AWARE

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The strange sexual and fascinating biology of the Spotted Hyena

By Peter Hudson
with Mary Fick

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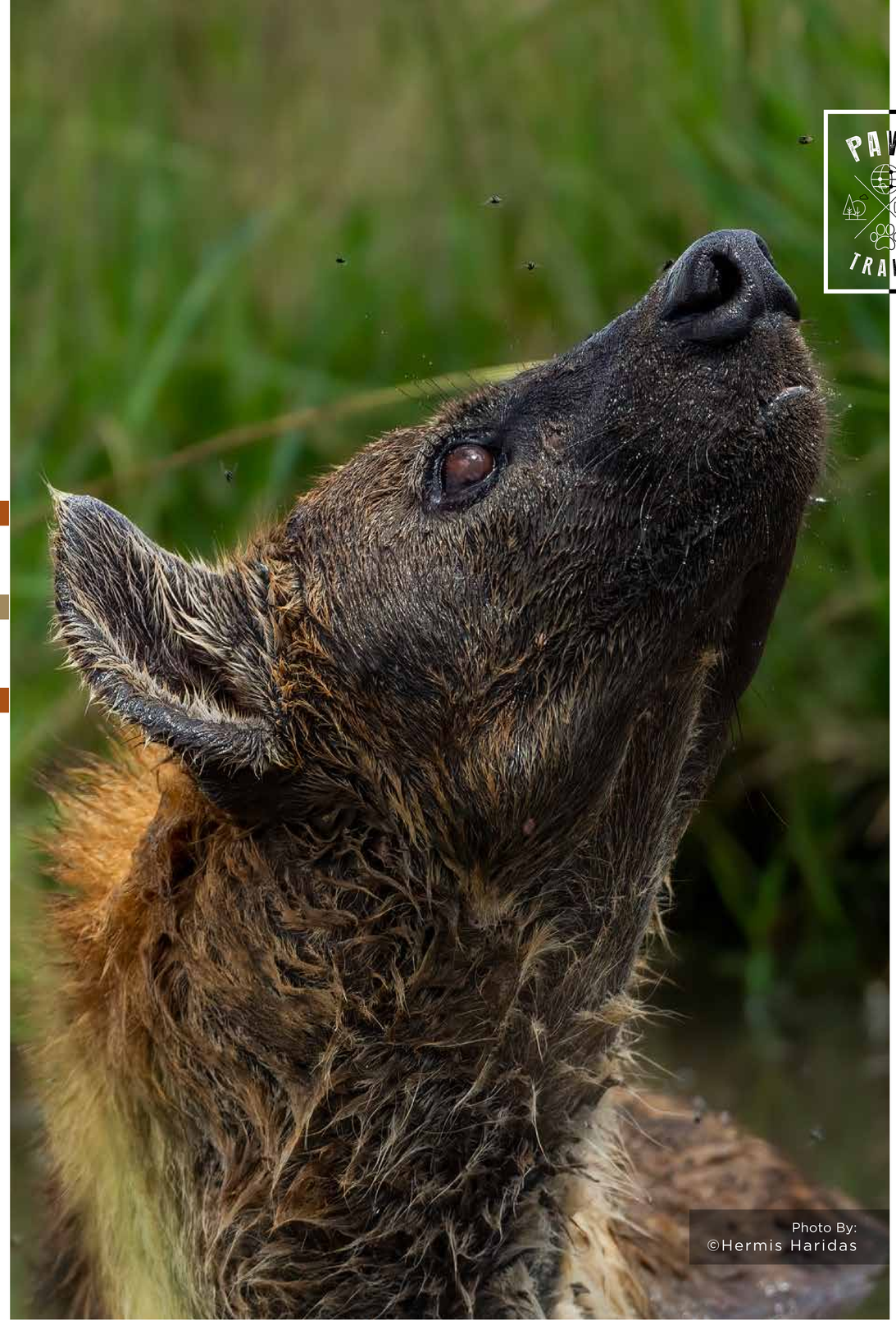

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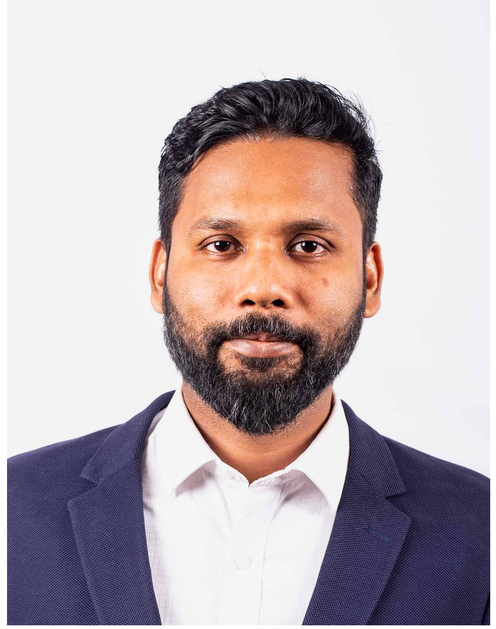

Raghul Patteri
Editor

EDITOR'S DEN

The spotted Hyena, Freak of nature or marvel of evolution – the verdict on that one is still out. Sometimes in the animal kingdom, you come across such characteristics in an animal that you are left wondering, why would evolution do something like that.

