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Abstract: Three arguments explaining why the infanticide in cheetahs was never seen and is not favourable are proposed: (i) there is no guarantee that the female would remain in their territory after the loss of litter; (ii) females can conceive, on average, less than three weeks after losing cubs; and (iii) females can conceive while still with dependent cubs.

DO MALE CHEETAHS COMMIT INFANTICIDE?

In the fierce struggle to pass on one's genes, competition among individuals can be fatal. This is dramatically demonstrated when mates kill unrelated juveniles of their own species, a strategy thought to yield reproductive pay-offs. Many male mammals have a very brief tenure as the dominant breeding individual and cannot afford to wait for females to raise offspring sired by other



males and then resume estrus. Infanticide accelerates the whole process and the male maximizes his own genetic contribution. Among cats, it has been documented most compellingly in lions but tigers, leopards, cougars, and smaller species including lynxes, ocelots, and even feral domestic cats are known to do it.

A possible exception to the pattern is the cheetah, where despite decades of study, infanticide has, to my knowledge, never been observed (although it has been inferred in one case in the Masai Mara). When males interact with family groups, they typically tolerate or ignore the cubs, suggesting they are the fathers that, naturally, would not kill their own offspring. During a study of reintroduced cheetahs at the Phinda Resource Reserve in northern KwaZulu-Natal, South Africa, I had the opportunity to observe interactions between mother cheetahs with cubs and males

that were almost certainly not the fathers, and examine the question a little further.

The situation at Phinda provided unusual opportunities to observe cheetahs for a number of reasons. The small population of cheetahs was recently reintroduced and all males were known and radio-collared. During my study, there were no transient males in the park and the study males were resident on small exclusive territories. I located all coalitions every day and so was fairly certain which males had been in association with known females at the time they conceived. I must stress that without genetic data—which, unfortunately, I don't have for this study—paternity was not certain. Nonetheless, I hope these observations contribute to the questions and stimulate more investigation: perhaps someone *has* observed cheetah males killing cubs. It would be fascinating to hear of it, if so.

The encounters I witnessed seemed to follow the pattern seen elsewhere in studies on cheetahs, notably the comprehensive long-term observations from the Serengeti made by Tim Caro and his team. Interactions were always characterized by very dramatic vocalizations and harassment of females—regardless of whether the males were the litters' sires or not—and persisted for as long as 18 days. In most of the encounters, the males were very focused on the female, presumably to assess her reproductive status, and the cubs were largely ignored. Occasionally, I did see cubs attacked by males, resulting in bleeding injuries from bites or slaps in half a dozen cases. However, the wounds were relatively superficial and the cubs always survived. This is in stark contrast to other cat species: during pride take-overs, male lions kill or evict most unrelated cubs under a year old. Interestingly, unlike lionesses, cheetah mothers never intervened or attempted to defend cubs when males attacked them.

So, assuming at least some of these interactions involved unrelated males (which indeed probably applies to the dozens of observations from other studies where paternity was unclear), why don't cheetah males follow the feline pattern of killing unrelated cubs? Perhaps the migratory movements of females preclude the benefits of

infanticide. Unlike most cats, female cheetahs generally appear non-territorial and wander over huge ranges. Males would gain little by killing unrelated cubs, as there is no guarantee the female would remain in their territory after the loss of a litter. She may be just as likely to mate with a competitor in a neighboring territory or even hundreds of kilometers away.

However, in Phinda, which is only 180km² and entirely enclosed by electrified fencing, females are far more localized in their movements and often remained exclusively in a single coalition's territory for up to six months. Furthermore, females can conceive, on average, less than three weeks after losing cubs, so the opportunity for males to reap substantial genetic rewards by infanticide was ripe. Possibly because the cheetahs had been translocated from the vast spaces of Namibia where males and females have huge home ranges, I was seeing a pattern that had arisen in their original habitat. It remains to be seen whether different behavior will emerge with subsequent generations of cheetahs born at Phinda, where, with its high density of non-migratory game, cheetahs may be more conservative in their movements than the Namibian founders.

Reproductive flexibility may be a factor. Cheetah females can conceive while still with dependent cubs, although typically the cubs are over 12 months old and close to independence; the mother leaves them to give birth to the second litter. If unrelated males encounter a female with large cubs, infanticide is probably unnecessary because the mother is likely to be sexually receptive already. During one encounter, I saw two males chase year-old cubs away from the female and mate with her, a union in which she conceived (the cubs returned to the mother once the males had left). Nevertheless, while I never saw encounters involving very young cubs, often they were still some months away from independence and by the norms of cat behaviour, should therefore have been killed. Conceivably, it is too dangerous for a male to attack large cubs. However, male coalitions will attack and kill other males in territorial clashes, and I have twice seen male pairs kill single adult males with amazing swiftness,

incurring almost no injuries in the process. Therefore, it would seem reasonable that coalitions could kill large cubs with relatively little risk, but perhaps gaining only a few months in the race to perpetuate one's genes is not enough of a benefit to outweigh even a slight chance of injury. Clearly, more observations are required.

Finally, as has been stressed to me by some very experienced observers of cheetah behavior, perhaps my males were friendly! These sorts of social interactions between cheetahs are very rare to witness, and although I've seen over 20 encounters between males and mothers with cubs, it involved a very small number of males. Those males hardly represent an adequate cross-section of cheetah "personalities" so even though the rates of aggressive behavior directed towards cubs did not differ for sires and non-sires, I cannot say whether or not my study males were particularly tolerant individuals or that more aggressive males would have behaved in a similar fashion. Until more observations become available, we need to be cautious about drawing any conclusions. I am sure there are situations where infanticide must occur, and rigorous observation will hopefully further reveal this little-known facet of cheetah behavior.

— Luke Hunter

CHEETAH NEWS DEADLINES

Thank you for your contributions to *Cheetah News*. Please remember that the deadline for the next issue is November 30, 1998.

— Helena Pritch-Snyder

