THE SUNBIRD

Journal of the

QUEENSLAND ORNITHOLOGICAL SOCIETY

Volume 13 : Number 4 December, 1983

Registered by Australia Post - Publication No. QBH1902

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THE SUNBIRD

Volume 13 Number 4 December 1983

BIRDS AND BURNING HISTORIES OF OPEN FOREST AT GUNDIAH, SOUTH EASTERN QUEENSLAND

J.W. PORTER and R. HENDERSON

SUMMARY

Regular observations were made between 1973-75 of birds along transects located in three mid-height open forest compartments; respectively burnt annually, burnt periodically once every 2-5 years, and protected from fire for 29 years. The common resident species showed preferences for the fire regimes as follows; five were common in the annually burnt forest, three were common in the periodically burnt forest, and six were common in the protected forest. The preference of the species for the different forest fire regimes most likely relates to the well-developed shrub layer in the protected forest and the grass layer with few shrubs in the annually burned forest. Some fifteen common residents had no preference for any of the forest fire regimes.

INTRODUCTION

Prescribed burning of the drier open forest contained in the Gundiah State Forest, south of Maryborough, is carried out periodically to reduce the possibility of serious fires damaging forest trees. To assist studies of fire effects on open forest environments, three compartments have been subjected to different fire regimes since 1946. One compartment (Cpt 20) has been protected from fire. A second compartment (Cpt 19) has been periodically burnt recently every 2-5 years along with the aerial ignition of most of Gundiah State Forest. According to Forestry records this compartment experienced a severe wild fire in 1951, a patchy burn in 1965, a hot burn in 1969, and two-thirds of its area burnt in 1973 and 1975. The third compartment (Cpt 21) has been fired every year since 1952, and the area of ground cover which burnt each year averaged 40-60%, but in some years a lesser or greater area (10-95%) burnt.

A survey was commenced in 1972 to determine the species of birds in the three forest compartments subjected to the different fire regimes, and to examine any differences in the species composition and the relative abundance of individuals between the forest compartments. Vernacular names in the text and Appendix follow "Recommended English Names for Australian Birds" in *Emu*, Vol. 77, Supplement, 1978.

STUDY AREA

Gundiah State Forest was acquired by the Queensland Department of Forestry in 1946 and prior to this is thought to have been subject to periodic fires, logging and some ring-barking. Subsequently, logging was carried out about 1951 and 1971. Ring-barking of trees considered unsuitable for future sawlogs was also undertaken following these loggings. Species such as white mahogany *Eucalyptus acmeniodies* Schau., pink bloodwood *E. intermedia* R.T. Bak., and smooth-barked apple *Angophora costata* (Gaertn.) Druce, were mostly killed out. The state forest is a large expanse of open forest (20-30m tall) growing on low ridges (160m altitude) of Jurassic sandstone. An annual rainfall of 1,000mm and warm temperatures are experienced. Tall open forest with rainforest undergrowth lines larger creeks within the state forest.

The vegetation on the three compartments in 1976 was open forest of young to mature straight-boled trees. The transects in the protected and annually burnt compartments are on southerly slopes predominantly growing spotted gum *E. maculata* Hook., Queensland grey ironbark *E. drepanophylla* F. Muell. ex Benth. and some white mahogany. The transect in the periodically burnt compartment is on a northerly slope supporting forest red gum *E. tereticornis* Sm. and grey gum *E. propinqua* Deane et Maiden as well as the above trees. The undergrowth in the protected forest is a sparse to mid-dense layer of tall shrubs such as brush box *Tristania conferta* R. Br., paperbarks *Melaleuca* spp., forest quinine *Petalostigma* spp., and red ash *Alphitonia* spp. and a sparse layer (5-20% cover and 2m tall) of shrubs such as wattles *Acacia* spp., dogwood *Jacksonia* spp., and lantata *Lantana* spp. A continuous mid-dense layer 0.25m tall of grasses with much fallen leaves, dry logs and branches is also present. The annually burnt forest is mostly spotted gum. It has undergrowth consisting of a very sparse layer of tall wattles and a well-developed layer of blady grass *Imperata* spp., and kangaroo grass *Themeda* spp. Litter of leaves, bark and partially burnt logs is sparse. The undergrowth in the periodically burnt compartment consists of patches of shrubs and open grassy areas.

METHOD

A transect of 1.6km was selected within each forest compartment. Observations were carried out by RH along each of the transects over three consecutive days. This procedure was repeated on 19 occasions between December 1972 and November 1975. Bird observations were made over a two-hour period between 6-10am on a transect. Bird species seen and heard within 60m of the transect line were recorded. Other information recorded included the number of individuals, flock size when a distinctive grouping other than a pair could be seen, vegetation layer where first observed in, and breeding activities. Where transects crossed creeks fringed by rainforest shrubs, RH did not record the birds which were present in these parts of the transects.

In the analysis of the data, the following criteria were chosen arbitrarily and used to indicate species recorded on sufficient occasions to permit comparisons to be made between the forest compartments.

(1) The species is common, i.e. recorded on nine or more occasions as individuals, pairs, or flocks (total individuals divided by average flock size equals number of flocks) and in three or more months.

(2) The species has a preference for one compartment, i.e. the total number of individuals recorded in the compartment exceeds that in another compartment by a factor of four to one. A ratio of 3:1 was taken to indicate that a species had a "slight preference" for a compartment.

RESULTS

Seventy-seven species of bird are recorded in total (Appendix 1). Fifty-four species are in the forest which was burnt annually, and 59 species are in the forest which was protected from fire. There are 16 species which were recorded in the annually-burnt forest that were not recorded in the protected forest, and 11 species *vis-a-vis*. Six species are recorded only in the forest which was burnt periodically. There are 37 species recorded as being common. In this group there are fourteen species where the total number of individuals recorded in one compartment exceeds that in another compartment by a factor of four or more.

Four species, namely the Pheasant Coucal, Willy Wagtail, Brown Treecreeper and Australian Magpie, prefer the annually-burnt forest. Likewise two species, the Forest Kingfisher and White-throated Honeyeater, prefer the forest subjected to periodic burning. In the protected forest, six species are more abundant. They are Eastern Yellow Robin, Golden Whistler, Variegated Fairy-wren, White-throated Treecreeper, Little Wattlebird, and Yellow-faced Honeyeater. The Yellow-tufted Honeyeater prefers both the periodically-burnt and protected forests. Painted Button-Quail is abundant in both the annually-burnt and protected forests, but not in the periodically-burnt forest. An additional eight common species have abundance ratios of 3:1 in favour of one forest fire regime over another. There are fifteen common species which do not show a preference for any forest fire regime. There are four common birds which were not recorded in one of the forest fire regimes. Lewin's Honeyeater and Olive-backed Oriole were absent in the periodically-burnt forest. Little Friarbird and Australian Magpie were absent in the protected forest.

