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An electronic journal published by the Animal Demography Unit at the University of Cape Town

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Editors of this paper: James A Harrison and Les G Underhill

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Recommended citation format:
Fincham JE, Peek R, Markus MB 2017 The Greater Honeyguide: Reciprocal signalling and innate recognition of a Honey Badger. Biodiversity Observations 8.12: 1–6

URL: http://bo.adu.org.za/content.php?id=307

Published online: 4 March 2017

– ISSN 2219-0341 –

BEHAVIOUR

THE GREATER HONEYGUIDE: RECIPROCAL SIGNALLING AND INNATE RECOGNITION OF A HONEY BADGER

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It is historically recorded that tribal people in Africa follow the Greater Honeyguide *Indicator indicator* to bees' nests to obtain honey (Friedmann 1955). By means of a controlled experiment, new research has analysed the relevance of specific vocal signalling to the bird by the human honey-hunter, as used by a tribe in northern Mozambique (Spottiswoode et al. 2016). The bird wants the comb in order to feed on bees' wax, eggs, and larvae (Vernon & Dean 2005).

There are numerous claims that there is a similar mutualistic relationship between the honeyguide and the Honey Badger *Mellivora capensis*, but Dean et al. (1990) reviewed the literature and concluded that no convincing evidence had been published. Nevertheless, Colonel James Stevenson-Hamilton, who was the Warden of the Kruger National Park in South Africa for 44 years, and also saw military service in remote parts of Africa, described seeing (more than once) the bird and the badger moving together in the bushveld while vocalising reciprocally (Stevenson-Hamilton 1954). Militarily, Stevenson-Hamilton was trained at Sandhurst, achieved the rank of Colonel, and served during the Anglo-Boer War and the First World War (Carruthers 2001). As regards his report of seeing honeyguides and badgers moving together, the suggestion has subsequently been made that the bird may generally follow the badger, rather than the reverse (Peek & Peek 2011; Begg & Begg 2017).

The recent research in Mozambique reminded JEF of an interaction he had with a honeyguide. It took place in 1956 or 1957 during a hunt for Bush Pigs *Potamochoerus larvatus* that were damaging the maize crop on a ranch in central Zimbabwe. He was accompanied by four Karanga hunters and some dogs. The Karanga are a large group within the Shona tribe. The vegetation was a type of Miombo woodland in which the bigger trees were mostly *Brachystegia glaucescens*, which goes by the misleading common name of Mountain Acacia.

At about 09h00, the party was approached by an adult male Greater Honeyguide (Figure 1), which was making the chattering sounds that are used to attract attention initially, and to maintain contact while guiding. One or more of the Karanga responded with a repetitive whistle unlike the "brrr-hm" sound used in northern Mozambique (Spottiswoode et al. 2016). In East Africa, honey-hunters of the Boran, Hadza and Maasai tribes also whistle in response to the honeyguide (Wood et al. 2014).

The honeyguide led the hunters for about 500 m, staying approximately 20 m ahead of them, until it reached a bees' nest situated 3–4 m above ground level in a hole in a *B. glaucescens* tree.The bird remained perched nearby. To generate smoke, a bundle with dry grass inside and green leaflets of *Brachystegia* (msasa and/or mnondo) on the outside was bound with inner bark from the same tree species. The grass was set alight and smouldered within the green leaflets. This produced an abundance of smoke, which was directed upwards around the bees.

The youngest and most agile man climbed up to the nest and enlarged the entrance with a small traditional hand-axe (Figure 2), before extracting combs full of honey that were passed to the men below. The man up the tree did get stung, despite the smoke. The honey was apparently sufficient compensation for the discomfort. A portion of

Figure 1. The adult male Greater Honeyguide (left) and the juvenile (right) are easy to distinguish because of distinct differences in plumage colours and patterns; and also from the colour of the beak. Photos by Hugh Chittenden.

– ISSN 2219-0341 –

Figure 2. A traditional hand axe like the one that was used to widen the entrance to the bees' nest.

honeycomb was left as a reward for the honeyguide. The bees' nest was on Hashu Farm at co-ordinates which are close to 19°25.596'S, 30°07.084'E (from Google Earth).

On three or four subsequent occasions when the same observer (JEF) was alone in the bush, Greater Honeyguides approached and solicited his attention by means of their guiding chatter. In these instances he did not respond vocally but stayed as close to the birds as was physically possible. A honeyguide led him to a bees' nest the first time, but on the other occasions he stopped following the birds. These experiences suggest that physical signalling by humans in the form of persistently remaining with the bird is sufficient, without any reciprocal vocalisation having to take place. Support for this comes from historical descriptions of how a hunter and a game ranger, respectively, followed honeyguides to bees' nests (Selous 1881, Wolhuter 1947). These accounts did not mention the need for any specific signalling to the bird, and apparently the game ranger was on horseback.

