

## Brief Overview of Chacma Baboons and Vocalizations

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### Introduction

This study of chacma baboons (*Papio hamadryas ursinus*) was conducted at Wildcliff, a newly founded private Nature Reserve. Wildcliff is located within the Langeberg Mountains in Western Cape, South Africa. Within its 955 hectare range, lives a variety of mammalian life, including grey rheebok (*Pelea capreolus*), bushbuck (*Tragelaphus scriptus*), porcupine (*Hystrix africaeaustralis*), and rock dassies (*Procarria capensis*). The reserve encompasses a wide range of habitats for such animals with afro-montane forests, meadows harboring many species of fynbos, deep kloofs and rocky mountainsides, waterfalls and springs, and many other areas where endemic species of plants and birds reside nowhere else in the world. Along with the list of plant and animal life is of course, the chacma baboon.

Chacma baboons are spread throughout Southern Africa, with habitats ranging from woodlands, grasslands, to semi deserts with a high frequency of acacia shrubs. They are primarily terrestrial, spending some time in trees or cliff sites for sleeping quarters. Chacma baboons live in variable social structures ranging from multi male; multi female to one male; multi female groups. The environment in which the baboon lives will influence this structure. The chacma diet is primarily frugivorous, with opportunistic meat eating of reptiles, small mammals, and birds. Chacma baboons are sexually dimorphic in body size and shape, with a male's weight reaching twice that of a female. Chacmas range in colors from a yellowish gray, to dark brown, and black. Chacma baboons live on average 27 years in the wild (Rowe, 1996).

Several species of primates engage in specific and intricate vocalizations to maintain stability within or between groups and to ensure the proliferation of their social structure. Calls can ease social tension, alarm the rest of troop of a potential predator in the area, or signal to nearby troops of a dominant male baboons presence. For my project, six general calls were chosen that are emitted by chacma baboons. The goal was to establish whether or not, out of the calls chosen, if they are limited to specific times of the day or are rather influenced more significantly by other environmental factors.

### Objectives

1. Establish an all occurrence ethogram documenting number of times a specific behavior is observed.

Documentation will include but is not limited to: the time of observation, the call(s) given, and comments. Ad-libs will also be used to obtain data.

2. Observe baboons by random selection of 2-minute intervals throughout the day.
3. Compile and complete field data within a 2-month period.
4. Report findings from samples of baboon calls, and if these calls are used at particular times of the day or may occur at any point in time.
5. Release significant findings recorded from ad-libs of the baboon troops (i.e. shifts in troop members, predation, foods being eaten, preferred sleeping quarters, etc).
6. Contribute to ongoing observation hours and the habituation of the chacma baboon troops at Wildcliff.
7. Propose possible ways in which further research may be conducted upon the Wildcliff baboon troops.

**Method**

An “all occurrence” ethogram was established to mark when any of the six different categories of vocalizations occurred during a two minute sampling interval. Below is the layout and description of each of the calls monitored, and a table showing the results of the records from morning and afternoon observations.

**All Occurrence Sampling**

**Screeching** – A response used to inhibit aggression and is performed by all members of the troop.

**Two-Phase Bark** – A low pitched, loud call repeated every 2-5 seconds. Used by males during within or between group aggression.

**Muffled Growl** - Mating call emitted by females during copulation, with the mouth closed and cheeks expanding and contracting to produce sound.

**Grunting** – A generally soft “uh uh” that may precede the two phase bark used by adult males.

**Yakking** – Call given by sub adult and adult baboons to signal a retreat from a threatening animal.

**Non-Adult Male Vocalizations** – Calls emitted by all members except adult males, including chattering, “ick-ooer” calls of infants and juveniles, and shrill barks given by infants, juveniles, and females (Primate Info Net, 2002).

