Did you know that:

- There are eleven species of cuckoos in Western Australia. Four of these visit the Perth region each year, one frequents the inland and the remaining six are found in the Kimberley. All except the Pheasant Coucal are brood parasites.
- Most cuckoos are migratory. On our Gooseberry Hill Study Area near Perth, Shining Bronze-Cuckoos arrive each year in July or August (Figure 1) and most will have departed for their non-breeding areas in Indonesia by the end of November. Fantailed Cuckoos arrive earlier (May-June) and retreat to southern Western Australia in October. Movements by the other two species are much more erratic. The Pallid Cuckoo visits our area during winter and spring, sometimes for the whole period, in other years for just a few weeks. On the other hand, Horsfields Bronze-Cuckoos are numerous in some years, and rare or absent during others (Figure 1).
- Cuckoos have zygodactyl feet. Zygodactyl means two toes pointing to the front, and two pointing toward the rear, a characteristic that cuckoos share with parrots. Cuckoos also have prominent rounded nostrils and long pointed wings. In flight the larger cuckoo species can sometimes be mistaken for raptors. They also have an unusual diet showing a strong preference for hairy caterpillars, which other birds usually avoid.
- Parasitic cuckoos never raise their own young. Instead, they rely on a host species to incubate their eggs and feed their

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CUCKOOS

by Michael and Lesley Brooker

Figure 2. Horsfield's Bronze-Cuckoo removing a host egg after laying in the nest of a Splendid Fairy-wren at Goosberry Hill (drawing from videoclip, artist Belinda Cale).

offspring. When the female cuckoo is ready to lay, she searches for a nest of her favourite host species that is at a suitable stage of incubation. She then lays her own egg in the nest, at the same time removing one of the host's eggs. On four occasions we have watched Horsfield's and Shining Bronze-Cuckoos in the act of laying. Figure 2 is a sketch made from a video-recording of a Horsfield's Bronze-Cuckoo laying in the nest of a Splendid Fairy-wren on Gooseberry Hill. The whole procedure took less than 10 seconds.

- Cuckoos are cunning. The female cuckoo lays her egg in the early morning, shortly after the host has laid one of her own eggs. If she lays before the host has started her clutch, the host female will bury the cuckoo egg under the nest lining and it will fail to hatch. If the cuckoo lays well after incubation has begun, the cuckoo nestling will hatch after the host young and so will receive insufficient food for survival.
- Cuckoo eggs are adapted toward the eggs of the host. In some cuckoos, the eggs are mimetic, which means they match the host eggs in colour and pattern. On Gooseberry Hill, we sometimes had difficulty in spotting a Horsfield's Bronze-Cuckoo egg in nests of Splendid Fairy-wrens and Western Thornbill nests (Figure 3a). However, close inspection shows that the cuckoo egg is usually more elongated. In other cuckoos, the eggs are not mimetic but cryptic. This means that the cuckoo egg is difficult to see against the background of the nest. One example is the Shining Bronze-Cuckoo which lays a dark olive green egg, while its host, the Yellow-rumped Thornbill lays white eggs (Figure 3b). We know from experience that Shining Bronze-Cuckoo eggs are

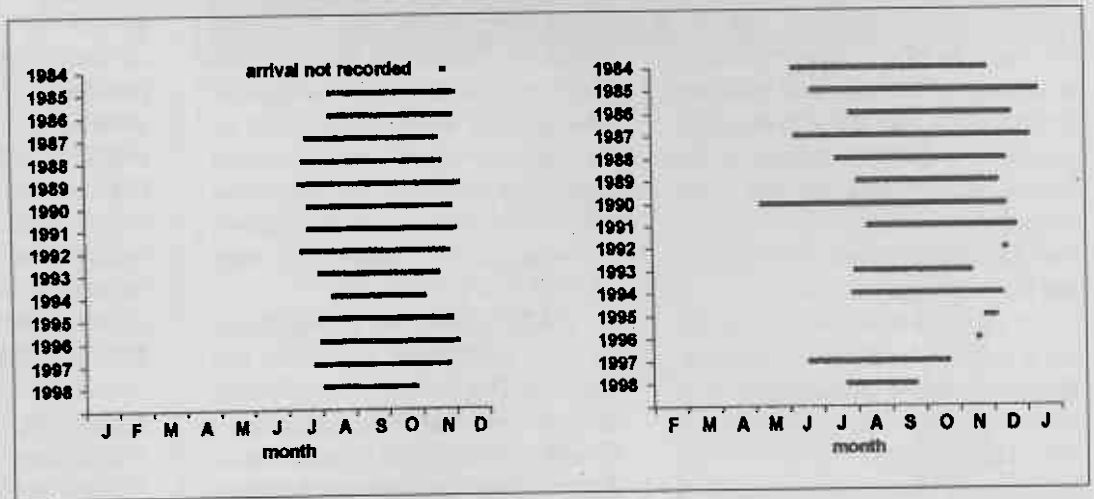

Figure 1. Arrival and departure dates for Shining Bronze-Cuckoos (left) and Horsfield's Bronze-Cuckoos (right) at Gooseberry Hill, WA.

extremely difficult to see in the dark interior of a thornbill's nest.