DISCUSSION

The difference between the total numbers of bird species recorded in the three forest fire regimes are insignificant. This is because these differences relate to the many species which were recorded on less than nine occasions during the survey. In most cases differences between the species recorded are similarly insignificant. The Australian Magpie, a common bird, is absent from the protected forest. This bird has a distinct preference for open habitats such as farmland. The presence of a dense shrublayer in the protected forest could prevent it seeking prey upon the ground. An explanation as to why Lewin's Honeyeater and Olive-backed Oriole are absent in the periodically-burnt forest cannot be given. However, as these birds do not have a preference for the other two forest fire regimes, their absence may reflect the level of sampling carried out in this study. The presence of the Rufous Fantail, Fan-tailed Cuckoo, Lewin's Honeyeater and Figbird on the study transects is perhaps because they come from nearby gully rainforests.

Amongst the 37 common species, there are eight sets of congeners. In two sets, the species have different abundances in either the annually-burnt forest or the protected forest. The preferences of these species are as follows: White-throated Treecreeper (protected forest) and Brown Treecreeper (annually-burnt forest); Variegated Fairy-wren (protected forest) and Red-backed Fairy-wren (slight preference for annually-burnt forest). In another two sets of congeners, only one member has a prefered forest fire regime. These are Grey Fantail (no preference) and Willy Wagtail (annually-burnt forest); and Golden Whistler (protected forest) and Rufous Whistler (no preference). The response of the three cuckoo-shrikes to the forest fire regimes is unclear. The Black-faced Cuckoo-shrike has no preference, the White-bellied Cuckoo-shrike has a slight preference for the periodically-burnt forest and the Cicadabird has a slight preference for the protected forest. All three species of *Lichenostomus* honeyeater prefer the protected forest. These species are Yellow-faced Honeyeater, Yellow-tufted Honeyeater (also prefers the periodically-burnt forest) and

APPENDIX 1

List of bird species recorded in Gundiah State Forest (152°10', 25°50' Sth) showing the vegetation layer where species were most frequently sighted; the average size of flocks; abundance as the total number of individuals recorded in the annually burnt forest (Cpt 21), the periodically burnt forest (Cpt 19), and the protected forest (Cpt 20). The years and months when species were recorded are shown thus [+]; breeding (nests or young) is shown thus [+*]; and feeding in flowering eucalypts is shown thus [++]. Sampling was repeated twice in those months indicated by an asterisk [*].

Bird Species	Layer	Flock Size	Abundance Cpt 21	Cpt 19	Cpt 20	1972 Dec*	1973 Jan	Jul	Oct*	1974 Sep	Nov	Dec*	1975 Feb	Mar	Apr	Jul	Aug	Sep	Oct	Nov*
Pacific Baza			2	1	2	+			+			+		+			+			
Brahminy Kite			0	0	1													+		
Brown Goshawk			0	1	0													+		
Wedge-tailed Eagle			2	2	0	+	+*													
Painted Button-Quail	Herb	3	15	2	11	+		+	+			+*		+	+	+			+	+
Peaceful Dove	Herb	4	19	22	10	+	+	+	+	+	+	+	+	+	+	+	+		+	
Common Bronzewing			0	1	0								+							
Yellow-tailed Black-Cockatoo		8	0	12	4					+						+				
Rainbow Lorikeet	Crown	10	150	74	158		++	+	+	+	+		+	+	+	++	++		++	++
Scaly-breasted Lorikeet	Crown	30	81	117	96	++		++	++					++		++	++		++	++
Little Lorikeet	Crown	15	56	83	59			+	++				+	+	+	++			++	++
Australian King Parrot	Crown	4	6	3	4	+			+											+
Pale-headed Rosella	Shrub	2	13	10	16	+	+	+	+	+	+		+	+	+	+	+		+	+
Oriental Cuckoo	Shrub		2	0	1	+			+						+					
Pallid Cuckoo			0	1	0				+											
Brush Cuckoo	Shrub		0	1	1												+			
Fan-tailed Cuckoo	Shrub		0	1	3					+							+			
Horsefield's Bronze-Cuckoo			1	0	0										+					
Shining Bronze-Cuckoo	Crown		0	2	3								+		+					
Common Koel			2	1	0				+			+								
Pheasant Coucal	Grass		15	3	6			+*	+				+	+	+				+	
Southern Boobook			0	0	1				+											
Tawny Frogmouth			0	0	2	+													+	
White-throated Nightjar			0	3	0		+*													
Azure Kingfisher			1	0	2	+														+
Laughing Kookaburra	Branch		37	22	41	+	+	+	+	+	+	+	+	+	++	+	+	+	+	+

Appendix 1 (Continued)

Bird Species	Layer	Flock Size	Abundance Cpt 21	Cpt 19	Cpt 20	1972 Dec*	1973 Jan	Jul	Oct*	1974 Sep	Nov	Dec*	1975 Feb	Mar	Apr	Jul	Aug	Sep	Oct	Nov*
Forest Kingfisher	Branch		3	7	1				+	+				+						+
Sacred Kingfisher			2	0	0													+		
Rainbow Bee-eater	Crown		2	3	0								+	+						
Dollarbird			4	4	0	+														
Black-faced Cuckoo-shrike	Crown	4	23	19	21	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
White-bellied Cuckoo-shrike	Crown		13	23	7	+		+			+	+		+		+				+*
Cicadabird	Crown		0	2	6										+					+
Eastern Yellow Robin	Shrub		5	12	28	+		+	+	+	+	+	+		+	+	+	+	+	+
Jacky Winter	Shrub		3	3	0									+			+		+	
Crested Shrike-tit	Branch		0	0	6										+	+				
Golden Whistler	Shrub		1	2	6			+								+	+			
Rufous Whistler	Branch		23	26	14	+		+	+	+	+	+			+		+	+	+	+
Little Shrike-thrush			1	0	1			+												
Grey Shrike-thrush	All		14	8	26	+		+	+	+	+	+	+	+		+	+	+	+	+
Leaden Flycatcher	Shrub		0	1	4					+		+		+	+					
Restless Flycatcher			0	0	1			+												
Rufous Fantail			0	0	1					+										
Grey Fantail	Shrub		4	4	9			+								+	+			
Willy Wagtail	Shrub		9	2	4		+		+				+	+					+	+
Eastern Whipbird	Shrub		4	12	9	+	+	+	+	+	+	+	+	+	+	+	+*		+	+
Grey-crowned Babbler	All	4	14	6	5		+		+	+*				+*			+		+	
Variegated Fairy-wren	Shrub	6	10	15	72	+		+	+				+	+		+			+	
Red-backed Fairy-wren	Herb	4	115	75	47	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Varied Sittella			0	0	1			+												
White-throated Treecreeper	Branch		6	4	24			+	+	+		+	+	+		+	+		+	
Brown Treecreeper	Branch		43	2	3	+			+		+	+	+		+	+	+		+	+
Little Wattlebird	Crown		11	5	19	+		+	+	+	+	+	+	+	+	+	+		+	+
Noisy Friarbird	Shrub		63	59	56	+*	+	+	+	+	+	+*	+	+	+	+	+		+	+*
Little Friarbird	Shrub		13	14	0				+						+				+	+
Blue-faced Honeyeater	Shrub		13	5	4	+							+	+	+					+
Noisy Miner	Branch	6	5	3	4			+										+	+	+
Lewin's Honeyeater	Shrub		4	0	8				+				+			+				