Hyena fits this bill to the T. A staple of the African savannah, but one of the least admired by the numerous visitors. The looks and some seemingly vulgar habits all add to this lack of admiration. But they are an awesome carnivore, even capable of bringing down big cats like lions.

This article explores two aspects of the Hyena, one physiological and one sociological, and explorers if one is linked to the other. They exhibit a complex matriarchal social structure and live in big clans and the need to flourish in this structure seem to have impacted their biology.

Thanks for all the wonderful photographers who have contributed the amazing photographs in this edition. Special thanks for resisting the charms of the big cats and taking the time to photographs the Hyena. It is thanks to your work that we are able to bring the focus on the less charismatic animals, which are no less intriguing and special, like the Hyena.

Our next edition will chronicle the Grizzly Bears, so please be ready with your Grizzly bear images.

Photo by: Deepa Girish

FOUNDERS' NOTE

Welcome to the latest edition of PT Aware.

If you have ever visited the Mara, you would have indeed sighted the Hyena. But how many would have paid attention, stopped to study? We hope you did because these are truly marvelous beings. These carnivores can virtually eat and digest anything and are very resilient creatures. Once they catch your fancy, there is no amount of time that you can spent researching, photographing or observing them.

At PT Aware, we try to bring awareness to all the different beings that inhabit this wonderful planet. The big cats and the big ungulates generally hog all the limelight, so it is important to explore and spotlight the others too. At our marvelous Mara Trails camp, we ensure to provide the full bouquet of experience of the Masai Mara, and encourage our visitors to spend time with the less popular animals like the Hyena as well. Please contact us for an unforgettable mara experience.

PT Aware strives to bring you the best from both worlds, latest scientific perspective, and mind-blowing photographs. To all our contributors and readers, a big thank you for being part of this journey.

Hermis Haridas &
Nisha Purushothaman
Founders - Paws Trails Explorers

THE STORY

The strange sexual and fascinating biology of the Spotted Hyena

By Peter Hudson (Conservation Director, Paws Trails)
with Mary Fick

Images by: Deepa Girish, Peter Hudson, Hermis Haridas, Syed Ahmar Amjad, Divesh Cm, Chintan Gohel, Kalika Shah, Sajeev KTDA, Sibin Nelson, Solomon Rajkumar, and Nisha Puruhothaman

Peter Hudson is a scientist, photographer, and conservationist. He undertook his first scientific expedition to Africa at the age of 21 and has been a regular visitor ever since. Passionate about nature, he manages his own 36-hectare nature reserve in Pennsylvania which is home to bears, bobcats, and other animals.

In his professional career, Peter is the Willaman Professor of Biology at Penn State University. The focus of his research has been the infectious diseases of wildlife and in particular how new diseases emerge. For the past 11 years, he has been working on how and why viruses move from bats to humans in an attempt to predict when viral spillover occurs. He has also been studying the wolves in Yellowstone, tortoises in the Mojave Desert, and bighorn sheep in Idaho.

Peter is the Conservation Director at Paws Trails and uses his skills as a scientist and educator to increase awareness about conservation issues. He is supported by two interns at Paws Trails: Hayden Kissel and Shreya Menon. He is also heavily involved with the Random Good Foundation that undertakes storytelling for social change. He is an adjunct Professor at The Nelson Mandela African Institute of Science and Technology based in Arusha, Tanzania, and a Fellow of the Royal Society.

Photo by: Peter Hudson

Photo by: Divesh Cm

The Spotted yena (*Crocuta crocuta*) is one of the most obvious, and to many people, the least attractive of the carnivores that inhabit the savannah grasslands of Africa. Most of us stop and take a few photos the first time we spot one wallowing in a mud hole, after which we tend to say "just a Hyena" and rush on hoping to see if we can find a spectacular cat. Hyenas are close relatives of the cats and what you are missing is the remarkable biology and social life of these truly fascinating animals. They are carnivores with massive strong jaws that carry robust conical molars that can easily crack bones and their digestive system is so strong that they can digest bones and every part of animal except for hair and hooves. These they eat but then disgorge in a pellet. So, after reading this article I want you to stop the next time you come across a Hyena in the Mara, try to identify the sex and status of the individuals you are looking at and understand what they are doing.