- Cuckoos lay eggs that are smaller than expected for the size of the bird. This allows them to parasitize species much smaller than themselves. The advantage is that, once hatched, the nestling cuckoo will grow faster than the host young and will have no trouble in dealing with its nestmates! Cuckoo eggs also have a shorter incubation period than their hosts, which means that the cuckoo egg usually hatches before the host eggs.
- Nestling cuckoos know how to survive. Even though the cuckoo is blind and naked when it hatches, within a day it usually manages to eject all of the remaining host eggs or newly hatched host young from the nest. By manouvring the egg or chick onto its slightly concave back and using its outstretched wings for balance, the nestling cuckoo clambers backwards up the side of the nest and deliberately tips its cargo over the rim. The foster parents never seem to intervene and completely ignore their own offspring once they are outside the nest. Now the sole occupant of the nest, the cuckoo has the undivided attention of its hosts for the rest of the brooding period and for a 2-3 week fledgling period.

As you can see, cuckoos possess an amazing array of adaptations to cope with their parasitic way of life. So amazing, that observers of natural history have not always been believed. The first published account of a nestling cuckoo ejecting its nest mates, made in 1788 by Edward Jenner (famous for his discovery of vaccination), was initially disbelieved and the paper rejected by an incredulous Royal Society in London.

Not all the mysteries have been resolved. Our studies of cuckoos on Gooseberry Hill and elsewhere in Western Australia have produced results which do not always fit the theories of the numerous overseas experts. This applies particularly to

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Figure 3a. One egg of Horsfield's Bronze-Cuckoo (bottom) with two eggs of Splendid Fairy-wren (top).

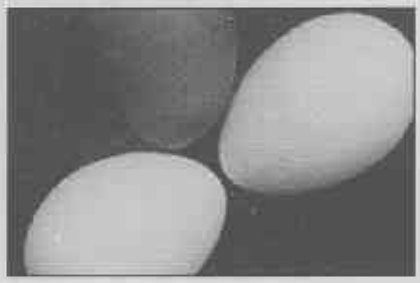

Figure 3b. One egg of Shining Bronze-Cuckoo (top) with two eggs of Yellow-rumped Thornbill (bottom).

explanations for the evolution of egg mimicry and egg crypsis. In the Northern Hemisphere, cuckoos lay eggs which closely resemble those of their preferred hosts and most of these hosts have been shown to be rejectors; i.e. the host will either desert or remove the cuckoo egg from the nest. Thus the mimicry can be interpreted as a cuckoo adaptation for countering host rejection. In our studies, however, we found the same mimicry by Horsfield's Bronze-Cuckoo of its hosts egg types, but none of the hosts species that we studied showed any rejection of foreign eggs, even when we added dummy eggs painted blue with conspicuous polka dots. One explanation could be that, in some Australian cuckoos, the mimicry is due to selection by competing female cuckoos, who remove one host egg when they lay. In other words, the mimicry is a cuckoo adaptation for out-smarting other cuckoo females. This would explain both the mimicry and crypsis in Australian cuckoos, since the crypsis could be the result of competing female cuckoos being unable to detect dark cuckoo eggs in dimly-lit domed-shaped nests.

During our detailed study of cuckoos and their hosts, we found that, on Gooseberry Hill, 22% of Splendid Fairy-wren's nests were parasitised by Horsfields Bronze-Cuckoos, as were 8% of Western Thornbill nests and one or two Scarlet Robin nests. Shining Bronze-Cuckoos preferred Yellow-rumped Thornbills as hosts (32% of nests) but also parasitised 5% of Western Thornbill nests. Fantail Cuckoos usually laid in the well-hidden nests of White-browed Scrubwrens, and occasionally in Inland Thornbill nests. We have no records for Pallid Cuckoos laying on Gooseberry Hill. Their favourite hosts are the larger species of honeyeaters. At Wyalkatchem, in highly fragmented habitat, 20% of Blue-breasted Fairy-wren nests were parasitised by Horsfield's Bronze-Cuckoos.

The wrens and thornbills are usually able to cope with these high rates of parasitism, as they have long breeding seasons, allowing them sufficient time to renest after raising a cuckoo. Female wrens will sometimes start building a new nest while the other members of her group look after her newly fledged cuckoo!

We now maintain a database, recording any report of parasitism by a cuckoo in Australia. This can be viewed on our Website www.users.bigpond.com/LesMikeBrooker/cuckoos.htm Please send us your own observations. A copy of our publication "Cuckoos Hosts in Australia" is available on request.

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