one good turn

Exploring honeyguide–human mutualism

TEXT & PHOTOGRAPHS
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above *Honey-hunters searching for honeyguides in Niassa National Reserve, Mozambique.*

previous spread *Yao honey-hunter Orlando Yassene holds a male Greater Honeyguide temporarily captured for research in Niassa.*

BENEATH THEIR modest appearance, honeyguides are intriguingly bizarre birds, and none more so than the Greater Honeyguide. Its scientific name, *Indicator indicator*, tells you much of what you need to know about it.

Much, but not all. Like all 17 honeyguide species, the Greater Honeyguide begins life in a brutal and bloody fashion in the nest of another bird. In the case of the Greater Honeyguide, the victim is typically a bee-eater, kingfisher, hoopoe or wood-hoopoe, nesting deep within an underground burrow or a tree cavity.

The honeyguide chick hatches surrounded by the decomposing remains of one or more of its host's eggs that have been punctured by its mother, killing the embryo within. Some eggs are laid after the honeyguide female lays her own, however, and others manage to hatch despite the damage to their protective shell.

Unfortunately for the hosts, natural selection has equipped the honeyguide chick with the means to remove any competition for its parents' care. It hatches already armed with a pair of needle-sharp, translucent hooks at the tip of its beak. Blind, naked and weighing only three or four grams, it lashes out in the dark as soon as it senses movement alongside. It bites down on whichever body part it hits first, grasping tight and shaking its victim like a terrier shakes a rat. After each frenzied bout, it pauses to recover from the exertion before stirring into life again some time later.

My colleagues and I have been studying honeyguides in southern Zambia since 2008 and have filmed this behaviour in many hosts' nests. Our infra-red cameras, buried underground alongside the nest chamber, have revealed that host young can take anything from a merciful nine minutes to more than seven hours to die. Mission accomplished, the honeyguide chick now has a monopoly on all the food brought to the nest. The host parents will blithely proceed to feed the impostor in the darkness, even while it savages their own offspring. A month later, the honeyguide fledges from the nest, its bill hooks long since vanished and its handsome yellow and green plumage showing no trace of its bloody start to life.

And then Mr Hyde switches to Dr Jekyll. The Greater Honeyguide is a master of cooperation as well as exploitation and deceit. As most birdwatching or rural-living African people know, the Greater Honeyguide (and, as far as we know, no other species) has a sweeter side. Another of the honeyguide family's peculiarities is that its members all specialise in eating wax. Wax is a lipid and therefore rich in energy if you're able to digest it; most vertebrates can't, but honeyguides can. We don't yet know for certain how honeyguides are able to do this, but what we do know is that they use humans to get it.

