

## Breeding of the Eastern Yellow Robin in an Exotic Pine Plantation at Armidale, New South Wales

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### Summary

Eastern Yellow Robin *Eopsaltria australis* nests were observed in an exotic Monterey Pine *Pinus radiata* plantation near Armidale, New South Wales, for 5.25 hours over seven 45-minute sessions during the incubation period in spring 2002 (five nests of three groups). The Robins nested at 2–21 m above ground (mean 12 m) in exotic conifers, constructing nests of exotic materials. Males fed incubating females 2.9 times/h, and females left the nest (apparently to forage) at the rate of 2.3 forays/h. Nest success was 20%, with one brood of two fledging from five attempts.

### Introduction

The biology of the Eastern Yellow Robin *Eopsaltria australis* is well known (reviewed in Higgins & Peter 2003), particularly on the New England Tablelands of northern New South Wales, where this species' nesting biology, breeding success and parental feeding rates have been studied intensively (Zanette 2000, Zanette & Jenkins 2000, Zanette *et al.* 2000). However, previous detailed studies have been conducted in native woodland or forest, albeit mostly in habitat remnants in an agricultural landscape. This species is affected by habitat fragmentation and degradation, as it tends not to occur in small, open woodland patches lacking high structural complexity (Seddon *et al.* 2003, Watson *et al.* 2003), although it is common in exotic pine forest (Higgins & Peter 2003). This study examined aspects of the breeding biology of Eastern Yellow Robins living in a mature plantation of introduced Monterey Pine *Pinus radiata* managed for timber production and recreation.

### Study area and methods

The study site was Armidale State Forest (locally known as the 'Pine Forest') 5 km north-east of Armidale (30°30'S, 151°40'E) on the New England Tablelands of New South Wales. Armidale is at 900–1300 m elevation on the Great Dividing Range, with summer-dominant rainfall of about 800 mm per year, and cold winters with about 45 frost days and the occasional snowfall (further details in Heatwole & Simpson 1986; Heatwole *et al.* 1995, 2003). The Pine Forest is described by Debus (1983) and Bass (1990). The year 2002 was a drought year, with 84% of average annual rainfall (University of New England weather data). The Pine Forest is frequently used for recreation such as picnicking, walking, horse-riding and trailbike-riding.

The forest (250 ha) is about 200 ha of mature plantation and about 50 ha of recently planted saplings, surrounded by cleared land and tenuously connected to small remnants of native eucalypt woodland via scattered eucalypts on the perimeter. Yellow Robins were studied in spring 2002, in the central area (C block: Debus 1983) of mature trees with a sparse understorey of exotic shrubs including privet *Ligustrum* spp. and Firethorn *Pyracantha angustifolia*, scattered wattles *Acacia* and other native shrubs, and regenerating pines.

Thirteen Robins were colour-banded by SD, in about 50 ha over seven mornings in late July and early August 2002; several birds remained unbanded in the area. Five active nests, from three pairs or groups of Robins, were observed between 21 September and 28 October by BB and AK, for seven sessions of 45 minutes during the incubation period, between 0830 and

1130 h or 1330 and 1600 h (total 5.25 h). Observers sat 20–25 m from the nest with 8× binoculars, dictated events and times into a tape-recorder, and later transcribed the data. The Robins were given a 15-minute settling period before the start of recording, to enable any flushed birds to return to the nest and resume normal behaviour. Three other active nests were found, but not studied.

A subjective measure of nest concealment was made by rating lateral nest visibility in four classes (0 = not obscured by foliage, 1 = <50% obscured, 2 = >50% obscured, 3 = 100% obscured, i.e. invisible) on eight compass bearings from the nest, at 20 m distant, and summing the score (maximum 24).

An index of predator activity was calculated according to the method of Zanette & Jenkins (2000) by counting the minimum number of potential nest-predators (Laughing Kookaburra *Dacelo novaeguineae*, Grey Butcherbird *Cracticus torquatus*, Australian Magpie *Gymnorhina tibicen*, Pied Currawong *Strepera graculina*, Australian Raven *Corvus coronoides*) in a 50-m radius around the nest during each nest watch.

## Results

There were at least four pairs or groups of Eastern Yellow Robins in 50 ha, or one group to about 13 ha. Five nests were at heights of 2–21 m (mean 12 m) above ground in exotic conifers, four in pines and one, the lowest, in a fibrous-barked cypress *Cupressus* sp. Nests were constructed of pieces of fibrous cypress bark bound with cobweb, and lined with pine needles. Nests high in pines were difficult to see; most were built in clusters of pine cones. The nest-concealment score was 10–24 for the five nests (mean 16.6); only two nests scored 0 concealment for one or more compass points.

