

## Observations on the Breeding of Figbirds and Common Koels

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Observations on Figbirds *Sphecotheres viridis* breeding in one locality during 1980-81, 1981-82 and 1982-83, are presented. Observations include methods of nest building, incubation and rearing of young. Dates of laying, hatching and fledging were also noted. Parasitism by Common Koels *Eudynamys scolopacea* occurred in each year and was included in the study. Breeding success appears to have been affected by the unusually dry conditions of the last two summers.

In the Pioneer Valley, west of Mackay, Queensland, land is cleared and levelled wherever possible for sugar cane farming. Only steep slopes and gullies are left to carry trees or undergrowth. The Pleystowe Sugar Mill grounds extend from a main road to the banks of the Pioneer River, containing a large industrial complex within parks and gardens which are in places 100 years old.

The factory, powerhouse and associated buildings cover approximately three hectares in area. Marshalling yards for mill tramways, which supply the factory, constitute another two hectares and spray ponds for cooling water a further two hectares. These areas are in use 24 hours per day, at least six days a week and brightly floodlit at night. Despite the traffic and noise of the working area, large numbers of birds live and breed throughout the grounds. Large flocks of Figbirds are present and nests are frequently situated very close to the working areas.

### Methods

For three years a regular programme of searching for nests and recording of summer breeding behaviour has been undertaken over an area of 25 hectares of the sugar mill grounds. This area was walked every two to three days searching all trees and following birds carrying nest material or food. Binoculars (8 x 40) were used to observe details of behaviour and progress of the nesting cycle. Contents of nests were monitored using a mirror on a six metre pole.

The angle of the mirror was adjustable and the pole consisted of three sections suitable for transport by bicycle. Estimation of nest height was assisted by marks at one metre intervals on the pole. Nevertheless, many nests were beyond the reach of the six metre pole at full arm height. Records refer only to nests where eggs were laid and the data submitted to the RAOU Nest Record Scheme.

### Results

#### *Non-Breeding Season*

In the non-breeding season flocks of Figbirds at times containing a few Olive-backed Orioles *Oriolus sagittatus* and Black-faced Cuckoo-shrikes *Coracina novaehollandiae*, were observed to congregate on fruiting trees and systematically strip them. A morning feeding session is generally followed by a quieter time of preening and resting. A further intensive feeding session occurs from 16:00 hours onwards. During this afternoon session, birds have been observed to fly either from branch to branch or even to adjacent trees in a swift, repeated, criss-crossing fashion. No conflict over food is apparently involved and the purpose of this display is not clear. Flocks favour various species of native and introduced fig trees, Umbrella Trees *Schlefflera actinophylla*, Alexandra Palm *Archontophoenix alexandrae*, Brazilian Cherry *Eugenia uniflora* and Guava *Psidium guajava*.

Towards late October, brightly coloured male birds sing on prominent high perches in order

to attract potential mates. Trapping in mist nets for banding\* yields more females than males on first appearances. However this result is misleading because of the presence of immature males in female type plumage and also by the habit of males to follow slightly behind the females. Seeing the female enmeshed males were observed to detour sharply to avoid capture.

### Nesting

Nests have been found in a wide variety of trees including figs *Ficus* spp, Giant Bamboo *Bambusa arundinacea*, *Cassia*, *Peltophorum inerme* and Mango *Mangifera indica*. Heights of nest may vary from two metres to beyond seven metres with most nests being in the upper canopy. At the commencement of nesting many of the nest sites are completely exposed due to spring leaf shedding. Nevertheless, the new growth provides progressively increasing cover.

Female birds, flying a rapid direct line to the river bank beyond the gardens gather thin vines and grasses for nest construction. Long strands of grass and vine are tied to the tip of branches having a horizontal fork. When the basic suspended shallow cup has been constructed further strands are laced through it to form an open weave basket. Some females were seen to use material from abandoned nests and one nest was re-used at a later date. No lining is added and eggs may often be seen through the thin base.

### Eggs

Figbird eggs are generally 32 mm x 24 mm (Beruldsen, 1980), dull apple green in colour with dark brown spots and blotches. This colour may fade with exposure. Koel eggs are slightly larger (34 mm x 24 mm) (Beruldsen, 1980), pale salmon-pink, marbled with reddish and violet-grey especially at the large end. The usual clutch size of the Figbird is two-three eggs, although one (unsuccessful) nest was found with four eggs. Koels usually lay only one egg in each nest parasitised.