REPORT YOUR SIGHTINGS

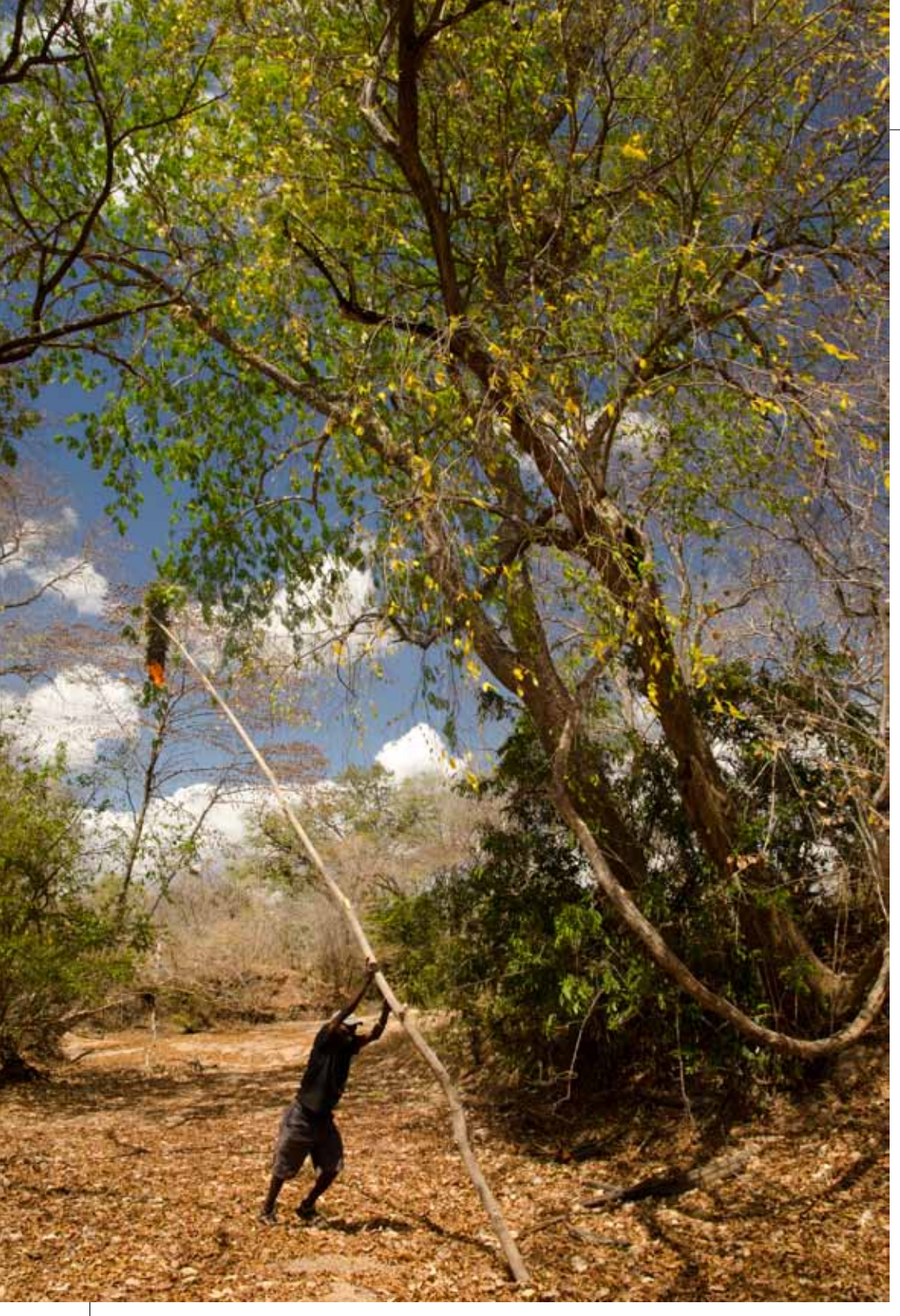
Have you seen a Greater Honeyguide? Did it guide you? Your sightings are valuable for our research, so please submit all your Greater Honeyguide sightings to *www.honeyguiding.com*. There you will also find more information about this citizen science project, which is being conducted in collaboration with the Animal Demography Unit at UCT.

Honeyguides are brilliant finders of wild bees' nests, both honeybees and the tiny stingless bees that will have infuriated you by sipping at the corners of your eyes on a sweaty savanna day. Again we don't know how the honeyguides do it, but their disproportionately enlarged olfactory bulbs suggest that smell may well be involved, probably aided by vision and hearing. But there's a snag. Honeybee nests are usually hidden in tree cavities high in the canopy and are defended by swarms of bees that can – and do – kill honeyguides by stinging them. In short, honeyguides know where the bees are, but can't get at the wax. Humans know how to get at the wax, but we're not nearly as good at finding bees. So Greater Honeyguides enlist our help and, it turns out, we enlist theirs.

