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Presumptive Renesting of Red-tailed Black-Cockatoos in South-eastern Australia

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A study on the endangered subspecies of the Red-tailed Black-Cockatoo *Calyptorhynchus banksii graptogyne* in south-eastern Australia has been under way since late in 1988. To understand the conservation needs of this cockatoo we aim to determine nest and food requirements, population size, movements and range. Early results indicate that this cockatoo usually lays during October and November in south-eastern Australia; most young fledge during February and March but a few fledge as late as April (Joseph et al. 1991). Before this study, the latest date that an active nest (either eggs or young present) had been recorded for this population was 24 April (Attiwill 1960).

It does not appear that this population breeds successfully twice a year as does *C. b. samueli* in the wheatbelt of Western Australia (Saunders 1977). However, in this paper we report on the apparent renesting of several pairs of Red-tailed Black-Cockatoos in southeastern Australia during the 1992–93 nesting season.

Methods

The Red-tailed Black-Cockatoo in south-eastern Australia has a restricted distribution centred in the Brown Stringybark *Eucalyptus baxteri* forests of south-western Victoria and, to a lesser extent, in the south-east of South Australia. These forests often have a heathy understorey and usually occur in discrete blocks of varying sizes, surrounded by crop and pasture land. The surrounding agricultural land sometimes has scattered River Red Gum *E. camaldulensis*, Yellow Gum *E. leucoxylon* or Buloke *Allocasuarina luehmannii* still remaining, as well as some large dead gums which often contain deep hollows. Details of nest trees, roosts, population size and food are given in Joseph et al. (1991) and Emison & Joseph (1992).

Field work was conducted in south-western Victoria from December 1988 to July 1993. Early in the study (1988–89), the work was confined mainly to the spring and summer months. Searches conducted during the first two seasons (1988–89 and 1989–90) found three main nesting areas of the Red-tailed Black-Cockatoo. After 1989, we made monthly visits to each of these breeding areas to determine if nesting was occurring.

A typical visit to a nesting area involved arriving two or three hours before nightfall at a position where several known nests could be observed. The behaviour of the Red-tailed Black-Cockatoos around the nests was watched until dark and an assessment made as to whether breeding was occurring. In most cases there was little reason for the cockatoos to be in these areas other than for nesting purposes. The main difficulty was distinguishing between the activity associated with prenesting and that associated with having an egg or young in the nest; uncertainties were clarified by follow-up

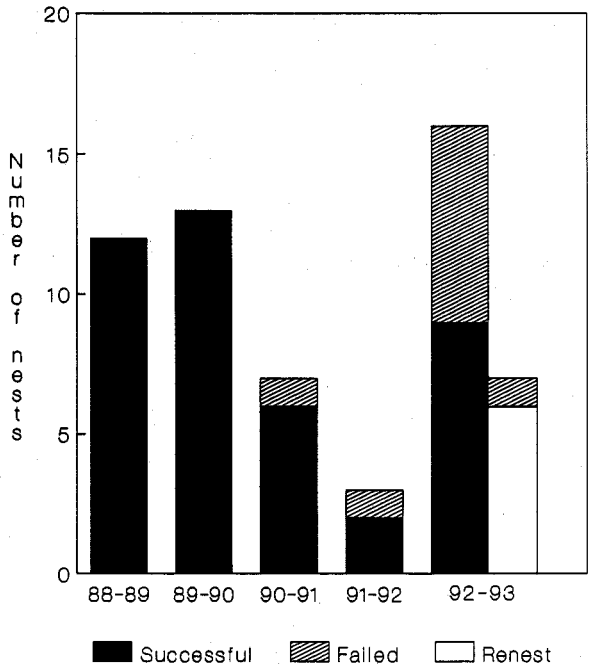

Figure 1 Number of nests of Red-tailed Black-Cockatoos found in south-eastern Australia, 1988–89 to 1992–93.

visits. As the chicks got older they often waited at the entrances of the nest hollows for their parents to return in the evening with food.

On 3 February 1993 and 15 April 1993, a cherry-picker capable of lifting two people allowed us to examine nests at less than 13 m. Nest examinations included recording their contents, measuring the entrance and internal characteristics, and collecting addled eggs or dead chicks. Each nest site was classified as either a hollow (a side opening into a limb or trunk) or a spout (a broken-off limb open at the top).

Rainfall data were obtained from one of the three main nesting areas, where rainfall was recorded daily during the entire period of our study.

