Corella, 1995, 19(2): 51–54

NOTES ON THE CORROBOREE BEHAVIOUR OF THE NEW HOLLAND HONEYEATER

DAVID C. McFARLAND

15 Currong Street, Kenmore, Qld 4069

Received 1 September, 1993

The corroboree or congregation display occurs in a number of honeyeater species. This paper presents data on the display of New Holland Honeyeaters in New England National Park. Corroboree frequency is highest in the morning (0.85 displays/hr) and peaks in late summer and winter (up to 3.3 displays/hr) when breeding territories are being established. The displays involve an average of six birds with the majority of those identified being adult males occupying nearby territories. The relationship between corroboree activity and co-operative behaviour in honeyeaters is examined.

INTRODUCTION

The term corroboree was first coined for bird behaviour by Cameron (1970) for the congregation display of the highly sociable Noisy Miner *Manorina melanocephala* and was described in detail by Dow (1975). Corroborees have been observed in eight honeyeater species from three genera (Pyke and O'Conner 1989 and references therein; pers. obs.). New Holland Honeyeaters *Phylidonyris novaehollandiae* also engage in corroborees and use postures and repeated calling similar to those of the miner display (see Rooke 1979 for description). Both Dow (1975) and Rooke (1979) considered that the behaviour, derived from submissive displays, facilitated the recognition of resident birds in an area, particularly those returning after some absence. Some studies (Paton 1979; Pyke and O'Connor 1989) have found that corroborees occur most often with the onset of breeding but the behaviour is not confined to this period. A major re-establishment event is when a breeding territory or centre of activity associated with breeding is being defined for a new nesting season.

In this paper I examine the corroboree behaviour of New Holland Honeyeaters, its frequency with respect to time (over day and during year) and honeyeater activity (New Holland Honeyeater capture rates and resident numbers), and what birds (number, sex, status) participate in the display. I also explore the occurrence of corroboree activity within the honeyeater family (Meliphagidae), especially with respect to the level of co-operative social behaviour displayed by various species.

STUDY AREA AND METHODS

New Holland Honeyeaters were studied in New England National Park (30°30'S, 152°30'E) in north-eastern New South Wales. The study area was in an open forest with a canopy of eucalypts, an understorey dominated by banksias and a ground layer of ferns and grasses (McFarland 1985a).

Corroboree frequency was measured by recording the number of displays seen 35 m either side of a 600 m transect, walked between 0700 h and 0900 h, twice each month in 1983. Each transect took one hour to complete. During each visit to the area, the locations of colour-banded birds were marked on a map of the study area.

New Holland Honeyeater activity during the same period was indicated by the number of birds caught in mist-nets each month. To overcome the variable netting effort all capture rates were converted to the number of birds trapped per 100 net hours. The rates were separated into three components: total — all adult and immature birds; transient adults — adults trapped once only; and resident adult —adults caught more than once, colour-banded and subsequently seen in the study area.

Individuals participating in corroborees were identified during 66 hours of focal-bird observations of colour-banded birds spread throughout the period when New Holland Honeyeaters were most conspicuous in the area (February to August, McFarland 1985b). Observations were made at three times of day (0800–1030 h, 1100–1330 h, 1500–1730 h) and records kept of the total number of birds involved in a display, the identity of birds present and the location of the corroboree.

TABLE 1

Frequency of corroboree displays (mean number/h), capture rates of resident adult New Holland Honeyeaters (number caught/100 net hours), number of net hours and the maximum number of colour-banded residents (total and males only) recorded on maps each month. the resident numbers are minimum values as there were birds, unbanded or metal only, in the area whose status could not be determined.

	Month											
	J	F	M	A	M	J	J	A	S	O	N	D
Display frequency	0	1.5	0.8	0.3	1.5	3.3	1.3	0.8	0	0	0	0
NHH capture rate	2.3	10.8	5.0	1.3	8.3	13.8	11.9	8.6	2.1	0	0	0
No. net hours	42	56	140	78	24	50	42	58	48	56	42	24
No. residents												
Total	3	15	14	16	17	17	15	16	5	1	0	2
Male	2	8	8	8	9	11	9	9	3	1	0	1

RESULTS

Corroboree frequency, based on transect data for the year, averaged 0.77 ± 0.22 displays/h (mean ± S.E., n = 24 h). The frequency of corroborees seen during transects for the period February to August was 1.30 ± 0.30 displays/h (n = 14 h) while morning focal-bird observations for the same months yielded an average of 0.85 ± 0.18 displays/h (n = 22 h). The values were not significantly different ($t = 1.36$, $df = 34$; $P > 0.1$). Based on focal-bird observations, corroborees were significantly more common in the morning than at other times of the day (a.m. = 20, noon = 6, p.m. = 10; $\chi^2 = 8.7$, $df = 2$; $P < 0.05$).

