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Data on ethology and behavior of the striped hyena *Hyaena hyaena* (Linnaeus, 1758) under captive conditions in Algeria

Abstract

A study was carried out on a pair of captive striped hyenas[1] (*Hyaena hyaena*) composed of Tana (female) and Taurus (male) in the Bordj Blida animal park in Jijel. It is based on the descriptive and comparative analysis of certain behavioral traits of the couple between the enclosure and the lodge during the period from March 18th to June 8th, 2020, for 10 days, extending over 12 hours from 6.00p.m to 8.00a.m. For this, a camera trap was placed for 6 days in the enclosure where the couple lived, and 4 days in the lodge. An ethogram[2] comprising 9 behaviours (Sleep and rest, feeding and watering, grooming, urination and defecation, sniffing or scenting of the partner, grooming of the partner, games, territory marking, and stereotyping) was developed from the video sequences. We noticed that the couple spent much more time in sleep behaviour (12.72%), in 12 hours; 7.04% of their time in active behaviour (feeding, watering, grooming, partner sniffing, play, urination and defecation) and 3.85% of their time in stereotypical behaviour.The main objective of studying it is to determine more precisely the needs and arrangements necessary for the protection and conservation of this endangered species.

Keywords: behavior, striped hyena, role of captivity, conservation

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Introduction

Boice[3] provides a critical review that begins with a working definition of captivity and moves on to the problems of measuring its behavioural effects. He stated that ethologists[4] have traditionally assumed the effects of captivity to be distorting, psychologists have assumed them to be harmless or useful, and zookeepers and others have dramatized them as aberrant. Although rare, research on captive specimens suggests that many behaviours generalize from captivity to those within the wild where systematic captivity analysis methods suggest.

Behavioural management in zoos is a well-known method that attempts to improve the welfare of captive animals. However, for successful conservation and reintroduction of threatened or endangered species, it is also important to manage behaviour in a way that maintains natural behavioural diversity.[5]

The striped hyena (*Hyaena hyaena*) is a species of hyena native to North, East and South Africa, Middle East, Caucasus, Central Asia and the Indian subcontinent. It is listed by the IUCN as Near Threatened at international level and Vulnerable at the Mediterranean level, as the global population is estimated to be under 10,000 mature individuals. The species continues to experience deliberate and incidental persecution, along with a decrease in its prey base such that it may undergo a continuing decline of 10% over the next three generations.[6] It is the smallest of the true hyenas and retains many primitive viverrid characteristics lost in larger species,[7] such as having a smaller and less specialised skull.[8,9]

In Algeria the distribution and status of the species has been described first by.[10] Later Ahmim[11] stipulated that from 2000 to 2017, 223 individuals were killed in Algeria. The species is distributed from the coast north of the Sahara and information concerning its presence in the desert is not certified. Results of a recent field survey conducted in many regions and suitable habitats by Derouiche L[12] showed that the striped hyena has been eradicated from some northern areas of its former range, but still occurs in most regions of Algeria. The striped hyena is often killed without reason by villagers or hunters[11] and even today, trapping, poisoning and hunting are among the main causes threatening the species.

Materials and methods

We carried out a study concerning a pair of striped hyenas, Tana (female) and Taurus (male) held in captivity in the Bordj blida animal park in Jijel,located northwest of the capital of the wilaya, which hosts among others several endangered species in their natural habitat or at risk of extinction. The main objective of this research is to study the behaviour of the striped hyena outside its natural environment, in order to more precisely determine the needs and the arrangements necessary for its protection and conservation We achieved this through the observations of the two captive hyenas and studying the differences in behaviours. The Bordj Blida Animal Parc is located about ten kilometers west of Jijel, a coastal town in the northeast of Algeria (Latitude: 36.8167, Longitude: 5.76667 36° 49′ 0″ Nord, 5° 46′ 0″ Est) Figure 1. It covers an area of 25 hectares and hosts 226 individuals belonging to 48 species, including ruminants, carnivores, equines and birds. The enclosure for the pair of striped hyenas has an area of 720m^2, is located to the south-east of the animal park and is fenced with wire netting. Three boxes with a surface area of 12m^2 each are present in the enclosure Figure 2.

