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Abstract: In all of the African literature on wildlife only two observations of fighting between cheetahs have been reported. In captivity, it was observed that cheetahs are aggressive in a number of situations and their fighting behaviour is quite stereotyped and complex. Situations of fighting over food are described.



Aggressive Behavior

I left Kenya in 1967, and used my data on social organization and spacing in cheetahs for a Master's Thesis at Purdue University. From 1968 to 1971, I studied social behavior in lions for a Ph.D. at Purdue, but not in Africa. Instead, I chose to investigate the lion's social life under semi-natural conditions at Lion Country Safari. With two sites, in Florida and California, and a total of over 300 lions, I was able to observe a number of prides over a long period. Under these conditions experimental manipulations could be carried out that would have been impossible in the wild. For example, once the status relations in a pride were clearly established, I was able to introduce a foreign lion and study the process of social integration. Mating and fighting behavior were as natural as in the wild, only continuous observation of each pride was possible. I knew what took place in a pride every day and why changes in dominance or mating preferences came about.

My major objective was to describe aggressive behavior and what induced it, but during the lion study, Lion Country Safari imported 24 wild cheetahs from South West Africa. This gave me an excellent opportunity to study aggression in cheetahs and to compare it to lions.

In all of the African literature on wildlife only two observations of fighting between cheetahs have been reported. Stevenson-Hamilton (1947) in South Africa recorded the fights, both of which involved one

male fighting another at a kill site. Both combats resulted in death for one of the combatants. In Africa I had witnessed only slight aggression between a mother, in heat, inspected by her nearly adult son. A simple slap of the face was all it amounted to. If cheetahs do fight, even rarely, I was most intrigued to discover what caused it. Also it would be interesting to be able to see how they fought compared with other predators.

The setting of 24 cheetahs, the world's largest collection, in a small area was the perfect experimental situation to study fighting behavior. Surely the crowding would result in competition and aggression.

I spent all day and many nights in the cheetah section for about three months just after the cheetahs arrived from Africa. Later I spent late afternoons and early evenings, after the tourists left and the cheetahs became more active, watching the cheetahs for six more months. The results were illuminating. Indeed, cheetahs are aggressive in a number of situations and their fighting behavior quite stereotyped and complex.

After the tourists left one evening in July, 1970, we threw out a whole carcass of a horse. All the cheetahs, though already fed to satiation on cut-up fresh horsemeat, ran to the carcass. Immediately there was fighting, hundreds of fights in a manner of minutes! Fur literally flew through the air and the vocalizations were so many and so loud that I had trouble believing my ears. This experiment was repeated many times with typical cheetah prey that died in the reserve, for example gazelles, moufflon sheep, etc. When I analyzed the film and tape-recordings, the nature of fighting behavior became more discernible.

As the cheetahs are gathered around a carcass, they are all quite nervous. They are attracted to the carcass but at the same time are inhibited by the presence of many other cheetahs crowded around the carcass. When one cheetah turns its head and sees another standing close by looking at it, the outcome is inevitable—there is a short fight (Fig. 6-1). One of the cheetahs swats the other on the head; however, swatting in cheetahs is unique among the big cats. This is related to the specialized anatomy of the cheetahs. All of its claws on the forepaw except one are dull. The cheetah's claws are only partially retractile, and they are used in running. The claws on the front of the paw are not sharp and could not be effectively used in fighting. However, there is a large, slightly curved claw on the side of the foot which is not used in running and which is very sharp. It is this claw, the dew claw, which is used in swatting with the forepaw. It makes the opponent's fur fly (Fig. 6-2).

The blow is directed to the head of the opponent, usually the forehead or cheek. The dew claw is dug into the fur and skin and then pulled loose from the hide. This is the most common form of physical aggression. It is rarely injurious, and then only superficially.