Appendix 1 (Continued)

Bird Species	Layer	Flock Size	Abundance Cpt 21	Cpt 19	Cpt 20	1972 Dec*	1973 Jan	1973 Jul	1973 Oct*	1974 Sep	1974 Nov	1974 Dec*	1975 Feb	1975 Mar	1975 Apr	1975 Jul	1975 Aug	1975 Sep	1975 Oct	1975 Nov*
Yellow-faced Honeyeater	Shrub		3	3	11				+		+*	+*			+	+				
Yellow-tufted Honeyeater	Shrub	10	18	87	67								+	+	+	+				
Fuscous Honeyeater	Shrub	10	91	123	224					+	+	+*	+*	+	+*	+	+	+	+*	+
White-throated Honeyeater	Crown		1	5	3	+		+	+	+										
Scarlet Honeyeater	Crown		57	22	52			+				+		+	+					
Mistletoebird			0	1	0				+											
Spotted Pardalote			0	0	1													+		
Striated Pardalote	Crown		2	3	0								+				+		+	+
Silvereye	Shrub	5	0	25	10	+		+			+	+				+				+
Red-browed Firetail	Herb	10	60	62	98	+		+*	+	+	+	+	+*	+*	+		+	+	+	+
Olive-backed Oriole	Crown		6	0	9	+		+			+	+				+				+
Figbird	Crown		2	0	2			+	+										+	
Spangled Drongo			0	1	0							+								
White-breasted Woodswallow			0	0	1	+														
Dusky Woodswallow	Crown	5	0	15	0			+								+	+			
Grey Butcherbird	Branch		9	4	11	+					+		+	+	+		+	+	+	+
Pied Butcherbird			1	1	0												+	+		
Australian Magpie	Herb		30	5	0	+			+		+		+	+	+	+			+	+
Torresian Crow	Branch		16	15	9	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Summary																				
Total Species (77)			54	61	59	32	13	33	37	23	22	25	30	32	30	32	29	16	32	32
Total Individuals			1106	1044	1305															

Fuscous Honeyeater (slight preference only). The remaining two sets of congeneric species show no preference for any of the fire regimes. They are the Rainbow Lorikeet and Scaly-breasted Lorikeet, and the Noisy Friarbird and Little Friarbird.

Competition whereby congeners exclude one another from the forest type (fire regime) in which each has an advantage may explain the relationship between the treecreepers and fairy-wrens. The Golden Whistler is an inhabitant of the undergrowth in moist forests and its numbers are therefore favoured in the protected forest where a shrub layer has developed. Its congener, the Rufous Whistler frequented tree branches and for this reason it may be ubiquitous in the area. The Willy Wagtail is an inhabitant of open vegetation and is more numerous in the grassy areas under the annually burnt forest. The Grey Fantail appears to be a winter visitor to all the forest fire regimes in the area. The *Lichenostomus* species are known insectivores which seek their prey in the foliage of shrubs which they find in adequate density in the protected forest. These honeyeaters may coexist in the same habitat by either not competing for the same foods, or perhaps by dividing the forest according to their preferences. Both the Fuscous Honeyeater and Yellow-tufted Honeyeater live in colonies, and the Yellow-faced Honeyeater tends to feed in tall shrubs and tree crowns. The lorikeets and friarbirds feed mostly in tree crowns where they seek flowering eucalypts. Consequently they are not influenced by changes brought to the undergrowth by differing fire histories.

The Eastern Yellow Robin and the Little Wattlebird prefer the protected forest. They are both insectivores and they typically inhabit shrubby vegetation. Hence the well developed shrub layer in the protected forest would provide for their needs. The Pheasant Coucal, a ground-dweller, appears to favour the grass cover which it finds in the annually-burnt forest in preference to the cover provided by shrubs and lantana in the protected forest.

The resident birds which do not prefer any of the forest fire regimes either seek foods in places such as trees which are not affected by mild fires or feed opportunistically. Common birds in this group are Little Lorikeet, Pale-headed Rosella, Laughing Kookaburra, Peaceful Dove, Red-browed Firetail, Grey Butcherbird and Torresian Crow.

CONCLUSION

The findings of this study suggest that the local abundance of several resident birds in open forest at Gundiah is influenced by structural changes in the undergrowth which have resulted from different fire histories. Shrubs dominate the undergrowth in the absence of fires and certain birds which inhabit shrub layers become common. When the undergrowth is fired annually grasses become dominant and shrubs are diminished. This condition favours an increase in the abundance of certain birds which utilize grass layers or require open spaces below forest trees.

The current management at Gundiah State Forest involves periodic aerial ignition when the conditions favour a mild bushfire. This burns the undergrowth but does not damage the trees. These fires rarely burn evenly throughout the forest and so produce a mosaic of shrubby undergrowth in less frequently burned areas or grassy undergrowth in frequently burned areas. It could be expected that this burning pattern would be influenced by fire breaks such as rainforest gullies and tracks, the topography, the density of undergrowth associated with differing soils and aspects, and the spacing between trees following logging. When fires occur frequently, dense shrub undergrowth is left mostly in moist gullies. When fires are absent for long periods, shrubs are able to colonise the forest. This process would reduce the extent of any grassy patches, restricting these to sites which are unfavourable to shrub growth.

This study suggests that the present periodic burning of Gundiah State Forest favours the populations of three species of common birds. It is also maintaining a diversity of both the shrub-dwelling birds (6 common species) and birds which prefer grass and sparse shrub layers (5 common species). However, the abundance of both groups of these species is low compared to their abundance in forest where fires are excluded or occur annually. The periodic burning in the area is also likely to be restricting any encroachment of both rainforest and rainforest birds into open forest in the vicinity of creeks. Some fifteen resident birds appear not to be affected by the fire regimes.

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THE RED-NECKED CRAKE RALLINA TRICOLOR IN EUNGELLA NATIONAL PARK, QUEENSLAND

PETER F. WOODALL and LEITH B. WOODALL

The Red-necked Crake *Rallina tricolor* is a little-known bird inhabiting the rainforests and scrubs of North Queensland. Recent observations and a review of the literature on this species have been given by Mason *et al* (1981).

On 1 January 1981, we saw a Red-necked Crake in rainforest on the walking track between "Palm Grove" and "Sunshine Lookout" in Eungella National Park (29° 10'S, 148° 29'E). The bird was flushed from a bank at eye-level approximately two metres behind us and one metre off the path. It was watched in flight, without binoculars, until it landed about twenty metres away, where the bird disappeared into the undergrowth. Notes made at the time indicated that it was about 25cm long, and had a relatively slow flapping flight. These features, together with an "upright" posture in flight and long neck, indicated it was a rail. The head, neck and breast were rufous and the rest of the body appeared a slate-grey-black. The bill could not be seen as the bird was flying away from us. Although lighting conditions were poor, we had been in the forest for over an hour and our eyes had fully adjusted to the gloom. The close proximity of the bird permitted clear views of its plumage. It was certainly a rallid and that was the first plate we examined in Slater (1970). The distinctive plumage colouration identified it as the Red-necked Crake. The pale barring to the belly and undertail coverts, as depicted in Pizzey (1980), was not observed. However, this feature is not constant and can vary from 'distinct to indistinct or absent' (Mason *et al*, 1981). Ripley (1977) and Mason *et al* (1981) suggest that sub-adult birds have more pronounced barring on the ventral surface.

