

# Elephants born when mothers are stressed age faster, produce fewer offspring

September 14 2015

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Baby elephants playing together. Credit: University of Sheffield

Elephants born into stressful situations have fewer offspring and age faster, researchers at the University of Sheffield have found.

Scientists discovered that Asian elephants born during times when their mothers experience highest stress levels produce significantly fewer offspring in their lifetime despite having higher rates of reproduction at an early age.

The research team, from the University's Department of Animal and Plant Sciences, also found that those animals born under stress declined much more rapidly in older age, decades later.

Lead author Dr Hannah Mumby, said: "Poor early life conditions have been linked to many disease outcomes in humans, but is unknown whether stress in early life also speeds up ageing rates in long-lived species."

"We found that the decline in reproduction with age is much steeper in the elephants born at the poorer time of year. Even though they reproduce slightly more when they're young, this still doesn't compensate for the steep decline and they end up with fewer offspring."

The scientists investigating how the process of ageing affects animals made the discovery after being given access to a unique record of the lives and deaths of more than 10,000 elephants from Myanmar spanning three generations and almost a century.



The elephants are semi-captive animals working in the timber industry by pushing and dragging logs.

The researchers used measures of a hormone associated with stress (glucocorticoid metabolites) to determine which months represented stressful condition for the elephants.



Baby elephants playing together and laying down. Credit: University of Sheffield

The study showed that the months from June to August, which is monsoon season and typically when elephants work hard dragging logs to rivers, are the most challenging for the animals. The number of calves born at this time is low and their survival prospects are the poorest.

Senior author, Dr Virpi Lummaa, said: "Fertility and reproductive rate decline with age for all of us, but for some faster than others - and this variation was how we measured differences in ageing."

The results, published in *Scientific Reports*, highlight the potential for maternal stress to be associated with offspring ageing. They could also have important implications for Asian elephant populations both in western zoos, where they may experience stressful conditions associated with captivity, and in range countries where both captive and wild [elephants](#) may experience seasonal exposure to [stress](#). Improving developmental conditions could therefore delay reproductive ageing in species as long-lived as humans.

Provided by University of Sheffield

Citation: Elephants born when mothers are stressed age faster, produce fewer offspring (2015, September 14) retrieved 23 April 2024 from <https://phys.org/news/2015-09-elephants-born-mothers-stressed-age.html>

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