The fight consisting of a single forepaw swat usually results in the



Figure 6-1 Fighting over a single carcass at Lion Country Safari. Notice that the animal swatted has its eyes closed. (Photo: R. L. Eaton.)

swatted cheetah actively submitting by rolling onto its side. Expression of submission usually "cuts off" or inhibits further attack. The submitter also emits high-pitched yelps, one after the other, once lying on its side, or when stared at prior to a potential attack.

Sometimes, around a carcass, there is a domino effect. A cheetah that submits by rolling onto its side away from the opponent, unknowingly makes contact with a third cheetah. The third cheetah then either attacks the submitter or in turn also submits and elicits attack or submission in a fourth cheetah. In this way fighting and submission move in a circle, from cheetah to cheetah, around the carcass.

Mere visual contact is enough to act as a threat and induce submission without there being any physical contact. In fact cheetahs actively avoid looking other cheetahs in the face. When crowded together at a carcass, it seems that every cheetah except those feeding is looking in a different direction. When one cheetah's eyes meet another's, there is either a fight, one immediately submits, or both "look away," which itself is a form of submission.

The eyes have it, no doubt, and not just in the cheetah but also in

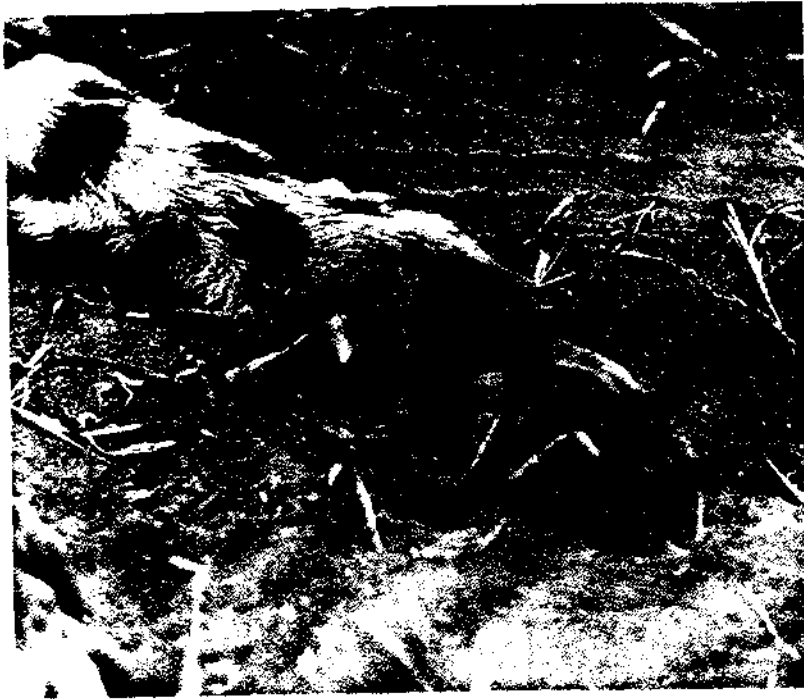


Figure 6-2 Visible here is the dewpaw, highly cornified and pointed. It is different from the dew claw hidden from view by hair. The dew claw is used both in fighting and predation. The paw is used only in fighting. (Photo: R. L. Eaton.)

wolves, lions and many primates, including man. A direct stare is a threat; looking away is submissive. There is one time when the eyes are always completely closed. That is during physical combat. Two fighters seal their eyes shut as soon as they initiate a swatting movement or are about to be struck. The dew claw could easily damage an eye, especially since it so often strikes the forehead. I believe that closure of the eyes is an adaptation that prevents eye injury.

The aggressive behavior at carcasses is not to be considered unnatural. Obviously the competing cheetahs possessed the ability to threaten, fight, and submit repeatedly in a predictable and stereotyped fashion. The absence of observing these behaviors in the wild is also explainable. At a carcass in the wild, there are rarely more than five or six cheetahs. Usually there is ample room for all the cheetahs to lie around the carcass and feed together. Furthermore, in the wild, the individuals that feed on the same

carcass know each other well and probably already recognize and respond to an existing and stable dominance order.