There is no doubt that the bird we saw lacked the 'broad black and white barring on the lower breast, belly and under tail coverts' (King *et al*, 1975) of the Red-legged Crake *Rallina fasciata*, another crake with a chestnut head, neck and breast which has reached the Kimberleys of Western Australia (Storr, 1980).

The distribution of the Red-necked Crake in Australia is generally reported to extend from Cape York in the north to between Ingham and Townsville in the south (A. Griffin, *pers. comm.*; Mason *et al*, 1981; Pizzey, 1980; Storr, 1973) (Fig. 1). This record extends the range southward of this species by approximately 240km.

It seems likely that the Red-necked Crake, which normally appears restricted to North Queensland, may occasionally be found in rainforests further south. A similar situation has been recorded in the case of the Little Kingfisher *Ceyx pusilla*, and Buff-breasted Paradise-Kingfisher *Tanysiptera sylvia*, which were recently recorded from Eurimbula (Broadbent and Clark, 1976), far south of their normal range. Robertson (1962) suggested that the Eungella Ranges may be an important area to investigate when considering the distribution of North Queensland birds.

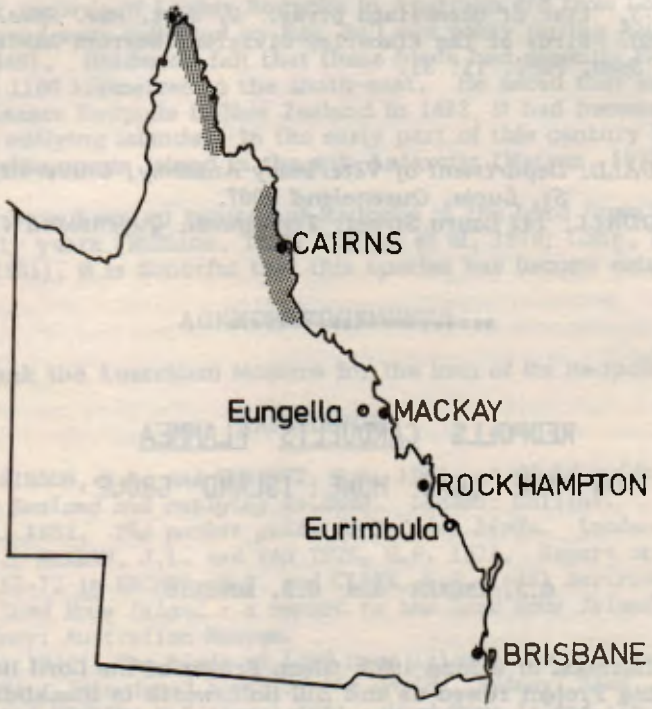

FIGURE 1. The distribution of the Red-necked Crake in Queensland (partly after Mason *et al*, 1981).

Storr (1973) described the Red-necked Crake as a "wet-season visitor" to Queensland, but it is obvious from Mason *et al* (1981) and from correspondence with Mr. Hans Beste, Mrs. Billie Gill and Mrs. Dawn Magarry that Red-necked Crake are present throughout the year in North Queensland.

The Red-necked Crake is often a shy and retiring bird that is difficult to observe but it does have distinctive calls which are most frequently heard during the summer : a monotonous "tock-tock-tock" and a harsh descending "naak-nak-nak-nak-nak" (Mason *et al*, 1981). It should be looked for in the rainforests of central and southern Queensland.

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REDPOLLS CARDUELIS FLAMMEA ON THE LORD HOWE ISLAND GROUP

G.J. INGRAM and G.J. ROBERTS

On Thursday afternoon of 9 June 1983, Glenn Fraser of the Lord Howe Island Woodhen Breeding Project rowed us and Bill Holdsworth to Blackburn Island. This island, which is also called Rabbit or Goat Island, lies about 600 metres off the west coast of Lord Howe Island in a reef-sheltered lagoon. Blackburn Island was of special interest to us, as it was the most accessible area in which to observe two rare reptiles which were extinct on the main island. The island is covered mostly in herbs. A few introduced Norfolk Island Pines dominate the skyline and on the eastern end there is a remnant patch of rainforest.

Soon after landing, our attention was drawn to a small charm of finch-like birds which flew into the top of one of the pines. For the next half-an-hour we closely studied these birds as they flittered and fed amongst the trees and herbs.

The party of birds was comprised of two males and three females. The males were brightly coloured with conspicuous red crowns and a crimson wash extending from the throat to the lower breast. The throat was black. An obvious pale eye-brow extended from the lores to just behind the eye. The belly was creamish with the flanks heavily streaked brown. The upperparts were uniformly medium-brown with darker streaking. The feathers of the nape and mantle were broadly edged buff, and there was a prominent buff wing-stripe. The females were similarly patterned but paler. They lacked the crimson wash on the breast and their crowns were pinkish in colour.

We believe that these birds were Lesser Redpolls *Carduelis flammea cabaret*, and not the larger Mealy *C. f. flammea*. The latter is said to have a white, not buff, wing-bar and is paler, particularly on the rump which is conspicuously paler than the rest of the upperparts in flight (Fitter, 1952). The birds we saw appeared uniformly dark on the upperparts, and had buff wing-stripes.

The birds on Blackburn Island probably came from New Zealand, where the bulk of birds are Lesser Redpolls, with Mealies constituting 10-15% of the population (Falla *et al*, 1966). Both forms are said to hybridise in New Zealand.

The only other records of Lesser Redpolls in Australia are from Lord Howe Island. Several specimens were collected by Roy Bell and party during August 1913 (Hindwood, 1940). Hindwood felt that these birds had recently flown from New Zealand, some 1100 kilometres to the south-east. He noted that since the liberation of Lesser Redpolls in New Zealand in 1862, it had become well established and spread to outlying islands. In the early part of this century it became established on Macquarie Island in the sub-Antarctic (Watson, 1975).

Because there have been no records of Redpolls in the Lord Howe Island Group in the last seventy years (Williams, 1953; Fullgar *et al*, 1979; Long, 1981; Recher and Ponder, 1981), it is doubtful that this species has become established there.

ACKNOWLEDGEMENTS

We wish to thank the Australian Museum for the loan of its Redpoll specimens.

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NOTES ON THE NESTING OF THE LARGE-TAILED NIGHTJAR CAPRIMULGUS MACRURUS

J.A. McLEAN

Compigne Island (23°47'S, 151°16'E) is situated in Port Curtis, 6km north of Gladstone. Observations of the Large-tailed Nightjars *Caprimulgus macrurus* were made on a small low sector at the northern extremity of the island which is almost entirely surrounded by mangroves, the predominate species being Stilted Mangrove *Rhizophora stylosa*, Grey Mangrove *Avicenna marina*, Spurred Mangrove *Ceriops tagal* and Myrtle Mangrove *Osbornea octodonta*. A narrow isthmus which is awash at mean high water tide connects this small sector to the main island.