Moreover, Vernon (1989) followed honeyguides successfully to bees' nests, and he did not indicate that any auditory reciprocal signalling had been required. It is possible that the vegetation and topography where guiding is taking place (e.g. dense bush in broken terrain versus open savannah on flat plains) influence not only whether vocal signalling by the human is desirable to maintain contact with the bird, but also the optimal type, frequency and volume of sound needed to achieve the most effective results.

Ornithologists and mammalogists do not accept anecdotal reports that honeyguides can also lead the honey badger to bees' nests (Dean *et al*. 1990). However, a recently completed study has contributed new findings based on more than 3,000 hours of observation of the physical and behavioural development of a young male honey badger (Figure 3) in a natural setting at Stone Hills Wildlife Sanctuary, which is close to the Matobo National Park in Zimbabwe. The study lasted for two years and included recorded positive responses from honeyguides to the presence of the badger; growth of the cub as shown by body weight; and behaviour that was detailed by means of written notes, photographs and videos. The badger was an orphaned male cub about six weeks old and weighed 800 g when the study started. Two years later, he was a sexually active adolescent weighing 10 kg when he was killed by an adult male in a fight over a female. Unanticipated termination of the study in this way reflects that the sequence of events took place in an ecologically natural situation. Many of the results have been described in two books (Peek 2009; Peek & Peek 2011). Animal minder Jabulani Khanye made a key contribution in various ways, which included both observation and recording.

Figure 3. The adolescent male Honey Badger searching for food by breaking open dead wood in a free-living situation close to the Matobo National Park in Zimbabwe. Photo by Richard Peek.

Details of positive responses to the badger by three different honeyguides were recorded. Early one morning, the cub and an accompanying person were led by an adult honeyguide for a long way to a bees' nest that was too high in a tree to reach. The response to the bird was initiated and sustained by the human observer with the badger continuously present, but there was no detectable recognition of the bird by the badger. The cub was tired when they reached the vicinity of the bees' nest, so they rested. This caused the honeyguide to intensify efforts to attract the attention of the cub (by approaching it and vocalising), but not that of the accompanying person, who deliberately stood aside. When the cub was left asleep, the bird stayed with it and ignored the human observer as she walked away. On two more occasions in different areas, an adult and a juvenile honeyguide, respectively, again tried persistently to attract the attention of the young badger, while ignoring human bystanders. The immature honeyguide (Figure 1) vocalised less than adult birds but actively followed the badger while he ranged around freely.

The replicated behaviour by different honeyguides in relation to the badger, as detailed in the previous paragraph, implies that the response to the badger's presence was innate because the birds persisted in attempting to engage his attention in preference to that of an accompanying person. This strong focus by the birds on the badger seems to be compatible with legends that honeyguides lead badgers, rather than *vice versa.*

Taking the limitations of the study into account, the absence of a reciprocal response by the juvenile badger does not prove that badgers never respond to honeyguides. Potentially significant study limitations include the absence of any behavioural cues from a wild mother, and the death of the badger before he became an adult. Furthermore, the badger was not driven by hunger because he had other sources of food available to him, in addition to which he could find bees' nests by himself. The study at Stone Hills, described by Peek (2009) and Peek & Peek

(2011), has demonstrated that more research is needed to clarify the behavioural relationships, whether innate or learned, between the Honey Badger and the Greater Honeyguide.

It has been claimed that a reciprocal relationship with the bird is not possible because the Honey Badger is nocturnal. However, KS & CM Begg, co-authors of the recent paper on the association between human honey-hunters and the Greater Honeyguide (Spottiswoode et al. 2016), have shown that badgers in the Kalahari are both diurnal and nocturnal (Begg & Begg 2004). Some of their observations are recorded in the video "Snake Killers of the Kalahari", a National Geographic DVD release. These daylight activities have been confirmed in Botswana, Kenya, Namibia and South Africa (Begg & Begg 2017). They include raiding of bees' nests and burrowing for rodents or lizards, some of which, when flushed, are pirated by other predators that deliberately shadow the badger (perhaps analogous to the possibility that the honeyguide follows the badger). The opportunists include the Pale Chanting Goshawk *Melierax canorus* and the Black-backed Jackal *Canis mesomelas*.

Unfortunately, the Greater Honeyguide does not occur in the part of the Kalahari where the badger research was done. In most other areas where the bird is still present, the badger may have become more nocturnal than previously because of escalating persecution by people. An unresolved question is whether honeyguides operate at night, especially in moonlight, when bees are less aggressive, people are generally asleep, and honey badgers may be more active. Night-vision cameras positioned at bees' nests in habitats utilised simultaneously by badgers and honeyguides could provide key information.