Greater Honeyguides approach and beckon people with a special chattering call, then fly from tree to tree in the direction of the bees' nest, indicating its location to a human follower. The honey-hunters track the bird's call through the trees, typically for several hundred metres. When the bird stops and its chatter dwindles, the honey-hunters know that they are close. They scan the branches above, occasionally hitting tree trunks with their axes to provoke the bees into emerging and revealing their location. The nest found, the humans provide their part of the deal, and precisely how this unfolds seems to vary subtly among cultural traditions in different parts of Africa.

For the past three years, together with a honey-hunting community of the Yao ethnic group in northern Mozambique, I have been studying honeyguide–human cooperation. This community lives in the beautiful Niassa National Reserve, a wilderness the size of Denmark where people and wildlife coexist and, in the case of the Greater Honeyguide, cooperate. Here, Yao men are superb honey-hunters and loyal collaborators with the Greater Honeyguide, which they call the *sego*. When a *sego* shows them a bees' nest, the men gather dry wood, surround it with big bunches of green leaves and shape it into a duffle-bag-like bundle securely bound with strips of bark or palm frond. They then find a slender sapling with a >

Orlando Yassene chops open a wild bees' nest in a felled tree in the Niassa National Reserve (top), then harvests the honeycomb (above).



Orlando Yassene hoists a bundle of burning dry sticks and green leaves up to a wild bees' nest in Niassa in order to subdue the bees before harvesting the honey.

natural fork at just the right height, chop it down, jam the bundle into the fork, set it alight and hoist this billowing torch high into the tree until it lies alongside the bees' nest. The smoke causes the bees to desert their nest and gather in a tight swarm on a nearby branch. With the swarm thus subdued, the men can continue their work, only occasionally having to swat a particularly zealous bee. These few stings are a small price to pay for the prize that awaits.

The men fell the tree with their axes and expertly chop open the bees' nest to expose the honey for themselves, filling buckets with oozing comb while gorging on the best bits as they recover from their exertions. In so doing, they expose food for the bird. Plenty of wax is left behind, either as dry combs containing no honey or as chewed lumps spat out by the honey-hunters. Many Yao honey-hunters even make a special effort to gather up the wax and present it to the honeyguide on a little bed of fresh green leaves; they make a point of respecting the *sego*. When the men depart, the honeyguide quietly flies down to feed. Our camera traps have shown that several Greater Honeyguides usually join in and benefit from the men's efforts, as do other honeyguide species such as the Lesser and Scaly-throated.

Thus the bird exchanges its knowledge for the humans' skills, to mutual advantage. This remarkable cooperation was first scientifically documented by Dr Hussein Isack, working in Kenya in the 1980s. I remember as a child being transfixed at Dr Isack's account of it during a Cape Bird Club lecture when he visited South Africa in the early 1990s.

Where I now work in northern Mozambique, Yao honey-hunters rely on cooperating with honeyguides to find a large proportion of the honey that they eat and sell. In so doing, they also provide a dependable supply of wax to Niassa's honeyguide population. So both livelihoods appear to be greatly enhanced by this collaboration. But a fascinating phenomenon takes this association a step further: Niassa's honey-hunters signal to honeyguides, and the honeyguides seem to understand them.

In the Niassa region, the Yao honey-hunters seeking and following honeyguides make a special sound, a loud trill followed by a grunt ('*brrrrr-hm*'). If you ask them why, they'll tell you that they learnt it from their fathers and that it is the best way to attract a honeyguide and to keep its attention; it tells the bird that you are its friend. The men make this sound only when interacting with honeyguides, so from a honeyguide's perspective, the call reliably signals that the person making it is serious about honey-hunting and that a reward is likely to result if the honeyguide offers its cooperation.

left *A honey-hunter eating part of the harvest from a wild bees' nest.*

below *Yao honey-hunter Musaji Muamedi places wax on a bed of green leaves to reward the honeyguide that led him to a bees' nest.*

How do we know whether honeyguides really 'understand' what humans are signalling to them? If honeyguides know that humans giving the '*brrrr-hm*' call are likely to be good collaborators, then we should expect the birds to be more likely to beckon a human making this particular sound rather than other sounds, and to be more likely to keep leading such a person through the bush rather than giving up too soon. To test this we need a controlled experiment, to keep constant all the other factors that might affect a honeyguide's chances of cooperating.