In a situation with far too many cheetahs to feed simultaneously, plus the lack of long-term social relationships among individuals, increased competition and fighting should be expected.

There are many other expressions of aggression in cheetahs which also became known at Lion Country Safari. During the normal feeding procedure of throwing out whole chickens or cut-up horse or beef, there was competition. As one cheetah is lying down alone feeding, another approaches. If the possessor of the food looks up at the competitor or growls, the competitor quickly looks away as if not interested in the meat. As the competing cheetah gets closer and is again threatened with a stare or growl, he quickly turns around 180 degrees and faces directly away from the feeding cat. This wheeling around is repeated until the competitor's rear end is inches from the food and head of the feeding cheetah. The competitor remains sitting and occasionally glances over his shoulder at the food, eventually turning very quickly and grabbing the meat in his mouth. Sometimes this technique results in freeing the meat and making off with it. The presenting of the rear end as a means of approach to a potentially aggressive cheetah works because it removes the head and eyes from contact with the other cheetah. An animal that has its entire body facing completely away is obviously no real threat or danger. "I am not a competitor, how could I be in this orientation?," seems to be the information communicated. Presenting of the rear end in many primates plays a comparable role: it changes or redirects an attacker's motivation from aggression to sex.

Other times the original possessor has a good grip on the meat with his dew claws and teeth. There is a tug of war, which may last 15 minutes before one cheetah gives up or loses its grip.

The interesting thing about direct competition for food is that a rule emerges: "Possession is nine-tenths of the law." Once both cheetahs have a grip on the meat, neither swats the other though both are perfectly vulnerable. The goal is to obtain sole possession of the meat by maintaining a hold on it, and not to physically attack the other competitor and make him yield. This same rule holds true most of the time in lions also. Like cheetahs, lions with food are seldom physically attacked. Usually they are charged and threatened. The response is either to abandon the meat, for example to a more dominant lion, or to grip the meat in the claws and teeth so that the challenger cannot get it away. The cheetah or lion that lies there tightly holding the meat is extremely vulnerable to damaging attack, but the challenger is inhibited; he obeys the rules that have evolved to prevent harmful and possibly lethal damage.

The inhibitions which normally prevent lethal aggression favor the

possessor. The result of leaving the food to threaten, fight, or chase a potential competitor away is usually futile as I have seen in both lions and cheetahs. Once the meat is abandoned, a third party quickly grabs it and runs away to feed, thus leaving the original competitors empty handed.

Very rarely a stereotyped form of physical attack is seen in cheetahs. It employs the use of another, unique anatomical specialty of the cheetah—the dew paws. All cats have fleshy dew paws on the back of their foreleg and above the pads on which the cat walks. However, the cheetah's dew paws, on each foreleg, are hard, pointed and sharp. The dew paws are not used in a head-on attack. Both paws are simultaneously raised up and brought down hard against another cheetah's shoulder or flank. They sometimes pierce the skin, inflicting puncture wounds.

Cheetahs are less formidable than lion, hyena, and leopard. The cheetah is slight in build, weighing less but taller and longer than a leopard. The cheetah's skull and jaws are reduced in size as a specialization for increased speed. Their claws are not especially dangerous either. Basically, they are ill-equipped to defend prey against competitors. In a few cases in Tanzania, cheetahs threatened approaching competitors, but in only one case did they succeed in preventing loss of their own kill, and that was against a single hyena. In all other instances, against several hyenas or a



Figure 6-3 Interspecific threat expression. (Photo: R. L. Eaton.)

lion, the cheetahs abandoned their kill. The threats were not backed up by physical contact. Descriptions of interspecific threatening have been incomplete and never captured on film. At Lion Country Safari I had a good chance to make many observations of the aggressive responses reserved for other species.

