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FIDELITY TO BREEDING-SITE IN FOUR MIGRATORY SPECIES NEAR ARMIDALE, NEW SOUTH WALES

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Rufous Whistlers *Pachycephala rufiventris* and Leaden Flycatchers *Myiagra rubecula* are breeding visitors to the area. Some individuals return to the same territory in successive years. Yellow-faced Honeyeaters *Lichenostomus chrysops* and Silvereyes *Zosterops lateralis* are common passage migrants and winter visitors. Both have small breeding populations near Armidale and remain within, or return to, the same territories in subsequent years.

INTRODUCTION

Many small passerines of eucalypt woodlands and forests in eastern Australia are sedentary (e.g. Superb Fairy-wren *Malurus cyaneus*—Rowley 1965, Eastern Yellow Robin *Eopsaltria australis*—Marchant 1985, White-throated Treecreeper *Climacteris leucophaea*—Noske 1985). In other species the adults may be sedentary, but juveniles disperse widely, giving the impression that the species wanders during winter (e.g. Scarlet Robin *Petroica multicolor*—Huddy 1979, Brown Thornbill *Acanthiza pusilla*—Bell 1985) Several species are migratory, at least in parts of their range, as evidenced by flocks on passage (e.g. Yellow-faced Honeyeater *Lichenostomus chrysops*, White-naped Honeyeater *Melithreptus lunatus*—Hindwood 1956), or absence during part of the year (e.g. Leaden and Satin Flycatchers *Myiagra rubecula* and *M. cyanoleuca*—Blakers, Davies and Reilly 1984).

In this paper we provide evidence that two summer visitors to the Armidale area, the Rufous Whistler *Pachycephala rufiventris* and Leaden Flycatcher, may return to the same breeding territories in successive years. Two other species, the Yellow-faced Honeyeater and Silvereye *Zosterops lateralis*, are principally passage migrants and winter visitors to the area. However small numbers of both species breed near Armidale, and may remain within the breeding territory, or return to it, over several years.

STUDY SITES AND METHODS

All four species were studied at Wollomombi, 40 km east of Armidale, and the Rufous Whistler was studied at Eastwood State Forest, 10 km south-east of Armidale. The main habitat in both areas was eucalypt woodland, in places grading into open forest. Details have been pre-

TABLE 1

Mean densities of four species at Wollomombi, N.S.W., each month from censuses (details of method in Bell and Ferrier 1985) and the number of breeding records each month.

Density (birds/10 ha)	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Yellow-faced Honeyeater *Lichenostomus chrysops*	12.9	6.3	9.2	9.1	13.0	13.8	12.6	17.2	17.0	10.3	12.6	13.5
Silvereye *Zosterops lateralis*	0.5	1.0	0.6	0.5	0.4	0.3	0.3	0.1	0	0.2	0.8	0.5
Leaden Flycatcher *Myiagra rubecula*	6.6	4.9	1.4	0.1	0	0	0	0	1.5	7.4	7.5	6.8
Rufous Whistler *Pachycephala rufiventris*	9.8	8.1	7.9	2.4	0	0	0	0	5.2	9.4	11.2	11.2
Breeding	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Yellow-faced Honeyeater *L. chrysops*	–	–	–	–	–	–	–	–	2	–	2	5
Leaden Flycatcher *M. rubecula*	5	–	–	–	–	–	–	–	–	5	11	6
Rufous Whistler *P. rufiventris*	2	–	–	–	–	–	–	–	–	1	7	5

