

Predation on a Yellow Baboon (*Papio cynocephalus cynocephalus*) by a Lioness in the Tana River National Primate Reserve, Kenya

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Predation on an adult female yellow baboon (*Papio cynocephalus cynocephalus*) by a lioness is reported. This predation occurred in full daylight within 10 m of the observer. The high incidence of disappearances of adult females from the study troop during a one-year period is reported and the potential long-term demographic effects upon the troop resulting from this one year's high number of disappearances discussed. These disappearances may be due to predation. We suggest that lion predation upon baboons, and baboon deaths and disappearances in general, in the Tana Reserve, may be inversely related to rainfall. We also report that there does not appear to be a long-term sex difference in vulnerability to death or disappearance.

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INTRODUCTION

The importance of predation on primate sociality has been, and continues to be, a source of debate [e.g., Alexander, 1974; van Schaik, 1983; Wrangham, 1980]. Though the issue remains unresolved, predation pressure is generally accepted as one of the factors affecting group living. As such, data provided by observed primate predations may be beneficial in addressing this concern. Unfortunately, predation upon feral primates is seldom observed, and, while often suspected or implied, it is generally difficult to prove.

Extensive research on baboons has now been conducted for over 30 years [e.g., Washburn & Devore, 1961; Smuts, 1985], yet relatively few predatory events have been observed, and lion predation in particular, rarely documented. (See Cheney and Wrangham [1987].) Altmann and Altmann [1970] reported no predatory attacks on the Amboseli baboons by lions. Busse [1980] reported eight observed lion attacks upon chacma baboons (*Papio ursinus*) at Moremi Wildlife Reserve, Botswana, only two of which resulted in predation. Schaller [1972] observed no baboon predation in his 1967-1969 study of free-ranging lions in Serengeti Park,

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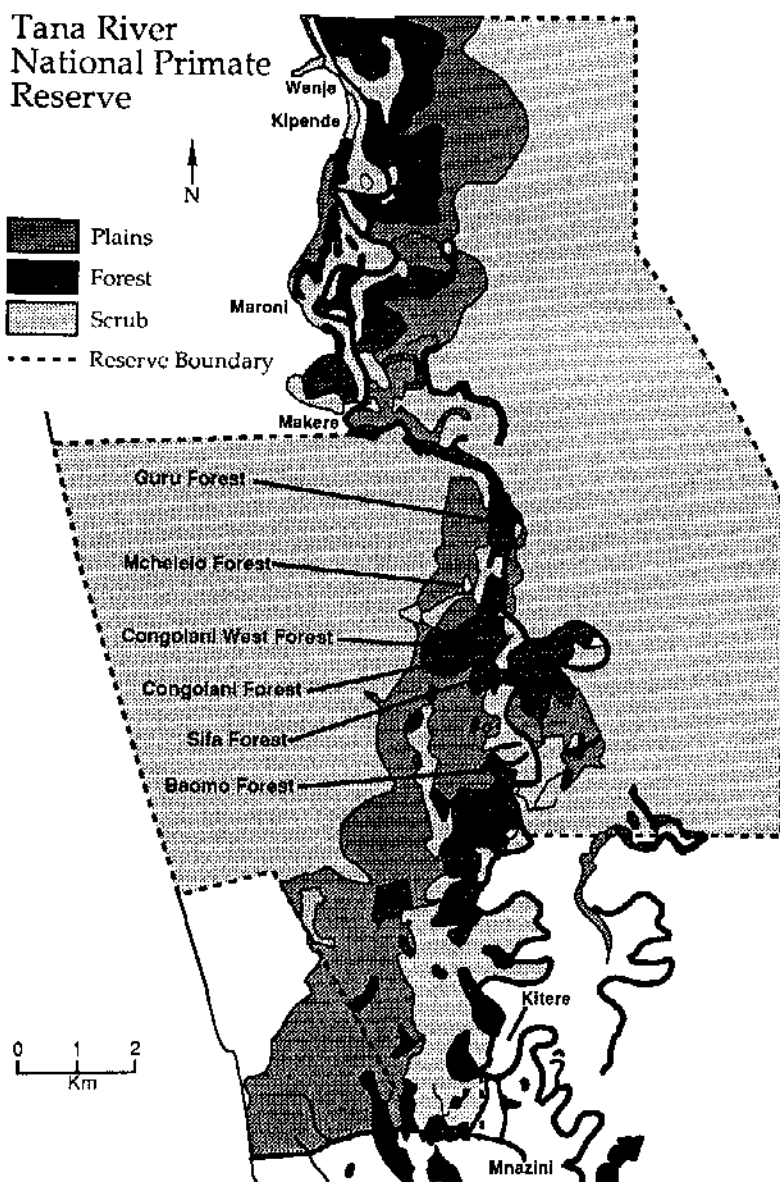


