



ScienceWatch-An Avian Arms Race

There is an arms race going on right now in Australia. Three groups are competing for the upper hand and how it will end no one knows. Not to worry, the combatants are three bird species. One is a lovely passerine named the superb fairy-wren (*Malus cyaneus*). It lives in Australia and builds its hollow, football-shaped nest on the forest floor where it lays several white eggs with dark red speckles. Unfortunately for the fairy-wren, females of two cuckoo species seek out its nest to lay their own egg in it as well. One cuckoo species, the Horsfield's bronze-cuckoo (*Chrysococcyx basalis*), specializes in parasitizing fairy-wrens. The other cuckoo species, the shining-bronze cuckoo (*Chrysococcyx lucidus*), is an occasional parasite. The egg of the specialist cuckoo closely resembles the fairy-wren's egg, while that of the other cuckoo does not. In the dark nest it doesn't seem to matter, neither egg is seen as foreign. The fairy-wren will only abandon the nest if she sees the cuckoo lay her egg there. Upon hatching, the cuckoo chick evicts the eggs and chicks of its host; the poor fairy-wren parents end up feeding a monster, much larger than them, and losing their own brood as a reward.

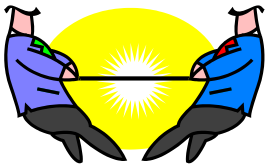
Bird species around the world have been duped into raising cuckoo chicks for millennia. In response, some host species have learned to recognize the cuckoo egg and toss it out even when it closely mimics theirs. However, once the egg hatches, the host parents feed the chick, failing to realize it is not their own. Writing in the March 13, 2003 issue of *Nature*, a team of naturalists headed by Naomi Langmore at the Australian National University in Canberra, show that in the case of the fairy-wren the combat has reached a new level. While, the fairy-wren is not good at detecting foreign eggs, it has apparently learned to recognize cuckoo chicks as imposters.

Langmore *et al.*, manipulated clutches so that after hatching, fairy-wren nests contained either a lone Horsfield's bronze-cuckoo chick, a lone shining bronze cuckoo chick or a fairy-wren chick. Female fairy-wrens faced with a single shining-bronze cuckoo chick deserted it every time, while those confronted with a Horsfield's bronze-cuckoo, the specialist, abandoned it only about half the time. Under the conditions of the experiment no single fairy-wren chicks were deserted by these females.

Since the infrequent fairy-wren parasite (shining-bronze cuckoo) was routinely abandoned while the specialist parasite (Horsfield's bronze-cuckoo) was deserted less frequently, the latter must have a way of overcoming the fairy-wren's ability to recognize a foreign chick. Visual cues didn't seem to matter, since the less successful cuckoo chick closely resembled the fairy-wren chick, while the more successful cuckoo chick did not. So the team collected sonograms of begging chicks from each species. They found that Horsfield's bronze-cuckoo chicks could closely mimic the "cheep-cheep-cheep" call of the fairy-wren chick. In contrast, the shining-bronze cuckoo chick produced a raspy, un-wren-like call that became increasingly different from fairy-wren calls as chicks grew

older. Thus, the Horsfield's bronze-cuckoo has learned how to fool the fairy-wren, while the shining-bronze cuckoo has not.

These results show that the fairy-wren and its cuckoo specialist (Horsfield's bronze-cuckoo) are locked in a coevolutionary arms race. The cuckoo evolved to lay an egg that closely resembles the host's. The fairy-wren countered by learning to recognize cuckoo chicks and leaving them to starve. This works against one cuckoo species, but not the other because the Horsfield's bronze-cuckoo has counter attacked with a new weapon, learning to mimic the call of its host. These parasite-host contests are continually playing themselves out in nature and are good examples of evolution in action. Hosts evolve defenses against cuckoos and cuckoos retaliate with new weapons, finding better ways of tricking their hosts into rearing them. This is one war that will never end.



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