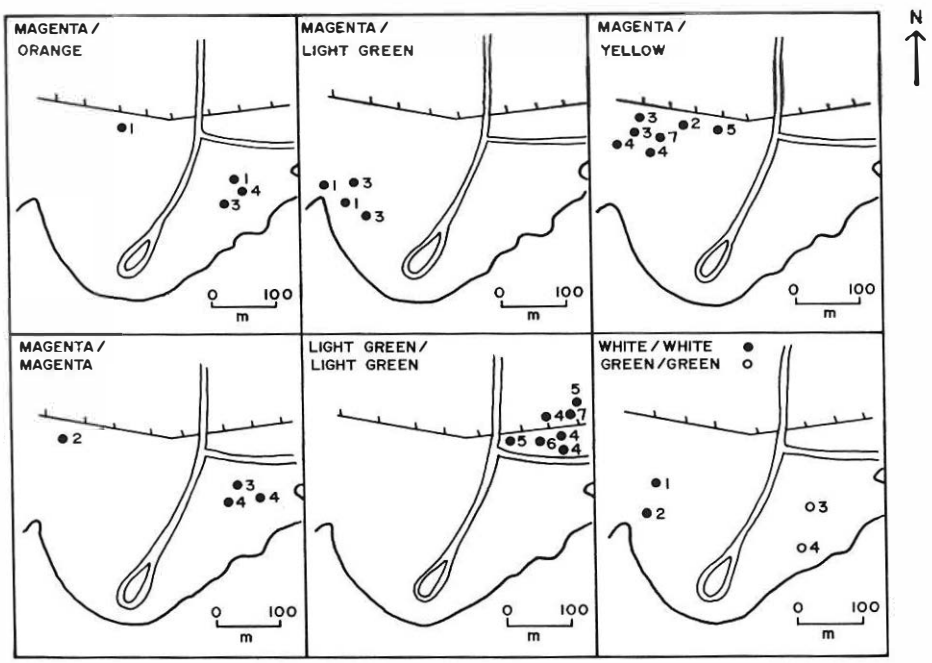

Figure 1. *Locations of colour-banded Yellow-faced Honeyeaters at Wollomombi, N.S.W. (Numbers refer to years, 1 = 1978, 2 = 1979, 3 = 1980, 4 = 1981, 5 = 1982, 6 = 1983, 7 = 1984).*

sented in several other papers (e.g. Bell and Ferrier 1985, Ford, Bridges and Noske 1985).

Birds were captured in mist-nets and some members of the four species, usually recaptures, were colour-banded. Recaptures or sightings of colour-banded birds were subsequently mapped on grids of the two study sites. Birds were first banded at Wollomombi in September 1978, and at Eastwood in December 1979. Visits were frequent to Wollomombi until April 1982, and to Eastwood until December 1982. Both sites were visited less frequently after these dates.

RESULTS AND DISCUSSION

Yellow-faced Honeyeater

Yellow-faced Honeyeaters are perhaps the most conspicuous diurnal migrant in the ranges of south-eastern Australia (Hindwood 1956, Liddy 1966, summary in Blakers *et al.* 1984, Davey 1986). In the Northern Tablelands of N.S.W. they pass over to the north or north-east in April and May and less obviously to the south in September. Yellow-faced Honeyeaters are common in some years in winter in areas where nectar is abundant, for example, in the New England National Park (McFarland 1984). They occur all year round at Wollomombi, (Table 1) which does not include birds seen flying over) and breed in spring and early summer. Seven colour-banded birds were resighted or recaptured in subsequent years, often close to their banding site. Figure 1 shows locations of these sightings and the years in which they occurred (1 = 1978, 2 = 1979 ..... 7 = 1984). Two birds were seen in 2 subsequent years, two over 3 years, two over 4 years and one over 5 years. Colour-banded birds were recorded in all months except April.

There is thus apparently a sedentary population of Yellow-faced Honeyeaters at Wollomombi, which is separate from the migratory population that passes through or into the area. Marchant (1982) also found at Moruya, on the south coast of N.S.W., that breeding Yellow-faced Honeyeaters returned to their territories in subsequent years. He suspected (pers. comm.) though, that at least some of these birds left in winter to be replaced by migrants. Further south, in Victoria, Yellow-faced Honeyeaters are virtually absent in winter.

Silvereye

Silvereyes are abundant in the Armidale area between April and September, when flocks include both pale-flanked (mainland) and dark-flanked (Tasmanian) birds (Ford pers. obs.). Small numbers of pale-flanked birds are present at Wollomombi throughout the year (Table 1). Two colour-banded birds were seen in 2 and 3 successive years respectively (Figure 2). They were not seen between March and October, so were possibly summer visitors to the area rather than residents.

