Incubation and Nestling Periods of some Australian Birds

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Incubation and nestling periods of Australian birds, particularly small passerines, seem not to have been much studied and in general are not known accurately. Details of incubation and nestling periods, collected for 25 species at Moruya, New South Wales, are presented.

Moreau and Moreau (1940) discussed critically the recording of incubation and nestling periods of birds, pointing out that 'a single visit to a nest each day cannot fix a fledging or incubation period within practically two days (or more)' and recommending that such periods ought to be presented as the mid-points between the extreme limiting times of observation plus or minus half the range of this interval, i.e. 15 days ± 1 day, if appropriate. They went on to record the periods for some tropical African species. Skutch (1945) elaborated the theme of the Moreaus and said that they had broken new ground, not only by their critical approach to a matter of great theoretical and practical importance but also by extending our knowledge of the periods to African and tropical birds. He then presented much data for neotropical birds in the way advocated by the Moreaus. Data on the periods for many species in the Palaearctic were already available in Witherby *et al.* (1938-41) and in contributions by others, e.g. Bletchly (1938).

It seems that the periods for Australian birds are still less accurately known than those of the birds of other regions, except for a few species that have been studied professionally in detail and, even then, the data have not always been presented in the way that the Moreaus recommended; in consequence, one is not always convinced that the periods recorded, e.g. 13 days baldly, have been derived satisfactorily and are not approximate. Since 1975, I have tried to establish the lengths of incubation and nestling periods for as many species as I could near Moruya, N.S.W., and, though I have succeeded with few, it is worth presenting what data I have in the hope of encouraging interest in the subject. Also, the data given may be a guide to the lengths of the periods in other birds of the same genus or related genera for which observations are not available.

Methods

Skutch (1945) remarked on the difficulties and hazards of recording accurate incubation and nestling periods. He and the Moreaus thought that the only proper method was to take the interval from the laying of the last egg of a clutch to the hatching of the last egg for incubation and from the hatching of the last chick to the fledging of the last chick for nestling. I have followed this, even when observing marked eggs, and fortunately at critical times could often inspect nest several times a day, so that not only did I occasionally witness the laying and hatching of the same egg exactly, but often could reduce the limits of observation to a very few hours.

In the species list in Results, the periods of incubation are given in days and hours as the mid-point of the difference between two intervals: (a) from the last observation before the clutch was completed to the first observation of all eggs hatched and (b) from the first observation of the full clutch to the last observation of unhatched eggs, plus or minus half the range in hours between the difference of these two determinations; thus 15.8 ± 6 means a period of 15 days and eight hours plus or minus six hours. The same applies to the nestling period. Most determinations were limited by intervals of less than 24 hours but a few had latitudes of one day or more and for these I always give the period as 15.8 ± 1.3d, for instance. I also give the average of all mid-points recorded for a species (Av.) and the two extreme limits (incomplete clutch and all eggs hatched) of all determinations simply in days and hours. Determinations of periods for marked eggs are given separately from all others, when eggs were not marked.

Close determination of the incubation period depends greatly on the time of laying of the last egg. Like Skutch (1945), I had assumed that birds generally and normally lay before the middle of the morning, except for aberrants like cuckoos, and went even farther and thought that passerines normally lay within an hour or two of dawn. I found, however, that Eastern Yellow Robins, at least for the last egg of a clutch, lay towards the end of the morning and that Eastern Whipbirds lay in the afternoon. Details of laying for these species are given. For both whistlers, both fantails, both thornbills and the Yellow-faced Honeyeater, I found that they lay from just before, to an hour or so after, dawn. For other species, I have assumed laying at or about 08:00 hours.

Results

For convenience in the list, IP = incubation period and NP = nestling period. The number in brackets after each represents the number of determinations.

Wonga Pigeon *Leucosarcia melanoleuca*
Because inspection of occupied nests, if feasible, would probably cause desertion and because events (change-over, feeding, etc.) at the nest occur so seldom, I can record only that at two nests 38½ ± 2½ days and about 39 days elapsed from the time that the adults began to sit until the young fledged. The incubation period is probably about 19 days and the nestling period slightly longer.

Brush Cuckoo *Cuculus variolosus*
IP: 12.21½ ± 5½.
NP: 17.0½ ± 4½. Note that the incubation period was about one day shorter than that of the Grey Fantail, which had been parasitized.

Cicadabird *Coracina tenuirostris*
IP: almost exactly 22 days.
NP: 27.8. Though the nest was too difficult to inspect, I watched it closely from building to fledging of the chick and feel confident of the periods (Marchant 1979).

