# Wildlife Ecology Project

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# Hierarchal Structure and Social Dominance of the African Elephant, *Loxodonta africana.*

**Introduction**

The African elephant, *Loxodonta africana* from the order Proboscidea is a protected species worldwide with a population of between 470,000 and 690,000 in Africa. The African elephant can expect to live a long life of up to 70 years. Female elephants have a gestation period of 22 months with a female first ovulating at 13/14 years of age and producing approximately 4-5 calves during her life span.

The African elephant has a very ordered social structure with male and females living very different lives. While female elephants spend their entire lives in close-knit groups of mothers, daughters, sisters and aunts and other maternal kin, bull elephants on the other hand live mostly solitary lives. Each group of females have a matriarch, often the eldest female of the group. This project was complied with the help of the research paper "The ties that bind: genetic relatedness predicts the fission and fusion of social groups in wild African elephants" Elizabeth A. Archie, Cynthia J. Moss and Susan C. Alberts (2005). This hierarchal structure and the social dominance within groups of the African elephant is an interesting aspect of the behaviour of this species and the aim of this project is to investigate this unique behaviour.

**Social Groups**

Within elephant populations, "core" social groups, often called "families" are composed of predictable sets of individuals (Douglas-Hamilton 197;Moss & Poole 1983; Moss 1988). Core groups usually consist of 5-15 adult females including a

number of immature males and females. If a core group becomes too big, a few of the elder daughters will break off and form a new group. But these newly established groups always remain aware which local groups are relatives and which are not. When two or more core social groups repeatedly and consistently fuse to form larger groups, the participating core groups are collectively known as a "bond group" (Moss & Poole 1983). Individuals elephants demonstrate long-term fidelity for core social groups and bond groups and it has been hypothesised that kinship may be one factor underlying these associations (Douglas-Hamilton 1972; Moss & Poole 1983). "Kinship groups" were defined by Douglas-Hamilton,1973 as the product of "2-4 family units which are made up of up to 50 animals coming together but of slightly less stability".

**Female African elephants**

Female African elephants are philopatric and closely bonded to their relatives, generally remaining in natal groups for life (Moss 1988). Each core group is led by a matriarch. The role of the matriarch is to keep the family strong by protecting the group from predation and by ensuring that the group obtains enough food and resources. A method found to be used by more experienced matriarchs to protect their group involves the group bunching together defensively and using their trunks to smell and confirm the identity of strange elephants. Another method used by senior females of a group involves these individuals listening to other elephants calls to determine if these elephants will be friendly and co-operative or if they will present problems to the herd. The senior females then signal this information to the rest of the group. The matriarchs do this to ensure their families don't spend too much time being defensive and not enough time reproducing (McComb 2001).

**Male African elephants**

The life of an African male elephant is very different to that of its female counterparts. At puberty, male elephants are usually driven out of the core group by the older females and join or form bachelor herds (Nowak et. al 1983). Only the most dominant males are allowed to breed with cycling females and so the less dominant males must wait their turn. Usually it is the older bulls (40-50 years old) that do most of the breeding. During the breeding season, known as musth, the bulls become very

aggressive and will fight with almost any other male it encounters in order to find a mate in the female herd.

**Methods**

A research project was conducted through the study of elephants that live in and around Amboseli National Park, Kenya. These elephants are individually known and have been studied by the Amboseli Elephant Research Project (AERP) since 1972. Data was collected between 1998 and 2003. The core social groups were identified at the start of the AERP based on repeated observations of I) consistent spatial associations, ii) coordinated activities, iii) orientation around a single leader (i.e matriarch) and iv) high rates of affilitive behaviours that are exclusively exchanged among members of a core social group (Archie et.al 2005).

**Results:**

It was found that dominance relations among the matriarchs of different social groups were primarily age based, rather than driven by physical or group size, and group matriarch rank influenced the dominance relationships among non-matriarchal females in the group (Wittemyer et.al 2006).

In the research paper conducted at AERP, it was found that since there are only four mtDNA haplotypes among females in Amboseli, mtDNA haplotype diversity is a relatively coarse measure of migration. It is assumed that emigrating females join social groups at random, they would have around a 30% chance of joining a core social group that had their own haplotype. Also, long term observations in Amboseli indicate that females immigrate because they have lost all of their natal core group members. When this happens the decision to join a new core social group may be influenced by the number of relatives a female has, including paternal relatives, in their new group. Because elephant social groups fission and fuse, members of the 10 focal core groups at Amboseli varied in how often they were together in the same group. On average, a given pair of adult female group members were in the same party about 2/3 of the time. Also it was found that the matriarch of each core social group tended to be more closely related than expected to the matriarchs of the other core groups in the bond group.

In the discussion it was concluded that most female elephants are matrilocal and remain with the group into which they were born. Consequently, the average genetic relatedness within core social is relatively high.

**References**

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