

## Short Communications

### Co-operative Care of Fledglings by New Holland Honeyeaters

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Dow (1980) listed five honeyeaters in which co-operative breeding is well documented (Bell Miner *Manorina melanophrys*, Noisy Miner *M. melanocephala*, Yellow-throated Miner *M. flavigula*, Yellow-tufted Honeyeater *Lichenostomus melanops*, White-naped Honeyeater *Melithreptus lunatus*) and another nine in which co-operative breeding has been recorded once or twice. He included New Holland Honeyeaters *Phylidonyris novaehollandiae* in the latter group on the basis of Recher's (1977) observations. Recher (1977) considered New Holland Honeyeaters to be individual breeders but noted that a few nests seemed to have more than two birds attending. He could not identify the individuals feeding the young because the birds were not banded, and he cautioned that groups of birds around nests might simply be social 'corrobores' (Rooke 1979; Pyke & O'Connor 1989) or responses to predators. Three intensive studies on the ecology and breeding of New Holland Honeyeaters in other locations have revealed no evidence of co-operative breeding (Paton 1979, 1985; Rooke 1979; McFarland 1986).

In 1987 and 1988, I observed breeding behaviour of New Holland and White-cheeked *Phylidonyris nigra* Honeyeaters in Brisbane Water National Park, New South Wales (33°32'S, 151°17'E), at or near the site where Recher (1977) recorded his observations. The two species have interspersed breeding territories in heathland areas of the park. Males occupy these territories over most of the year, whereas females occupy these territories only during the breeding season. Both species form breeding pairs from late summer to early autumn, and lay several clutches between then and early spring.

I recorded identities and behaviours of birds that approached active nests or approached locations where fledglings were hidden (I define 'fledglings' as birds that have recently left the nest). I observed nests and fledglings in territories of 20 male New Holland Honeyeaters that had a total of 117 clutches over the two years, and in territories of ten male White-cheeked Honeyeaters that had a total of 43 clutches. Of the 30 males, 17 were present throughout both breeding seasons. The 30 males paired with a total of 47 females, five of which were present throughout both

breeding seasons. All males and most females in breeding pairs were colour banded.

#### *Observations of nests*

I conducted an average of 2.4 half-hour observation sessions of 103 New Holland Honeyeater nests with eggs and 39 White-cheeked Honeyeater nests with eggs. I observed at least one nest with eggs on all territories. I conducted an average of 2.1 half-hour observation sessions of 66 broods of nestling New Holland Honeyeaters on 19 territories and 31 broods of nestling White-cheeked Honeyeaters on ten territories. The number of observation sessions per nest ranged from one to five during both the incubation and brooding stage.

I never observed a visit to a nest by a bird that was not a member of the breeding pair on the territory. In both species, only one member of the pair built nests, incubated eggs and brooded nestlings, whereas both members fed nestlings. This division of labour was similar to that observed in New Holland Honeyeaters by Rooke (1979), Paton (1985) and McFarland (1986). Rooke (1979) confirmed by laparotomy that only females incubate.

The only birds that frequently perched within 15 m of an active nest were the breeding pair and their offspring from previous nests earlier the same year. Members of adjacent breeding pairs sometimes perched together near a nest belonging to one of the pairs. In some of these cases, the visiting bird was known to be an offspring from the previous year. The only times I observed larger groups of birds near nests occurred when birds were mobbing a potential predator.

#### *Observations of fledglings*

Of the nests I observed, one or more young fledged from 51 New Holland Honeyeater nests and 27 White-cheeked Honeyeater nests. I conducted observations of 44 New Holland Honeyeater broods fledged in 16 territories and 23 White-cheeked Honeyeater broods fledged in 9 territories. I conducted an average of 2.4 (ranging from one to five)

half hour observations per brood during the first two weeks after they left the nest. I could easily locate the young from their begging calls. They were difficult to observe, however, because most of them moved to dense thickets after leaving their nests. I noted any adult birds that flew into these thickets and whether or not they were carrying insects.

