

Short communication

Spotted hyena (*Crocuta crocuta*) predation on passerine birds in Namibia

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ABSTRACT

Spotted hyenas (*Crocuta crocuta*) are known for their flexible foraging behavior and trophic interactions with diverse prey species. However, most studies describing their hunting behavior are focused on predation of large prey. Here we describe the capture rates and behavior of adult and subadult spotted hyenas hunting passerine birds. Hyenas were actively chasing, catching and feeding on red-billed queleas (*Quelea quelea*), a passerine bird gathering in large flocks at a waterhole in the Etosha National Park, Namibia. In total, we observed 38 successful captures with the average individual capture rate of 21 birds caught per hour. It remains unclear if this is a learned behavior of a single hyena clan or if it could be a widespread interaction across Africa, where the two species co-occur. Although it is unlikely that passerines could make up a substantial part of a spotted hyenas diet regardless of the location, our observations provide a rare documented example of trophic interactions between a large carnivore and small birds. It also represents an addition to a diverse repertoire of hyena foraging behaviors, which confirms their adaptability in obtaining food from non-typical sources.

1. Introduction

The spotted hyena (*Crocuta crocuta*) is a generalist apex predator that preferentially hunts medium-sized wild ungulates or scavenges from carcasses (Kruuk, 1972; Cooper et al., 2001; Hayward, 2006; Trinkel, 2009). Spotted hyenas occasionally predate on livestock animals, consume various anthropogenic food sources, particularly in semi-urban areas, and feed on other carnivores, small mammals, birds, ostrich eggs, and reptiles (Pienaar, 1969; Kruuk, 1972; Mills, 1990; Yirga et al., 2011, Yirga et al., 2012; Hanssen and Cunningham, 2012; Fester et al., 2021). Information on spotted hyena predation of birds is scant in the literature and mostly focused on large birds, such as flamingos and ostriches (Brown, 1971; Kruuk, 1972; Mills, 1990; Holekamp et al., 1997; Nasirwa, 2000), while reports on predation of small birds are rarer. Holekamp et al. (1997) reported observation of two passerines hunted by juvenile spotted hyenas, while they were still living at the communal den, but without information about the hunting method and whether the hunts were successful. Kruuk (1972) found evidence of a consumed unidentified small bird in a hyena scat. Here, to the best of our knowledge, we describe for the first time the hunting and feeding behavior of spotted hyenas on red-billed queleas (*Quelea quelea*), a passerine bird gathering in large flocks, at a waterhole in the Etosha National Park (ENP), Namibia.

2. Methods

We opportunistically observed the hunting behavior and made video recordings of up to four spotted hyenas on the highly gregarious red-billed queleas at the Aus waterhole in the ENP (19.205° S, 52 16.192° E) on the 14th May and 20th May 2022, with further visits to the waterhole in June 2022 and May-June 2023. The ENP is located in north-central Namibia and covers an area of 22,270 km². The dominant vegetation in the national park is grasslands, mopane forests, and bush savanna (Mannheimer and Curtis, 2009). The average annual rainfall is 350 mm and the seasonal average temperatures range from 6–8 °C to 34–36 °C (Mendelsohn et al., 2002). We estimated the rate at which birds were caught and consumed. Because not all hyenas at the waterhole were foraging all the time, we calculated individual capture rates for each hyena that was actively engaged in hunting (i.e. searching for birds on the ground and in the water or actively chasing the flocks).

3. Results

First observations were made from 09:24 to 10:06 a.m. on the 14th of May 2022, when large flocks of red-billed queleas, each with more than 1000 individuals, were visiting the Aus waterhole to drink. During the drinking process, often several birds fell into the water and, unable to lift

