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Field Report

What goes around comes around: complex competitive interactions between two widespread southern African mesopredators

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Abstract

Intra-guild competition, including kleptoparasitism, can shape a species' ecology, particularly when competitors commonly occur sympatrically. Here, I describe a series of interspecific interactions between a black-backed jackal *Canis mesomelas* and two honey badgers *Mellivora capensis* from an observation in Etosha National Park, Namibia. This interaction involved a typical kleptoparasitic "producer-scrounger" relationship, but resulted in a novel observation of one honey badger successfully kleptoparasitising the jackal to reclaim its prey. This observation highlights the complexity of foraging interactions between these two functionally important mesopredators, and complements our current understanding of their foraging ecologies.

Introduction

Interspecific competition between predators occurs when species exploit the same resources in space and time. This process can often manifest as kleptoparasitism, whereby one species steals resources such as food from the other, which can have pervasive effects from the individual to ecosystem-level (Gorman et al. 1998, Krofel et al. 2012, Moleón et al. 2014, Balme et al. 2017). On the African continent, kleptoparasitism has been well documented among lions *Panthera leo*, leopards *P. pardus*, spotted hyaenas *Crocuta crocuta*, cheetahs *Acinonyx jubatus*, and African wild dogs *Lycaon pictus* (Scantlebury et al. 2014, Broekhuis and Irungu 2016, Balme et al. 2017). However, little is known about this behaviour in medium-sized predators or the mesopredator guild (e.g. jackals *Canis sp.* and honey badgers *Mellivora capensis*), despite their abundance in the landscape and their important ecological function as mid-level predators. Documenting cases of mesopredator kleptoparasitism within this guild is important to develop our understanding of these species and how they interact in the landscape.

The black-backed jackal *Canis mesomelas* and the honey badger are opportunistic mesopredators that are sympatric across much of their range (Hoffmann 2014, Stuart and Stuart 2014). The jackal preys and scavenges largely on mammalian prey, as well as a host of birds, reptiles, invertebrates, fruits and vegetation (Kaunda and Skinner 2003, Humphries et al. 2016, Temu et al. 2016), while the honey badger's diet includes small and medium-sized mammals, reptiles, birds, invertebrates (Kingdon 1977, Cohen and Kibii 2019), and in harsh conditions some vegetation such as tsamma melons (Begg 2006). Like most opportunists, both honey badger and jackal diets vary substantially by region and season, with both species often feeding on the most abundant or available prey species to satisfy their energy requirements (Begg et al. 2003, Goldenberg et al. 2010). This opportunistic switching in response to environmental changes or differences satisfies the optimal foraging theory whereby generalists will exploit a broad range of resources which present limited energy cost to obtain (Perry and Pianka 1997, Begg et al. 2003).

While these species overlap in distribution, diet and body size, they differ in hunting techniques and specific niche exploitation. The honey badger can exploit subterranean environments (e.g. burrow systems); a niche that is generally closed to jackals due to their greater size and build (Kingdon 1977, Cohen and Kibii 2019), and where jackal prey can often escape (Ferguson 1980, Begg et al. in press). However, above ground, being larger and longer legged, jackals have an advantage in chasing down faster prey. When prey occupies both fossorial (e.g. burrow systems) and terrestrial (above ground) environments (i.e. most small to medium-sized burrowing mammals in southern Africa), behavioural strategies allowing exploitation of both niches would be advantageous.

However, extensive observations of these two mesopredators in southern Africa suggest that only jackals obtain a net benefit by exploiting prey flushed from honey badger diggings (Begg et al. in press). As such, interactions between these two species have been described as either commensal, whereby the jackal benefits and the honey badger is unaffected, or "producer-scrounger" (King et al. 2009), whereby the jackal (scrounger) reduces its energy costs by following the honey badger (producer) and allowing it to locate prey, before investing substantial hunting effort – a form of kleptoparasitism (Begg et al. in press). Here, I describe a kleptoparasitic "producer-scrounger" interaction between these two mesopredators hunting a yellow mongoose *Cynictis penicillata*, which culminated in a novel observation of the honey badger kleptoparasitising, or stealing back, its prey from the jackal.

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Results

This observation took place from a vehicle, with the aid of 10 x 32 binoculars on 13th December 2018 between 08:20 – 08:50 in the company of J. Bergmark and M. Breckenridge on the plains north-west of Okaukuejo Camp (19°11'S 15°55'E) in Etosha National Park, Namibia. A black-backed jackal was spotted 20m off the road, alert and pacing at an entrance to an extensive warren system (Fig. 1a). Soon after, the first and second honey badger emerged from the warren system before returning underground, while the jackal remained alert above ground (Fig. 1b). A yellow mongoose emerged soon after and began slinking slowly away from the warren system, keeping low to the ground, but was soon pursued by the jackal and one honey badger and was forced to retreat back into the warren (Fig. 1c-d). The emergence and unsuccessful attempt to escape by one mongoose (it was only revealed later that two mongooses were present) was observed 12 times in a period of 30 minutes. During this period, the jackal pursued its prey, forcing it to retreat into the warrens, while the honey badgers would often pursue, usually behind the jackal. Sometimes, the honey badgers appeared unaware of the mongoose's location until it was chased by the jackal and had retreated (Fig. 1e). Eventually, one of the mongooses committed to escaping, and managed to move roughly 40m away before it was spotted by the jackal and pursued out to 70 – 80m from the warrens (Fig. 1f) where it was caught and killed, its neck broken by a bite. One of the honey badgers had followed the jackal and confronted it immediately after the kill had been made, causing the jackal to drop the mongoose which the honey badger then carried back to the warrens where the other honey badger remained (Fig. 1g). During the kill, the second mongoose emerged (this was the first time we had knowingly observed a second individual) and slunk away in the opposite direction (Fig. 1h) and was at least 100m away by the time the honey badger returned to the warrens with the dead mongoose, followed closely by the unsuccessful jackal.