**Results of Sampling**

Time	(S)	(TPB)	(MG)	(G)	(Y)	(NM)
08:00	x					
08:04	x					
08:08						

08:18				x		
08:22						x
08:26						
08:30						
08:36	x					x
08:40	x				x	x
08:44	x		x			x
08:48						x
08:54	x			x	x	x
08:58	x				x	x
09:50			x			
09:54	x			x	x	x
09:58			x			x
10:02	x				x	
10:06	x					
10:10	x					x
10:14	x		x	x		x
10:18	x					x
10:22	x			x		x
10:26				x		
10:28						
10:32	x			x		
10:36	x			x		
10:40	x					x
10:44						
10:48	x					

10:52	x					x
10:56	x			x		
11:00	x					x
11:04				x		
11:08	x					
11:12	x			x	x	
11:16	x			x		
11:20	x			x		
11:24	x			x		
11:28			x	x		
11:32	x				x	x
11:36			x			x
11:40	x			x		x
11:44						x
11:48						
12:56			x			
13:00			x			
13:04	x	x		x	x	
13:08				x		x
13:12	x			x	x	x
13:14			x		x	
13:18					x	
13:22						
13:26						
13:30						
13:34					x	

13:38	x					x
13:42	x					x
13:46						
13:54						
13:58	x					
14:02				x		x
14:36				x		
14:40	x					
14:44						
14:48	x		x	x		
14:52	x			x		
14:56			x	x		
15:00	x		x	x		
15:12				x	x	
15:16	x			x		x
15:20				x		
15:24						
15:28				x	x	
15:32			x	x		
15:36	x			x		
15:40	x				x	x
15:44	x		x	x		
15:48	x			x		x
15:52				x		
15:56	x		x	x		x
16:00	x		x			x

16:04			x	x		
16:08			x			
16:12	x				x	x
16:16	x					x
16:20	x					
16:24	x			x		
16:28	x					x
16:32	x		x			
16:36	x					x
16:40			x			
16:44	x					
16:48			x		x	
16:52				x	x	
16:56					x	
17:00						
17:04						
17:08					x	
17:12					x	
17:16					x	
17:20						
17:24					x	
17:28						

### Interpretation of the Results

Out of the six categories of vocalizations chosen, they differ by age, sex, or are calls which may be emitted by any troop member. These calls included the adult male two phase bark, the muffled growl given by females during copulation, the chacma alarm call defined as yakking, the stress reducing cry known as screeching, the social grunt

call, and lastly calls made by every individual except adult males ([Primate Info Net, 2002](#)). The larger, 75 +/- chacma troop was observed at the highest rate, with only one observation of the smaller 15 +/- troop.

When the observer was within 50 meters of a given troop, calls were recorded if they occurred during the two-minute time interval regardless if a vocalization was given once or multiple times. Two-minute intervals were used due to the unpredictability the troop's time spent within range of the observer. The samples gave a general layout of vocal calls emitted between 8 AM and 5:30 PM nearly spanning the amount of time in which the troop spends leaving a roosting site in morning hours to returning to sleeping quarters in the evening. Biases within this project may include differences in vocalizations of troop members directing calls toward a researcher (who may be a potential predator), with higher rates of alarm calling (yakking) or lack of calls all together. To buffer against given biases, call samples were taken from various days, spanning from the 21<sup>st</sup> to the 30<sup>th</sup> of July. This also allowed at least one month for the troop to become less distracted by the presence of a human within close and continuous contact. This study does not conclude when the frequency or intensity of a specific call occurs, rather it implies that out of the six calls chosen, they may occur at any time of the day and are not limited to timely contextual events (i.e. chacma baboons do not use any of the given calls only in the morning, afternoon, or evening, etc.).

