Corella, 1989, 13(3): 88-89

NOTES ON THE BREEDING OF THE PACIFIC HERON *Ardea pacifica* NEAR BALRANALD, NEW SOUTH WALES

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Received 1 July, 1988

The Pacific Heron *Ardea pacifica* is a typical day-heron endemic to the Australasian region (Hancock and Elliott 1978). Its biology is poorly known. Recently Marchant (1988) provided his observations on the nesting behaviour of the species. McCulloch (1967) describes a short observation that she made. In an attempt to add more to the published knowledge of this species, data on some aspects of the breeding of the heron, which were collected incidentally to a study of the Glossy Ibis *Plegadis falcinellus* (Lowe 1983), are presented.

METHODS

The breeding was studied at an unnamed freshwater marsh approximately 50 km east of Balranald, New South Wales (34°30′S., 144°04′E.). Pacific Herons were found nesting in live and dead River Red Gums *Eucalyptus camaldulensis* that flanked a semi-permanent creek along the northern perimeter of the marsh. Further details of the habitat are given in Lowe (1983).

The study area was visited at fortnightly intervals from late September until mid December 1981. On 24 October sample nests were selected and nest trees marked with tags. All sample nests were in River Red Gums that could be easily inspected from a boat. Visits to the sample nests were made quickly to minimize disturbance. Observations of other nests in the area suggested that sample nests were representative of nest position, construction and timing of breeding, except that the few nests above ten metres could not be studied.

RESULTS

All nests of the Pacific Heron in the marsh were placed on side branches of the gums. Of the 33 sample nests, 20 were in live trees, 11 in dead trees and for two no record was kept. The heights of sample nests above the water were estimated by eye as the following height intervals: <2 m nil nests; 2-3 m nine nests; 3-4 m 14 nests; 4-5 m two nests; 5-6 m two nests; 6-7 m two nests; >7 m nil nests. The heights of nests below the top of the vegetation of six trees containing nests were 3, 7, 8, 8, 10 and 10 metres. Of the 33 sample nests, 30 were the only known nest in the tree and the other three nests were in the same tree (no other known nests with them). The nests were piles of interwoven small sticks, but a detailed examination was not made.

By using known laying events and hatching dates of clutches, the sample clutches were estimated to have been laid during a six week period commencing around 10 October. On this basis, six, nine and seven clutches were ascribed to each fortnight, respectively, after 10 October, that is, laying in the sample clutches extended more or

less evenly over approximately six weeks. Other Pacific Heron clutches in the marsh were started before and after the sample clutches, but the details of the breeding attempts were not collected.

The contents of nests were examined with a mirror on a pole but eggs were not marked for identification. Clutch size was defined as the maximum number of eggs seen in a nest on at least two consecutive visits. This method should give a slight underestimate of the clutch size as it does not account for the unestimated losses of eggs.

In the sampled nests two to five eggs were observed per nest, the most frequent clutch size being three. Of the 28 nests providing data clutch size was: two eggs 3 times; three eggs 16; four eggs 8; five eggs 1. The mean clutch size was 3.2 eggs.

The interval between laying of eggs within a clutch could not be examined with fortnightly visits. However, for six nests, sample visits fell during both laying and hatching, and incubation was estimated to be about 30 days. Hatching occurred over at least two days, probably more.

The loss of eggs during incubation appeared to be very low, but could not be estimated accurately. However, most clutches (22 out of 30) hatched some young. The fledgling success could only be estimated within fortnightly visits and was defined as the number of young known to be alive at least four weeks after known or estimated hatching for all nests which completed their clutch, and was: no young (failed) 7; one young 1; two young 1; three young 0; four young 1; five young 0. These data may be biased in favour of failed nests because their outcome is more easily determined than successful nests, which must be followed through the entire nestling period. To assess a possible bias, brood size two weeks after hatching was: no young (failed) 6; one young 1; two young 8; three young 6; four young 1; five young 0. Until further studies are made on this subject mean fledgling success is estimated at between 0.3 and 1.8 young per nest with a completed clutch.

DISCUSSION

Hancock and Elliott (1978) and Marchant (1988) have collected what little information there is on the breeding of the Pacific Heron and the data presented here add to that review. My data do not support the notion that dead trees are particularly favoured for nest sites; rather near Balranald live trees were used more frequently than dead ones. These observations support the assertion (Frith 1969) that nesting is not truly colonial but nests are made in groups of adjacent trees. On the contrary, Marchant (1988) found groups of nests in the one tree. At Balranald the common clutch size was three whereas Frith (1969) and Hancock and Elliott (1978) claim four as the usual clutch size. My data on incubation periods are close to Marchant's (1988) estimate of 28-30 days and size of broods at fledging are in the same range as his subjects.

Most breeding parameters of the Pacific Heron fall well within the bounds of a typical day-heron. The incubation period is in the upper end of the range for herons but the significance of this is unknown. The species offers excellent opportunities for study of breeding because the individuals are conspicuous, rather gregarious and do not react badly to human activity near the nest. Detailed studies of all aspects of its ecology are needed for a proper understanding of this species.

ACKNOWLEDGEMENTS

I am grateful to Margaret and Tom Lowe for their generous hospitality and to Tom Lowe and Robert Preston for assistance in the field.

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