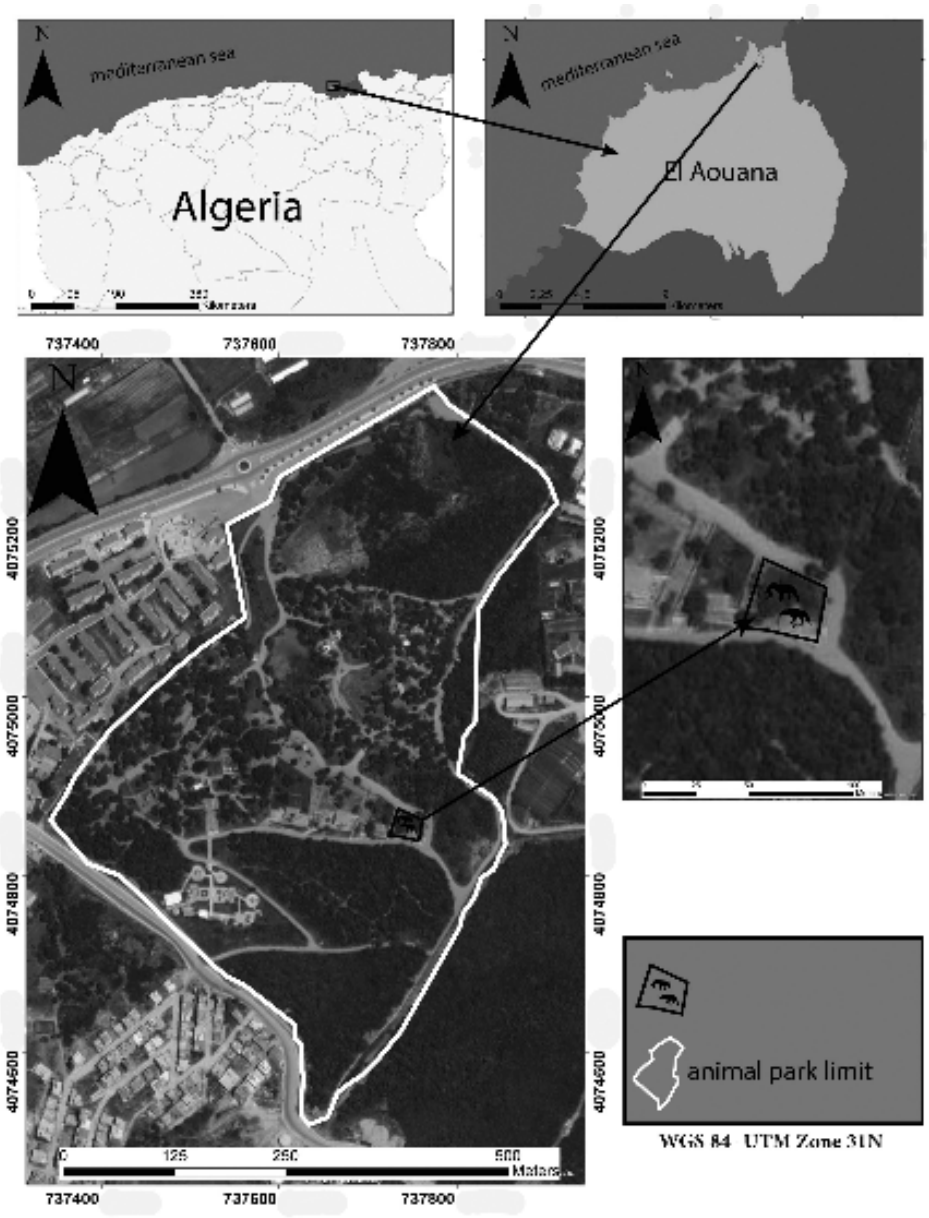

Figure 1 Location of the Bordj Blida animal park in the wilaya of Jijel.