The mouth is opened wider in interspecific threat. The "open mouth" threat is a display of the teeth which is enhanced by the striking contrast of black gums and lips (Fig. 6-3). The wrinkles in the face, so typical of tiger, lion, and leopard, are seen in the cheetah in threatening lion, leopard, hyena, and man. The wrinkles in the face are seen in lion against lion, in leopard against leopard, and, so on, however, lion and leopard use the same expressions to communicate visually a threat or a warning to their own and other species alike. The cheetah is different in this respect, it mimics the competing predator's general threat expressions. For example, hissing, growling, and similar sounds have a similar effect among a variety of species. The cheetah does not hiss or growl at other cheetahs, but it does at other predators and men. This achieves what is in essence a common language. If a cheetah threatened a leopard the same way it did another cheetah, the leopard would not recognize and respond to the cheetah's expression. We find in the cheetah two different sets of behavioral patterns that express a warning and aggressive mood—one for their own species and another for other species.

The threatening between cheetahs is far more subtle and less exaggerated. A momentary stare and a slightly open mouth can easily elicit submission in another individual. Threatening against other species is far more intent but is never backed up with actual physical attack.

The first time I personally experienced an attack of a cheetah, I kept telling myself "cheetahs have never been known to attack people!" It was nearly dark as my wife and I walked through the cheetah section. Suddenly two cheetahs got up from 60 yards away and ran straight at us. I looked in horrified disbelief for a second, then stood in front of Katia, facing them, which often deters an animal's attack (one has no chance if he runs!). The cheetahs kept on coming. When they were 20 feet away I thought to raise my windbreaker up over my head to arms length thus creating a huge silhouette against the dimly lit horizon. Both cheetahs suddenly came to a halt only five feet away. I still wonder if they did not perceive us as prey.

At a carcass at Lion Country, just as in the wild, cheetahs threaten man. Fritz Walther, the well-known ungulate ethologist, was once charged by cheetahs on a gazelle kill in the Serengeti. I studied under Walther and when he related the story to me it was quite a shock. This was the first report I had heard of a cheetah attacking man in the wild. Cheetahs had stalked me in the wild as I lay on the ground observing them. My standing



Figure 6-4 A Cheetahs threatening human with interspecific behavior not seen in aggression between cheetahs. (Photo: R. L. Eaton.)

up always ended their stalks and I was never attacked. The cheetahs had apparently perceived me as prey until I stood erect.

The cheetahs that charged Walther were responding to him exactly as they would to a hyena. Cheetahs attempt to defend kills against man and beast alike. Hundreds of times during feeding, I have been threatened by cheetahs as I walked nearby or purposely approached them (Fig. 6-4). The cheetah makes a short rush with its body angled slightly sideways so that the hind end is partially visible. The head is held low, the mane on the neck is raised, and an eerie moaning growl is emitted. The climax of this complex display is the "foot stamp." The cheetah lunges forward while raising both forelegs and then stamping them down on the ground. The stamp makes considerable noise and dust may fly. The foot stamp is accompanied by a sudden loud gush of air that creates a sound not unlike

the "hai" of karate. The mouth is opened its widest during the foot stamp, throughout which the cheetah stares directly into your eyes. It is very frightening (Fig. 6-5).

The lowered head, the "moan," the "hai," the "foot stamp," and the prolonged stare have never been observed in hundreds of aggressive encounters between cheetahs. Truly, this complex of behavior is highly evolved and specialized for interactions with other species only. This is not a common thing among large cats, usually they warn or threaten their own and other species in the same way.

At World Wildlife Safari we avoid being near the cheetahs to prevent human contact and any undue stress which would conceivably interfere with breeding. However, periodic observation has revealed that our cheetahs also exhibit intra- and interspecific threat identical to that described above, though perhaps more intense since they see people and compete directly with other cheetahs far less than at Lion Country Safari.



Figure 6-4 B The author eliciting threat from cheetah. (Photo: K. Eaton.)



Figure 6-5 The foot stamp involves a forward lunge in which both forepaws strike the ground. (Photo: R. L. Eaton.)