Corroboree frequency varied during the year with distinct peaks in February and June (Table 1). This seasonal pattern was significantly correlated with the capture rates of adult New Holland Honeyeaters resident in the area (Table 1; $r = 0.90$, $df = 10$; $P < 0.01$). Less strong or non-significant correlations were found when total New Hollands ($r = 0.06$, $P > 0.05$) and transient adults ($r = 0.46$; $P < 0.05$) were considered. The occurrence of the display was also correlated with the number of resident birds in the area ($r = 0.73$, $df = 10$; $P < 0.01$), especially males ($r = 0.80$, $df = 10$; $P < 0.01$ Table 1).

On average, the total number of birds involved in a corroboree was 6.2 ± 0.3 (mean ± S.E., range = 4--12, n = 36). Two-thirds of the displays had between four and six birds attending. Of the birds identified in displays 91 per cent were males and only 9 per cent females (n = 66 observations of 18 individuals). All of the recognized birds occupied territories in the vicinity either as members of pairs or as single birds (unpubl. map data). (The identification rate of participants (sex and status) was low because the main aim of the observations was to time budget specific individuals and little time was available to examine the other birds present.) On 17 occasions when an observed bird was noted as flying over other territories to reach a corroboree not once were they attacked by the owners of those territories. In at least six cases this was because these territory owners were already attending the display. Corroborees occurred both within known territories (areas successfully defended over at least two weeks, n = 24 times) and in undefended areas between territories (n = 12).

DISCUSSION

Both the diurnal and seasonal changes in corroboree frequency can be attributed to changes in the encounter rate between resident birds partly through increased activity of those present and increased numbers of resident birds in the area. During the day more birds are detected (active) in the morning than in the afternoon or at midday (McFarland 1985a) hence there is a greater chance of a display being triggered in the morning. The yearly pattern of high corroboree frequencies in February and June coincides with increased activity and numbers of adult New Holland Honeyeaters re-establishing territories for autumn and late winter breeding (McFarland 1985b, 1986a,b). Corroborees outside this period could be due to the fact that

residency among honeyeaters, such as New Holland Honeyeaters can vary with birds reoccupying areas at different times (Pyke and O'Connor 1989; Pyke *et al.* 1989).

On average six birds participate in corroborees with those involved usually being adult male territory owners that have territories near the site of the display. These results support the findings of Paton (1979) and Pyke and O'Connor (1989).

The function of corroboree behaviour is not clear but one explanation is that the display enables birds to associate and learn to recognize neighbours or others in the group (Dow 1978). New Holland Honeyeaters occupy territories or centres of activity in close proximity (McFarland 1986a). Within these 'neighbourhoods' (*sensu* Rowley 1975) the corroboree behaviour may be a non-aggressive means of allowing resident birds to congregate and identify surrounding territory owners thereby reducing future aggression costs (time and energy) associated with territory defence. Both New Holland and White-cheeked Honeyeaters *P. nigra* appear to be able to recognize neighbours and are less aggressive toward them compared to responses to transients (Rooke 1979; Armstrong 1991). A consequence of this discriminatory behaviour is the potential for co-operative activities or at least non-aggressive associations among neighbours that know each other. Among honeyeaters, such 'co-operative' actions may include mobbing predators (Ford, pers. comm.), chasing transient conspecifics and larger competitors (Rooke 1979; Dunkerley 1989), foraging at clumped resources (McFarland 1984a) and co-operative breeding (Armstrong 1990). However, these events appear to be rare among New Hollands given the lack of reports in the major studies of this species (Paton 1979; Rooke 1979; McFarland 1985b; Armstrong 1990). The few records present are probably beneficial side effects to the more important reduction in inter-neighbour aggression. The beneficial side effects may, however, be more developed and play greater roles in other species.

Corroboree behaviour in the Meliphagidae

The proposal I wish to explore is that within the honeyeater family the presence and extent of corroboree activity appears to vary with the degree of proximity when breeding and the level of co-operative behaviour of a species. Quantitative data are very limited and need to be collected to test the following idea. However, I believe enough anecdotal evidence is available for a cursory examination of any relationship.

Corroborees have not been recorded for wattlebirds *Anthochaera* spp. and friarbirds *Philemon* spp.; honeyeaters with large and/or widely spaced breeding territories, (Hindwood 1944), but such birds do exhibit submissive postures similar to elements found in a corroboree (McFarland 1983). Co-operative behaviour by any of these species has not been confirmed.