Fig. 1. Map of Tana River National Primate Reserve.

Tanzania. Lion research conducted at four other sites representing over 14,000 kills by lions and spanning a 15-year period (1954–1969) (summarized by Schaller [1972]) indicated that baboons are not normally “preferred” lion prey.

Data are presented in this report on two observed baboon troop interactions with lions, one involving predation. Data were recorded during observations of a troop of yellow baboons (*Papio cynocephalus cynocephalus*) at the Tana River National Primate Reserve, Kenya, during an 11-month period (November, 1991–September, 1992).

METHODS

The Tana Reserve is located in Eastern Kenya and consists of 171 km² bisected almost equally by the river. (See Marsh [1976] for detailed description.) As indicated by Figure 1, the Reserve is primarily scrub land, ideal lion habitat as it not only provides cover but also attracts numerous prey species [Schaller, 1972], some of which are migratory [Kingdon, 1977]. It appears, based upon sightings, spoor, and other field signs (i.e., location of prey carcasses), that there were several lions within the research area throughout the study period.

The study troop of yellow baboons (Mchelelo Troop) included 78 members at the beginning of the study period and 74 members at the end. Systematic observations of this troop began in 1988 and have shown that the Tana Reserve baboons have few predators. Their potential non-human predators are limited to the crocodile (*Crocodilus niloticus*), cheetah (*Acinonyx jubatus*), python (*Python sebae*), and lion (*Panthera leo*) [Kingdon, 1977]. Leopards (*Panthera pardus*) are no longer considered a threat as (1) there have been no sightings of leopards/leopard spoor in the research area since the 1986 establishment of the camp (B. Decker, personal communication); (2) they were seen only seldomly in the late 1970's [Marsh, 1976]; and (3) Kenyans report that poachers have decimated the leopard population. During the current study, one predatory attempt by a crocodile was observed. No predation by pythons was witnessed; however, one incident did occur prior to the period reported here (J. Larson, personal communication). Cheetahs were never observed.

RESULTS

On two occasions (June 2, 1992 and July 3, 1992), the responses of a yellow baboon troop to a lion were recorded. On both occasions, the baboons screamed and ran as a group, travelling for approximately 20 meters. They then rushed up tall (8 m–10 m) doum palm (*Hyphaene compressa*) trees and watched the lion, while continuing to emit alarm calls (a two-phase "waa-hoo" call [Hall & DeVore, 1965]). The baboons continued to be watchful and give an occasional alarm call long after the lion was out of sight to the observer. At other times, it was inferred that the baboons were responding to lion sightings based upon their behavior and the finding of lion footprints by observers. Only lions elicited the troop's extreme response of screaming and flight (also see Bussc [1980]). Crocodiles elicited caution and occasionally alarm calls, but not flight, when the baboons drank or traveled along river banks.

Of the two troop interactions with a lion, only the second involved predation. The first incident occurred on June 2, 1992 and involved a lion sighting by the troop in the late afternoon. The lion was approximately 20 m from the troop (100 m from the camp entrance), drinking at a puddle. The troop responded as described above. The lion left after spotting the observers. The second incident occurred on July 3, 1992 as follows:

- 06:36 Troop located in Guru South Forest. Some still resting in trees.
- 08:00 Troop moving south from Guru South Forest into Camp. Feeding on doum palm nuts and corms.
- 08:52 Began focal observation on female Siku (SK). Troop still located in Camp. SK is in small clearing along track which leads into Camp. This clearing is 30m behind and within sight of my tent. Clearing leads into Mchelelo North Forest. SK is foraging, moving slowly south through the clearing and toward edge of forest. At least one-half to two-thirds of troop is ahead of focal animal, either scattered throughout the clearing or having moved through clearing and into forest edge.

