

The Ecology of the Spotted Hyaena in the Woodlands of Hwange National Park and Conservation/education of Local Community
By the Hyaena Research and Conservation Project
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Held on 23 May 2003 at Ulwazi Institute, Suburbs, Bulawayo.

Hyaena research began in 1999 and for the first 18 months was purely a research project. From 2001 it has been run by Julia Salnicki, an Australian zoologist, and now includes aspects of conservation and education with the local community at Main Camp.

The Hyaena Research & Conservation Project (HRCP) operates under the banner of the National Parks Carnivore Research Unit (CRU) at Main Camp, headed by Dr F. Murindagomo. All data collected by HRCP is given to CRU and is for their use in future carnivore management plans. Julia is completely self-funded, receives no payment for her work and has worked with the CRU for the past 4 years on a completely voluntary basis.

The objectives of the HRCP are to obtain baseline data on the following aspects of spotted hyaena ecology, and include conservation education:

- Population and density
- Home range area
- Diet
- Social Behaviour
- Training of National Parks CRU staff
- Conservation education of local community (Main Camp primary school)

Background Information on Spotted Hyaenas

Spotted Hyaenas are not yet endangered but are classified by the IUCN as 'threatened – increasingly dependent on protected areas'. In 1998 IUCN estimated there were 5600 spotted hyaenas in Zimbabwe of which 60% were in protected conservation areas.

The collective noun for a group of hyaenas is a 'clan'. It is a matriarchal society and linear ranking exists within both males and females. Most females in a clan are very closely related. Males and females have similar looking external genitalia but the female has a pseudo-penis (which is an elongated peniform clitoris) and her false scrotum is full of fatty tissue. Hyaenas are not just scavengers but highly efficient predators. Males are the sex that disperses from their natal clan around 3 years of age. Females will only suckle their own young – unlike lionesses for example who suckle any cub in the pride. Hyaena cubs suckle for up to 12-18 months. Only cubs live in a den, the entrance to the den is small to prohibit entrance by lions that could harm cubs.

Difficulties for Spotted Hyaena Research in Hwange National Park

- Spotted hyaenas are nocturnal so most research must be done at night
- The wooded vegetation of Hwange made hyaena observations difficult
- Limited road access made following hyaenas problematic
- Identification of individuals could only be done once coat patterns had been learnt

Results from First phase of Project from March 1999-October 2000 (except Population with

results to October 2002) [Remaining data from November 2000-June 2003 will be analysed as part of Julia's M.Phil. with University of Zimbabwe].

Population

Population Calling Exercise is conducted on an annual basis in the dry season in September or October. Strict protocol is followed using techniques developed by Kruuk (1972) and later improved by Mills (1985) using high power amplifier, speakers and a cassette tape with hyaena and other calls designed to attract hyaenas to the vehicle where they can be spotlighted and counted. Using statistical analysis and taking into consideration vegetation density, water levels and amount of prey available, figures are extrapolated to give estimated population and density. During the 2002 Calling Exercise 70% of Hwange National Park was covered, including the southern and western wilderness areas, the Main Camp area and up to Sinamatella Camp - this involved a total of 30 calling stations. Results are shown in Table 1 below.

Table 1. Results from Spotted Hyaena Annual Calling Exercise 1999-2002.

Year	1999	2000	2001	2002
Population	1048	968	752	1145

The low figure of 2001 could be attributed to the fact that this calling was done in late October after a heavy rainfall which could have dispersed both prey and concomitantly, spotted hyaenas.

The mean density of the 4 calling years 1999-2002 is 0.065 hyaenas per km², a very low figure in comparison with densities of East African game parks such as the Serengeti at 0.80 hy/km² and Masai Mara at 0.60 hy/km², however more in keeping with Kruger NP with 0.07-0.20 hy/km². So with a population of over 1000 hyaenas, Hwange National Park holds Zimbabwe's largest sub-population.

Home Range Areas

A sample of a radio-collar was shown to the audience. These collars contribute to the conservation of the species because of two special adaptations; firstly the anti-snare device which is fitted to the front of the collar, inhibiting a slow and painful death from a wire snare around the neck; secondly the banding of the collar is retro-reflective and when picked up by car headlights, helps to slow speeding drivers and to reduce death and injury to both hyaenas and drivers.

The fitting of radio collars is an ethical question that every researcher should ask – radio collars should not be fitted (i.e. an animal compromised by being under anesthetic) if a full-time, professional researcher is not working with the collared animals. It is a time-consuming procedure to radio-collar spotted hyaenas, especially in areas where not habituated to vehicles. Radio tracking is mostly done during the day when hyaenas are sleeping. Triangulation is used to determine a 'fix' (the point at which the hyaena is lying), these are entered into the computer and using Ranges V software, home range areas are calculated on a 100% Minimum Convex Polygon basis.

Results 1999-Oct 2000: Home ranges area of main study clan was 373 km², in the dry season and 133 km² in the wet season (during question/answer time the possible reasons for this difference was debated, but no conclusion was drawn). HRA's of females varied depending on whether they had a cub at the den or not, from 131 km² with cub to 256 km² with no cub. Male home range very large as was in nomadic phase, at 330 km². The HRA of the study clan at 373 km² is very large compared to other studies, even to Kruger NP where HRA of one clan was 130 km².

Points of Interest in Hwange NP Hyaena study:

- 'Satellite' clans have been found
- Once alpha female died, clan fragmented

- Male lion responsible for hyaena cub death
- Within days of male lion marking (urinating) over communal den, hyaenas who had been at den for 18 months, moved away
- Lions could have effect on both hyaena HRA's and population. More research needed.