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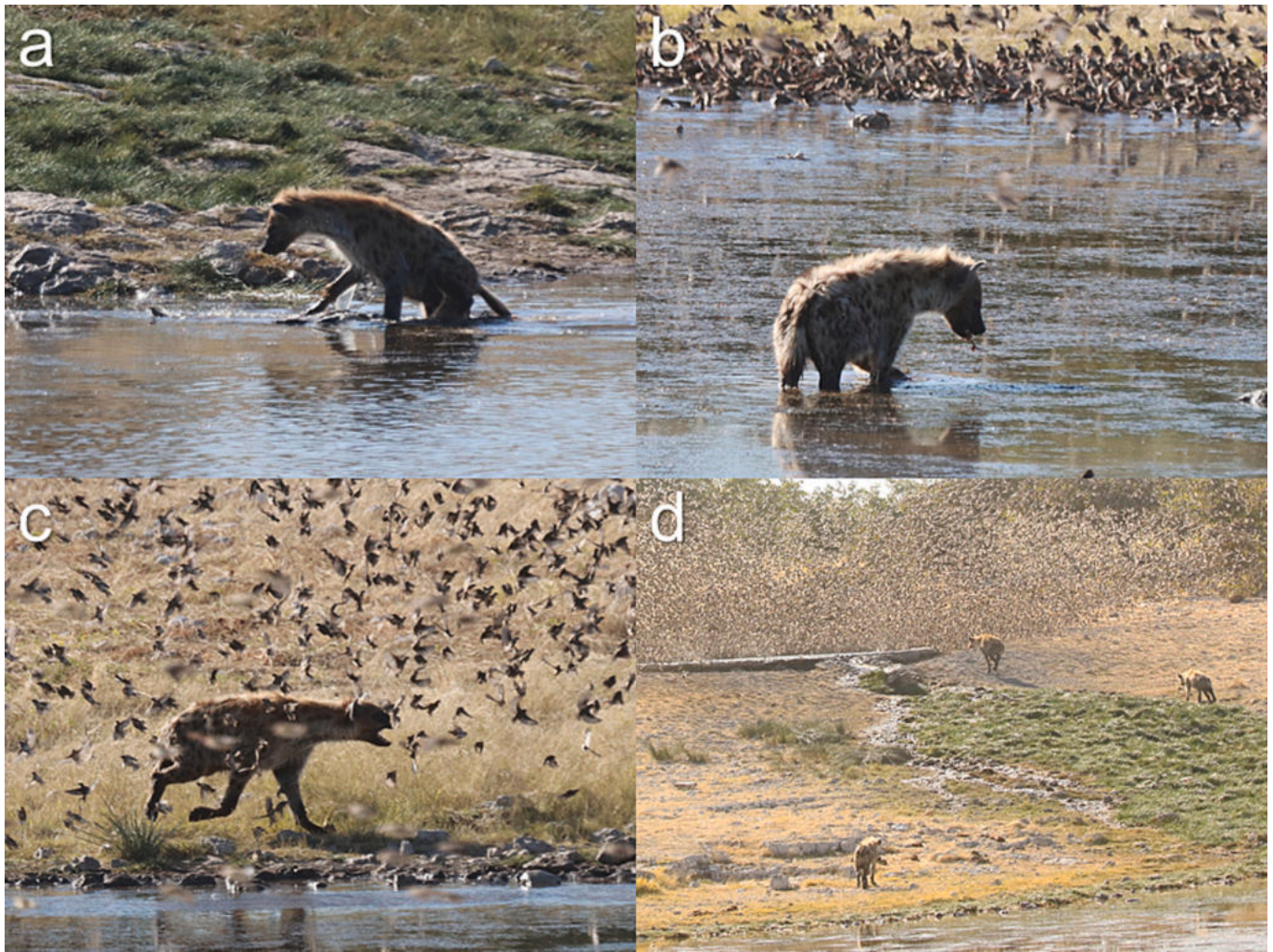