Males made 15 visits to feed incubating females in 5.25 hours of observation (2.9 visits/h). Females left the nest, at times apparently to forage, during each of the seven observation sessions, at a rate of 12 departures during 5.25 hours (i.e. 2.3 forays/h). However, they were also flushed off the nest twice by human activity (passing horse-riders) unrelated to the observers' presence. Females spent 77% of observation time incubating, and the remainder off the nest.

Of five nests for which the outcome was known, one fledged two young and the others failed (20% nest success). The outcome of three other active nests was undetermined.

Counts of potential nest-predators gave an average predator-activity index of 6 over the seven nest watches. All records were of Ravens, except for one Currawong.

Incubating or brooding females either sat low and flat on the nest in the presence of potential danger, such as an approaching human, or flushed off the nest.

## Discussion

Eastern Yellow Robins are known to live in pine plantations and nest in exotic plants (Higgins & Peter 2003), but this study emphasises their adaptation to an environment dominated by exotic plants. One Robin ate a Firethorn berry by plucking and swallowing it (SD pers. obs.). Nests were as previously described (Higgins & Peter 2003) and externally resembled those of Eastern Yellow Robins in native woodland, except that the materials were of exotic origin. Subjectively, the Pine Forest interior structurally resembled that of moist native forest where Eastern Yellow Robins are abundant (Higgins & Peter 2003; SD pers. obs.), i.e. gloomy beneath a dense canopy, with a moist ground-layer and deep litter of pine

needles. Nest height was greater than in previous studies (mean 3 m: Higgins & Peter 2003), perhaps because the shrub layer was sparse and the pines had their lower lateral branches pruned to create 'pole' trunks.

The male feeding rate in the Pine Forest here (2.9 visits/h) was similar to that for Eastern Yellow Robins in small woodland fragments (3.1 visits/h), but lower than that for large woodland remnants (4.2 visits/h: Zanette *et al.* 2000). Unlike those in other studies, females in the Pine Forest left the nest during every 45-minute nest watch (compared with only 43% of equivalent watches in small and 32% in large remnants), at a greater rate (2.3 forays/h compared with 1.1 forays/h in small and 0.4 foray/h in large eucalypt woodland remnants: Zanette *et al.* 2000). Females incubated for less time (77%) than in other studies (80–90%: Higgins & Peter 2003). These results suggest that food may have been less abundant in the Pine Forest than in native woodland, or that the level of human disturbance was greater. However, the sample size for the Pine Forest was small and food supply in pine and native habitat alike may have been affected by the dry conditions in 2002. Females in the Pine Forest may also have been meeting the males for a food-pass on some forays off the nest.

Nest success in the Pine Forest was lower (only 20%) than reported for the Eastern Yellow Robin in coastal localities (up to 39%: Higgins & Peter 2003), though similar to that for western New England (23%: Zanette & Jenkins 2000) and for native woodland near Armidale in 2002 (24%: Debus in prep.). The predator-activity index at the Pine Forest was higher (6) than for small or large woodland remnants in western New England (1.9 and 2.3 respectively: Zanette & Jenkins 2000). Furthermore, Grey Shrike-thrushes *Colluricincla harmonica*, another potential predator, were present in the Pine Forest (SD pers. obs.), though not counted. Although predation is the main cause of nest failure elsewhere and the main nest-predators are large birds (Zanette & Jenkins 2000, Debus in prep.), dense pine foliage may hinder discovery of nests by predators.

Eastern Yellow Robins occur at an apparently higher density in the Pine Forest than in remnant woodland near Armidale (one group per 30 ha: Debus in prep.), and their breeding performance in the Pine Forest may be comparable. Therefore, pine plantations may contribute to the local conservation of this species in a cleared and fragmented landscape, given that the Robin appears to be adversely affected by fragmentation and degradation of its natural habitat.

## Acknowledgements

This study was largely an undergraduate project by BB and AK. We thank Will Buchanan, Greg Lollback and Jim Palmer for assistance with mist-netting, Greg Lollback for help in finding nests, and Peter Burr (University of New England) for weather data. The research was conducted under U.N.E. Animal Ethics permit AEC 02/074, with authorisation from the N.S.W. National Parks & Wildlife Service, State Forests of N.S.W., and the Australian Bird & Bat Banding Scheme. We also thank Hugh Ford, Greg Lollback and Jarrad Cousin for comments on a draft, and Andrew Ley for editing.

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Received 16 February 2004

