Hannah Mumby, Ph.D.

Behavioural Ecology

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FELLOWSHIP
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Male Elephant Social Dynamics: a Comparison of Sociality During High and Low Poaching Impact

My study will emphasise the importance of the human environment in understanding the behavioural ecology and the demography of African savannah elephants (Loxodonta africana). I will do this by comparing populations with high rates of illegal hunting and those with low rates of legal hunting. This is urgent and vital research for conservation, because current population declines are heterogeneous across the savannah elephant range, and our understanding of population-level demographic and social patterns is essential to effective conservation and management strategies. It will also reveal new information about male social behaviour by determining how networks are restructured following the removal of older bulls with large tusks.

My aim during the Fellowship is to conduct both demographic and dynamic social network analyses to investigate the changes in male elephant survival and sociality over time. I am very fortunate to be able to access longitudinal data from two sites in order to do this. My project will involve determining the age and sex structure of the populations concerned using long-term datasets and mapping the social networks of male elephants over time. I will use data from a long-term study in the greater Kruger Biosphere, South Africa, conducted since 2003. I will then compare its structure to that in Samburu National Reserve, Kenya, which has experienced heavy losses as a result of poaching (25% of the population was poached between 2009 and 2012). All data has been collected from the field, including from my own trips in 2015 and 2016.

I will continue to write blogs for wider audiences and communicate results to managers, rangers and conservationists working at the demand and supply ends of the ivory trade. This research may also be of relevance to Fellows at the Wissenschaftskolleg with interests in sociality, the illegal wildlife trade, male reproductive and social strategies and interdisciplinary research linking basic and applied ecology.

Recommended Reading

Chapman, S. N., Mumby, H. S., Crawley, J. A. H., Mar, K. U., Htut, W., Thura Soe, A., Aung, H. H., and Lummaa, V. (2016). "How big is it really? Assessing the efficacy of indirect estimates of body size in Asian elephants." PLOS ONE 11, 3: e0150533. doi: 10.1371/journal. pone.0150533.

Mumby, H. S., Chapman, S. N., Crawley, J. A. H., Mar, K. U., Htut, W., Thura Soe, A., Aung, H. H., and Lummaa, V. (2015). "Distinguishing between determinate and indeterminate growth in a long-lived mammal." BMC Evolutionary Biology 15: 214.

Mumby, H. S., Mar, K. U., Hayward, A. D., Htut, W., Htut-Aung, Y., and Lummaa, V. (2015). "Elephants born in the high stress season have faster reproductive ageing." Scientific Reports 5: 13946.

The Lives of Elephants

 So entangled are the lives of humans and elephants that almost every person has an interspecific story to share. Whether if it's a memory of from a favourite childhood book, a transformative experience with a live elephant (positive or negative), or an attempt to harness of the symbolic or physical power of elephants. I started studying elephants in an effort to understand life through their lives, and in doing so, to widen the comparative framework for human life history. Elephants share some of our most extreme traits, such as long lives, high investment in relatively few offspring, large brains and complex social lives. All of this evolved on a convergent evolutionary trajectory, which makes for some striking parallels and contrasts between the species.

In this talk I will first present what I mean by life history; the study of the timing, shape and pace of lives. To compare life histories, we can distill lives to their key landmarks, such as, in mammals, birth, weaning, sexual maturity, reproduction (or not) and death; those key experiences that we see as universal, but experience as individuals.

I will introduce two key sites at which I study elephants, to highlight the context in which these studies are conducted, the availability of data, and the different but relevant limitations of studying wild and captive elephants. The first site is in Myanmar, where I have studied captive Asian elephants (Elephas maximus) working in the timber industry. The second is wild free-ranging African savanna elephants (Loxodonta Africana) in the greater Kruger biosphere, where elephants traverse the human-made border between South Africa and Mozambique. Both of these sites represent fascinating environments for studying elephants, with hunting (legal and illegal), workload, stress, climate change, protected areas (such as nature reserves, fenced parks, national parks and transfrontier parks), tourism and governance potentially affecting the animals.

Patterns of births, mortality and fertility are a great starting point to understanding a big puzzle like an elephant life. I'll show these and how they compare to our lives, and link to the human-influenced environments elephants inhabit. I'll then discuss one key life history phase; growth, and the potential for a body size versus reproduction trade-off elephants.

In the second part of the findings section, I aim to illustrate the value of a behavioural ecological approach to understanding life history. One of the key characteristics of male elephant life is the lag between sexual maturity and reproduction. During my fellowship, I have been investigating how older and younger males live their lives around this in different environments. I will present patterns of social associations by age and temporally, genetic structure and vocal communication in male elephants. Finally, I'll return to the links between humans and elephants by proposing avenues for the application of this work to conservation.

Mumby, Hannah (Amsterdam [u.a.],2021)

Detecting community structure in wild populations : a simulation study based on male elephant, Loxodonta africana, data

https://kxp.k10plus.de/DB=9.663/PPNSET?PPN=1795639113

Mumby, Hannah (München,2021)

Elefanten : das Leben der Riesen zwischen Geburt, Familie und Tod

https://kxp.k10plus.de/DB=9.663/PPNSET?PPN=1735616532

Elephants

https://kxp.k10plus.de/DB=9.663/PPNSET?PPN=1735616532

Mumby, Hannah (London,2020)

Elephants : birth, life and death in the land of the giants

https://kxp.k10plus.de/DB=9.663/PPNSET?PPN=1725833557

Mumby, Hannah (Oxford,2019)

Age differences in the temporal stability of a male African elephant (Loxodonta africana) social network

https://kxp.k10plus.de/DB=9.663/PPNSET?PPN=1680718916

Mumby, Hannah (Basel,2019)

Conservation genetic assessment of savannah elephants (Loxodonta africana) in the Greater Kruger biosphere, South Africa

https://kxp.k10plus.de/DB=9.663/PPNSET?PPN=1680714996

Mumby, Hannah (Washington,2019)

Elephants have a nose for quantity : supplementary information

https://kxp.k10plus.de/DB=9.663/PPNSET?PPN=1666862614

Mumby, Hannah (Washington,2019)

Elephants have a nose for quantity

https://kxp.k10plus.de/DB=9.663/PPNSET?PPN=1666861901

Mumby, Hannah (London,2019)

Mining morphometrics and age from past survey photographs

https://kxp.k10plus.de/DB=9.663/PPNSET?PPN=1666203815

Mumby, Hannah (Oxford [u.a.],2018)

Ten year assessment of the 100 priority questions for global biodiversity conservation

https://kxp.k10plus.de/DB=9.663/PPNSET?PPN=1048945766

Mumby, Hannah (2018)

Taking the elephants' perspective : remembering elephant behavior, cognition and ecology in human-elephant conflict mitigation

https://kxp.k10plus.de/DB=9.663/PPNSET?PPN=102936768X