Comments in recently published ornithological field guides are collectively inconclusive as to whether honey badgers are guided to bees' nests by honeyguides. For example, Sinclair & Ryan (2010) wrote in their introduction to the honeyguide family that "some species guide predators to hives"; without defining which predators are being referred to. By contrast, according to Tarboton & Ryan (2016) the honeyguide is: "Reputed to also guide honey badgers, but this has never been confirmed."

Concluding Remarks

The new evidence from the study at Stone Hills suggests strongly, and may even be proof, that there was innate recognition of the adolescent badger by adult and juvenile honeyguides. It is conceivable that this relates to nutritional benefit for the bird when badgers raid bees' nests. Despite the absence of any response to the honeyguides by the adolescent male badger, it is still feasible that wild honey badgers learn to interact with the honeyguide through maternal behavioural example, reinforced by the reward of honey.

There is also the possibility that female badgers may be more responsive to honeyguides than males, for several reasons. These include hunger because of the extra nutritional burden imposed by pregnancy and lactation, as well as the need to share food with a weaned cub during the long dependent period of 12–16 months (Begg et al. 2005). Also, young cubs are frequently moved between newly excavated dens, which incurs substantial energy expenditure. In contrast, male badgers are not subjected to any of these nutritionally demanding stressors.

The suggestion that the honeyguide may follow the badger to bees' nests, rather than lead it, seems reasonable (Peek & Peek 2011, Begg & Begg 2017). However, if this is so, there would be no need for honeyguides to make the badger aware of their presence. Yet in the Stone Hills study, three birds, including a juvenile, persistently approached the badger closely. The adult honeyguides simultaneously vocalised overtly.

Final elucidation of the details of any relationship has not yet been achieved, but the co-existence of the bird and the mammal for millennia in the African bush would rationally have facilitated evolution of co-operative behaviour to exploit honey bees. Perhaps there will be readers who can help to resolve the debate before unique behavioural and ecological relationships between wild birds and mammals are permanently destroyed by relentless human population pressure.

References

Begg CM, Begg KS, Du Toit JT, Mills MGL 2005. Life-history variables of an atypical mustelid, the honey badger *Mellivora capensis*. Journal of Zoology, London. 265: 17–22.

Begg KS, Begg CM 2004. Badgers and birds: interaction satisfaction. Africa - Birds & Birding. 9(6): 32–41.

Begg KS, Begg CM 2017. The Honey Badger: Associations. http://www.honeybadger.com/associations.html (accessed on 14 January 2017).

Carruthers J 2001. Wildlife and Warfare: The life of James Stevenson-Hamilton. University of Natal Press, Pietermaritzburg.

Dean WRJ, Siegfried WR, MacDonald IAW 1990. The fallacy, fact and fate of guiding behaviour in the Greater Honeyguide. Conservation Biology 4: 99–101.

Friedmann H 1955. The Honey-guides. U.S. National Museum Bulletin 208. The Smithsonian Institution, Washington D.C.

Peek B 2009. Wild honey. Penguin Books, Johannesburg (see pp. 176–286).

Peek B, Peek R 2011. Beyond the wild wood. Penguin Books, Johannesburg (see pp. 9–340).

Selous FC 1881. A hunter's wanderings in Africa. Richard Bentley & Son, London (see p. 71).

Sinclair I, Ryan P 2010. Birds of Africa south of the Sahara. 2nd ed. Struik Nature, Cape Town (see p. 310).

Spottiswoode CN, Begg KS, Begg CM 2016. Reciprocal signalling in honeyguide-human mutualism. Science 353: 387–389.

Stevenson-Hamilton J 1954. Wild Life in South Africa. Cassel & Company, London (see pp. 241–245).

Tarboton W, Ryan P 2016. Guide to the birds of the Kruger National Park. Struik Nature, Cape Town (see p. 118).

Vernon CJ 1989. Greater Honeyguide *Indicator indicator.* In: Ginn PJ, McIlleron WG, Milstein P le S (eds) The complete book of southern African birds. Struik Winchester, Cape Town (see p. 400).

Vernon CJ, Dean WRJ 2005. Greater Honeyguide *Indicator indicator*. In: Hockey PAR, Dean WRJ, Ryan PG (eds) Roberts Birds of Southern Africa. VIIth ed. The Trustees of the John Voelcker Bird Book Fund, Cape Town (see pp. 123–124).

Wolhuter H 1947. Memories of a game ranger. The Wild Life Protection Society of South Africa, Johannesburg (see pp. 283–284).

Wood BM, Pontzer H, Raichlen DA, Marlowe FW 2014. Mutualism and manipulation in Hadza–honeyguide interactions. Evolution and Human Behavior. 35: 540–546.