This is just what Mbamba village's honey-hunting community and I did, with the support of Colleen and Keith Begg and their team at the Mariri Environmental Centre at Niassa. First, Mbamba's honey-hunters allowed me to record their individual calls: 24 versions of '*brrrr-hm*', each with its own personal style. I also asked the honey-hunters to make other, arbitrary sounds (either their own names or the Yao words for 'honeyguide' and 'honey').

I then edited each set of recordings so that they would play back every seven seconds at a constant volume through a speaker. Finally, two honey-hunters (Orlando Yassene, Musaji Muamedi or Carlos Augusto) and I carried out 72 experimental trials in different locations, simulating honey-hunting trips. In each trial, the two honey-hunters and I walked in a straight line through the bush for 15 minutes, not talking to one another. The two honey-hunters kept alert for honeyguides while I played back one of the two kinds of human sounds (either the '*brrrr-hm*' call or the arbitrary human sounds) or an arbitrary >

Orlando Yassene and Carlos Augusto helping with the bio-acoustic tests.

non-human sound (the song or call of the Ring-necked Dove) through a speaker at a constant volume. The important point is that everything about these trials was kept constant, except for the specific sound we were making. Therefore, if a honeyguide responded differently to the different kinds of trials, we would know that these differences arose specifically from the sounds we made and no other factor.

I was astonished at what we found. Giving the '*brrrr-hm*' call doubled the chances of our being beckoned by a honeyguide (66 per cent chance), relative to the arbitrary human and animal sounds (33 per cent chance) and tripled our chances of being shown a bees' nest (from 16 per cent to 54 per cent). So the honeyguides were clearly responding to the specific information given by the '*brrrr-hm*' call rather than it simply alerting them to the presence of humans. In effect, the honey-hunters are signalling to the birds 'I am looking for honey' and in return the honeyguides are communicating, 'Here it is'.

Thanks to the work of two other honeyguide researchers, Dr Hussein Isack in collaboration with the Boran people in northern Kenya and Dr Brian Wood with the Hadza people in northern Tanzania, we know that other cultures elsewhere in Africa use completely different sounds when interacting with honeyguides. Brian and I plan to test whether honeyguides have learnt this language-like variation in human signals across Africa and are thus able to recognise good collaborators among the local people living alongside them. We're fascinated by the idea that this could have shaped a mosaic of honeyguide cultural variation that reflects that of their human partners.

Humans in different parts of the world have trained other species, such as dogs, falcons and cormorants, to help them find food. But these animals are domesticated or taught to cooperate by their owners. What is remarkable about the honeyguide–human relationship is that it has evolved through natural selection, probably over the course of hundreds of thousands of years. Anthropologist Professor Richard Wrangham has suggested that it might even be as old as our earliest ancestors who first mastered the use of fire nearly two million years ago, since this skill is what makes us such useful collaborators to honeyguides. It is a genuine evolutionary mutualism between two species.

Mutualisms are crucial everywhere in nature, but to our knowledge the only comparable foraging partnership between wild animals and our own species involves free-living dolphins that chase schools of mullet into fishermen's nets and in so doing manage to catch more for themselves. It would be fascinating to know whether dolphins respond to special calls made by fishermen, as Pliny the Elder reported nearly 2000 years ago.

Sadly, the unique relationship between Greater Honeyguides and people has already vanished from many parts of Africa. In South Africa, for example, wild honey-hunting is now very rare – the birds continue to call us, but few people listen. The world is a richer place for wildernesses like Mozambique's Niassa National Reserve where this astonishing example of human–animal cooperation and communication still thrives. ◆

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For more information about honeyguides and other brood parasites, visit www.africancuckoos.com

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