Eastern Yellow Robin *Eopsaltria australis*
Laying. Of 14 first eggs, two were laid before 07:00 hours; all the rest between 07:00 and 11.00 hours. Second eggs of clutches of two eggs were laid as follows: one between 07:25 and 09:15 hours; three at 09:30, 09:45 and 10:00 hours; one between 10:10 and 11:00 hours; one after 11:15 hours; the seven others between 06:45 and 11:30 hours. Three second eggs of clutches of three were laid: one beteen 07:35 and 09:15 hours, one before 08:30 hours and one between 07:30 and 11:00 hours. One third egg of a clutch of three was laid before 06:45; another after 07:00; another after 07:30; and two others after 11:30 hours. For calculation of incubation periods I have assumed laying at 10:00 hours if I did not know it in close limits.
IP (marked eggs) (7): 15.14 ± 6, 15.19½, 15.21¼ ± 1½, 16.3½ ± 1¼, 16.3¾ ± 2¾, 16.5 ± 2, 16.12¼ ± 6¼; (Av.) 16.1. (Range) 15.8 — 16.18½.
IP (unmarked eggs) (12): 15.0 ± 1d, 15.13 ± 12, 15.14 ± 12, 15.14½ ± 10½, 15.15 ± 7½ (twice), 15.20 ± 2, 15.23 ± 1d, 16.1½, 16.2 ± 2, 16.2½ ± 3½, 16.4 ± 3; (Av.) 15.18. (Range) 14.22½ — 16.23.
NP (3): 11.14¾ ± 1½d, 12.0¾ ± 7¾, 12.21¼ ± 1d; (Av.) 12.6¼. (Range) 10.1 — 13.22.

Jacky Winter *Microeca leucophaea*
IP (1): 17.6½ ± 4½.
NP (1): 18.19 ± 5.

Golden Whistler *Pachycephala pectoralis*
IP (4): 15.3 ± 23, 15.12 ± 12, 16.4½ ± 3½, 17.1 ± 3; (Av.) 15.23. (Range) 14.4 — 17.4
NP (1): 10.10 ± 10.

Rufous Whistler *Pachycephala rufiventris*
IP (4): 13.13 ± 1½d, 13.14¾ ± 11¾, 14.2½ ± 4½, 15.2½; (Av.) 14.2¼. (Range) 12.1 — 15.2½.
NP (1): 10.12½ ± 13½.

Grey Shrike-thrush *Colluricincla harmonica*
IP (1): 16.18 ± 11½ (minimum, calculated from 08:00 hours of day on which three very fresh eggs were found; last egg might have been laid 24 hours earlier, which would make the period one day longer).

Eastern Whipbird *Psophodes olivaceus*
Laying. The second egg of one clutch (all clutches were of two eggs) was laid at about 15:30 hours; two others were laid: betwen 10:30 and 14.30 hours and between 12:00 and 16:00 hours. For the fourth determination of the incubation period I assumed laying at 14:00 hours.
IP (4): 16.15½ ± 2d, 17.15, 17.18 ± 1.2d, 17.20½ ± 6½; (Av.) 17.11. (Range) 14.16 — 18.20.
NP (2): 10.17½ ± 2½d; 10.6½ ± 4½ (left prematurely, when I tried to band the chick).

Rufous Fantail *Rhipidura rufifrons*
IP (1): 14.21 ± 10½.

Grey Fantail *Rhipidura fuliginosa*
IP (4): 13.15 ± 12, 13.17 ± 6½, 13.20¾ ± 11¾, 14.1 ± 2; (Av.) 13.19½. (Range) 13.3 — 14.8½.

Variegated Fairy-wren *Malurus lamberti*
IP (2): 14.0½ ± 3½, 15.16 ± 9; (Av.) 14.20¼.
NP (2): 9.4 ± 3 (probably premature, after banding), 11.18 ± 19.

Brown Gerygone *Gerygone mouki*
IP (3): 18.4½ ± 1.5½d, 18.12 ± 12, 18.16 ±17; (Av.) 18.11. (Range) 16.23 — 19.10.
NP (1): 15.16 ± 12.

Brown Thornbill *Acanthiza pusilla*
IP (7): 17.14½ ± 11½, 18.6 ± 4, 18.7½ ± 2, 18.12 ± 11½, 18.17 ± 6, 19.2¾ ± 2¾, 20.22 ± 12; (Av.) 18.18½ (or 18.10½ if last determination is omitted, because incubation may have been delayed by cold weather). (Range) 17.3 — 21.10 (19.5½).
NP (2): 14.19½ ± 4½, 15.19 ± 4; (Av.) 15.7½.