Fig. 1. Predation of spotted hyenas (*Crocuta crocuta*) on red-billed queleas (*Quelea quelea*) in the Etosha National Park, Namibia. a) Hyena chasing a bird that fell in the water (photo: M. Krofel). b) Hyena feeding on a bird caught in the water (photo: M. Krofel). c) Hyena rushing into the flock in an attempt to catch birds (photo: M. Krofel). d) Group of hyenas approaching a waterhole to hunt birds (photo: R. Portas). (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

off, had to swim to the shore to dry their feathers. Other birds occasionally fell to the ground while flying in a dense flock and were temporarily unable to fly (similar to observations by Detlef, 2008). They were perhaps injured or in shock from collisions with other birds during the sudden direction changes of the flying flock. Three spotted hyenas were catching and feeding on the birds in and around the waterhole using three different methods: 1) picking up the birds that could not fly and were hopping on the ground (SuppInfo 1), 2) picking up the birds that fell on the water (Fig. 1 a-b; SuppInfo 2), or 3) rushing into the dense flocks and actively chasing the flying birds (SuppInfo 2), and occasionally jumping in the air in an attempt to catch them (Fig. 1c).

By 09:48, the three spotted hyenas caught 11 birds. All of the birds were totally consumed by chewing and swallowing them whole. Two hyenas continued hunting and captured seven more birds until 09:57. Between 09:57 and 10:06, only one hyena remained active, killing and feeding on six additional birds. In total, 24 birds were captured and consumed within 42 min with the average capture rate of 2.4 birds per 10 min. At the same time, two black-backed jackals (*Lupulella mesomelas*), a Marabou stork (*Leptoptilos crumeniferus*), five Tawny eagles (*Aquila rapax*) and two Lanner falcons (*Falco biarmicus*) were also observed hunting and consuming the queleas. On the 20th of May, another observation of predation by four hyenas (three sub adults and one adult) on red-billed queleas was recorded (Fig. 1d). The observation

was focused on one individual, which captured and fed on 14 birds between 12:05 and 12:15. The average capture rate from both observation days was 3.5 birds per 10 min.

During further visits to the Aus waterhole on the 20th, 21st and 23rd June, no red-billed queleas and spotted hyenas were observed. During the study period, we observed large flocks of red-billed queleas at other waterholes in the ENP (Goas, Halali, and Olifantsbad), but no hyenas were detected there. Visits to the same waterholes also took place during 2023 but no observations of hyena hunting behavior were made, probably because the presence of red-billed queleas was limited to few individuals and no large flocks were present this year.

4. Discussion

Observations presented here provide the first documented information on the capture rates of passerine birds and a description of hunting methods used by spotted hyenas to obtain this type of prey. It is difficult to assess whether this hunting behavior is limited to a certain area or if it also occurs in other parts of Africa. Distribution ranges of spotted hyenas (Bohm and Höner, 2015) and red-billed queleas (Chittenden et al., 2016) overlap in most protected areas of southern, eastern and western Africa, thus there is potential for widespread interactions between these two species. Since the observations were limited to a single waterhole, it

is possible that the described foraging was specific to the hyenas from the observed clan and occurred as an opportunistic response to abundant food source.

Concentrations of large numbers of red-billed queleas at the water sources in Namibia is a seasonal phenomenon, usually occurring from the start of the dry season (May) until the end of winter (August) with considerable variation of their numbers among the years (Ward, 2008). Seasonal occurrence of these flocks in combination with the small body size of red-billed quelea (~20 g; Chittenden et al., 2016) is unlikely to make this species an important food source for spotted hyenas anywhere in the overlapping distribution range, although scat analysis would be required to confirm this. According to our observed capture rates (21 birds/h) and the average daily food intake for spotted hyenas (3.0–6.2 kg; Mills, 1990), it would take a hyena approximately 7–15 h of hunting these passerines to meet its daily food requirement. At the same time, the large number of red-billed queleas in flocks that can reach up to several millions of birds (BirdLife International, 2018) make the potential impact of spotted hyena predation on the quelea populations negligible. Nevertheless, our observations represent a rare example of documenting trophic interactions between a large carnivore and small birds, as well as an interesting addition to a diverse repertoire of spotted hyena foraging behaviors that confirms their opportunistic nature and adaptability in obtaining food from non-typical sources.

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CRediT authorship contribution statement

Ruben Portas: Conceptualization, Investigation, Methodology, Writing – original draft, Writing – review & editing. **Miha Krofel:** Conceptualization, Investigation, Methodology, Writing – original draft, Writing – review & editing.

Declaration of competing interest

The authors declare that they have no conflict of interest.

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