Figure 2 Box of the hyenas in the enclosure.

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The hyenas were observed for 1212 minutes over 10 days between March 2020 and June 2020, and we seek to discriminate as precisely as possible the different behaviours observed. The methods used to study and quantify the behavior of the animals are direct observations and photographic trapping. Direct observations were made from the observatory located outside the enclosure, where visitors also view the animals. The observes did not affect the behavior of the specimens, as they are accustomed to a human presence. Camera trap recordings were taken over a total of 10 days, from March to end of June. Recordings were undertaken in the enclosure during the following days: 03/18/2020; 05/16/2020; 05/23/2020; 05/28/2020; 06/07/2020; 06/08/2020, with recordings made in the lodge during the following: 06/01/2020, 06/02/2020, 06/03/2020, 06/04/2020. Camera traps used were the Fivanus 1080P Hd, 16 mega pixel black flash camera model with a resolution of (640x480) producing high quality night photos, and it has been programmed to capture a photo and a video sequence of between 2 to 3 minutes, with a standby interval of 30s to 1min between the video sequences after detection of a new movement.

To have behavioral data collection, an ethogram with a description of the behaviors retained in the study was developed Table 1. We mentionne that this table does not represent an exhaustive list of behaviours in striped hyenas,[1] however we have only mentioned those observed in our recordings.

Table 1 Ethogram of captive striped hyenas describing the behaviors retained in the study[2,4,17,18]

Behaviour	Description	
Sleep and rest	The motionless animal is lying on its side with the thorax on the ground with the head raised or resting on the ground. Eyes closed.	
Food and dipsic	Food	Grinds food (generally with carnivorous teeth) and ingests
Behaviour	Watering	Drink water from the determined water points (in the enclosure and the lodge).
Grooming (of one self)	The animal licks itself, nibbles part of the body or scratches itself with the hind legs or on an object.	
Elimination behaviors	Urination and défécation	They defecate in the same way as other carnivores, although they never lift their legs as canines do when they urinate.
	Partner sniffing or scenting	Sniffing the muzzle and fur of a congener.
		Sniffing the genito-anal region of a congener.
	Partner grooming and other behaviors	Partner rubbing and grooming.
Social behaviours (affiliation)		· Licking the lips of a congener.
		Laying of the leg on a congener.
	Playful behavior	The animal can play alone by handling an object for example, but most often this behavior occurs between the two elements of the couple: races, chases, biting, etc.
	(Games)	
	Odormarking of the territory	Secretion by the male or the female of a creamy substance synthesized by the anal glands the animal spreads on various objects in its territory.
Stereotypical	Repeated back and forthe movements on the samepath, with no apparent goal.	

Results and discussion

We evaluated and compared the behaviour of the paired stripped hyena between the two compartments (enclosure and lodge) from end of day at dusk until dawn. A total of 1212 minutes of instant samples were analysed. On average, these captive animals between compartments enclosure and housing combined, spent 12.72% of their time in sleeping and / or resting behaviour,7.04% of their time in active behaviour (feeding, watering, grooming, partners sniffing, play, urination and defecation) and 3.85% of their time in stereotypical behaviour. Table 2. The comparison is made using the Student's test (t test) with a significance level ($p < 0.05$) and we treated each behavior individually, referring to the established ethogram.

Table 2 Percentage of time spent (Average±standard deviation) in different behaviors by the pair of captive hyenas studied

Behavior	Total averages (%)	Averages (%) in the enclosure	Averages (%) in the lodge	p-value
Sleep and rest	12,72±0,02	1,99± 0,002	10,73±0,02	0,10 (NS)
Food	3,02±0,003	2,25±0,003	0,77±0,002	0,32 (NS)
Watering	0,014±0,003	0,00±0,00	0,014±0,003	0,15 (NS)
Grooming	1,7%±0,003	0,2±0,0003	1,5±0,004	0,15 (NS)
Urination and defecation	0,17±0,13	0,11±0,14	0,06±0,12	0,75 (NS)

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Table Continued...