Lane (1972) also found separate breeding and wintering populations of Silvereyes in Sydney. Breeding birds either remained through the year or disappeared each winter.

Leaden Flycatcher

Leaden Flycatchers arrive in Wollomombi in late September and October and depart in March, with stragglers present up to mid-April, and nest between October and January (Table 1). Five birds were colour-banded and two, both females, were recorded in successive years at the same nest site (Figure 2). One bird returned for a third year and nested 50 m from the original nest.

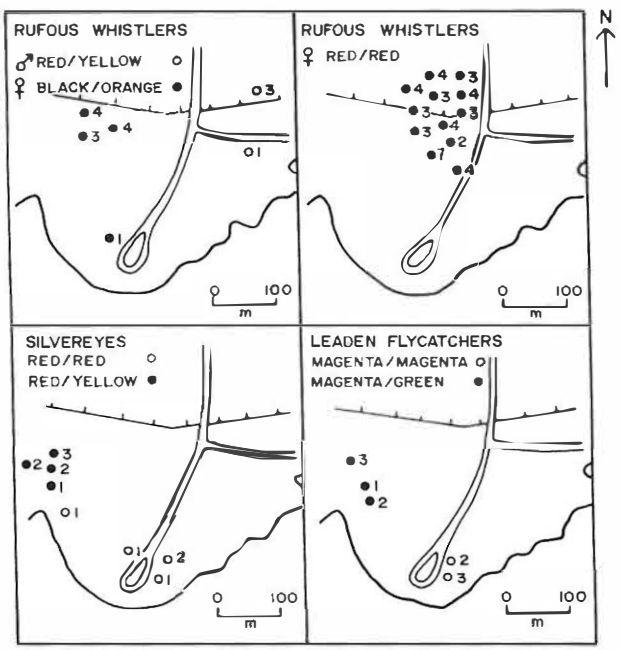

Figure 2. *Locations of colour-banded Rufous Whistlers, Silvereyes, and Leaden Flycatchers at Wollomombi, N.S.W. Year codes as in Figure 1.*

Leaden Flycatchers breeding in south-eastern Australia apparently winter in northern Queensland and New Guinea (Blakers *et al.* 1984). Wollomombi birds therefore probably winter some 2 000 km from their breeding area, yet may return to the same territory.

Rufous Whistler

Rufous Whistlers are common summer visitors to Wollomombi and Eastwood (Table 1), arriving in mid-September and leaving in early April (Ford *et al*, 1985). Three colour-banded birds at Wollomombi were recorded up to 5 years later, near their banding site (Figure 2).

A total of 30 birds were colour-banded at Eastwood, 20 were seen again, 17 in subsequent breeding seasons. Territories were plotted most thoroughly in the summer of 1981-1982 (year 3). Sightings of these birds in earlier or later years are shown in Figure 3. Most occurred close to their 1981-82 territories or within them. Nine birds returned to the area in 3 successive years, five were seen in four summers and two birds LG/Y and OR/BU could have been present in 6 years. In 1985-1986 a bird with only a yellow band was seen in LG/Y's old territory.

Although Rufous Whistlers are predominantly summer visitors to most of their breeding range in south-eastern Australia, they are also recorded in winter (Blakers *et al*, 1984). Occasional birds are even seen in winter near Armidale (Ford pers. obs.), though none of these has been colour-banded. Possibly these stragglers represent young birds or non-territorial birds, rather than being sedentary breeders. Rufous Whistlers elsewhere in south-eastern Australia have been recaptured