- 09:05 Troop alarm calls and all individuals in the vicinity scream and run past observer, running out of clearing onto track and then up trees. Focal animal does the same. Observer turns in direction of troop flight to attempt continued observation of focal animal. As focal has disappeared, observer turns back toward clearing where baboons are still fleeing. At that instant, a female lion bounds into the clearing from the SE corner. She grabs a large baboon by the neck, hesitates for a moment, and then runs back into the forest. The incident occurs within 10 m of where the observer is standing and lasts only a minute. The troop remains very watchful but stays within 50 m of the location of the attack for the next hour, occasionally emitting alarm calls.
- 10:04 Troop moves just outside of Camp onto plains. Troop stays along the main track in the open and near the Camp entrance for the remainder of the day. It is determined once they emerge that the animal taken during the predation was adult female Giza (GZ). Her carcass is not located.

GZ tended to travel and forage on the periphery of the troop. This observance neither refutes nor substantiates hypotheses on progression order [Rhine, 1975; Rhine et al, 1983], as her position is easily attributed to personal inclination (as described by Rhine [1975]). As with Busse's [1980], this daylight attack occurred from the direction the troop was moving, involved a female lion, and was within the research camp. In addition to the death of GZ, several other individuals disappeared from the Mchelelo troop during the study period. Table I presents a summary of troop deaths and disappearances for each year since 1988.

DISCUSSION

As indicated in Table I, all of the unaccounted for disappearances during the study period were either adult females or infants. Two of the females which disappeared left infants (<1 year), two females disappeared with infants (<1 year), and one infant (<1 year) disappeared alone. Of the remaining four females, one had no offspring and three had older offspring. In the case of adult female OM, circumstantial evidence suggests her disappearance was the result of predation. Her Infant II (OD) showed signs of severe head trauma on the day that OM was noted missing. It seems reasonable to speculate that both OD's injury and OM's disappearance were due to the same predatory event. Because no female emigration has been reported at the Tana Reserve (based upon monitored neighboring troops), all individuals appeared healthy when last seen, and 9 of 11 (81.8%) were seen on the day prior to their disappearance, it is likely that the majority were victims of predation. The timing of these disappearances (i.e., overnight) would tend to eliminate cheetah and crocodile as perpetrators.

Eleven deaths and disappearances over a one-year period from a troop which averaged 75 members is a large proportion. Even more striking are the data for adult females; eight of 25 adult females (32%) died or disappeared in 1992 in this troop. (See Table I) Even though this one year of high female disappearance may be an anomaly, there are potential long-term consequences for the troop. Given female yellow baboon life history parameters [see Altmann et al., 1977; Altmann, 1980], the demographic effects of a loss of 1/3 of the adult females over a one-year period can be estimated at a short-term loss of 10 to 12 offspring. Although group

TABLE I. Troop Disappearances/Deaths January 1, 1988 - December 31, 1992

Year	Average troop member-ship	Dis-appear-ances	Deaths ^b	AF	JF	I2F	II F	AM	Age class ^{a,c}								
									SAM	JM	I2M	I1M	II?	%F ^d	%M ^e		
1988	75	4	- (5.3%)	1 (4.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	3 (11.5%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	3.2%	8.5%
1989	86	10	.. (13.9%)	2 (9.0%)	0 (14.2%)	1 (16.6%)	2 (37.5%)	0 (0.0%)	2 (100.0%)	2 (7.1%)	1 (33.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	17.5%	12.1%
1990	84	15	- (20.2%)	4 (16.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (33.3%)	2 (25.0%)	3 (15.7%)	2 (28.5%)	3 (42.8%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	8.8%	33.3%
1991	78	6	- (7.7%)	0 (0.0%)	0 (0.0%)	2 (40.0%)	0 (0.0%)	1 (16.6%)	2 (43.3%)	1 (5.2%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	4.6%	12.1%
1992	75	10	- (14.6%)	7 (32.0%)	0 (0.0%)	0 (0.0%)	2 (40.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	21.2%	0.0%

^aFollowing Altmann et al. (1981) - AF (Adult Female), JF (Juvenile Female), I2F (Infant II Female), II F (Infant I Female), AM (Adult Male), SAM (Subadult Male); JM (Juvenile Male), I2M (Infant II Male), I1M (Infant I Male), II? (Infant I Unsexed).