On 10 September 1981, two Large-tailed Nightjars were flushed from Stilted Mangroves. One bird exhibited a white patch in each wing while the partly spread tail revealed white outer feathers. On 13 September 1981, at 0930 hrs, a Large-tailed Nightjar was flushed from the ground in the same locality. An immediate search revealed a nest containing two eggs. The nest, on the ground, was unexpectantly conspicuous against the darker leaf litter. The nest was particularly open with a 2½m high Corkwood tree *Duboisia* spp. directly overhead which provided sparse shade. Dry litter in the nest consisted of the leaves of Corkwood *Duboisia* spp., Hickory Wattle *Acacia aulococarpa*, Moreton Bay Ash *Eucalyptus tassellaris* and Hopbush *Dodonaea* spp. The nest was situated 10m from and 2m above mean high water mark.

The largest egg was approximately 35mm long, elliptically shaped, smooth and pale fawn with a darker band speckled brown. The other egg was approximately 29mm long. It lacked a smooth surface and was finely granular overall while the colour was uniform cottage cheese. About two-thirds of this egg was elliptically shaped while the remaining one-third appeared to lack the full thickness of shell and where this section met the other two-thirds, the egg was slightly concave instead of continuing in a convex surface, thus giving it a slight pyriform shape.

At 1600 hrs, one nightjar was sitting on the nest. The body and tail were held close to the ground while the head was held upright. The eyes were three-quarter closed.

On 14 September at 0800 hrs, one bird was sitting on the nest. On 15 September at 0830 hrs, there was no bird on the nest. The smallest of the two eggs was partly cracked and had numerous small brown ants upon it. At 1700 hrs, one bird was sitting 1m from the nest. On 16 September, at 0830 hrs, one bird was similarly sitting 1m from the nest. At 1500 hrs, the nest site was vacated and both eggs were absent. On 17 September, a search near the nest site located part of the shell of the smallest egg which was void of any contents.

A Brush Turkey *Alectura lathami* had been actively scratching the ground litter and a Sand Monitor *Varanus gouldii* was seen near the nest site during the observation period. It is not known whether these or other factors were responsible for the removal of one or both eggs.

I have recorded Large-tailed Nightjars at other locations on Compigne Island, and also at nearby Garden, Witt and Curtis Islands.

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A RE-EVALUATION OF AN ABERRANT MANGROVE HONEYEATER LICHENOSTOMUS FASCIOGULARIS

P.F. WOODALL

INTRODUCTION

An aberrant Mangrove Honeyeater *Lichenostomus fasciogularis* in the Queensland Museum collection has elicited previous comment. Robertson (1970) suggested that it may be "a plumage phase due to moult or season" while Ford (1978) suggested that the plumage "may represent a juvenile stage".

Although plumage varients have been frequently described in the literature (Harrison, 1963; Sage, 1962, 1963) few researchers have investigated the anatomical basis for the variation. This study has used light and electron microscope examinations of the feather pigment, together with additional information on measurements of Mangrove Honeyeaters (Robertson and Woodall, 1982a) to re-evaluate this aberrant specimen.

MATERIAL AND METHODS

The aberrant bird was found by Mr. J.S. Robertson at Wellington Point, south-east Queensland, in July 1970 and donated to the Queensland Museum (QM No. 011420). I measured it and closely examined its plumage in comparison with normal specimens. A single feather from the throat, ear coverts, nape and a few barbs from a primary feather were taken from both the aberrant and a normal specimen. Portions of these feathers were cleared in xylene for 48 hours and then mounted in DPX.

These were subsequently examined under the light microscope at various magnifications. Pigmented portions of a nape feather from the aberrant bird were examined with a Joel electron microscope using the methods of Carr (1957) in which the electron beam is used to "explode" the feather and so expose the internal pigment granules. A black feather from a domestic fowl was examined in the same way to provide material for comparison.

RESULTS

Measurements:

The measurements of the aberrant bird, compared with those of normal Mangrove Honeyeaters (Robertson and Woodall, 1982a), are presented in Table 1.

Although this aberrant specimen was sexed as a male, with a fully pneumatized skull (i.e. adult), its measurements are nearer to those of females and, using the critical values presented in Robertson and Woodall (1982a) [wing : 91; tail : 82.5; weight : 27.5], it would be classified as a female on all criteria.

Mangrove Honeyeaters	Wing	Tail	Culmen	Tarsus	Length	Weight
Aberrant	88	82		23	192	24
Normal:						
- male[1]	93	84	18	26	-	31
- female[1]	88	80	16	26	-	26
- both sexes[2]	90				202	28.6

[1]Robertson and Woodall, 1982a
[2]Robertson and Woodall, 1982b

TABLE 1. Measurements of the aberrant and normal Mangrove Honeyeaters from Wellington Point, South-East Queensland.

Plumage Colouration:

The aberrant bird is yellow on the face, lacking the black band which normally passes through the eye. The throat is pale yellow without the mottling of a normal bird. The breast and belly are buff, heavily streaked with brown, superficially resembling a Varied Honeyeater *Lichenostomus versicolor* (Fig. 1). The crown, nape, neck and particularly the upper tail coverts are more streaked than normal.

Light Microscopy:

Throat - In the normal bird, dark pigment was present in the barb and in the barbules, most dense at the distal end of each internode (Fig. 2). In the aberrant bird, dark pigment was absent from most barbules (Fig. 3) and was only found at the tip of the barb and at the distal ends of some barbules. A diffuse yellow pigment was present in the barbs and barbules.

Ear Coverts - Dark pigmentation was prominent in the barbs of the normal bird and extended through most of the internode of the barbules. In the aberrant bird, dark pigment was present in the barb and only the most distal barbules.

Nape - Dark pigment was present in the barbs and barbules of the normal bird and a similar, but less dense, distribution of pigment was found in the aberrant bird.

Primaries - Both the normal and aberrant birds had similar distributions of pigment in their primary feathers.

Electron Microscopy:

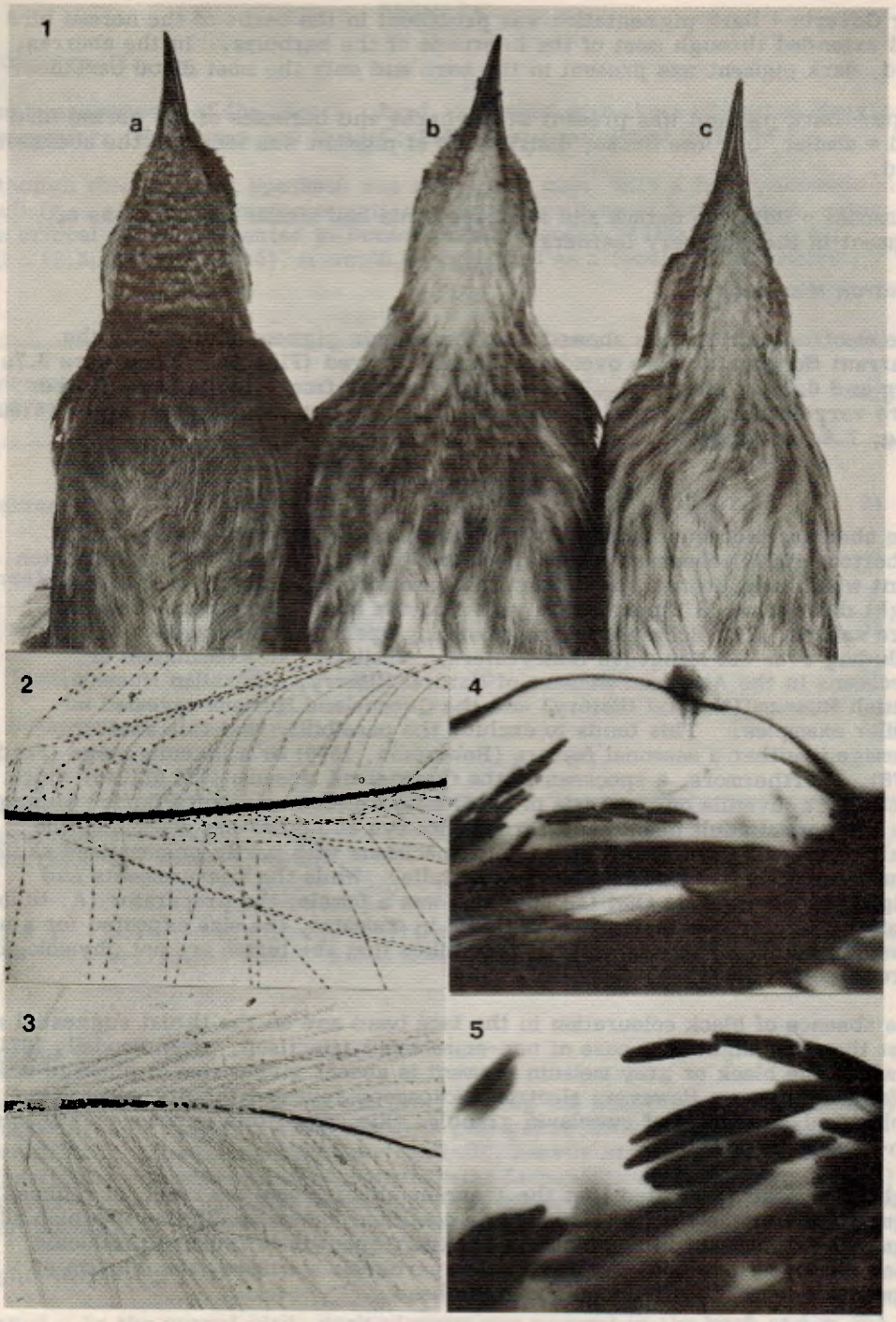
The electron micrographs showed that the melanin pigment granules in the aberrant Honeyeater were ovoid and slightly curved (Fig. 4). They were 3.7μ long and 0.5μ in diameter. The melanin granules from a fowl's black feather were very similar in general appearance (Fig. 5), but considerably larger (5.8μ long; 2.8μ in diameter).

DISCUSSION

The aberrant plumage exhibited by this specimen is apparently very rare. Robertson (1970) observed a similar looking bird on 10 June 1967 at Wellington Point which may, in fact, have been the same individual although there were slight differences in the extent of yellow on the face. No others, however, were seen by J.S. Robertson during banding operations lasting 14 years and including over 300 Mangrove Honeyeaters. Similarly, an examination of specimens in the American Museum of Natural History, Australian Museum, British Museum (Natural History) and the Queensland Museum revealed no similar examples. This tends to exclude the possibility that this aberrant plumage is either a seasonal feature (Robertson, 1970) or a juvenile stage (Ford, 1978). Furthermore, a specimen in the Queensland Museum (QM 011343) which is clearly a juvenile on the basis of small measurements and soft "fluffy" plumage, has the normal adult black band through its eye and otherwise resembles the adult plumage. Ford (1978) also found specimens with partly pneumatized skulls from Townsville had similar plumage to adults. While the measurements and weight tend to indicate that the specimen was a female, the preparator (A. Hillier) recorded finding two testes, about 1.5mm in diameter, the size expected for a non-breeding adult. There is still the possibility that the testes are not physiologically normal.

The absence of black colouration in the face band and on the throat suggested at first that this might be a case of non-eumelanism (Harrison, 1963; Woodall, 1971) in which the black or grey melanin pigment is absent giving rise to plumage which is fawn or brown. However, electron microscopy revealed the presence of the typical rod-like shape of eumelanin granules (Fig. 4) so this is not a true case of non-eumelanism.

Light microscopy indicated that the aberrant plumage was the result of reduced pigmentation in the feathers. This is a condition known as dilution in which all pigments are present in the plumage but their quantity is reduced producing paler plumage (Harrison, 1963). In this particular specimen, the dilution of pigments was most pronounced about the head.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In both the fowl *Gallus gallus* (Mueller and Hutt, 1941) and the turkey *Meleagris gallopavo* (Hutt and Mueller, 1942), "imperfect albinism" (= dilution) is the result of a sex-linked recessive gene. Mueller and Hutt (1941) also cite reports of sex-linked albinism in budgerigars *Melopsittacus undulatus* and canaries *Serinus* spp. Since, in birds, the female is the heterogametic sex, the majority of these plumage variants will be females.

Ford (1978) has clearly shown that this specimen, while superficially resembling a Varied Honeyeater on the underside, is quite different from intermediates between Mangrove and Varied Honeyeaters, the most obvious difference being the lack of black colouration on the side of its head.

ACKNOWLEDGEMENTS

Mr. D.P. Vernon and Mrs. L. Wedgewood kindly provided me with access to the specimens in the Queensland Museum. Messrs. P. Addison, D. Harbrow and R. Williams (Department of Veterinary Anatomy, University of Queensland) assisted with microscopy and photography and the Wellcome Trust (U.K.) supported the purchase of the Joel electron microscope.

FIGURE 1. Ventral plumage of:
(a) normal Mangrove Honeyeater;
(b) aberrant Mangrove Honeyeater;
(c) Varied Honeyeater.

FIGURE 2. Barb and barbules from the throat of a normal Mangrove Honeyeater.

FIGURE 3. Barb and barbules from the throat of the aberrant Mangrove Honeyeater. Dark pigment is only present in the tip of the barb and is absent from most barbules.

FIGURE 4. Electron micrograph of melanin pigment granules in the nape feather of the aberrant Mangrove Honeyeater. (Magnification: × 2400).

FIGURE 5. Electron micrograph of melanin pigment granules from a black fowl. (Magnification: × 2400).

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RITUALIZED AGGRESSION IN THE EASTERN SPINEBILL ACANTHORHYNCHUS TENUIROSTRIS

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INTRODUCTION

The development of intraspecific threat displays allows the outcome of agonistic encounters to be resolved without the need for overt fighting (Johnson, 1972). Both compatants benefit in that both the chances of disabilitating injury and the level of energy expenditure are greatly reduced (Kaufmann, 1983). The form of the threat can vary from specific vocalizations and sounds to certain odours and postures (Eibl-Eibesfeldt, 1970).

