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OBSERVATIONS ON COLOUR-BANDED REGENT HONEYEATERS *Xanthomyza phrygia*

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Forty-six Regent Honeyeaters were colour-banded between 1991 and 1995. One bird nested at the same site after a probable absence of two years; two pairs re-nested in the same year after fledging young; one bird, banded in April, bred at a site 42 km away in the following spring. Comparison of measurements of birds of known sex confirmed that males are larger than females but with a small overlap. Our sightings of individually marked Regent Honeyeaters suggest that at least some individuals show fidelity to breeding sites and perhaps to the local district, and confirm the value of colour-banding, linked with regular monitoring of known localities, as a technique for the study of the ecology of a species.

INTRODUCTION

The patterns of movement, whether migratory or nomadic, of most Australian honeyeaters (Meliphagidae) are poorly understood. There has been an understandable bias towards studying sedentary species which can be easily found. Although the Regent Honeyeater *Xanthomyza phrygia* has been described as highly nomadic (Keast 1968), Franklin *et al.* (1989) and Menkhorst (1996) concluded that it may make more regular movements, and suggested that these are governed by flowering patterns and nectar productivity of a range of eucalypt species. Before this study, our observations showed that the species was a regular if erratic breeding visitor to known localities west of Armidale, New South Wales; we saw birds in most years, but not always at the same places or in the same numbers. From year to year it has been unclear whether or not the same individuals were present in the district or returned to the same sites. There have been no published studies based on individually marked Regent Honeyeaters which attempt to elucidate their movements or other aspects of the species' biology.

This paper describes some preliminary results from a colour-banding study of the Regent Honeyeater at several locations in northern New South Wales and includes information on movements and morphometrics.

METHODS

We trapped Regent Honeyeaters opportunistically when they were found during regular monitoring of known sites mapped in 1993–95 by the Northern New South Wales Group of the Royal Australasian Ornithologists Union (Williams and Ley, unpubl.). The trapping was part of a wider banding study of birds in remnant bushland in the Bundarra-Kingstown district west of Armidale. This district and its use by Regent Honeyeaters are described by Ley *et al.* (1992). Additional trapping was undertaken at Warrumbungle National Park and Pilliga Nature Reserve when the birds were found at those places (Table 1).

Birds were trapped using 32 mm mesh mist nets erected at places which were selected by observation of the birds' behaviour and local movements. Although the birds usually fed high in trees, at times they visited vegetation which was sufficiently low to trap them in a mist net when they were approaching or leaving the food source. At Warrumbungle National Park birds were captured as they went to a known roost in relatively low saplings. However, the greatest success was at natural or artificial sources of water. Although some of the sites used by the birds rarely had surface water, it was used enthusiastically when available. Twenty-six birds were caught as they came to a natural source of water or to a dish of water placed to attract them. The four pulli banded within a few hours of fledging were caught by hand on the ground within 30 m of the nest tree.

Birds caught were measured and if possible, sexed. Weight, head-bill length, wing length and tail length were measured as described by Lowe (1989). Fifteen marked birds were sexed retrospectively on behaviour at the nest, or by presence of a brood patch indicating that the individual was a female, using criteria described by Ley *et al.* (1994). Measurements of males and females in this group were compared using the Student's *t*-test.

Birds were banded on the tarsi with a numbered metal band and at least one coloured plastic band. Because initially there was some doubt as to the appropriate size of colour band for the species, some individuals received only one size 4 plastic band. Later, when it was determined that size 5 was more suitable, all birds received on the left tarsus an orange plastic band over a numbered metal band and on the right tarsus two coloured bands. No attempt was made to seal the plastic bands. The banding was done in accordance with a nationwide scheme co-ordinated by the Victorian Department of Conservation and Natural Resources.

When marked birds were resighted the number of the metal band was inferred from observation of the colour band combinations.

RESULTS

Banding success

Between 1991 and 1995 inclusive we banded 46 Regent Honeyeaters at six locations: six birds at Warrumbungle National Park (31°15′S, 148°58′E) and three at Pilliga Nature Reserve (30°54′S, 149°37′E) in the Coonabarabran district; and one at Matoni (30°25′S, 151°10′E), 22 at Coonoor Road (30°18′S, 150°47′E), nine at Merrifield (30°20′S, 151°13′E) and five at the Gwydir River (30°26′S, 151°12′E) in the Bundarra-Kingstown district. The dates of capture and the bands applied to these birds are listed in Table 1.

Movements

Our sightings of marked birds included examples of both movements between sites and fidelity to a site.

One bird, band number 041–48909, banded at Coonoor Road on 8 April 1995, was observed breeding at the Gwydir River site in November 1995, a straight-line distance of 42 km. This is the longest recorded movement of a Regent Honeyeater. In contrast, 041–48913, banded on the same day and at the same place was sighted breeding at the banding place in November 1995.