Diet

Problems with collecting data from direct observations because dense vegetation and nocturnal habits make observations of kills virtually impossible. Therefore baseline data on spotted hyaenas diet has been recorded from hair analysis of scats. From first 102 samples top three results were: 18% Zebra, 8% Duiker, 8% Kudu. Interestingly there was only 3% Impala. As Impala are a year-round and prevalent species and in other southern African studies, a high percentage of the diet is normally from this ungulate, this result was surprisingly low. However, as this was a small sample size and analysis was considered to be somewhat subjective, all faecal samples from 2001-2003 have now gone to a university in the UK which has a department specialising in faecal analysis. The results are now being written up and will be available by July 2003. It must be noted that in these results it is not possible to show whether the species eaten was adult or juvenile or whether species was killed or scavenged.

Most interesting was the 3% of scats that included elephant hair. Hyaenas have been observed, only during winter months after particularly poor rainy seasons, hunting, killing and eating both newborn and young (2-5 years) elephants. This behaviour has not been witnessed in any other study and appears to be unique to Hwange NP. We should not be surprised, as it is well documented that hyaenas often prey on the most abundant species of ungulate, so why not prey on the most abundant species in Hwange NP during dry winter months apart from impalas – the elephant? There is not yet conclusive evidence but perhaps this year 2003 will provide the best evidence yet, as it has been the poorest rainy season since the HRCP started, of why hyaenas prey on what would normally be considered difficult prey. The hypotheses are that the elephant mothers are particularly stressed and out of condition, having to walk long distances to water and then again to forage and that this contributes to them being much less vigilant than normal; that many of these elephant mothers may be young and inexperienced and unable to handle the harassment of hyaenas.

Conservation through Children's Education

Once a fortnight, over the past 2 years, Julia teaches the Grade 7 children at Main Camp Primary School the subject of Environmental Science. The normal curriculum is followed but all examples of trees, animals, rivers etc are taken from Hwange National Park and the local surroundings. Wildlife & Environment Zimbabwe have contributed fuel on two occasions to take children into the Park – many of whom had never been in the Park!

Volunteer Field Assistants

The VFA programme is run in conjunction with SAVE Foundation of Australia and HRCP. Paying volunteers come to the HRCP to primarily give much-needed assistance with collecting data. However donations from payments are given in the form of equipment (never money) to the staff of the CRU (such items as binoculars, backpacks, thermarests, aluminium flasks, water bottles, mosquito nets, rechargeable batteries and recharger, head-lamps and a variety of books on birds, mammals, trees etc have already been donated), and to the Main Camp Primary School who recently received a full complement of exercise books for every child in the school for the full year of 2003.

Training of CRU staff

All staff are now adept at radio-tracking and use of telemetry equipment. CRU staff are always present at radio-collaring and are now competent with taking anal temperature, breathing rates, checking dentition, taking body measurements and fitting radio collars. The Ecologists are able to enter data and use methods of triangulation to obtain 'fixes'. Scouts are well versed in all procedures and techniques used in the annual calling exercise.

Conclusion

It is well documented that species adapt to their local environment and that the same species will exhibit different behaviour in differing eco-systems. This holds particularly true of the spotted hyaena in Hwange National Park. HRCF has already shown that hyaenas here are at very low densities in comparison to other similar areas; that they can have extremely large home ranges; form satellite clans; and exhibit unusual behaviour in the taking of newborn elephants as prey.

Thanks

My thanks to National Parks & Wildlife Authority for continued support of the HRCF. To my sponsors, particularly family and friends for their support and enthusiasm for the work of the HRCF. Finally to Biodiversity Foundation of Africa for organising this lecture and giving me the opportunity to talk about my work.

Addendum

A question was asked about the phylogeny of spotted hyaenas by Pam Birch, Chairman of WEZ and as the facts were not to hand they are given here.

The hyaena looks like a dog but it is more closely related to the Viverridae (genets, mongooses etc). This has been established from recent studies of chromosome patterns and from fossil evidence. The present hyaenas' fossil history shows direct descent of Hyaenidae (the 4 members of the Hyaenidae family are the spotted hyaena, the striped hyaena, the brown hyaena and the aardwolf) from the Viverridae; these two families, together with the Felidae, constitute the superfamily of Feloidea. The ancestors of spotted hyaenas have existed since the Miocene. (Kruuk 1972).

Hyaenas probably arose from civets (*Progenetta*) and the earliest known fossils (from Eurasia) date from the late Miocene (10 million years ago). Whether the family arose in Africa or Eurasia is now in doubt, but continental interchange of hyaenids occurred both in the Miocene and succeeding epochs. Maximum diversity was achieved early in the Pleistocene with 4 genera and 9 species, including the 3 surviving hyaenas. In Eurasia, *Crocota* diversified into many different species before becoming extinct in the late Pleistocene; in Africa there was and is only 1 spotted hyaena (Estes 1991)

References

- Estes, R.D. (1991) *The Behavior Guide to African Mammals*. The University of California Press, California.
- Kruuk, H. (1972) *The Spotted Hyaena. A study of Predation and Social Behavior*. The University of Chicago Press, Chicago
- Mills, M.G.L. (1985) Hyaena Survey of Kruger National Park: August-October 1984. IUCN/SSC Hyaena Specialist Group Newsletter 2, 15-25