Behavior	Total averages (%)	Averages (%) in the enclosure	Averages (%) in the lodge	p-value
Partner sniffing	0,32±	0,06±	0,26±	0,27 (NS)
	0,0005	8,14*10-5	0,0008	
Games	1,82±0,003	1,2±0,003	0,64±0,003	0,82 (NS)
Odormarking of the territory	0,009±	0,00±0,00	0,009±	0,06 (NS)
	1,59*10-5		1,65*10-5	
Stereotypical	3,85±0,003	2,05±0,002	1,8±0,005	0,69 (NS)

S Significant difference

NS No significant difference

The couple spent much more time in sleeping behavior in the lodge (10.73%) than in the pen (1.99%) but with no statistically significant difference ($p>0.05$). The result obtained in the lodge is similar to what was obtained by[13] in the 24-hour system (11.15%).

The animals spent respectively 3.02% and 0.014% of their time feeding and drinking. The percentages of time dedicated to feeding and watering are, respectively, 2.25% and 0 % in the pen, and 0.77% and 0.014% in the lodge. It is important to emphasize that the difference in the time spent on feeding and watering is not significant ($p>0.05$) between the pen and the box. Time spent on feeding is relatively small; this result corroborates too the data provided by[13] (0.44% in the 12-hoursystem; 1.33% in the 24-hour system). The time dedicated to watering is extremely reduced which is not in agreement with the previous results obtained by many authors, in particular.[13-16]

The time devoted to grooming behavior[17] (of oneself) represented 1.7%, of which 0.2% and 1.5% respectively concern the pen and the box without any statistical difference between the two compartments ($p>0.05$). This result of 1.7% seems to agree with what was obtained by[13] in their study conducted in Sudan (0.55%: for the 12-hour hourly system; 1.55% for the 24-hour hourly system). The cleaning of the other animal was a very rare behavior in our study, the latter is a very important character specially in the determination of the hierarchy within the group in this species.[13] In the rare cases noted, within this study, the female cleaned the male (so she dominates him). Eliminating behaviour (urination and/or defecation) occupied 0.17% of the time analyzed and the difference is not significant ($p>0.05$) between the enclosure (0.11%) and the lodge (0.06 %). The hyenas couple spent 0.32% of their time sniffing each other: 0.06% in the enclosure and 0.26% in the compartment without any statistical difference ($p>0.05$) between the two compartments raised. The female dominated the male as the sniffer more often. The couple spent 1.82% of their time playing together or alone. They played more in the pen (1.2%) than in the box (0.64%), due to the provision of much more space and light in the pen; however, the difference was not significant ($p>0.05$) between the two locations.

The odor marking developed only by the male in the compartment with very short time (0.009%), however the difference was not significant ($p>0.05$) between the places (pen and compartment). Stress behaviors reflected by a stereotypical back-and-forth manifestation,[18] accounted for 3.85% of the time. Numerically, the animals were more stressed in the enclosure (2.05%) than in the lodge (1.8%); however, there was no significant difference ($p>0.05$) between the two locations.

Conclusions

A study was carried out on ethology and behavior of a pair of striped hyenas[1], in a captive environment in the Jijel Zoological Park in Algeria. It is based on the descriptive and comparative analysis of certain behavioral traits of the animals. The aim of this research work is to inform people about the interest of carnivores in general and the striped hyena in particular on the services they render to nature, and to try to dispel the unreasonable fear to which they have for this carnivore. We also aimed to gather the ethological information necessary to determine more precisely the needs and the arrangements necessary for the maintenance and development of this threatened species.

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None.

Conflicts of interest

Author declares there is no conflict of interest.

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