The bird carrying band number 041–50386, banded after nesting at Merrifield on 8 November 1993, was found nesting at the same place in December 1995. During regular surveys in the intervening period no Regent Honeyeaters were seen at the site.

While marked birds have been seen at the banding place for up to four months after banding, observations have shown that birds can undertake local movements of up to at least several hundred metres. For example 041–48936, banded on 29 October in Mugga Ironbark *Eucalyptus sideroxylon* habitat at Coonoor Road, was seen 11 days later in River Oak *Casuarina cunninghamiana* 300 m from the banding place.

Breeding

Two pairs, 041–48926/041–48928 and 041–48927/041–48940, were observed nesting in spring/summer 1995 after successfully fledging young earlier in the season. Each pair built its second nest within about 20 m of its first. This is the only indication to date that pairs nest twice in the same year, previous observations having suggested that this may not be the case. It also establishes that members of a pair stay together, at least for multiple nesting attempts in the same year.

Morphometrics

Fifteen marked birds, eight male and seven female, were sexed by observation of behaviour at the nest, or in two cases by the presence of a brood patch confirming that the birds were female. There was a significant separation between sexes for all body measurements taken (Table 2). Males were significantly larger than females for body mass ($t = 6.54$, $P < 0.001$), head-bill length ($t = 5.25$, $P < 0.001$), wing length ($t = 7.30$, $P < 0.001$) and tail length ($t = 3.14$, $P < 0.01$).

The measurements of four pulli caught within hours of fledging are given in Table 3.

DISCUSSION

Our sightings of individually marked Regent Honeyeaters suggest that the species may not be as random or erratic in its movements as previously claimed (Keast 1968) and thus lend support to the conclusions of Franklin *et al.* (1989). While we have no knowledge of its whereabouts between the nesting observations, the recording of an individual nesting at the same location after two years confirms that the species shows some site-fidelity, at least when breeding. In a previous instance, at Chiltern in Victoria, a male which was colour-banded at the nest in November 1988 was sighted at the banding place in November 1992 (P. Menkhorst, pers. comm.). At Coonoor Road we colour-banded ten of 24 members of a non-breeding flock during autumn, and it was notable that, five months later, one of the marked

TABLE 1

Banding of Regent Honeyeaters in northern New South Wales 1991–1995, showing location, date and bands applied. (Me = metal, Or = orange, Re = red, Ye = yellow, Gr = green, Bl = blue, Bk = black, Wh = white, Ma = mauve).

Location		Bands applied		
Band number	Date	Left leg	Right leg	Comment
Warrumbungle National Park				
041–50392	08.06.94	Me	Or	
041–50393	"	Me	Or	
041–50394	"	Me	Or	
041–50395	"	Me	Or	
041–50396	"	Me	Or	
041–50397	"	Me	Or	
Pilliga Nature Reserve				
041–50358	23.11.91	Me	Or	Nesting M
041–50359	"	Me	Wh	
041–50360	"	Me	Gr	Brood patch
Matoni				
041–50388	21.11.93	Me	Gr	Nesting M
Coonoor Road				
041–48905	30.03.95	Or/Me	Gr/Bl	
041–48906	04.04.95	"	Gr/Ye	
041–48907	08.04.95	"	Gr/Gr	
041–48908	"	"	Gr/Or	
041–48909	"	"	Gr/Bk	Nesting M
041–48910	"	"	Gr/Wh	
041–48911	"	"	Or/Re	
041–48912	"	"	Or/Bl	
041–48913	"	"	Or/Ye	Nesting F
041–48914	"	"	Or/Or	
041–48926	27.09.95	"	Or/Bk	Nesting M
041–48928	19.10.95	"	Bk/Re	Mate of 041–48926
041–48930	"	"	Bk/Bl	
041–48931	"	"	Bk/Gr	
041–48932	"	"	Bk/Wh	
041–48933	29.10.95	"	Ma/Re	
041–48934	"	"	Ma/Bl	
041–48935	"	"	Ma/Gr	
041–48936	"	"	Ma/Or	
041–48937	"	"	Ma/Wh	Brood patch
041–50356	11.09.91	"	Gr/Re	
041–48943	05.12.95	"	Or/Ma	Juvenile
Merrifield				
041–48951	31.12.95	Or/Me	Re/Ye	Pullus
041–48952	"	"	Re/Bl	Nesting F
041–48953	"	"	Re/Or	Nesting M
041–50381	21.10.93	Bl	Me	Pullus
041–50382	"	Re	Me	"
041–50383	22.10.93	Bk	Me	"
041–50385	08.11.93	Or	Me	Nesting M
041–50386	"	Gr	Me	"
041–50387	"	Wh	Me	Mate of 041–50385
Gwydir River				
041–48927	18.10.95	Or/Me	Or/Wh	Nesting F
041–48938	31.10.95	"	Ma/Ma	
041–48939	05.11.95	"	Re/Re	Mate of 041–48927
041–48940	"	"	Re/Gr	
041–48942	04.12.95	"	Bk/Ye	

TABLE 2

Weight, head/bill length, wing length and tail length of eight male and seven female Regent Honeyeaters. Means and standard deviations are included.

