CSIRO Publishing

Emu

Volume 97, 1997

All enquiries and manuscripts should be directed to

Emu
CSIRO Publishing
PO Box 1139 (150 Oxford St)
Collingwood, Vic. 3066, Australia

Telephone: 61 3 9662 7622
Fax: 61 3 9662 7611
Email: emu@publish.csiro.au

CSIRO PUBLISHING

Birds Australia

Published by CSIRO Publishing
for the Royal Australasian Ornithologists Union

www.publish.csiro.au/journals/emu

Short Communications

The Importance of Mistletoe to the White-fronted Honeyeater *Phylidonyris albifrons* in Western Victoria

David M. Watson

Department of Ecology and Evolutionary Biology, Monash University, Clayton, Vic. 3168
Present address: Natural History Museum, The University of Kansas, Lawrence, Kansas 66045, USA

EMU Vol. 97, 174-177, 1997. Received 17-7-1995, accepted 17-6-1996. 10.1071/MU97021

This paper summarises occurrence data and observations gathered during a study of bird communities associated with remnant Buloke *Allocasuarina luehmanni* woodlands in western Victoria (Watson 1994). In late summer 1994, an influx of White-fronted Honeyeaters *Phylidonyris albifrons* was recorded, corresponding with a mass flowering event of the Buloke mistletoe *Amyema linophyllum*. Irruptions of this honeyeater have been recorded previously (Chandler 1937; Hobbs 1961; Brooker et al. 1979) and have been linked to short-lived nectar resources, particularly of certain desert plants (Keast 1968). While the species is relatively common in north-western Victoria, with most records from the Big Desert region (Emison et al. 1987), only 13 records exist from the study area (Atlas of Victorian Wildlife). The White-fronted Honeyeater is thus locally uncommon, although the paucity of records may simply reflect the cryptic nature of the specles.

Analyses of gut contents and incidental observations indicate that White-fronted Honeyeaters exploit a variety of foods including nectar (Hall 1901; Robinson 1934; Hobbs 1961; Brooker et al. 1979), insects (Hall 1901; Anon. 1913; Lea & Gray 1936), seeds, and other plant material (Lea & Gray 1936). However, comparatively little is known of the species' habits; indeed some workers have pointed out the scarcity of information regarding their seasonal movements, especially in Victoria (Emison et al. 1987). Keast (1968) suggested that the flowering of certain plants, including mistletoes, may be the most important feature determining the distribution of the species, yet little evidence is available to support this hypothesis.

In this note, records of the White-fronted Honeyeater in the Wimmera are summarised and its occurrence related to vegetation patterns. In particular, the distribution of honeyeaters across the study area is correlated with mistletoe densities. The study consisted of 12 months of regular monitoring with data on the occurrence of birds recorded before, during and after the flowering event.

Methods

Field work was conducted in the central Wimmera region of Victoria from April 1994 to March 1995 (Fig. 1). For the purposes of this study, Buloke woodland was defined as habitat where Buloke trees accounted for at least 50% of the canopy composition. Twenty-seven sites were selected in woodland remnants varying in size, vegetation structure and management history. Sites were selected such that soil type and dominant canopy species (Buloke) were similar.

The bird community of each site was monitored with a transect count procedure (Shields & Recher 1984). Censuses were carried out in the early morning and late afternoon with twenty minutes taken to census transects of fixed dimensions (50 x 200 m) marked out in each remnant. Species seen or heard outside the transect were also noted. Censuses were carried out in each site at six-weekly intervals over a 12-month period, yielding nine censuses for each site, starting on: (1) 20 April 1994; (2) 31 May 1994; (3) 12 July 1994; (4) 22 August 1994; (5) 17 October 1994; (6) 16 November 1994; (7) 28 December 1994; (8) 8 February 1995; and (9) 22 March 1995. In addition to census data incidental records were accrued from almost 1000 h of informal observations in the study area.