Results

Nests

During the first four nesting seasons (1988–89 to 1991–92), the number of Red-tailed Black-Cockatoo nests found ranged from 3-13 (Fig. 1). During these four seasons we found active nests between 17 October and 3 April; and the earliest date on which we saw fledglings was 14 February; we recorded only two nest failures during the entire period (Fig. 1).

The fifth nesting season (1992–93) started well with 16 nests found during October–December. However, by January some of the nests appeared to be deserted and by early February it was apparent that seven of the 16 nests had failed (Fig. 2). Of the seven failed nests, six had entrances classified as spouts and only one had an

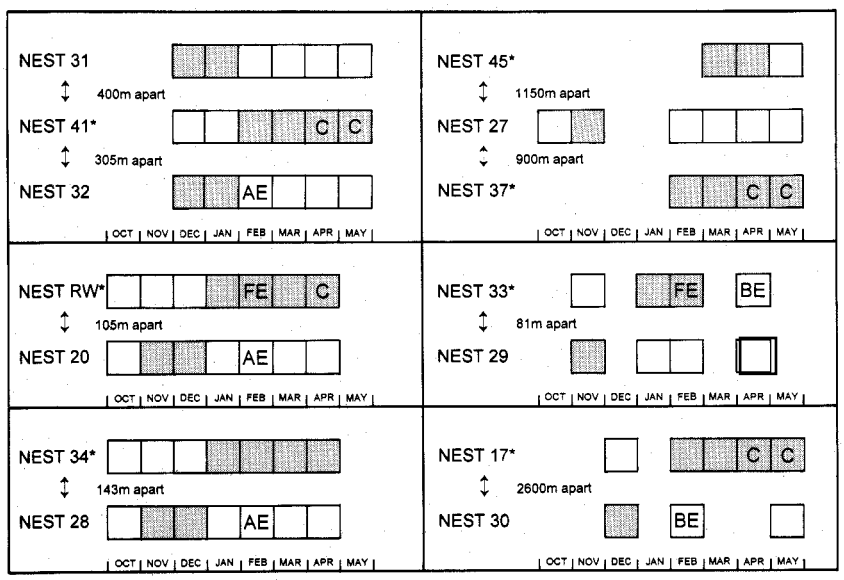

Figure 2 Nesting histories (1992–93 season) of seven pairs of Red-tailed Black-Cockatoos which started nesting at the usual time but had abandoned their nests by January–February and seven pairs (each marked with an asterisk) which started nesting at about the same time as the other nests were abandoned. The nests are shown in either pairs or trios, which are groupings based on the nearest failed nest(s) to the nearest renest(s). Evidence of nesting (based either on nesting behaviour, a fresh egg or a chick being observed at a nest at least once during a particular month) is indicated by shading in a box for a particular month and no evidence of nesting is indicated by an unshaded monthly box. The abbreviations in the boxes represent: C = a chick seen in the nest; AE = an addled egg found in the nest; FE = a fresh (recently laid) egg found in the nest; and BE = broken eggshells found in the nest.

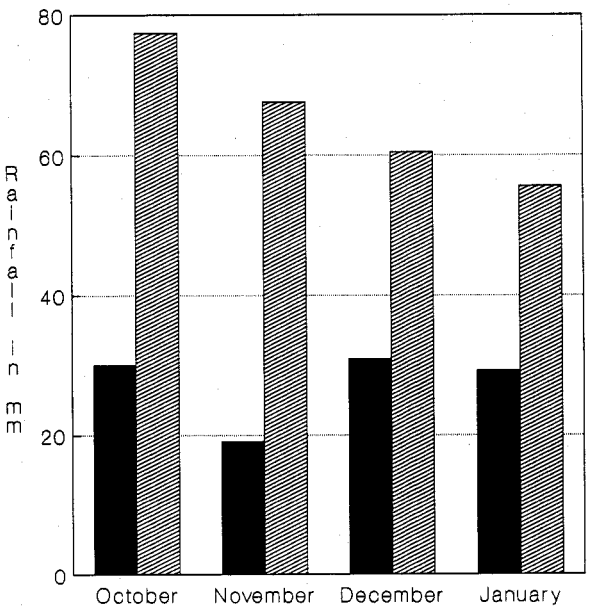

Figure 3 Rainfall for the early portion of the breeding season of the Red-tailed Black-Cockatoo in south-eastern Australia. The rainfall for each month (October–January) of the seasons 1988–89 to 1991–92 have been averaged (solid black shading) and for the 1992–93 season the actual rainfall figures are shown (grey shading).

entrance classified as a hollow; of the nine successful nests, five had spout entrances and four had hollow entrances.

