

Spotted hyaenas *Crocuta crocuta* prey on new-born elephant calves in Hwange National Park, Zimbabwe

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Spotted hyaena *Crocuta crocuta* are known to be opportunists and to have a varied diet including mammals, reptiles and birds. Prey most often hunted are medium sized ungulates but spotted hyaenas will on occasion take larger species such as giraffe *Giraffa camelopardalis* and zebra *Equus burchellii*. They are also known to hunt whichever species are most abundant and will vary their prey seasonally. In this study spotted hyaenas were observed to take an unusual prey species in the form of elephant calves (*Loxodonta africana*). On a number of occasions hyaenas were observed feeding on or killing new-born and very young elephant calves. These observations were made whilst the authors were conducting research on spotted hyaena ecology in the woodlands of Hwange National Park, Zimbabwe and were made during the dry season between September and November 1999.

Key words: Spotted hyaena, *Crocuta crocuta*, predation, elephant calves, *Loxodonta africana*, Hwange National Park

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Introduction

Spotted hyaena *Crocuta crocuta* are known to prey on a diverse array of mammals, reptiles and birds (Bearder 1977) and studies in southern Africa have shown that hyaenas, particularly in a woodland environment, have a varied diet (Mills 1992). In east Africa prey most often hunted were Thomsons gazelle *Gazella thomsonii*, wildebeest *Connochaetus taurinus*, topi *Damaliscus lunatus*, zebra *Equus burchellii*, impala *Aepyceros melampus* but included less regularly taken species such as giraffe *Giraffa camelopardalis*, ostrich *Struthio camelus* and buffalo *Syncerus caffer* (Hofer 1998; Hofer & East 1993; Holekamp *et al.* 1997). It has also been shown that hyaenas vary their prey seasonally and will easily switch from hunting one prey to another, whichever is the more abundant (Lindeque & Skinner 1982; Holekamp *et al.* 1997). This paper reports spotted hyaenas in woodlands of Hwange

National Park hunting a seldom-recorded prey species, new-born and very young elephant calves.

As Hwange National Park has a high population of elephants, estimated over 31 000 (Gibson 1997), it is not unreasonable to expect that spotted hyaenas would take advantage of this seasonally abundant prey. Data were collected whilst the authors were engaged in research on the ecology of the spotted hyaena for the Carnivore Research Unit of the National Parks of Zimbabwe.

Methods

Research was conducted in Hwange National Park, Zimbabwe which has a total area of 14 600 km². The park is situated between 18°30'S–19°50'S and 25°45'E–27°30'E. The study area on the eastern border of Hwange National Park is dominated by medium to dense vegetation on flat to undulating Kalahari Sands terrain, consisting of Zambezi Teak woodland

and *Terminalia* bushland (Rogers 1993). The mean annual rainfall in the area is 653.2 mm (Jones 1989).

A 22.1 km long transect was identified along roads in the home range area of the study clan. In order to obtain data on prey abundance, all species sighted and considered as possible prey were counted along this transect. The transect was driven at 15 km/h with two observers recording all species seen. Counts were made twice-monthly, once in the morning between 07:00–10:00 and once in the afternoon between 16:00–18:30 as these are times of maximum ungulate activity. The Index of Kilometric Abundance (IKA) (Vincent *et al.* 1979) was then calculated for each count. The IKA for one species is the total number of animals seen divided by the length of the transect. We used the Kruskal-Wallis non-parametric test for several independent samples to test if there was a significant difference between the IKA (i.e. abundance) of some common prey species present in the study clans home range. Common prey species were deemed to be buffalo, elephant, impala, kudu, steenbok *Raphicerus campestris*, warthog *Phacochoerus aethiopicus*, wildebeest and zebra.

One spotted hyaena clan was intensively studied between March 1999 and June 2000 with data from three neighbouring clans also recorded. Most hyaenas were known to researchers, either through artificial ear-tags and radio-collars or by their coat patterns. The study clan consisted of 19 adult and sub-adult hyaenas (Teichmann & Salnicki 2000) of which five were radio-collared and one ear-tagged only. Observations were made by following radio-collared hyaenas, mainly at night or at sunrise or sunset and by using a spotlight. The data represent critical-incident-sampling (Altmann 1974).