Four species of mistletoe were recorded from the area: Buloke Mistletoe *Amyema linophyllum*, Box Mistletoe *A. miquellii*, Fleshy Mistletoe *A. miraculosum* and Harlequin Mistletoe *Lysiana exocarpi*. Of these, the first and last were the most common and were the only species observed parasitising Buloke trees. *A. linophyllum* is similar in appearance to its host, with long needle-like leaves closely resembling the cladodes of *Allocasuarina* spp. (Barlow & Wiens 1976). Measuring plant density was therefore difficult so pres-

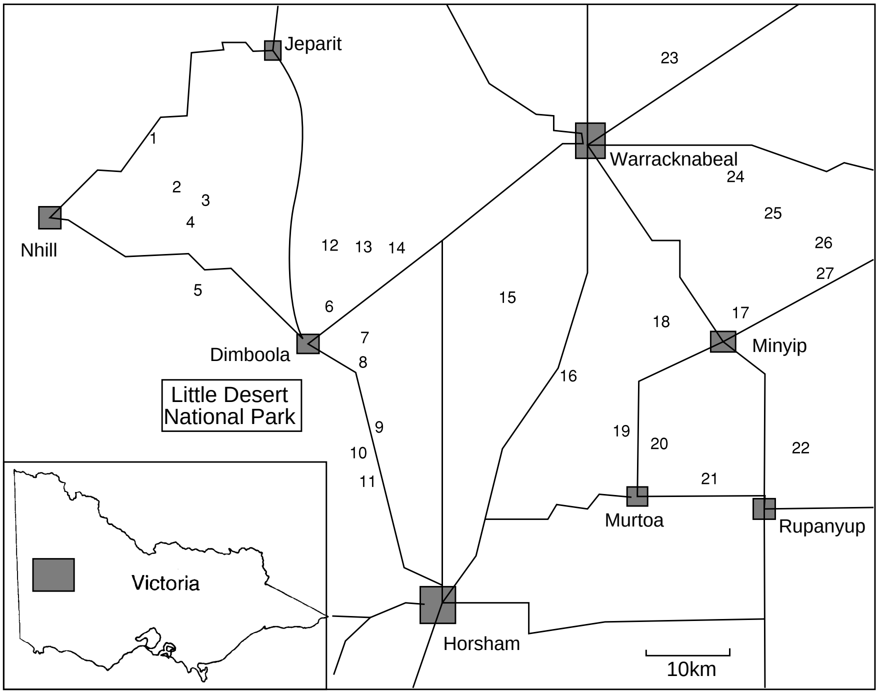

Figure 1 Map of the study area showing the location of the 27 remnants of Buloke woodland.

ence/absence data was recorded at all sites. However, *L. exocarpi* is readily distinguished from Buloke foliage, and its densities were determined. The two species of mistletoe were frequently found to grow in association, with *A. Iinophyllum* plants regularly growing from the same branch, even from the same point of origin as *L. exocarpi*. Therefore, given this close association and the difficulties in counting *A. linophyllum*, densities were inferred from the data recorded for *L. exocarpi*. This measure, although not absolute, provided a consistent, relative index of *A. linophyllum* density.

Results

The 13 site records of White-fronted Honeyeaters fell into two groups: isolated records in 1994 and a group of records in 1995 (Table 1). The latter records all occurred within a three-day period in mid-February 1995, at sites throughout the study area (Fig. 1) Birds were observed taking nectar from the flowers of *A. linophylum*, moving rapidly from one inflorescence to another. Prior to this influx, the species had been sighted on four separate occasions. They were recorded at sites with greater shrub coverage, and no nectarivory was observed. In two separate instances, honeyeaters appeared to be tak-

Table 1 Summary of records of the White-fronted Honeyeater *Phylidonyris albifrons* in the Wimmera. Asterisks denote incidental observations, not included in regression analysis. Only the transect data was used in this analysis, as they provided a repeatable and consistent measure of avian density.