### Egg Laying

Egg laying by Figbirds does not commence immediately on completion of nest construction. Both birds occupy it in turn for trial periods of about a week prior to laying. When laying commences the female occupies the nest only for the actual laying, leaving the male to occupy and guard it for the rest of the day. At night, females occupy the nest throughout the nesting period. Eggs are laid at daily intervals generally between 10:00-12:00 hours. Males continue to sit for several more days before each female settles to incubation. Perhaps this allows females time to replenish their energy levels.

Koels parasitising nests may lay on any of the three days or several days after the Figbirds have commenced laying.

### Incubation

Male and females share incubation throughout the nesting time. One pair was observed to change throughout the afternoon at intervals of 15-30 minutes. Male birds are generally more easily disturbed from the nest and nests are defended vigorously and noisily. Nesting neighbours generally join in the mobbing action. One pair of birds was able to differentiate between the intruding mirror and its bearer who was regularly attacked on approaching the tree. Efforts were made to space inspections so that the least disturbance occurred as it was feared that interference might have a detrimental effect on nest success.

### Predation and Parasitism

Predation was not observed directly at any of the nests but suspicion fell on the local Laughing Kookaburras *Dacelo novaeguineae* when all nests close to their nesting hollow were robbed of eggs and young within a day of the kookaburra eggs hatching. Broken eggs were found beneath some Figbird nests and many nests lost one or all of their eggs. No unhatched eggs were found in abandoned nests.

Where koels parasitised Figbird nests the total number of eggs did not exceed three, that is, the koel presumably removes one of the Figbird's eggs. Further, within the study area young koels were found only in Figbird nests, often occurring in the same nest location in successive seasons.

\* Bands used were provided by the Australian Bird-banding Scheme, Division of Wildlife and Rangelands Research, CSIRO.

### *Hatching*

Hatching occurs at daily intervals, commencing 16-17 days after the first egg has been laid. Young Figbirds hatch naked and develop a juvenile plumage similar to the adult female with a bright orange-pink gape. Newly hatched koels are likewise naked with a similar orange-pink gape.

### *Feeding*

Both parents feed nestlings and remove faecal sacs. Birds have been seen to feed young on fruit and berries which are regurgitated. On one occasion the food consisted of green caterpillars. Figbird nestlings solicit feeding with the usual wing quivering and neck stretching but koel chicks behave in a more aggressive and noisy manner. At times koels will jump up and down, and scramble on to the edge of the nest to pursue foster parents. Where nests are found to contain only one active constantly begging chick, it is usually a koel.

### *Development of the young koels*

The Figbird nestlings are usually ejected from the nest within a day of the koel's hatching. Koel chicks progress at a different rate to that of the Figbirds. At 16-17 days of age a Figbird chick resembles an adult female with a short tail and is capable of leaving the nest. In contrast koel chicks at this age were seen feathered only on the wings, with tiny tufts on the back of the head, throat and tail. These birds were still in the nest 28 days after hatching.

Male and female koel chicks fledge with a similar pale juvenile plumage. Both sexes progress rapidly to a darker plumage similar to, but still distinguishable from the adult female form. From this stage the male becomes more noticeable as the black male plumage replaces the previous one, progressing from the crown over the nape, back and upper wing coverts. It is not known if the complete adult plumage has been attained when dispersal commences, as young birds at this stage are independent, quieter and move higher into the trees.

### *Fledging*

Young Figbirds begin to leave the nest about 17 days after hatching with movement away from the nest being gradual. It is common to see them perched on the edge of the nest for a day or two before moving out to nearby branches in the day time. At night they return to the

nest. Adults continue to feed young after they begin to fly and in a different locality, adults in addition to the parents have been seen to feed juveniles.

This is certainly the case with young koels which demand attention aggressively. Young koels are larger and generally more conspicuous than Figbirds of the same age. Scrambling along branches rather than flying, koels range over a fairly wide area, accepting food from any nearby bird responding to their continual calling. Young koels appear to remain in the nesting area for about a month after the adult birds commence autumn migration.