In observations of all the White-cheeked Honeyeater broods and 37 of the New Holland Honeyeater broods, only members of the breeding pair carried insects to where the young were hidden. Each of the other seven New Holland Honeyeater broods, however, was amalgamated with a neighbouring brood after leaving the nest, such that members of two breeding pairs carried insects to a single location.

Six of these seven broods were from territories of two neighbouring males who had a close relationship throughout 1987 and 1988. The younger male was banded as a juvenile in October 1986 near the older male's territory and could have been one of his offspring. I often saw the younger male in or near the older male's territory throughout 1987, and the two birds sometimes perched together. The younger male began defending an adjacent territory and acquired a mate in mid-winter. They laid their first clutch in early September, and the two young fledged on 5 October. The older male had a nest 65 m away, from which two young fledged on 8 October. I colour banded all four young shortly before they left their nests.

On 10 October, both pairs of fledglings had moved to a single dense thicket (*Banksia ericifolia*, *Leptospermum attenuatum*, *Hakea teretifolia*) 45 m and 70 m from the nests of the older and younger male respectively. This was unusual, for young birds were capable of only weak flight when they left their nests, and usually did not move more than 15 m during the first week. I could not initially see the fledglings, but all four adults were directing their provisioning to the same location in the thicket. For five minutes starting at 0720 on 16 October, I could see all four fledglings sitting side by side on an exposed branch of the thicket. At 0722, the older male landed on the branch and the four young begged to him for food. He inserted his bill into the mouths of both the younger male's fledglings and the mouth of one of his own fledglings, then flew away. On 5 November, I again saw the older male feed one of the younger male's fledglings. Although all four adults may have fed both pairs of fledglings, I only have direct evidence that the older male did so.

The younger male had three more successful nests in 1988. The first two broods fledged in May and July, and moved to the periphery of the older male's territory after fledging. I saw the older male visit the thickets where both broods were hidden and once saw him carrying insects. He did not have a brood of his own on either occasion. The

younger male's third brood fledged in September and was raised well away from the older male's territory without any apparent assistance.

I observed one other case in which two pairs that fledged young simultaneously may have reared them co-operatively. The two broods were hidden in the same part of a large thicket that was visited by both pairs. One of these pairs had bred in the same location several times throughout the 1987 and 1988 breeding seasons, whereas the other pair had established a territory there only recently.

I observed two other cases in which the male of a pair I was observing carried insects to a thicket in which a neighbouring pair's fledglings were hidden but not his own. In both cases, the male of the pair whose brood was fed had been reared the previous year by the male who fed them. The two younger males had hatched in May and June 1987, had established territories adjacent to their natal territories by about one year later and fledged young in July and August 1988. Both broods that I observed being fed by neighbouring males were probably the first broods fledged by the younger males.

## Discussion

My observations do not support Recher's (1977) suggestion that some nests of New Holland Honeyeaters are attended by more than two birds, but instead indicate that some broods are attended by more than two birds after fledging. There was evidence of co-operative care in only a small proportion of the broods I observed. It is possible, however, that the first broods of males that breed adjacent to their natal territories are often fed by neighbouring males. In all cases in which I observed evidence of co-operation, one of the males involved was known to have been or could have been reared during the previous year by the other male.

If the only broods that are fed by neighbours are those reared by young birds, it is not surprising that I made few observations of co-operation. I only attempted to observe broods of experienced breeders. I therefore could easily have missed cases in which broods reared by young birds were fed by neighbouring adults if those broods were not amalgamated with neighbouring broods. In addition, it is likely that few young males successfully establish territories adjacent to their parents. Once established, male White-cheeked and New Holland Honeyeaters remain on the same territories over several years, so that the rate of turnover is low. Paton (1979) observed that male New Holland Honeyeaters stayed near their natal territories but that only a small proportion of them obtained mates and bred during his study.