Striated Thornbill *Acanthiza lineata*
IP (2): 15.17½ ± 8, 16.12½ ± 11½; (Av.) 16.3. (Range) 15.9½ — 17.0.

White-throated Treecreeper *Climacteris leucophaea*
Laying. Once proved before 10:00 at interval of 48 hours; once suspected similarly.
IP (2): 22.2 ± 4, 22.16 ± 6; (Av.) 22.9. (Range) 21.22 — 22.22.
NP (1): 26.9½ ± 8½.

Lewin's Honeyeater *Meliphaga lewinii*
IP (1 approx.): 14 days; two of three very fresh eggs on 10 December had hatched by 24 December, when two young looked to be less than 24 hours old, and the third egg was infertile.

Yellow-faced Honeyeater *Lichenostomus chrysops*
IP (marked eggs) (4): 13.23½ (twice), 14.2 ± 1, 15.0; (Av.) 14.6. **IP** (unmarked eggs) (8): 13.16 ± 13, 13.18 ± 6, 13.18½ ± 8½, 14.1½, 14.2½ ±3, 14.6 ± 5, 14.10½ ± 2½, 14.14½ ± 9½; (Av.) 14.2. (Range) 13.3 — 14.23.
NP (2): 13.0, 13.12 ± 1.6d; (Av.) 13.6.

Yellow-tufted Honeyeater *Lichenostomus melanops*
IP (2): 14.3 ± 4, 14.4 ± 14; (Av.) 14.3½. (Range) 13.14 — 14.18.

New Holland Honeyeater *Phylidonyris novaehollandiae*
IP (1): 13.11½ ± 11½.
NP (1): 12.19 ± 1.14d

Crescent Honeyeater *Phylidonyris pyrrhoptera*
IP (1): 13.13½ ± 10.
NP (1): 13.5 ± 19.

Eastern Spinebill *Acanthorhynchus tenuirostris*
IP (1): 13.17 ± 7.
NP (1): 10.12 ± 1½d.

Silvereye *Zosterops lateralis*
IP (1): 9.17 ± 15½. (One minimum determination: 9.11.
NP (1): 11.9½ ± 15½.

Olive-backed Oriole *Oriolus sagittatus*
IP (1 approx.): 18.5.
NP (1 possible, doubtful): 12d.

Satin Bowerbird *Ptilonorhynchus violaceus*
IP (1): 21.10½ ± 11½.

Conclusion

As will have been noticed, my data almost entirely concern passerine birds and indeed they are more interesting as regards incubation and nestling periods than non-passerines because they have so many endemic forms in Australia. Australian non-passerine landbirds mostly belong to groups better known and more plentiful elsewhere in the world and their incubation and nestling periods are probably similar to those of other species of the same genus or even family overseas, e.g. *Cuculus variolosus*, which has an incubation period apparently very close to that of the European Cuckoo *C. canorus*, though its nestling period is perhaps a week shorter (Witherby *et al.* 1938).

Though incubation periods in one species vary for many reasons, it seems to me that the more accurate the determination the less the variation. Perhaps this is shown by species like the Eastern Yellow Robin, where the mid-points of determinations vary only from 15.0 to 16.12½ for 19 determinations, and the Yellow-faced Honeyeater, where they vary only from 13.16 to 14.14½ for 12 determinations.

Among passerines there are some notable records. The Cicadabird has a long incubation period, as may have all campephagids — remarkably long in fact for any small passerine making an open nest as opposed to nesting in holes or domed nests — and a truly astounding nestling period, which almost matches those of some cotingas (Snow 1970, 1972). The Jacky Winter, also, has periods rather longer than one might expect for a small passerine using a small exposed cup-shaped nest. On the other hand long periods would be expected for species with domed nests (thornbills, Brown Gerygone) and for those nesting in holes like the White-throated Treecreeper; yet, both periods for the Treecreeper seem longer than one would imagine probable, the nestling period particularly so. The poor data for the Olive-backed Oriole seem different from those for the Golden Oriole *O. oriolus* (Witherby *et al.* 1938).

Nestling periods, being more difficult to observe than incubation, have been much less often determined, but the apparent shortness of the period in whistlers and in the Eastern Whipbird is interesting and could be important in regard to the general breeding performance of these species. However, these, and indeed all other determinations of both periods need substantiating with many more accurate observation. I know that there are already many data in the RAOU Nest Record Scheme for these same species and for many others, but I have been unable personally to extract it. It would be a task well worth doing by someone better placed than I.

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