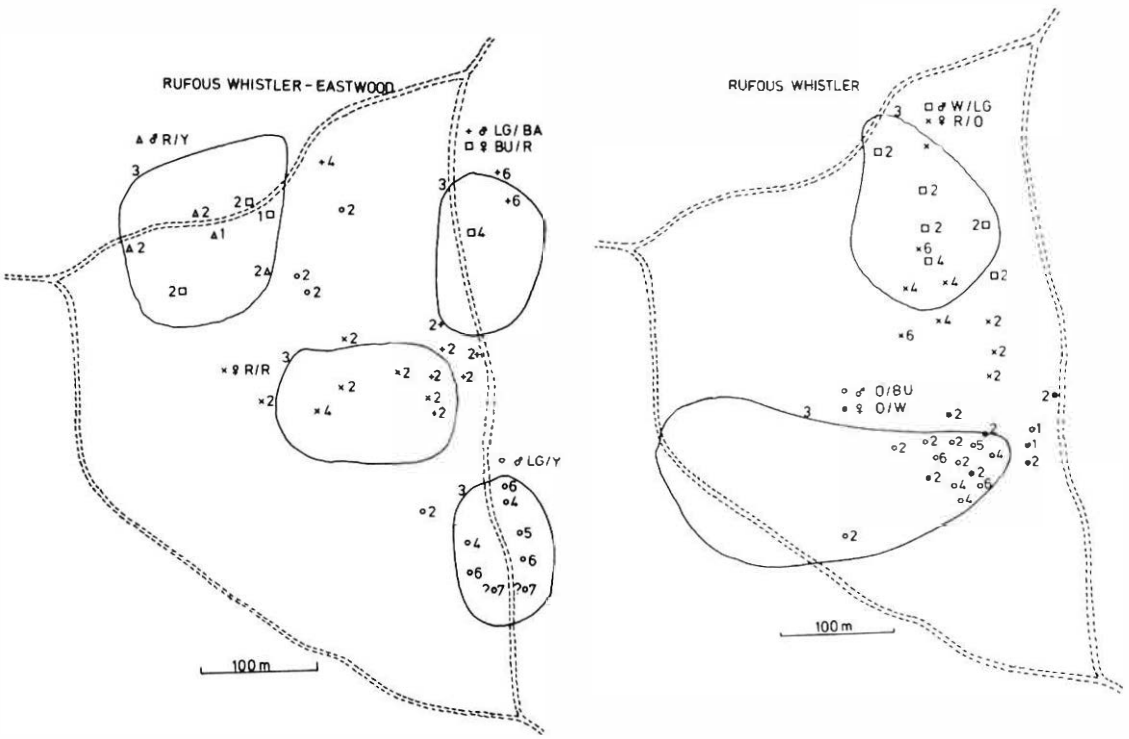

Figure 3. *Locations of colour-banded Rufous Whistlers at Eastwood State Forest (Numbers refer to breeding seasons, 1 = 1979-1980, 2 = 1980-1981, 3 = 1981-1982, 4 = 1982-1983, 5 = 1983-1984, 6 = 1985-1986). Approximate territorial boundaries rather than individual sightings are given for 1981-1982. (W = white, Y = yellow, O = orange, R = red, BU = blue, BA = black, LG = light green).*

near their banding sites up to 11 years after banding. One bird was recaptured at its banding site seven times (*Aust. Bird Bander, Corella passim*). Marchant (1982) also stated that Rufous Whistlers return to the same small areas to breed, though he provided no specific examples. Jack (1949) in south-eastern Queensland, and Erickson (1951) in south-western Western Australia studied sedentary populations of Rufous Whistlers and suggested that birds occupied the same territories in successive years, though none was colour-banded.

CONCLUSIONS

The movements of most Australian birds are poorly known compared with those of North America and Europe. They are also probably more complex as many species have both sedentary and migratory populations. In addition there is a widespread belief that some species are nomadic, showing irregular movements (e.g. Keast 1968). The results presented here indicate that in two species which show a regular north-south migration individuals may return to breed in the same territory in successive years. In the third species, which is also a regular north-south migrant, there is a local sedentary population, and in a fourth, apparently migratory species, some individuals return to breed in the same area in successive years.

Further long-term studies on colour-banded birds are needed to determine whether such fidelity to breeding areas is widespread in Australian migratory species.

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