In late January–early February seven new nests were found; four of them were close (81-400 m) to failed nests and these new nests all became active after the nearby failed nests had been abandoned (Fig. 2). The other three new nests (17, 37 and 45 in Fig. 2), which were situated long distances (900-2600 m) from known failed nests, were in areas where few observations had been made before 3 February (when we first used the cherry-picker to check nests). Thus, any early nests in these areas would not have been found before they failed in the November–January period.

On 3 February 1993, we used the cherry-picker to inspect some of the nests (some were too high for the cherry-picker and some had not yet been found); we found addled eggs in three of the failed nests and fresh eggs in two of the new nests (Fig. 2). On that day, we saw a pair of adults with a recently fledged young near an empty nest that had been active only eleven days before.

On 15 April 1993, we again used the cherry-picker to inspect five of the new nests (two others were too high). Four of these nests each contained a single chick and the other had failed; both of the new nests that we could not reach still appeared to be active (Fig. 2). Following these nest inspections we continued to see chicks at the entrances to some of the nests for more than a month, with the last sighting being on 20 May (Fig. 2).

Rainfall

The average rainfall for October–January of the 1992–93 nesting season was more than twice that of the combined averages for those months in the years 1988–92 (Fig. 3). The 1992–93 rainfall for each individual month (October–January) also exceeded the average rainfall for each of the corresponding months in 1988–92; however, the greatest differences occurred during October and November (Fig. 3)

Discussion

Defined as the period between egg laying and the fledging of young, the nesting season of the Red-tailed Black-Cockatoo in south-eastern Australia is normally October to March. However, the 1992–93 nesting season extended well into May and this extension appeared related to the starting of nests in January–February in areas where some nests that had started at the normal time (October–November) had failed.

During the four nesting seasons preceding the 1992–93 nesting season only two nest failures had been recorded and no evidence of renesting was found. Climatic conditions during the 1992–93 nesting season were markedly different from those during the four preceding nesting seasons. In particular, rainfall from October to January was unusually heavy and we believe was responsible for the abandonment of nests. Heavy rains may have forced the females off their eggs for long enough to kill the embryos; some females may have continued incubating addled eggs. Over 86% of the abandoned nests had spout entrances that afforded no protection from rain, whereas 44% of the successful nests had entrances in the sides of limbs or trunks and were protected from rain.

We believe it unlikely that breeding pairs were excluding other potential breeders from nesting areas because during the study it was common for pairs of birds to successfully nest close together, in one instance in trees only 42 m apart. Four (nests 33, 34, RW and 41)

of the seven late-starting nests were close (81-400 m) to failed nests. Because of the endangered status of this subspecies, we did not trap or mark any of the breeding birds so we could not be sure that the late-starting nests were renesting attempts by pairs from nearby failed nests. It is possible that the late-starting nests were started by adults that had not nested earlier in the year. This had not happened during the previous four seasons but perhaps some adults did not begin nesting at the normal time in 1992–93 because of the excessive rain. However, the proximity of the failed nests to new nests, as well as the timing of the abandonment of the failed nests in relation to the starting of new ones, suggested that renesting occurred.

There is an indication that not all pairs from failed nests renested in 1992–93. Nests 31 and 32, which started at the normal time, were close (95 m apart) to each other and both failed. Soon after these two nests were abandoned, nest 41 began and subsequently produced a chick (Fig. 2). However, despite frequent visits and searches throughout the area, no other late-starting nest was found. Either one of the two pairs did not attempt to renest or did so at a considerable distance (>1 km) away from the original nest.

The other three late-starting nests (nests 17, 37 and 45) that were distant (900-2600 m) from failed nests were in areas that had not been well searched early in the nesting season. Therefore, it is possible that nests in these areas had started in October–November but had failed and been abandoned before the areas had been thoroughly searched.

It is clear that the late nestings observed in this study were not a result of successful double breeding because most late-starting nests had started well before most normal-starting nests had fledged young. Also, Saunders (1977) indicated that, in the Three Springs area of Western Australia (where double breeding of *C. b. samueli* occurs), there was up to a two month gap between the fledging of a young and the starting of a new nesting attempt. Thus, if successful double breeding was occurring in the population of *C. b. graptogyne* in south-eastern Australia one would not expect the fledging of young from the second nesting to occur until July or August. This never occurred during the five years of our study and we conclude that *C. b. graptogyne* in south-eastern Australia only breeds twice a year when its first nesting attempt is unsuccessful at an early stage (i.e. during or immediately after incubation).

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