During a hunting or feeding incident we recorded the number of hyaenas involved and if possible their age and sex. Where hyaenas were found already eating from an elephant calf we looked for circumstantial evidence which could show that, if the calf had not died a natural death, what had killed it. Circumstantial evidence included checking the area around the kill for predator spoor, noting what predators were present and how prey had been killed, e.g., if a leg or tail was missing, or there were bites in the abdomen and hind legs this indicated hyaena kill; if bites were observed around throat or nostrils, it indicated lion kill (Kruuk 1972).

Results

We observed that spotted hyaenas from two clans in Hwange NP take an unusual prey: elephant calves. On five occasions we observed hyaenas feeding on or killing an elephant calf. In only one case a direct observation of hyaenas killing the elephant calf was possible. In the four other cases we arrived at the scene a few minutes after the kill had been made and from circumstantial evidence could confirm that hyaenas had made the kill (Table I). All observations were made towards the end of the dry season between September and beginning of November 1999.

The first kill, by the Dopu clan, was observed at 05:30 on 20 September 1999. Nine adult

Table 1
Summary of observations of spotted hyaenas preying on elephant calves

Date	Clan Size(adults & sub - adults)	No. of hyaenas at carcass	Age of hyaenas at carcass ^a	Sex of hyaenas at carcass ^b	Observed to hunt, kill or eat prey	Age of elephant prey ^c
20 Sep 99	18	9	U (A and SA)	U	Hunt, Kill & Eat	New-born
16 Oct 99	19	7	2A, 5U	2F, 5U	Eat	M calf (5 years)
19 Oct 99	19	9	3A, 2J, 4U	3F, 6U	Eat	New-born
08 Nov 99	19	12	4A, 8U	4F, 8U	Eat	New-born
09 Nov 99	19	14	7A, 1SA, 2J, 4U	7F, 7U	Eat	New-born

^a A = Adult, SA = Sub-adult, J = Juvenile, U = Age Unknown

^b F = Female, M = Male, U = Sex Unknown

^c New-born = 1 - 5 days old

hyaenas were following an adult female elephant accompanied by an approximately five-year-old sub-adult and a new-born calf. All nine hyaenas surrounded the elephants and ran forward attempting to bite at the legs of the elephants. The adult elephant ran at individual hyaenas in an attempt to chase the hyaenas from her young but was unsuccessful. The sub-adult remained close to its mother and took no part in defending itself or the calf. At one stage the new-born calf was accidentally knocked over by the mother and the hyaenas lunged at it but it returned to a standing position. After five minutes of attempting to bite the calf, one hyaena seized its tail and pulled it over onto its side. The mother chased the hyaena away and followed it into a thicket for about 10 metres. With the mother absent the remaining hyaenas then attacked the calf with severe bites, one hyaena biting off its trunk. The sub-adult elephant then became separated from the adult and ran 20 m away, followed by the adult. The nine hyaenas proceeded to kill the calf with persistent bites to the underbelly. The incident took less than 10 minutes and by 05:45 the hyaenas had bitten off small pieces of the new-born elephant and had begun eating, while the adult and sub-adult remained standing 20 m away. It was noted that the elephant cow was in poor condition being emaciated with ribs and pelvic girdle protruding. Moreover, the new-born calf did not appear to be very strong and initially had difficulties in keeping up with the female.

Four further observations of hyaenas preying on young elephants were made in the core area of the Nyamandhlovu main study clan (Table I). On all occasions, between seven and ten adult hyaenas (mean 8.8 SD 0.97) were seen feeding on the small elephant calves. In three instances the group of hyaenas included the alpha female from our Nyamandhlovu study clan and on three occasions two cubs, aged eight and ten months, were seen feeding on the carcass. In all cases the hyaenas observed feeding all came from the same clan.

On the 19th October 1999 we arrived minutes after a group of nine hyaenas from our

study clan had killed a new-born elephant. A herd of 25 adult elephants was close to the kill and although the elephants were agitated and formed a half circle facing the hyaenas they made no attempt to chase the hyaenas away. The killed elephant calf was only a few days old.

During the remaining three observations no elephants, other than the dead elephant, were in the vicinity. All elephant calves on which hyaenas were found feeding were only a few days old except one which was 5 years old. Apart from the observation on 20 September 1999, it was not possible to ascertain the condition of the other members of the herd to which the elephant calves belonged. It was also not possible to discern the condition of each of the prey calves except for the September incident where all three elephants present were in poor condition.