Of 43 New Holland Honeyeaters and 22 White-cheeked

Honeyeaters that I banded before they fledged in 1987, ten and one respectively were still living near their natal territories at the beginning of the 1988 breeding season. Of these, three New Holland Honeyeaters acquired mates in 1988. All three turned out to be males and all fledged one brood in July or August. One of these males no longer had his parents in the area and his was the only brood that I did not observe being fed by a neighbouring male. Because no young White-cheeked Honeyeaters obtained mates, it was impossible to tell whether their broods might also be fed by neighbouring adults.

The type of co-operation I have described is unusual in that parents seem to assist their offspring rather than vice versa. The most common system of co-operative breeding in Australian birds involves young birds helping their parents rather than establishing breeding territories of their own (Dow 1980). If the older males I observed feeding neighbouring broods had fertilised their female neighbours, then these males would have been feeding their own offspring. Extra-pair copulations are common in a variety of birds (Ford 1983; Birkhead *et al.* 1987), so this scenario is quite possible. This would not, however, explain the behaviour I observed. Males of other species that perform extra-pair copulations are not known to seek out their genetic offspring and feed them. In general, birds do not show a strong tendency to recognise and preferentially feed close kin (Shy 1982; Rohwer 1986).

A tendency of male New Holland Honeyeaters to feed neighbouring offspring is more likely to result from familiarity rather than paternity. Jamieson and Craig (1987) argued that helping behaviour in communal breeders can largely be explained by the opportunity for birds that do not disperse from their natal territories to encounter and interact with begging offspring. Unlike communal breeders, New Holland Honeyeaters do not remain in their natal territories and, at least initially, may not often encounter their younger siblings. After a period during which they have no strong site attachment, some young males establish adjacent territories. This is common in a variety of bird species (Greenwood 1980). The tendency for co-operative care to occur in New Holland Honeyeaters, however, may result from particularly strong social interactions between young males and the males on their natal territories.

Adjacent males often visit one another's territories, and it is primarily groups of males that aggregate and perform corroborees (Pyke & O'Connor 1989). At my study site, these interactions were particularly frequent among young males and the males from their natal territories. Given that the initial territories of young males that I observed were particularly close to their natal territories, first broods may be particularly likely to be encountered frequently by neighbouring males. In addition, those neighbouring males may be most likely to feed broods that they encounter on or near their own territories.

If the co-operation I observed results from social interactions between males, it is not surprising that I observed it only after broods fledged. In New Holland Honeyeaters, the majority of provisioning to nestlings is done by females, whereas the majority of provisioning to fledglings is done by males (Paton 1979). Incidences of males feeding neighbouring nestlings would therefore be much rarer if they occur at all. Fledglings could also be fed more frequently because they can move toward territories of neighbouring males who feed them. This could easily lead to brood amalgamation if neighbouring broods were to fledge at the same time.

In conclusion, I feel that my observations of apparent co-operation in New Holland Honeyeaters do not conflict with our existing knowledge of the social behaviour of this species. Overall, it appears that no more than a small proportion of broods are reared co-operatively. I have suggested particular circumstances in which co-operation is most likely to occur but more observations are needed to confirm or refute these suggestions. It is also not clear as yet whether birds that feed neighbouring broods do so regularly enough to significantly contribute to their rearing.

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### References

- Birkhead, J.R., Atkin, L. & Møller, E.P. (1987). Copulation behaviour in birds. *Behaviour* **101**, 101-133.
- Dow, D.D. (1980). Communally breeding Australian birds with an analysis of distributional and environmental factors. *Emu* **80**, 121-140.
- Ford, N.L. (1983). Variation in mate fidelity in monogamous birds. In: *Current Ornithology*, Vol. 1 (ed. R.F. Johnston) pp. 329-356. Plenum Press, New York.
- Greenwood, R.J. (1980). Mating systems, philopatry and dispersal in birds and mammals. *Anim. Behav.* **28**, 1140-1162.
- Jamieson, I.G. & Craig, J. (1987). Critique of helping behavior in birds: a departure from functional explanations. In: *Perspectives in Ethology*, Vol. 7 (eds P. Bateson & P. Klopfer) pp. 79-98. Plenum Press, New York.
- McFarland, D.C. (1986). Breeding behaviour of the New Holland Honeyeater *Phylidonyris novaehollandiae*. *Emu* **86**, 161-167.
- Paton, D.C. (1979). *The behaviour and feeding ecology of the New Holland Honeyeater Phylidonyris novaehollandiae in Victoria*. PhD thesis, Monash University.
- Paton, D.C. (1985). Do New Holland Honeyeaters *Phylidonyris novaehollandiae* breed regularly in spring and autumn? *Emu* **85**, 130-133.

