

Natural born killers

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(PhysOrg.com) -- Only a few days old and still blind and naked, chicks of the African greater honeyguide kill their newly hatched foster siblings in order to eliminate competition for parental care, new research from the University of Cambridge has found.

Honeyguides are brood parasites, cheats of the bird world that exploit the parental care of other [birds](#) to raise their young. Cuckoos are well-known examples, but parasitic behavior has separately evolved in several other groups of birds too.

Honeyguides are celebrated for their unique [cooperation](#) with humans, whereby they guide honey-hunters to bees' nests and exploit the humans' use of fire and tools to gain access to their favourite food, energy-rich [bees'](#) wax. But new research from Cambridge, published today (07 September 2011) in the Royal Society journal *Biology Letters*, has confirmed that honeyguides have a much darker side as unusually brutal brood parasites.

Honeyguides hatch from the egg already equipped with a pair of needle-sharp hooks at the tips of their beaks. It has long been inferred that they use these to kill the chicks of their hosts (often bee-eater birds) since maimed host young had been found alongside honeyguide chicks, but this behaviour had never been observed under natural conditions in host nests.

“This was very intriguing, so we buried infra-red video cameras within the hosts' underground nests to see what happened,” said Claire

Spottiswoode, the lead author of the paper. “While the apparent violence with which young honeyguides attacked their newly hatched foster siblings was quite shocking at first sight, it shows the power of evolution to shape amazing adaptations in parasites.”

The scientists have provided graphic video evidence of the honeyguide chicks’ behaviour, showing how they repeatedly grasp, bite and shake chicks of their host family until they eventually die. This behaviour occurs in pitch darkness because the most common hosts at the authors’ Zambian study site, little bee-eater birds, nest in underground tunnels, usually dug into the roofs of abandoned Aardvark burrows.

“The killing behaviour is actually the culmination of a sequence of specialised adaptations that ensure that the young honeyguide has sole access to the food the host parents bring to the nest,” said Dr. Spottiswoode. “The honeyguide mother ensures her chick hatches first by internally incubating the egg for an extra day before laying it, so it has a head start in development compared to the host, and she also punctures host eggs when she lays her own. But some host eggs are overlooked or survive puncturing, and it is these eggs that precipitate chick killing by the young honeyguide as soon as they hatch.”

Because the honeyguide hatches first, it has grown to about three times the weight of a hatchling bee-eater by the time it sets about killing it. The research showed that just one to five minutes of active biting time was enough to inflict sufficient injuries to cause host death. However, after maimed chicks stopped moving honeyguides often ceased their attacks and, as a result, hosts sometimes took over seven hours to die.

Host parents are apparently blithely unaware of what is happening and, in the darkness of their burrows, even attempted to feed a honeyguide chick busy attacking their own young. The researchers also filmed one instance of the honeyguide biting its foster parent by accident. By the

time the honeyguide emerges from the burrow after about a month of assiduous care by its foster parents, however, its bill hook has grown out and there is no trace of its siblicidal beginnings.

“This behavior is exactly analogous to that of young cuckoos, which hoist host eggs or chicks onto their backs and tip them over the rim of the nest. But because honeyguide hosts breed in tree holes or underground burrows, honeyguides can’t eject host chicks and have instead evolved this highly effective killing behavior to make sure that they alone monopolise the nest. Each time brood parasitism has evolved we see specialised adaptations for parasitic exploitation, which are no less astonishing for being sometimes rather gruesome.”

Provided by University of Cambridge

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