Date	Site	Number Seen	Number Heard	Foraging observations
4/94	5	2*		Hawking aerial insects
4/94	14	4*		No foraging activities observed
23/4/94	1	4*		No foraging activities observed
31/12/94	24	1		Feeding on flying insects
11/2/95	13	1		Probing *A. Iinophyllum* flowers
11/2/95	16	1		Probing *A. Iinophyllum* flowers
13/2/95	6	1		Probing *A. Iinophyllum* flowers
13/2/95	7	1	5	Probing *A. Iinophyllum* flowers
13/2/95	8	6	3	Probing *A. Iinophyllum* flowers
13/2/95	9	1	2	Probing *A. Iinophyllum* flowers
13/2/95	10	1		Probing *A. Iinophyllum* flowers
14/2/95	14	3	5	Probing *A. Iinophyllum* flowers
14/2/95	20	1	1	Probing *A. Iinophyllum* flowers

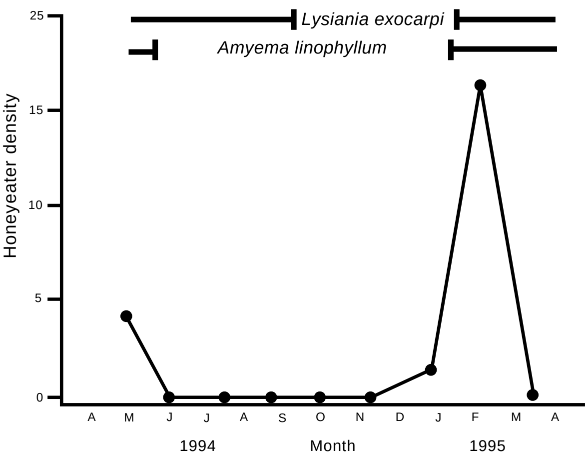

Figure 2 Summary of census records of the White-fronted Honeyeater *Phylidonyris albifrons* plotted against time. Incidental records are not included, and data on the flowering seasons of mistletoes are taken from Reid (1986).

ing insects on the wing, in a manner similar to the congeneric New Holland Honeyeater *P. novaehollandiae* (DMW pers. obs.).

A. linophyllum was recorded in 25 sites, 18 of which also contained *L. exocarpi* but *L. exocarpi* was not recorded in other sites. *L. exocarpi* density within the 1 ha transect ranged from 0-93, with a mean of 14, and densities of A. *linophyllum* were assumed to be similar. *L. exocarpi* had a prolonged flowering season from early summer to late winter. Conversely, *A. linophyllum* had a brief flowering period in late summer (Reid 1986), with individual plants producing numerous inflorescences (Bernhardt & Calder 1980).

The influx of honeyeaters and the flowering season of the two mistletoe species were closely associated (Fig. 2). To minimise the influence of climatic factors on the flowering season (1994–95 was abnormally dry in the Wimmera), data were taken from Reid (1986). In addition to this temporal association there was also a spatial relationship between mistletoe distribution and honeyeater density. The total density of honeyeaters for each site was related to the density of mistletoe plants. The relationship was found to be statistically significant using regression analysis ($P = 0.039$).

Discussion

The close association between *A. linophyllum* and *L. exocarpii* has not been previously noted, although similar relationships are known in other species (e.g. *A. miraculosum* and *Notothixos subaureus*; Hamilton & Barlow 1962). The intimacy of this relationship is illustrated by the fact that *L. exocarpi* was not present at any site by itself; it was only found in sites containing *A. linophyllum*. The process underlying this association is unclear. It may be related to the life histories of the plants, with one plant parasitising the other, or it may result from modes of fruit dispersal (Yan 1993), with the fruits of both species likely to be dispersed by common vectors (N. Reid pers. comm.).

The data discussed herein regard the distribution of honeyeaters in remnant vegetation in the Wimmera. Since the data were all collected in one 12-month period, conclusions about long-term movement patterns are not possible. If, however, the complete set of records of White-fronted Honeyeaters in the study area is examined, one can gain a more complete picture. Prior to this study there were 13 records of this species in the study area, 12 of which specified the month of observation. Three records are from January (1978, 1979 and 1981), one from February (1979), two from March (1978 and 1980) and three from April (1977, 1979 and 1980). The remaining records were from May (1978 and 1980) and September (1979). This information is similar to the data presented herein, with most records between January and April (the flowering season of *A. linophyllum*). Rather than being an isolated event or a response to unusually dry conditions, I suggest that the influx of White-fronted Honeyeaters into the Wimmera is a regular event, coinciding with the brief flowering season of the *A. linophyllum*. The species appears to spend most of the year in the northwest, moving into the Wimmera to exploit the short-lived nectar resource as hypothesised by Keast (1968).