^bPercentages given are of total troop membership, death, and disappearance combined.

^cPercentages given are of each age class, death, and disappearance combined.

^dPercentage female population, death, and disappearance combined.

^ePercentage male population, death, and disappearance combined.

TABLE II. Troop Disappearances and Deaths (D/D) by Season January 1, 1988 – December 31, 1992

Year	Rains			Nonrains		
	Female	Male	% total D/D	Female	Male	% total D/D
1988	1	0	25.0	0	3	75.0
1989	1	1	16.6	7	3	83.3
1990	2	6	47.1	2	7	52.9
1991	0	0	0.0	2	4	100.0
1992	2	0	20.0	8	0	80.0

size has remained relatively stable over the years, previously there has not been a decrease of this proportion in breeding females (see Table I). It is not necessary that a high rate of adult female disappearances occur every year for there to be repercussions in terms of future generations.

It appears that there may be some correlation between Mchelelo Troop deaths or disappearances and rainfall. The Tana Reserve has two rainy seasons, the "short" rains usually occur in November–December and the "long" rains usually in April–May. If deaths or disappearances are evenly spaced over the year, approximately 33% should occur during these two rainy seasons. However, as indicated in Table II, this is not the case. (It should be noted that 1990 cannot be analyzed due to trapping and general disruption of the troop.) A larger proportion of deaths and disappearances occur during the non-rainy months than would be expected if evenly distributed. There does not, however, appear to be a significant long-term sex difference in vulnerability to deaths or disappearances either during the rainy or non-rainy months. Again, this indicates that the high number of female deaths or disappearances in 1992 was unusual and could be associated with the fact that 1992 was unusually dry.

Migratory species (e.g., zebra (*Equus burchelli*), topi (*Damaliscus korrigum*)) leave the Reserve during the dry months, thus affecting prey available to lions. The high number of baboon deaths or disappearances during the non-rainy months may be related to a lack of some "preferred" prey for the lions [Schaller, 1972; Seidensticker, 1983; Scheel, 1993]. Those species which remain in the Reserve must come to the river to drink during dry times of the year. Prey concentration near the river would encourage the lions to hunt closer to the river rather than in the scrub area of the Reserve. As lions are considered opportunistic hunters [Schaller, 1972; Scheel, 1993], it is possible that if lions are responsible for the high rate of baboon disappearances, it may be due in part to higher encounter rates between the two species during dry periods. Baboons may move up on the lions' list of preferred food items due to their availability—both in terms of numbers relative to other prey species and their location in space.

An alternative explanation is similar to one proposed by Boesch [1991] for observed attacks on chimpanzees at the Tai National Park, Ivory Coast. He suggested the possibility of one specialized leopard (a "chimp killer") being responsible for many of the attacks. It is possible that the same thing is occurring at the Tana. The two observed interactions are believed to have been the same lion—based on sex, location, and coloration. There also appears to be a pattern to the deaths or disappearances which may reflect the migratory patterns of a particular lion. Only further research will elucidate the degree to which baboon and lion behaviors are

intertwined at the Tana Reserve, and the effects of predation pressure on this baboon population.

CONCLUSIONS

1. Predation by a lioness on an adult female yellow baboon was observed.
2. There may be long-term demographic effects of high rates of adult female deaths or disappearances over a one-year period.
3. Predation of baboons by lions and deaths or disappearances in general appears to be inversely related to rainfall.
4. There does not appear to be a significant long-term sex difference in vulnerability to death or disappearance.

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64 / Condit and Smith

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