Honeyeaters, such as the New Holland and White-cheeked, also occupy pair territories but these are often close together. While corroborees are present in these species both the display and other co-operative activity, such as co-operative breeding, is relatively rare (Pyke and O'Connor 1989; Armstrong 1990; unpubl. data). However, in species where corroborees are common, e.g. Fuscous Honeyeater *Lichenostomus fuscus* and White-plumed Honeyeater *L. penicillatus*, there are more reports of co-operative attacks on conspecifics and larger competitors and predators (McFarland 1984b, pers. obs.; Dunkerley 1989) and a suggestion of co-operative breeding (Schodde and Tidemann 1988 but see Dunkerley 1989).

Among the recognized co-operatively breeding honeyeaters there are those that have groups living in clumped territories, e.g. Yellow-tufted Honeyeater *L. melanops*, and those that have groups within large colonies, e.g. Noisy Miner. Only the miners have been studied in detail and corroborees are both common and the most striking social display of the species (Dow 1975). The Noisy Miner has highly developed co-operative behaviour not only in breeding but in the mobbing of predators and the almost total exclusion of other birds from the resources of the colony territory (Dow 1975, 1977). It is my proposition that corroborees initially arose as modified appeasement displays that reduced inter-neighbour aggression among close territory owners. However, under certain conditions, e.g. high territory density, the display has led to enhanced social cohesion within groups of birds and the advantages of the cohesion (co-operative breeding and resource defence) have achieved greater prominence in some species.

ACKNOWLEDGMENTS

My thanks to Hugh Ford for supervision during this study and the National Parks and Wildlife Service of New South Wales for permission to work in New England National Park. Bands were supplied by the Australian Bird and Bat Banding Scheme and the project was supported by a Commonwealth Postgraduate Award.

REFERENCES

Armstrong, D. P. (1990). Co-operative care of fledglings by New Holland Honeyeaters. *Emu* **90**: 132–135.

Armstrong, D. P. (1991). Aggressiveness of breeding territorial honeyeaters corresponds to seasonal changes in nectar availability. *Behav. Ecol. Sociobiol.* **29**: 103–111.

Cameron, A. C. (1970). The vocabulary of the Noisy Miner, *Myzantha melanocephala*. *Sunbird* **1**: 17–24.

Dow, D. D. (1975). Displays of the Honeyeater *Manorina melanocephala*. *Z. Tierpsychol.* **38**: 70–96.

Dow, D. D. (1977). Indiscriminate interspecific aggression leading to almost sole occupancy of space by a single species of bird. *Emu* **77**: 115–121.

Dunkerley, G. M. (1989). 'The Fuscous Honeyeater: Food resources and the bird community'. (Ph.D. Thesis, University of New England: Armidale.)

Hindwood, K. A. (1944). Honeyeaters of the Sydney District (County of Cumberland) New South Wales. *Aust. Zool.* **10**: 231–251.

McFarland, D. C. (1983). Appeasement display of the Red Wattlebird. *Aust. Birds.* **17**: 76–78.

McFarland, D. C. (1984a). Behaviour of White-cheeked Honeyeaters and Little Wattlebirds in *Banksia integrifolia*. *Aust. Birds.* **19**: 1–6.

McFarland, D. C. (1984b). Protection behaviours of breeding White-plumed Honeyeaters *Lichenostomus penicillatus*. *Emu* **84**: 42–43.

McFarland, D. C. (1985a). Diurnal and seasonal changes in aggression in a honeyeater community. *Corella* **9**: 22–25.

McFarland, D. C. (1985b). 'Community organization and territorial behaviour of honeyeaters in an unpredictable environment'. (Ph.D. Thesis, University of New England: Armidale.)

McFarland, D. C. (1986a). Breeding behaviour of the New Holland Honeyeater *Phylidonyris novaehollandiae*. *Emu* **86**: 161–167.

McFarland, D. C. (1986b). Seasonal changes in the abundance and body condition of honeyeaters (Meliphagidae) in response to inflorescence and nectar availability in the New England National Park, New South Wales. *Aust. J. Ecol.* **11**: 331–340.

Paton, D. C. (1979). 'The behaviour and feeding ecology of the New Holland Honeyeater *Phylidonyris novaehollandiae* in Victoria'. (Ph.D. Thesis, Monash University: Melbourne.)

Pyke, G. H. and O'Connor, P. J. (1989). Corroboree behaviour of New Holland and White-cheeked Honeyeaters. *Emu* **89**: 55–57.

Pyke, G. H., Recher, H. F. and O'Connor, P. J. (1989). Patterns of residency and movement among honeyeaters in heathland near Sydney. *Emu* **89**: 30–39.

Rooke, J. (1979). 'The social behaviour of the honeyeater *Phylidonyris novaehollandiae*' (Ph.D. Thesis, University of Western Australia: Perth.)

Rowley, I. (1975). 'Bird Life'. (Collins: Sydney.)

Schodde, R. and Tidemann, S. C. (Eds) (1988). 'Readers Digest Complete Book of Australian Birds'. (Readers Digest: Sydney.)