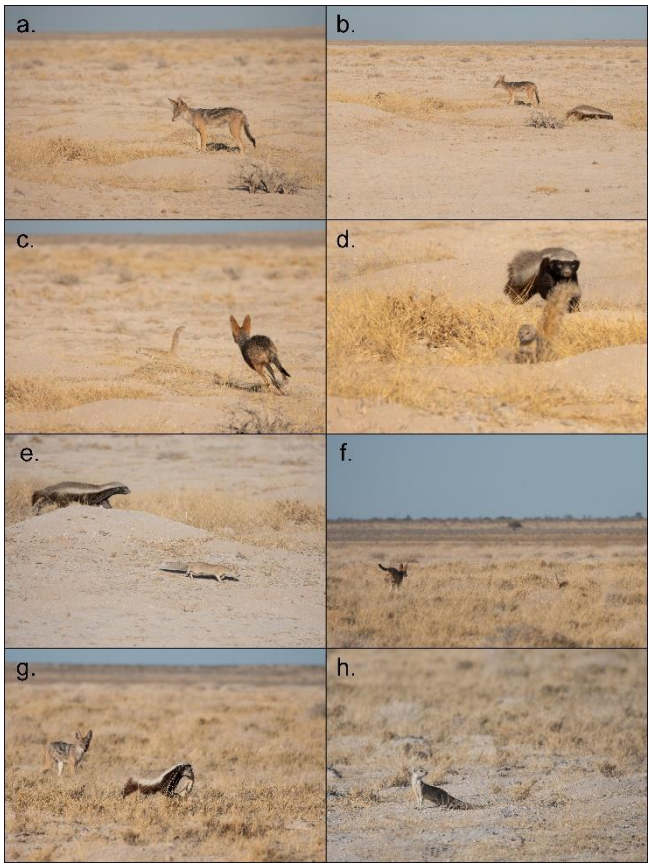

Figure 1: Competitive interactions of a black-backed jackal and two honey badgers hunting two yellow mongooses in Etosha National Park, Namibia. The jackal was observed alert at an entrance to a large warren system (a), from which the honey badgers would periodically emerge as they hunted the mongooses below ground (b). When a mongoose was chased out of the warrens, the jackal would often pursue it (c). The honey badgers would also pursue (d) but were often unaware of the mongoose's presence (e), until it was chased by the jackal. After 30 minutes, a mongoose ran from the warrens, and was chased by the jackal (f) and killed, before the dead mongoose was stolen from the jackal by a honey badger (g) which returned to the warrens where the other honey badger remained. The other mongoose escaped at the time of the kill (h).

Discussion

While black-backed jackals are known to scrounge prey escaping from honey badger diggings, kleptoparasitic behaviour by the honey badger towards the jackal to reclaim stolen prey has not previously been described. My observations began once the event was already underway, however it is likely the jackal initiated the interaction between the two mesopredators (as seen in Begg et al. (in press)), particularly given that the jackal could not exploit the subterranean environment in which the mongooses sought refuge. Yet, once the jackal had caught and killed the mongoose, the honey badger (or producer) reclaimed it from the jackal – a clear example of kleptoparasitic behaviour towards the jackal (the scrounger).

Failed scrounging behaviour in black-backed jackal – honey badger interactions due to the honey badger reclaiming the prey is poorly described in the scientific literature, however a video record from December 2019, one year after this described observation, apparently shows another such event. In this recording, a honey badger became entangled by a rock python *Python sebae* after what was presumably a failed predation attempt by the honey badger (Kerjosse 2019). A black-backed jackal, later joined by a second, then attacked the python which released the honey badger. The honey badger quickly recovered and proceeded to fight the jackals over the python (which was killed in the process), before retreating into a dense shrub with the kill. This appears to be the only other documented instance of failed scrounging by a black-backed jackal due to the honey badger reclaiming its prey.

While this behaviour has rarely been recorded, both instances involved medium to large-sized prey items, which represent a greater reward for effort invested by the honey badger. By contrast, prior observations of successful jackal scrounging associated with honey badgers exclusively involved small rodents (Muridae, Begg et al. (in press)). Kleptoparasitic interactions are often positively associated with prey size, with larger prey likely to be perceived by the kleptoparasite as representing a greater reward (Dies and Dies 2005, Dill and Davis 2012, Balme et al. 2017). While larger prey items represent a small part of the honey badger diet (Begg et al. 2003), they also represent prey items which are not commonly scrounged by black-backed jackals (Begg et al. in press). As such, defence, or reclamation of prey by the honey badger may represent an opportunistic trade-off of reward for effort, which can involve kleptoparasitism.

Observations of interactions between black-backed jackals and honey badgers are poorly documented compared to large predators in the same landscapes (e.g. large felid and hyaena interactions (Balme et al. 2017, Cusack et al. 2017) but see Begg et al. (in press)). This is probably due to observation and recording bias of citizen scientists and researchers alike towards larger, threatened predators. My observation complements our current understanding of competitive foraging interactions between these two mesopredators (see Begg et al. (in press)), highlighting the complexity of "producer-scrounger" and kleptoparasitic behaviours. Such observations are valuable and can shape our understanding of the behavioural ecology of relatively little known, yet widespread and functionally important predators.

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Biographical sketch

Simon Gorta is an ecologist from UNSW Sydney, Australia. He is interested in pragmatic conservation and ecosystem management, animals in their environments, and natural history. Simon's prior work has focused on avian-habitat associations in marine and arid environments, and he is passionate about citizen science.