- Pyke, G.H. & O'Connor, P.J. (1989). Corroborate behaviour of New Holland and White-cheeked Honeyeaters. *Emu* **89**, 55-57.
- Recher, H.F. (1977). Ecology of co-existing White-cheeked and New Holland Honeyeaters. *Emu* **77**, 136-142.
- Rohwer, S. (1986). Selection for adoption versus infanticide by replacement "mates" in birds. In: *Current Ornithology*, Vol. 3 (ed. R.F. Johnston) pp. 353-395. Plenum Press, New York.
- Rooke, I.J. (1979). *The social behaviour of the honeyeater Phylidonyris novaehollandiae*. PhD thesis, University of Western Australia.
- Shy, M.M. (1982). Interspecific feeding among birds: a review. *J. Field Ornithol.* **53**, 370-393.

## Micronesian Starling Predation on Seabird Eggs

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Native and introduced bird predation on seabirds has been well documented in many areas of the world. Often the predator species are other seabirds, such as gulls (Anderson & Keith 1980), but in some cases passerine species have been responsible. Crows are known to prey on a variety of seabirds (Montevocchi 1977); Laysan Finches *Psittirostra cantans* have been reported eating the eggs of at least seven seabird species (Ely & Clapp 1973); and introduced Common Mynas *Acridotheres tristis* are a serious predator on nesting Wedge-tailed Shearwaters *Puffinus pacificus* in Hawaii (Byrd 1979). Predation by Micronesian Starlings *Aplonis opaca* has not been documented previously.

On a trip to Guguan (17°20'N, 145°51'E), Commonwealth of the Northern Mariana Islands, in May 1987 we observed two Micronesian Starlings on a Black Noddy *Anous minutus* nest eating an egg. We saw five other cases of Micronesian Starling predation of Black Noddy eggs that day. In all cases observed, the eggs were broken into with a hammer-like use of the bill and eaten on the nest using a drinking-like motion with a raising of the head. Often the shells and part of the interior were dropped to the ground but we never saw them feeding on these dropped eggs. On a short hike (180 m) down a gully we had traversed earlier in the day, we found the fresh remains of 13 Black Noddy eggs that had apparently been preyed upon by Micronesian Starlings within the previous several hours. Approximately 250 pairs of Black Noddies nested in this gully. Nests were of typical stick construction, clustered at heights of 3-10 m in mature Tropical Almond *Terminalia catappa*, Strangling Fig *Ficus prolixa* and Screwpine *Pandanus fragrans* trees.

In March 1988, we again visited Guguan and observed one case of Micronesian Starling predation on Black Noddy eggs. This was during the beginning of the nesting season and only two nests with eggs were seen. We also saw one case of Micronesian Starling predation of a Red-footed Booby *Sula sula* egg in a tree nest. Several days earlier on the island of Maug (20°02'N, 145°19'E), Estanislao Taisacan observed Micronesian Starlings eating eggs from two Black Noddy nests. In each case 2-5 Micronesian Starlings were present at the nest. On Ulithi in March 1986 John Engbring and Gary Wiles observed a Micronesian Starling enter a Black Noddy nest and knock the egg to the ground; the Black Noddy had apparently been scared off the nest by the observers (Wiles pers. comm.).