Intimidatory behaviours have been recorded in honeyeaters (Dow, 1975; Immelmann, 1961; Rooke, 1979) however Immelmann (*loc. cit.*) considered that, in general, such gestures were rare and if present were ineffective in preventing outright aggression. The following paper describes a ritualized aggressive display exhibited by Eastern Spinebills *Acanthorhynchus tenuirostris* in the New England National Park, New

South Wales. Observations were made between May and August 1982 but because of other work commitments, the collection of data was not systematic.

RESULTS

The display was recorded a total of 48 times with detailed notes being made of 30 of the encounters.

A typical interaction began with one spinebill uttering a soft metallic call as it hopped through vegetation toward another spinebill. Calling continued for the duration of the encounter with only occasional short pauses. When in close proximity (<1m apart), the calling bird erected both its throat and crown feathers as it perched upright and side on to the other bird (Fig. 1a). Once in this position, the displaying bird opened and tilted its tail toward the other (Fig. 1b). In some instances the tail was rapidly flicked open and closed at a rate of about two or three flicks per second. If the 'attacked' bird retreated, the displaying spinebill followed, maintaining its orientation and tail movements until the former left the bush. Only on a few occasions was the display carried on outside the plant where the display was initiated. Throughout the encounter the 'attacked' bird's appearance did not seem different from normal and its actions were ones of avoidance.

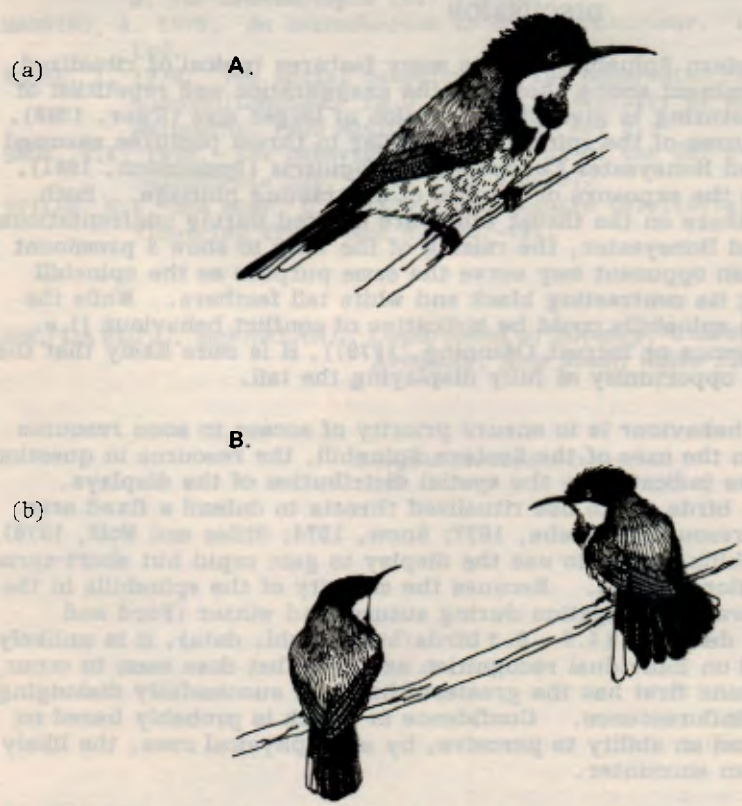

FIGURE 1. (a) Displaying male, lateral view.
(b) Posturing of a displaying male (right) to an 'attacked' male (left).

In nine encounters, the 'attacked' bird responded by assuming the same postures and giving the same call as the 'attacking' bird. The two birds moved through the bush keeping about 20 to 30cm apart and sometimes circling each other. Such interactions concluded with either overt aggression (such as a chase or fight) or a stalemate. In the latter instance both birds would suddenly cease displaying and begin feeding at different inflorescences in the same bush.

Thirteen displays were timed with a stopwatch. Display times averaged 9.1 ± 5.2 seconds (mean ± standard deviation).

In the majority of the encounters the spinebill that initiated the display usually won. Out of 22 encounters where the initiator was known that bird won 15, lost three and four ended in stalemate. The ultimate outcome of the 30 detailed interactions were separated into five categories: retreats (13), displacements (7), chases (4), physical fighting (2) and stalemates (4). Both physical fights were followed by chases.

The sites of interaction were predominately flowering *Banksia integrifolia* or *B. collina* plants (86.6%). The remaining 13.4% were in eucalypts or understorey shrubs and these may have been continuations of displays started in nearby banksias. In 79.2% of the 48 encounters recorded, both participants were adult males. Another 4.2% involved at least one adult male, and in the other 16.6% the display ended before either bird was identified.

DISCUSSION

The display of the Eastern Spinebill exhibits many features typical of ritualized behaviour. Most prominent among these are the exaggeration and repetition of movements and the posturing to give the impression of larger size (Ewer, 1968). In some ways the gestures of the spinebill are similar to threat postures assumed by the Rufous-throated Honeyeater *Conopophila rufogularis* (Immelmann, 1961). The basic similarity is the exposure of patches of contrasting plumage. Both species have dark feathers on the throat which are erected during confrontations. In the Rufous-throated Honeyeater, the raising of the wing to show a prominent yellow-green band to an opponent may serve the same purpose as the spinebill spreading and flicking its contrasting black and white tail feathers. While the side-on posture of the spinebills could be indicative of conflict behaviour (i.e. unsure whether to advance or retreat (Manning, 1979)), it is more likely that the stance offers the best opportunity of fully displaying the tail.

The aim of dominance behaviour is to ensure priority of access to some resource (Kaufmann, 1983). In the case of the Eastern Spinebill, the resource in question appears to be nectar as indicated by the spatial distribution of the displays. However, unlike many birds which use ritualized threats to defend a fixed area encompassing certain resources (Krebs, 1977; Snow, 1974; Stiles and Wolf, 1970) *viz.* territories, spinebills appear to use the display to gain rapid but short-term access to flowering inflorescences. Because the majority of the spinebills in the park occur as a temporary aggregation during autumn and winter (Ford and Pursay, 1982) at high densities (4.9 - 6.3 birds/ha, unpubl. data), it is unlikely that hierarchies based on individual recognition exist. What does seem to occur is that whoever threatens first has the greatest chance of successfully dislodging a conspecific near an inflorescence. Confidence in attack is probably based on previous experience and an ability to perceive, by some physical cues, the likely costs and benefits of an encounter.

The success of the spinebill display, in terms of gaining access to nectar without the need for energy expensive and potentially dangerous aggression, is evident in that 50% of the resolved encounters involved no overt aggression. Of those that did lead to aggression, the frequency of the type of agonistic behaviour used

was inversely proportional to the energy, time and risk involved in the execution of this behaviour. The fact that a display usually lead to an uneventful withdrawal and that the initiator was usually the victor, suggests that whoever dares to start an encounter usually wins.

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BOOK REVIEW

LEARNING ABOUT AUSTRALIAN BIRDS

by Rosemary Balmford, 1980. William Collins, Sydney. 240 pages, 15 colour plates. $16.95 recommended retail.