This project concluded in a simple, yet effective manner that the vocal calls sampled are not limited to a particular time of day and rather are influenced by other environmental factors or events occurring within/between troop members. In addition to this conclusion, ad-libs were taken throughout the two-month stay at Wildcliff, which suggest many interesting changes in the two troops. A high amount of two-phase barks were recorded and other vocal and visual threats between adult males. Between the 30<sup>th</sup> of June and 14<sup>th</sup> of July, the large troop escalated in aggressive behaviors, peaked, and began to reduce in levels. During this time the smaller troop dropped in size from 20-25 individuals to 12 (counted at this amount in multiple observations), and the large troop increased in size accordingly, with more than one occasion a straggling male spotted behind the large troop (suggesting this member to be the recently ousted alpha-male). The small troop was later seen on numerous occasions to be following closely behind the large troop. When the small troop was within the larger troop's territory or hearing distance, the adult male of the small troop would emit a series of two phase barks to signal his approaching into the area. To confirm this hypothesis a more in depth and longer observation would have been necessary to identify individuals and their rank within the troop.

### **Additional Observations**

Other interesting aspects of the two troops were that there was a high rate of juveniles and infants within the large troop, with roughly 25% of the troop of juveniles status and younger. The small troop, at its lowest, was made up of one fully adult male leading the troop, and roughly 5 females and 6 juveniles and infants. This pattern of an adult male(s) leading the troop was witnessed in both the small and large troop. According to Rhine and Tilson, the risk or rate of

predation among chacma baboons may influence the way in which the troop organizes its migration structure (Rhine & Tilson, 119-128). Within Wildcliff lives at least one leopard, being a natural predator of chacma baboons, and may explain the observations of social structure in the movement of troops. Upon entering open areas and even movement within forested areas, both troops were witnessed being lead by at least one adult male or more, followed by females, juveniles, infants, and weaker troop members. This would ensure greater safety to those individuals who are less able to defend themselves against an attack by a predator. Having canines longer than a lions, the male baboons have been recorded effectively defending themselves against attacks, thus providing insight to the higher mortality rates and predation among females and their young who are less physically able to fend off predators (Melnick & Pearl, 1987; Nowak, 1999).

The chacma baboon diet consists of various fruits, figs, leaves, insects, seeds, eggs, flowers, and small mammals and reptiles. At Wildcliff the two troops were observed foraging on the protea flowers, black wattle seeds, wild cherries, turning rocks over in search of scorpions and other insects, cracking open pine cones to extract pine nuts, eating seeping sap from pine trees, foraging off of planted orange trees, and in some cases were reported to have taken eggs from weaver bird's nests in the oak trees near the meadow (Noppe, 2008). It is interesting to note that the black wattle, pine, and orange trees are not native vegetation for the baboons, yet they were able to adapt themselves to the altered environment in an effective manner.

Other intriguing finds from the ad-libs were that the troops more or less have a number of preferred sleeping sites within the cliffs of valleys in and around Wildcliff. There are at least two valued sleep sites that may be seen from the Wildekrantz River, and a number of other sleep sites above the river system behind Heron House. Depending on the amount of human activity taking place on Wildcliff and the migration of the two troops sharing sleep sites, they may remain within the same sleep site for 5 days or more.

### **Future Research**

A more intensive study of chacma baboon vocalizations could be conducted at Wildcliff to record the number of times and intensity in which vocal calls occur, and what correlates with each sampling. This type of study could display a more precise pattern that is suggested by my project yet not confirmed, where the troop uses specific calls in different contexts throughout the day (a change in vocal patterns was noticed when the troop was emerging into the meadow or exposed areas, during waking hours and upon returning to roosting sites, etc.). Such a study would require at least two researchers to become fully habituated with the troop to avoid any biases such as the troop responding to the encroachment of humans into their territory, being one example. This could take between 3 and 6 months. My research was conducted within a two-month frame, and only within the last two weeks has the large troop grown accustomed to my presence. Some members are still very weary even though I never threatened the troop or approached the troop in

a sudden and frightening manner, and gave the troop at least 15 meters of distance within forest vegetation and between 25-50 meters distance when in open areas. With two or more researchers habituation could take much longer, and the need for at least one researcher to be within/close to continuous visual sight of sampled baboons, possibly increasing this time frame. To conduct such an experiment, equipment would be needed to record the sound wavelengths of the different calls to show the intensity and length of time each was given. One researcher may be in charge of recording these calls and the individual most habituated with the troop to visually record or write ad-libs of the context of the call.

## **References**

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