	Weight (g)		Head/bill (mm)		Wing length (mm)		Tail length (mm)	
	M	F	M	F	M	F	M	F
	44.5	37.0	43.1	41.4	118	107	99	97
	45.5	35.0	44.5	40.6	116	104	99	86
	44.0	36.5	43.7	41.1	117	105	98	96
	41.0	33.0	44.8	41.3	114	107	96	93
	45.0	37.0	47.3	42.9	119	103	98	88
	41.0	41.0	44.4	41.6	116	107	92	90
	44.0	37.0	45.9	42.9	110	107	95	90
	45.0		44.4		112		97	
Mean	43.75	36.64	44.76	41.69	115.25	105.71	96.75	91.43
SD	1.77	2.43	1.31	0.89	3.06	1.70	2.38	4.08

TABLE 3

Weight, head/bill length, wing length and tail length of four newly fledged Regent Honeyeaters.

Weight (g)	Head/bill (mm)	Wing length (mm)	Tail length (mm)
25.0	33.8	66.0	25.0
29.0	34.8	70.0	26.0
27.5	35.6	73.0	28.0
25.0	32.3	64.0	26.0

birds bred at the banding place while another bred at the Gwydir River site 42 km away. Between these sightings no Regent Honeyeaters were seen at Coonoor Road during regular, intensive surveys. The re-appearance of marked birds at the same site, and the movements between sites, suggest fidelity to the district (as opposed to site). It may be that the birds are present in the district all year.

From movements made by marked birds it is clear that the birds travel considerable distances locally and use a range of habitats. This is illustrated by the bird at Coonoor Road which moved between Ironbark woodland and riparian River Oak. A comparable local movement was recorded elsewhere when two of 57 birds colour-banded by A. Morris and W. Filewood at Howes Valley, New South Wales were sighted 1.5 km from the banding place after four months. The birds had changed their foraging strategy from gleaning lerps on epicormic growth on several *Eucalyptus* and *Angophora* species to taking nectar from Yellow Stringybark *E. muellerana* (D. Oliver, pers. obs.). In contrast, birds marked by us in the Warrumbungle National Park were sedentary for at least four months.

This study emphasizes the importance of key sites in the ecology of the Regent Honeyeater and confirms that the birds use many sites and a range of habitat types at different times. This highlights the probable inadequacy of a strategy based partly on the preservation of a small area around each nest tree (State Forests of NSW interim policy for protecting Regent Honeyeater habitat, cited in Fanning (1995)), and suggests that conservation of only selected sites may not be sufficient to ensure the survival of the species.

Our measurements of known-sex individuals confirm and quantify the differences in size between the sexes in the Regent Honeyeater. This was shown, mainly from museum specimens, by Schodde *et al.* (1992) and has long been observed in the field. Our sample size is small, but the figures suggest that it may not be possible to separate by measurement the smallest males from the largest females.

Our observations show the value of individually colour-banding birds: all the results are derived from observations of the colour bands. One bird was retrapped at the banding place after eight days, but we have had no other retraps. Our work clearly supports Major's (1995) contention that knowledge of breeding behaviour and biology can be enhanced by colour-banding. It also illustrates the importance of regular monitoring for the appearance of marked birds at known Regent Honeyeater sites and elsewhere.

In our experience the use of colour bands is a reliable technique. We have no examples of birds losing bands as can occur in some species, for example Noisy Friarbirds *Philemon corniculata* (H. Ford, pers. comm.), or of bands fading. All marked birds that we have sighted have had complete sets of bands; we have seen no birds carrying only a metal band which might indicate that all its plastic bands had been lost. We consider it unlikely that a bird would shed its metal band in the time period covered by this study. The green band on 041–50386 was still clearly visible and unfaded after two years. Further, while colour-banding is a simple process,

requiring no elaborate equipment or technical expertise, it can yield significant information. The results given here increase our knowledge of the biology of a species although based on a pool of only 37 marked birds in the Bundarra-Kingstown district. In addition, while we have documented only local movements, colour-banding may identify longer distance movements.

Our necessarily limited efforts are already providing new information, which suggests that continued work may shed further light on the biology of the poorly studied, and now endangered, Regent Honeyeater. This will assist recovery of the species.

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