This book is a pleasantly presented guide to novice birdwatchers in Australia. The introduction states: 'The chapters are largely independent; they are arranged in a logical order, but they can be read in any order which appeals to the reader.' This is certainly the case. The textual arrangement is excellent and embraces a broad range of topics commendable for a small book. The book has a practical approach on how to make the most of bird observing. It includes basic information on identification, places to go, organisations to join, how to record descriptions, and starting a research project. It is coherent and useful in relation to the material with which the author has some expertise.

The author obviously has great enthusiasm but little ornithological expertise. The relevant qualification cited is that she 'began to notice birds over fifteen years ago'. The impression gained is that this is very much a book written by a beginner.

Unfortunately, in the specialised or technical sections, errors or misconceptions are both frequent and severe. A section so important as 'Using Statistical Methods' is reduced to confusion. If any reader unfamiliar with the subject succeeded in understanding it, they could only be misguided. This section should describe the basics of several important statistical methods and illustrate them with appropriately chosen sets of data. However, only one statistical principle (the normal distribution) was discussed using data inadequate for the purpose, while appropriate data would have been easy to find. It was excellent in its own right and quite amenable to appropriate analysis which was not achieved. Within this discussion, Figure 23 contains cartesian co-ordinates and a curve reminiscent of the normal distribution, which is not identified in the caption. The curve is both wrongly shaped and wrongly positioned. The extremeties flatten our at frequencies less than one, this being mathematically meaningless. Also, the mean-median-mode is positioned at a value not even near the calculated mean given in the text. The ensuing text becomes entangled in errors.

Other technical sections have similar problems and are sometimes vague. For example, she states that 'generally speaking, the members of a family are regarded as sufficiently alike for it to be assumed that they derive from a common evolutionary history', and 'the genus is largely a subjective concept'. This creates a wrong impression. Every taxon above the species level is defined by both of these parameters. There is nothing special about the genus or family, as such. It is the hierarchy of taxa that create their relative importance.

There are other less conspicuous faults. In discussing bird groupings for field identification purposes, we are told that frigate-birds are 'very large' while albatross are 'large'. Hawks other than the kestrel and two *Elanus* species 'defy classification'. This would have us believe that, for example, the eagle or harrier groups are not immediately distinguishable from each other or from the falcons as a group.

There are many diagrams which range from mediocre to good. There are also colour plates, one of which (Fairy Martin) is presented sideways though this is not immediately obvious. The short captions are inadequate and the potential for informative captions is not fully exploited. For example, the plate of a flock of waders in flight could have been used to show both the importance of flight plumage markings for identification purposes, and the problems of estimating numbers of birds in a large flying flock.

The book concludes with a useful set of appendices, a reference list and index. Although I found it easy to criticise, it is a useful contribution to Australian ornithology. It is recommended here for school and municipal libraries for the interest it can create in bird study. Beginners and 'experts' alike may well find it appealing and a source of some new helpful hints. If not that, it is entertaining and reasonably priced.

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BOOK REVIEW

UNDERSTANDING AUSTRALIAN BIRDS

by J.D. Macdonald. 20.6cm × 12.3cm, 62 colour plates, 173 pages. Paperback $5.85. Sydney/Wellington. Received 1982.

This is a very good book on the basics of bird biology, with particular emphasis on Australia. The book covers a wide range of subjects including aspects of behaviour, population biology, ecology, structure, physiology and evolution. It provides many of the answers to questions asked after someone learns the basics of bird identification and wishes to know a little more. The text is authoritative, direct and clear. The many diagrams, colour and black-and-white plates are well chosen and of direct relevance to the text. The preface outlines the aims and contents of the book well. There is a good reference list at the end.

The subtitle suggests that the book imparts an understanding of the behaviour of birds. This is not entirely the case. The greatest fault of the book is the absence of a chapter devoted to ethology and the mechanics of behaviour. Important aspects, such as instinct, stimulus, response, learning, displacement activity, and imprinting are not mentioned.

There are a few strange remarks in the book. In discussing behavioural differences between sexes of a species, we are not given any of a large number of possible examples. Instead, one case describing how a single behavioural aspect happened to differ between two males and two females is given. The author gives no reason to suggest that this difference is either regular in or

typical of the species. The statement that birds chose mates "in apparently haphazard ways" could well have been followed by the qualifier that in many well studied species, we can discern a pattern of mate selection.

It is worth noting how the section describing the 'normal distribution' was presented. It concisely and accurately explained the principle of how most members of a population tend towards the population mean, with a tapering off of individuals at either extreme. The graph accompanying the text was well presented, although being a hypothetical population it should have had a greater sample size.

The captions are well chosen and informative. There are two minor errors. A photograph of a Little Eagle above a caption referring to the Wedge-tailed Eagle is unfortunate but the information is no less valid. Also the incorrect name Brushed Bronzewing appears in one.

This book is an important step towards achieving a basic textbook on Australian ornithology. Unfortunately, its scope is insufficiently wide enough to warrant this status. There is no reason why the book should not be in every bird observer's library. For a source of extra biological information about birds once the enthusiast has the basic field guides and picture books, this book is cheap and highly recommended.

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INSTRUCTIONS TO AUTHORS

The Sunbird is published quarterly by the Queensland Ornithological Society to further the knowledge of birds in Queensland and adjacent northern regions of Australia.

Papers are invited from non-members as well as members on all aspects of ornithology, e.g. life history, taxonomy, distribution, behaviour, and ecology. Articles may take the form of major articles on specific birds, birds in specific areas or habitats, or short notes on either birds themselves or the literature on birds, such as reviews of books or comments on published articles.

Submission of a paper implies that the results reported have not been published and are not being considered for publication elsewhere.

Manuscripts should be typed (if possible), double-spaced and two (2) copies sent. Papers longer than four (4) typed A4 pages should have a summary. If needed, help may be given to authors to find relevant literature. Common names, scientific names and order of names should follow "Recommended English Names for Australian Birds", in *The Emu* Volume 77, Supplement, 1978. Intending authors should consult recent issues of *The Sunbird* to see acceptable forms of contributions.

References should be listed in alphabetical order at the end of papers in the following style, titles of journals will be abbreviated as in the *World List of Scientific Periodicals*:

Fleay, D.H. 1937. Nesting habits of the brush turkey. *Emu* 36: 153-163.

Frith, H.J. 1976. Mallee fowl. In *Complete Book of Australian Birds* (H.J. Frith consul. ed.) pp. 136-137. Sydney: Reader's Digest.

Serventy, D., Serventy, V.N. & Warham, J. 1971. *The Handbook of Australian Sea-birds*. Sydney: Reed.

Slater, P. 1970. *A Field Guide to Australian Birds. Non-Passerines*. Adelaide: Rigby.

Tables and Figures should be numbered with Arabic numerals. Drawings and diagrams should be in Indian ink on cartridge paper or tracing cloth. If authors cannot arrange suitable drawings, the editor may arrange the drawing of figures and diagrams.

Twenty (20) reprints of each paper are supplied free; senior authors must ensure equitable distribution to the other authors. Additional copies may be purchased, but must be ordered when the paper is accepted for publication.

Manuscripts should be sent to:

The Editor, The Sunbird, Queensland Ornithological Society, P.O. Box 97, St. Lucia, Queensland 4067.