Patterns such as that documented herein highlight the importance of remnant patches of vegetation, and in particular the conservation value of Buloke woodlands (see also Watson 1995). Although many of the remnants were too small and degraded to support resident populations of birds (Watson 1994), they were able to supply important resources to transient species.

Acknowledgements

The field work for this study was supported by grants from the Flora and Fauna Branch of the Department of Conservation and Natural Resources (DCNR) Institute, and from the Catchment and Land Management team of the Horsham DCNR. I am grateful to Ralph MacNally, Allan Lill and

Andrew Bennett for advice on sampling techniques, and to Anonymous and Nick Reid for constructive suggestions on the manuscript. I am also grateful to Simon Bennett of the Wildlife Branch of the DCNR for the print-outs from the *Atlas of Victorian Wildlife* and to Kim Bostwick for advice and assistance with figures.

References

Anon. 1913. Ornithological notes, Barclay expedition. Emu 12, 238-262.

Barlow, B.A. & Wiens, D. 1976. Host-parasite resemblance in Australian mistletoes: the case for mimicry. Evolution 31, 69-84.

Bernhardt, P. & Calder, D.M. 1980. Comparative breeding systems and adaptive floral morphologies of *Amyema linophyllum* and *Amyeme pressii* (Loranthaceae). Phytomorphology 30, 271-289.

Brooker, M.G., Ridpath, M.G., Estbergs, A.J., Bywater, J., Hart, D.S. & Jones, M.S. 1979. Bird observations on the North-Western Nullabor plain and neighbouring regions, 1967-1978. Emu 79,176-187.

Chandler, L.G. 1937. White-fronted Honeyeater. Emu 36, 293.

Emison, W.B., Beardsell, C.M., Norman, F.I., Loyn, R.H. & Bennett, S.C. 1987. Atlas of Victorian Birds. Department of Conservation, Forests and Lands & RAOU, Melbourne.

Hall, R. 1901. Notes on a collection of bird-skins from the Fitzroy River, North-Western Australia. Emu 1, 87-112.

Hamilton, G. & Barlow, B.A. 1962. Studies in Australian Loranthaceae. II. attachment structures and their interrelationships. Proceedings of the Linnean Society of New South Wales 88, 74-90.

Hobbs, J.N. 1961. The birds of South-west New South Wales. Emu 61, 21-55.

Keast, A. 1968. Seasonal movements in Australian honeyeaters (Meliphagidae) and their ecological significance. Emu 67, 159-209.

Lea, A.H. & Gray, J.T. 1936. The food of Australian birds: An analysis of stomach contents. Emu 35, 251-280.

Reid, N. 1986. Pollination and seed dispersal of mistletoes (Loranthaceae) by birds in southern Australia. Pp. 64-173 in The Dynamic Partnership: Birds and Plants in Southern Australia. Eds H.A. Ford & D.C. Paton. Government Printer, Adelaide.

Robinson, A. 1934. *Gliciphila albifrons*. Emu 33, 316.

Shields, J.M. & Recher, H.F. 1984. Breeding bird censuses: an evaluation of four methods for use in sclerophyll forest. Corella 8, 29-41.

Turner, R.J. 1991. Mistletoe in eucalypt forests – a resource for birds. Australian Forestry 54, 226-235.

Watson, D.M. 1994. The dynamics of bird communities in remnant Buloke *Allocasuarina luehmanni* woodlands. Honours Thesis, Monash University, Melbourne

Watson, D.M. 1995. Black Honeyeaters in the Wimmera. Australian Bird Watcher 16, 166-167.

Yan, Z. 1993. Seed dispersal of *Amyema preissi* and *Lysiana exocarpi* by Mistletoebirds and Spiny-cheeked Honeyeaters. Emu 93, 214-219.