### *Nesting Data*

Details of the nesting of Figbirds from the three years are summarised in Table 1. In 1980-81 the first egg was laid on 13 November 1980. Eggs were laid in a total of 19 nests observed; hatching occurred in 15 of these. Six nests were parasitised by koels with five koels hatching and all of these fledging successfully. Another six nests produced 15 Figbirds to fledging.

In the 1981 summer many nests had been commenced by 1 November. The first egg was observed on 12 November. On 14 November there was a wild electrical storm with strong winds and heavy rain. Many nests were destroyed before egg-laying and in three others the entire clutch was lost. Some birds continued incubation but in that season all the eggs were lost before hatching in at least 11 nests. In nine more nests young died or were eaten by predators. From six remaining nests, 11 young; ten Figbirds and a koel, fledged successfully.

In two other nests koel eggs were laid. One koel egg was lost nine days after laying although the Figbird eggs remained and in the other, all three young hatched and were still alive four days later. Unfortunately these nests were not observed further and the outcome is not known. It is presumed the koel survived as a koel chick of appropriate age was resident in the area a month later but these nests are not included in the data given in Table 1.

When the 1982-83 breeding season commenced, the district was in the grip of its second full year of drought. Only 16 nests were recorded for the entire season, the first egg not being laid until 21 November. Hatching occurred in

TABLE 1

Details of the nesting success by Figbirds and Common Koels at Pioneer Valley, Queensland during the 1980-81, 1981-82 and 1982-83 breeding seasons with tabulated rainfall data.

Year	Date 1st Egg	Number of Nests				Number of Young Fledged		Breeding* Success Figbirds
		Laid	Young Hatched	Young Fledged	Parasitised by Koels	Koels	Figbirds	
1980-81	13 Nov	19	15	12	6	5	15	$\frac{15}{19} = 0.79$
1981-82	12 Nov	26	15	6	5	1	10	$\frac{10}{26} = 0.38$
1982-83	21 Nov	16	9	5	2	1	6	$\frac{6}{16} = 0.38$

\*Breeding success measured as number of young fledged/clutch commenced.

#### Rainfall Data

	Annual total (mm)	Quarterly total preceding breeding (mm)
1980-81	1 169	70.8
1981-82	1 743	26.8
1982-83	1 089	34.4

nine nests and from five nests six Figbirds reached fledging. During this season only two of the nests contained koels and one of these left the nest successfully.

Usual causes of loss of young Figbirds were predation (probably by other birds), storm damage, ejection by koels, and premature departure from the nest. In several cases dead young birds were found dangling below the nest. Parents continued to defend these young for at least a day afterwards.

#### Discussion

In normal seasons breeding ceases with the onset of the wet season in January. During dry years birds have extended breeding attempts by about a month and in 1982, two young birds fledged successfully on 6 February.

This survey was carried out in a garden environment where permanent water from both human activity and the Pioneer River is freely available. Figures recorded at Pleystowe Mill show an average annual rainfall of 1 730 mm over the period 1939-1982. For the three years of the study the annual rainfall totals were 1 169, 1 743 and 1 089 mm respectively. However, rainfall for each of the three July to September quarters, immediately preceding the breeding season was 70.8, 26.8 and 34.4 mm respectively, compared to the 44 year average of 75.3 mm.

If breeding success is calculated as the number of young fledged per clutch commenced, a sharp decrease can be seen from the first to the following two seasons. Although there were less birds breeding in the third year the breeding success was identical to that for the second year. Perhaps this reflects less competition in foraging between active breeding pairs. Since the overall number of koels in the survey is low, no attempt has been made to calculate breeding success for koels but the results appear similar. This is not surprising since koels were found only to parasitise Figbird nests in the study area.

Certainly the reasons for the reduced nesting success in both Figbirds and koels are outside the scope of this study. However, it does seem that the presence of localised permanent water is not sufficient to ensure maximal nesting success. Rather, the poor breeding results for the two drought years may simply reflect an overall reduction in the available food supply both prior to and during the breeding season.

#### Acknowledgements

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#### Reference

- Beruldsen, G. (1980), *A Field Guide to Nests and Eggs of Australian Birds*, Rigby Publishers Limited, Adelaide.

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