Cheetahs found to use spatial avoidance techniques to allow for surviving among lions

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Cheetah. Image: Wikimedia Commons.

(Phys.org) —A team of researchers at the University of Minnesota, along with assistance from several African wildlife agencies, has found that contrary to popular belief, cheetahs are able to maintain population levels when sharing space with lions. In their paper published in the *Journal of Animal Ecology*, the team describes how they performed an analysis of cheetah and wild dog survivability in lion areas using data from prior field studies.

For several years wildlife experts have lived under the assumption that where lions tread, cheetahs and wild dogs decline. In this new effort, the

researchers claim that while that assumption might be true for wild dogs, it does not appear to be the case for cheetahs.

The reason that experts have though that cheetahs couldn't survive living near lions was because of the many notes by field experts reporting lions killing up to 57 percent of cheetah cubs. In their analysis, the researchers agree with that number, but suggest it's not high enough to cause a cheetah population decline.

To separate fact from fiction, the researchers combed through records kept by researchers over the past 30 years studying life in Serengeti National Park in Tanzania. They also looked at data from a radio collar field study conducted from 1985 to 1990, also in the park, which included lions, cheetahs and wild dogs.

The team notes the data shows that the lion population in the park tripled between 1966 and 1998, the cheetah population held steady, and the wild dog population declined to the point of almost disappearing. They suggest there is good reason for those numbers.

Cheetahs are fast runners, as everyone knows—a lion cannot run one down. For that reason, a lion killing an adult cheetah is very rare (not so for wild dogs). The cheetahs use what the researchers call spatial avoidance—they keep themselves a certain distance from lions at all times, typically 100 meters. This means they have to be hyper-aware of course, but it's a strategy that clearly works. Interestingly, the researchers found that the cheetahs almost always had their cubs in lion areas, which accounted for the high cub killing rate. Why the cheetahs choose to do so is difficult to fathom, though the researchers suggest it's because the lions inhabit the best parts of the park. They also note that while the cheetah survival strategy appears to work well enough to prevent population declines, it doesn't appear to be strong enough to allow for population gains.

More information: Cheetahs and wild dogs show contrasting patterns of suppression by lions, *Journal of Animal Ecology*, Accepted Article. onlinelibrary.wiley.com/doi/10 … -2656.12231/abstract

Abstract

Top predators can dramatically suppress populations of smaller predators, with cascading effects throughout communities, and this pressure is often unquestioningy accepted as a constraint on mesopredator populations. In this study, we reassess whether African lions suppress populations of cheetahs and African wild dogs, and examine possible mechanisms for coexistence between these species. Using long-term records from Serengeti National Park, we tested 30 years of population data for evidence of mesopredator suppression and we examined six years of concurrent radio-telemetry data for evidence of large-scale spatial displacement. The Serengeti lion population nearly tripled between 1966 and 1998; during this time, wild dogs declined but cheetah numbers remained largely unchanged. Prior to their local extinction, wild dogs primarily occupied low-lion density areas, and apparently abandoned the long-term study area as the lion population "saturated" the region. In contrast, cheetahs mostly utilized areas of high lion density, and the stability of the cheetah population indicates that neither high levels of lion-inflicted mortality nor behavioral avoidance inflict sufficient demographic consequences to translate into population-level effects. Population data from fenced reserves in southern Africa revealed a similar contrast between wild dogs and cheetahs in their ability to coexist with lions. These findings demonstrate differential responses of subordinate species within the same guild and challenge a widespread perception that lions undermine cheetah conservation efforts. Paired with several recent studies that document fine-scale lion-avoidance by cheetahs, this study further highlights fine-scale spatial avoidance as a possible mechanism for mitigating mesopredator suppression.