂ often pecked and harassed OW, who was unlikely to mate with the female but was apparently too close to her for the male's liking.

I have observed the species roosting on many nights over two years. In all cases, group members (as many as eight were recorded) huddled together, side by side, along a thin twig and/or petioles amongst foliage usually near the top of a eucalypt. The birds arrived at the intended roost-site quickly, but after a short struggle, sometimes dismantled and flew to other trees or rested in nearby branches before attempting to assemble again at the site. As with the Striated Thornbill *Acanthiza lineata*, which also roosts in huddles and in similar situations (Noske unpubl.), the individuals face different directions. This possibly helps the birds to pack more tightly into limited spaces, as well as affording a wide field of vision for predator surveillance.

Groups containing young (three in one season and two the next) were watched on three nights. In each case, the young birds occupied the most central positions in the row, with two or three adults on either side. Similar configurations of individuals at roosts have been found in the Jungle Babbler *Turdoides striatus* (Gaston 1977), and Varied Sittella *Daphoenositta*

chrysoptera and Striated Thornbill (Noske unpubl.). The outer birds (adults) probably provide some protection for the inner birds. In the Honeyeater and the Thornbill, the adults apparently settled around the young birds, each new arrival taking its place on the end. However, in the Jungle Babbler and Sittella, juveniles were usually the last to arrive, squeezing between the birds already present.

DISCUSSION

The above roosting observations contradict Immelmann's (1961) general assertion that honeyeaters are "distance types" and cannot tolerate physical contact after fledging. Though he claims mutual preening does not occur within the Meliphagidae, I have several records of allopreening in *Melithreptus*. Communal breeding by the Brown-headed Honeyeater is further evidence of mutual tolerance and cooperation within groups of this species, which I suspect is typical of the genus.

The mated female appears to do most of the building but other birds may occasionally participate in this activity. At the first nest studied, only the mated female (RR ♀) was observed building, but in earlier years I have seen two Brown-headed Honeyeaters simultaneously collecting material and taking it to the nest. Lord (1956) refers to a pair collecting hairs from a pony, though whether he observed both birds simultaneously is not clear. The mated male (GG ♂) sometimes alighted on the back of the calf, once with food for the female, while the female was collecting hairs, and often accompanied her to the nest, but did not collect material. Similarly, in a pair of colour-banded White-naped Honeyeaters, only one bird (presumably the female) took material to the nest four times, but the other bird accompanied it each time (pers. obs.). This is consistent with information on many other species of honeyeaters in which the female alone builds the nest, though the male accompanies her on the search for material and greets her at the nest (Immelmann 1961). D. Milledge (in litt.), however, noted more than one bird building at two nests each of the Strong-billed and Black-headed Honeyeaters *Melithreptus validirostris* and *M. affinis* in Tasmania.

While incubation is "exclusively the concern of the female with most honeyeaters" (Immelmann 1961), this is clearly not the case in the Brown-headed. Incubation sharing is also suspected in the two Tasmanian *Melithreptus* species (D. Milledge in litt.), but as yet no colour-banding study has been attempted. It is curious that the mated female Brown-headed was fed by the other birds during the incubation period since one would expect this behaviour to be more typical of species in which the female alone incubates.

H.L. Bell commented on an earlier draft of this paper.

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MORPHOLOGY AND DEVELOPMENT OF NESTLING GREY-CROWNED AND HALL'S BABBLERS

Information on the morphology and development of nestlings is available for few Australian passerines. Yet this knowledge is valuable because details such as the arrangement of natal down may prove to be useful taxonomic characters, particularly at supra-specific levels. In this note we describe and compare nestling Grey-crowned and Hall's Babblers, *Pomatostomus temporalis* and *P. halli* (Timaliidae).

Between August and December 1980 we repeatedly examined twenty-one nestling Grey-crowned Babblers. Most nests were on a pastoral property ('The Dell') 8 km south-east of Meandarra in south-east Queensland. This is currently the main study site of the Meandarra Ornithological Field Study Unit of the University of Queensland. From 30 August to 8 September 1980, during an expedition to 'Goonamurra', a property near Eulo in south-west Queensland, we examined eight nestling Hall's Babblers aged between 0 and 10 days. The nomenclature of the patches of natal down (neossoptiles) follows Saunders (1956) and the naming of the tracts of feathers (teleoptiles) follows Lucas & Stettenheim (1972). We called the day of hatching Day 0.

The nestling periods of twelve Grey-crowned Babblers were 17-22 days (mean 19.3 days, s.d. 1.37). Brown (1979) reported the age of fledging of the oldest in a brood to be 20-22 days. Five oldest nestlings in our sample fledged at 19-22 days (mean 19.8 days, s.d. 1.31) (excludes single nestling fledging at 17 days as it obviously lacked opportunity for any developmental manifestation of social behaviour and Brown's sample

did not contain any such birds). These estimates agree well; our daily examinations of the young may have slightly hastened fledging. We were unable to determine the nestling period of Hall's Babbler.

Newly-hatched Grey-crowned Babblers weighed about 3.7 g, Hall's Babblers about 3.0 g. Adult Grey-crowned Babblers, both sexes combined and birds at least two years of age, averaged 75.0 g (SE = 0.275, N = 321); Hall's Babblers, at least one year old, averaged 41.5 g (SE = 0.456, N = 15). In both species the colour of the skin varied slightly, even within broods, but it was usually orange or pink-orange and brighter ventrally than dorsally. The bill was the same colour as the skin or more yellow, the buccal lining and tongue yellow-orange, the rictal flanges yellow or bright yellow, and the egg-tooth white. Usually the tip of the mandible protruded beyond that of the maxilla by about 1 mm.

The following six patches of natal down were common to both species: coronal, occipital, dorsal, humeral, secondary and femoral (Fig. 1). In addition, Hall's Babblers possessed an ocular patch, above and behind the eye. The dorsal patch was median, the others bilaterally paired. In both species, down was restricted to the dorsum, except that one nestling Hall's Babbler showed traces of an abdominal patch. In some Hall's Babblers, both parts of the coronal patch were discontinuous, giving four elements altogether.

Natal down was fine and rather sparse. That on the body and wings was grey. All down on the head of Grey-crowned Babblers was white, whereas in Hall's