In all cases the hyaenas started to feed from the rear of the elephant, eating the flesh of the pelvis and all the soft parts and needed between 45 minutes and two hours to finish the elephant.

Apart from our own observations, we have received two reports from other areas of Hwange National Park where hyaenas were observed killing elephant calves and four reports of hyaenas running around a herd of elephants and attempting to hunt very young calves. In one of these instances the hyaenas managed to pull the elephant calf down but the mother chased the hyaenas away and the calf fled between the legs of its mother before the herd ran into a thicket (Kitt Hussler *pers. comm.*).

Using the IKA from our regular prey transect counts showed there was a significant difference between all species ($\chi^2 = 30.607$; $df = 8$; $P = 0.000$). Figure 1 shows that impala and elephant were the most abundant prey species in the sampled area during the dry season 1999 (from August to October).

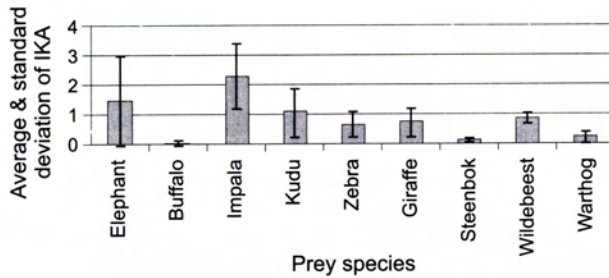


Fig. 1. Index of kilometric abundance for dry season 1999 prey counts.

Discussion

Spotted hyaenas are capable of taking large prey such as adult gemsbok *Oryx gazella*, eland *Taurotragus oryx* (Mills 1990), buffalo and giraffe (Holekamp *et al.* 1997). Our results indicate that hyaenas, when in a group of more than seven, can successfully hunt elephant calves even when adult elephants are present. Although foraging group size in Hwange National Park is normally between one and five hyaenas (Salnicki & Teichmann unpubl. obs.), hyaenas when hunting elephant calves numbered between seven and ten adults. Kruuk (1972) also found that when hyaenas set out to deliberately hunt large prey such as zebra their group size would increase from the normal one to six to one to twenty-seven. Likewise, Bearder (1977) working in a similar woodland environment to Hwange National Park found that hyaenas commonly moved alone or in pairs but found that pack hunting was necessary to hunt larger ungulates.

There are several reasons that might explain why spotted hyaenas in Hwange National Park preyed upon elephant calves during the winter of 1999.

Spotted hyaenas are opportunistic feeders and will easily switch from one food source to another, whichever is the more abundant (Henschel & Skinner 1990). Lamprechts (1973) noted that impala were the most abundant species in the woodlands of Tim-

bavati, and Hirst (1969) showed that they made up 75 % of hyaena kills in this area.

Hwange National Park has an estimated dry season elephant population of 31 613 with a density of 2.08/km² (Gibson 1997). However, a recommended density of only 1.0 elephant/km² (DNPWLM 1998) indicates that the park might be overpopulated.

Between September and the beginning of November when we observed hyaenas hunting elephant calves, the results from the IKA analysis showed that elephants and impala were the most frequently observed prey species in the study clan area (Fig. 1) and it is reasonable to expect that spotted hyaenas would avail themselves of this abundant resource.

Elephant herds visit the pumped pans in the park mainly in the late afternoon and at night. Therefore, hyaenas have a more abundant and visible prey resource during these dry months at the times of day and night when they are most active. All instances of hyaenas preying on young elephant were observed close to pumped pans. In addition, many elephants were in poor condition at this time of the year. This was due to reduced quantity and quality of forage, particularly because of poor rains from the previous season. It is known that hyaenas will select a physically inferior animal from a group if they see it and probably search for such prey (Kruuk 1972).

Although seasonality of elephant births in Hwange has not been confirmed (Williamson 1975), Wilson (1997) reported a peak in elephant births from August–November. This may further explain why observations of hyaenas hunting elephant calves have only been made from September to November. There is insufficient data at present but further observations may suggest that hyaenas are particularly targeting young, inexperienced elephant mothers who do not yet have the knowledge to protect their calves from a sustained attack.

Increased visibility because of reduced vegetation also aided researchers and it is acknowledged that there will be a bias towards observations made during the dry season.

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