Micronesian Starlings appeared to follow us and eat the eggs in nests from which adult seabirds had fled. We had previously made note of their extreme lack of shyness and apparent curiosity towards human interlopers in this rarely visited small (412 ha) island wildlife sanctuary. Vocal groups of 2-6 birds often approached a stationary observer to distances of less than 2 m and remained nearby for several minutes. The presence of a human intruder could be a behavioural key which triggers the flocking and foraging (nest robbing) response in individual birds. Laysan Finch egg predation, facilitated by human disturbance, is said to have caused massive mortality in Sooty Terns *Sterna fuscata*, Black Noddies and White Terns *Gygis alba* (Ely & Clapp 1973). Anderson & Keith (1980) report Yellow-footed Gulls *Larus livens* walking ahead of human intruders in a Brown Pelican *Pelecanus occidentalis* colony and pecking holes in eggs. These Yellow-footed Gulls

often gathered over intruders calling frequently, which attracted more gulls and frightened more Brown Pelicans off their nests. Productivity, as measured by nesting success, was found to be markedly (52-100%) decreased in Brown Pelican subcolonies which received frequent human visitation.

The extent of predation under undisturbed conditions is unknown. Micronesian Starlings could be a substantial factor in reducing Black Noddy breeding success in conjunction with human disturbance. Presently only about 50 pairs of Black Noddies nest on inhabited islands in the Marianas while approximately 3000 nest on uninhabited islands (Reichel in press). While this distribution is thought to have resulted primarily from direct human exploitation, predation by Micronesian Starlings during human related disturbances may have contributed to losses.

These are the first published accounts of Micronesian Starling egg predation. Previous authors regarded these indigenous birds as exclusively (Baker 1951) or predominantly fruit and seed eaters and occasional insect eaters (Marshall 1949; Marshall 1975; Jenkins 1983; Engbring & Ramsey 1984). Eggs may be an important food for Micronesian Starlings, especially on islands which are small and have simple forest bird and vegetative communities.

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#### References

- Anderson, D.W. & Keith, J.O. (1980). The human influence on seabird nesting success: conservation implications. *Biol. Conserv.* **18**, 65-80.
- Baker, R.H. (1951). The avifauna of Micronesia, its origin, evolution, and distribution. *Univ. Kansas Publ., Mus. Nat. Hist.* **3**, 1-359.
- Byrd, G.V. (1979). Common Myna predation on Wedge-tailed Shearwater eggs. *'Elepaio* **39**, 69-70.
- Ely, C.A. & Clapp, R.B. (1973). The natural history of Laysan Island, Northwestern Hawaiian Islands. *Atoll Res. Bull.* **171**, 1-361.
- Engbring, J. & Ramsey, F.L. (1984). *Distribution and Abundance of the Forest Birds of Guam: Results of a 1981 Survey*. U.S. Fish Wildl. Serv. FWS/OBS-84/20.
- Jenkins, J.M. (1983). The native forest birds of Guam. *Ornith. Monogr.* **31**, 1-61.
- Marshall, J.T. (1949). The endemic avifauna of Saipan, Tinian, Guam, and Palau. *Condor* **51**, 200-201.
- Marshall, M. (1975). The natural history of Namoluk Atoll, Eastern Caroline Islands. *Atoll Res. Bull.* **189**, 1-53.
- Montevicchi, W.A. (1977). Predation in a salt marsh Laughing Gull colony. *Auk* **94**, 583-585.
- Reichel, J.D. (in press). The status and conservation of seabirds in the Mariana Islands. In: *Supplement to Status and Conservation of the World's Seabirds* (ed. J.P. Croxall). Int. Council Bird Preserv. Tech. Publ.

## Archbold's Bowerbird *Archboldia papuensis* (Ptilonorhynchidae) Uses Plumes from King of Saxony Bird of Paradise *Pteridophora alberti* (Paradisaeidae) as Bower Decoration

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Archbold's Bowerbird *Archboldia papuensis* (*Archboldia* hereafter) is a little-known large (37 cm) bowerbird patchily distributed in the central ranges of Irian Jaya and Papua New Guinea at altitudes of 2300-2900 m, rarely to 1800 m (Beehler *et al.* 1986). Due to inaccessibility, it remained

unknown except for a 'mat' type bower and a 'grovelling' male courtship display (Gilliard 1959, 1969) until the discovery of its nest and egg (Frith & Frith 1988).

The bower of adult males consists of several square