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LEARNING BEHAVIOUR AT THE NEST OF THE COOPERATIVELY BREEDING YELLOW-RUMPED THORNBILL *ACANTHIZA CHRYSORRHOA*.

These observations were made in the Middlesex district of Manjimup in S.W. Australia. The behaviour of Yellow-rumped Thornbills *Acanthiza chrysorrhoa* nesting in an olive tree 2m from the back verandah and overlooked by the kitchen window, has been watched for four seasons. The birds are resident and seen all the year in an area of approximately 10 ha.

Yellow-rumped Thornbills are recorded as cooperative breeders (Immelmann 1960; Ford 1963), progeny of earlier broods assisting at subsequent nests. In nine nests between September 1977 and January 1980 the juveniles from the first brood were fed and tolerated in the nesting area while the female incubated a second clutch, but on hatching were chased from the garden. Whether the juveniles assisted with feeding their siblings after fledging was not known but none was seen at the nest.

On 29 May 1980 a pair, male orange/yellow (O/Y) and female white/red (W/R) began to build, they were a known pair who had been sexed by incubation patch and cloacal examination. On 12 June a third bird was seen carrying material to the nest and was identified as violet/violet (V/V). It was one of two young that fledged on 21 January 1980, from a nest in the olive of O/Y and W/R, the pair now building. At first materials brought by this helper were small and pushed at random into the general fabric, but as building proceeded more

proficiency was acquired in bringing better materials and more often. All the help was given to the male while the female worked alone in the brood chamber. At the end of June V/V was seen weaving material round vertical twigs. On 21 July the female began incubating three eggs in the brood chamber while O/Y and V/V continued adding to the false nest at the top of the already bulky structure above her. The resulting very large false nest at hatching time was almost enclosed at the top. The constructional methods were exactly the same as those used at the commencement of nest building i.e. an open cup nest gradually enclosed to make a circular brood chamber with a small entrance hole. Identified materials used were dried grasses, spider's web, and bark from the vine. Feathers from domestic geese lined the brood chamber.

When the young hatched O/Y brought food for them and V/V flew to and fro with him, but carried nothing, and next day was not seen to take any part, but on the third day after hatching V/V, carrying a very small item, hopped onto a branch slightly below the brood chamber and poked it forward. Being so low the food went into the fabric, a second try had no greater success, and in a third attempt the prey was lost. In another twenty-four hours V/V was perching sideways to the nest entrance, thus a turn of the head was necessary to deliver the food and only if the female was brooding was it taken in

because the young were too small to reach it, V/V persevered and learnt to cling to the nest fabric, pushing head and shoulders inside to deliver food as the adults did. When the nestlings were twelve days old V/V was equalling his parents in rates of feeding and size of prey. The young fledged successfully on 31 August and V/V helped with their feeding away from the nest.

On 29 September 1980 W/R started her second clutch of three eggs in the same nest, they fledged successfully on 9 November. V/V helped assiduously throughout but none of the juveniles of the first brood was seen at the nest, although one, yellow/blue, was frequently seen in the garden.

On 1 December 1980 the first egg of a third clutch was in the nest, and again there were three eggs which hatched on 19–20 December. Nest inspection on 21 December found only one young, and when extracted for banding at seven days it was found to be a Shining Bronze Cuckoo, *Chrysococcyx lucidus*. It fledged on 10 January 1981. As before

none of the juveniles from the previous two broods was seen at the nest, and V/V helped energetically through the cycle.

The advantage to the parents was evident in the help given to feeding the young, both in the nest and after they fledged, and the advantage to the helper was in the experience gained. The helper's contribution to nest building was not meaningful, most of the effort being put into the false nest. Various suggestions have been put forward for the construction by Yellow-rumped Thornbills of a false nest. May we offer another — a practical building apprenticeship for the young.

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DESCRIPTION OF THE NEWLY HATCHED WILLIE WAGTAIL *RHIPIDURA LEUCOPHRYS*

Some passerines are naked at hatching but many have a natal down (of neossoptiles), present mainly on dorsal surfaces. The patches of down do not correspond exactly with the tracts of feathers that develop later but each neossoptile is continuous with, and eventually pushed from its follicle by, an underlying teleoptile or pin-feather (Pettingill 1970 *Ornithology in Laboratory and Field*).

There are few descriptions of newly hatched Australian passerines, perhaps because ornithologists are rarely lucky enough to visit nests on the day the young hatch. This is unfortunate because morphological features of the nestling in its early stages, particularly the patterns of natal down, are potential taxonomic characters that may help elucidate generic and familial relationships among Australian songbirds.

In December 1980 I examined and described two Willie Wagtails *Rhipidura leucophrys* during their first five days in the nest. The nest was 1.3m off the ground in a small Sandalwood *Santalum lanceolatum*, growing against a house near Meandarra, south-eastern Queensland.

The nestlings had not hatched at 07:00 Eastern Standard Time on 5 December 1980 but had at 06:30 the next day (Day 0). At that time Nestling A weighed 2.7g and its tarsus (from notch at ankle-joint to base of folded toes) was 8.5 mm. Nestling B weighed 2.9 g and its tarsus was 8.0 mm long. At 06:30 on Day 4, at the last examination I made, the measurements were Nestling A: weight 9.3 g, tarsus 16.3 mm; Nestling B: weight 9.7 g, tarsus 16.0 mm.

The newly hatched Willie Wagtails had very dark red-black skin, paler on the underside. The natal down was pale brown. Rictal flanges were pale yellow-white and the buccal lining and tongue were orange. The dark grey bill had a black tip, claws were grey and the pale egg-tooth was small and inconspicuous.

Figure 1 shows schematically the down-patches of the neonate Willie Wagtail, but the diagrams are not intended to indicate the precise orientation or size of the patches nor the number of neossoptiles involved. Saunders (1956, *Bird-banding* 27: 121–128) coined the term down-patch and I follow the