Females have a pseudo-penis

One of the almost unique features of spotted hyenas is that the genitalia of the females have become highly masculinized so the females appear to have a penis – I say almost unique since I have since discovered that some mole species do the same. The females have no external vaginal labia, and the clitoris has developed into a pendulous organ that resembles a penis. This still functions and is used by the females for passing urine, giving birth, intercourse and can even become erect and used to signal submission. The labia have become fused and form an organ that resembles the male's scrotal sac. For some time, zoologists assumed that the masculinization of the female genitalia was a consequence of being exposed to male hormones (androgens) during development but recent experiments, where production of the male androgen hormones was blocked, show that this is not the case. Indeed, the female estrogen hormones play a critical role in both penile and clitoral development and determine the position of the urethral orifice. Of course, the obvious question is why? What advantage does this give the females and what selection pressure has resulted in the females developing this pseudo-penis? The answer is not apparent but may lie in their matriarchal and complex social life.

Matriarchal social system

The real fascination of Hyenas is their large, socially complex societies that resembles more the behavior of large troops of baboons you see walking across the savannah than their closer carnivore relatives like lions. They live in clans that can include as many as 80 individuals, in areas where there are much prey available. These clans consist of multiple matrilineal lines – that means several female descendent lines with mothers, daughters, and granddaughters. These matrilineal lines are not closely related to each other and yet they form a

Photo by: Peter Hudson

Photo by: Hermis Haridas

Photo by: Kalika Shah

Photo by: Sajeev KTDA

Photo by: Sibin Nelson

coalition clan with groups of related individuals supporting each other within the clan. This is very different to lions where the prides consist of closely related lionesses and a coalition of males that are often related to each other but not to the females. Each female line is hierarchical within the clan, so that each daughter takes the rank of their mother and are dominant over low-ranking females irrespective of age and size. The high-status females start breeding at a younger age, reproduce more frequently and produce more cubs that survive better than the lower ranking females. Females give birth in remote dens but then move their young cubs to a common den, shared amongst the females of that clan and may accommodate as many as 30 cubs of different ages, derived from as many as 20 females. Since only some of the females are related, mothers invariably nurse only their own cubs and reject cubs from other litters. The cubs take a while to develop not weaning until 14 months of age, and are highly dependent on the mother for years in finding food. Young females usually stay with the clan, but the males leave their natal clans and join neighboring clans. The males do not carry the status of the mothers and join a new clan at the bottom of the pecking order. The males form their own hierarchy and status is determined by when they joined the clan and only get promoted when a male above them dies or moves onto another clan. Even so, females favor the incoming

Photo by: Solomon Rajkumar

Photo by: Peter Hudson

Photo by: Peter Hudson

Photo by: Nisha Purushothaman

males as mates and they often form tight amicable relationships with a female that results in them getting mating opportunities.

The social ladder

All of the Hyenas in the clan help to defend territories and when individuals from another clan appear they advance as a group with their tails and manes erect and often results in running battles. When they approach members of their own clan they do so in a ritualized manner, approaching face to face then raising their hind leg and letting the individual sniff their genital areas. Low-ranking females will often present an erect pseudo-penis in submission and in group situations only the dominant female will not have an erect pseudo-penis.

Young Hyenas start by being aggressive to both individuals with higher and lower ranks than their mothers but when a year old all their aggression is aimed at lower ranking animals. Mothers frequently support their young in being aggressive towards lower ranked individuals, and just like baboons, the young form coalitions to gang up against some individuals in an attempt to climb the social ladder. Scent is important and they spend much time sniffing each other's genitals. They produce a thick paste from their specialized anal glands that they smear on grass and vegetation along the clan boundaries and within the territories and this strong scent identifies both clan members and individuals.

The clans act as a "fission-fusion group" that will come together in and around the den, defend the territory as a single unit, often hunt together but then will break apart and small subgroups or individuals will hunt alone. The Hyenas tend to stay within their territories but in the Serengeti, where large herds of ungulates migrate long distances, the Hyenas will commute to the migrating herds, often passing through the territories of other clans where they are tolerated when it is apparent they are not hunting. Hyenas are very aware of any kill made within their territory and immediately come running when cheetahs, lions, leopards or any other Hyenas make a kill. If the kill is made by their own clan, then dominant females immediately take over and the low-ranking individuals must wait their time. This can result in low-ranking individuals not getting access to kills they have made so it is often more profitable for the low ranking individuals to hunt alone.

Hyenas clearly have a complex and tense matriarchal social life with interactions amongst clan members, neighboring clans and while only the spotted Hyena amongst the 4 Hyena species has a pseudo-penis, none of this really explains the evolution of the pseudo-penis. The very presence and shape of it means it is not physically easy to copulate and so the female can select who

Photo by: Peter Hudson

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she lets mate with her. Some have suggested that it is a by-product of female-female aggression or siblicide whereby females and not males are identified as potential competitors in the clan and so they developed pseudo-penises to hide their sex. Field work has shown that giving birth with a pseudo-penis has its problems and can lead to death of the babies while on the other hand it appears to be useful in the complex greeting displays. Maybe there is no simple explanation, and this developed through selection for several characteristics. Either way it is a great subject for discussion when you are next in your Land Cruiser in the Mara and they are indeed interesting animals to watch.

Photo by: Solomon Rajkumar

Photo by: Peter Hudson

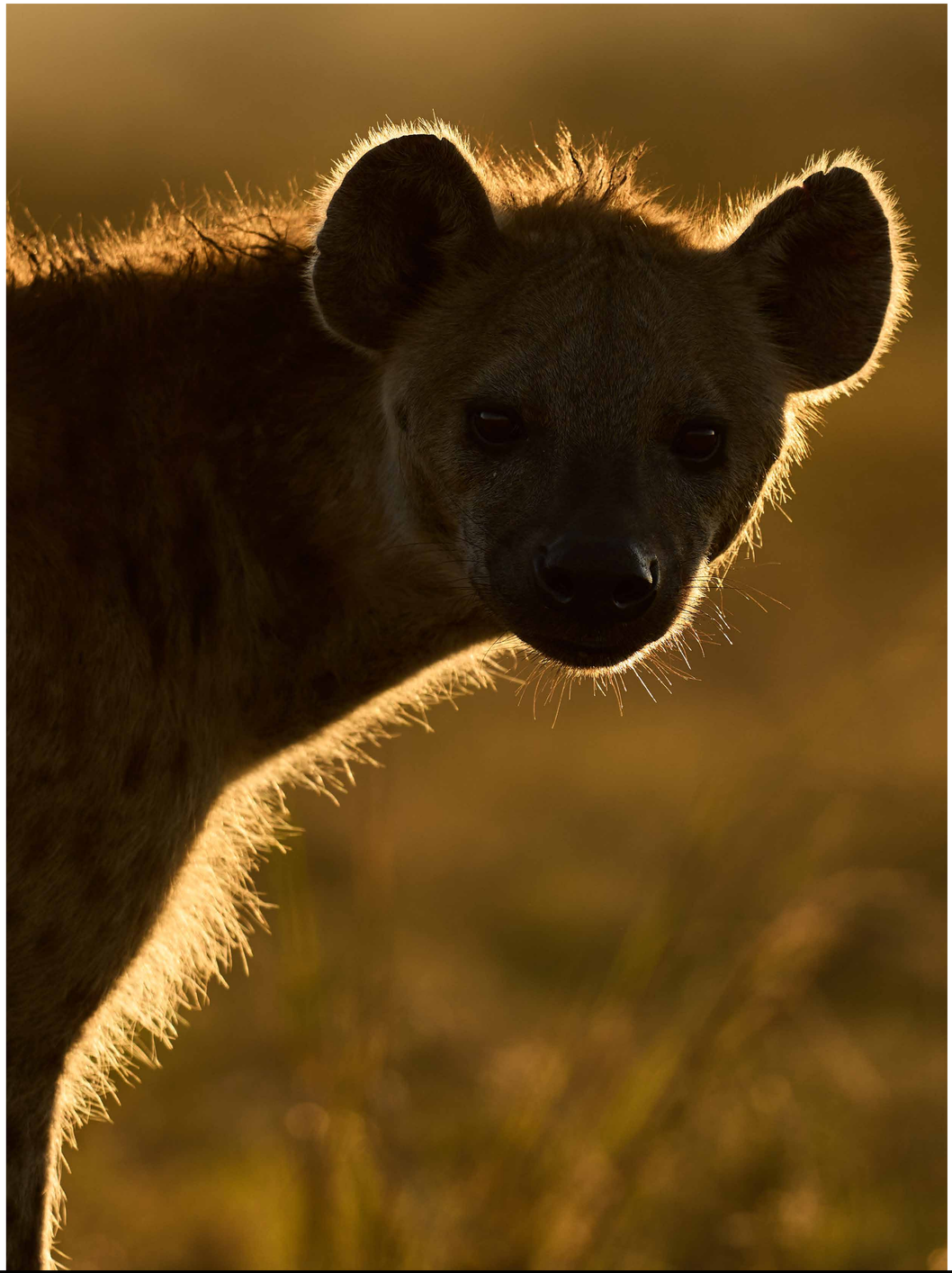
Photo by: Deepa Girish

Photo by: Peter Hudson

Photo by: Chintan Gohel

Photo by: Sibin Nelson

Photo by: Syed Ahmar Amjad



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