

Elephant age estimated from voice

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A paper published in *Bioacoustics* explains how researchers have been able to estimate the age of an elephant based on its vocal sounds. Results showed that they could distinguish infants, calves, juveniles, and adults with 70% accuracy and youngsters (infants/calves) from adults with 95% accuracy. The call feature that was most useful for doing this was overall frequency—not surprisingly, since vocal frequency usually decreases as an animal grows larger.

The need to control and monitor elephant populations is evident everywhere because poaching, human disturbances, habitat loss and the resulting human–elephant conflict pose serious threats to elephant populations worldwide.

Acoustic recordings are an efficient way (apart from cost-intensive and invasive global positioning system (GPS) and satellite tracking) to sample populations and to obtain reliable estimates of species occurrence and potential abundance.

Elephants produce powerful sounds with frequencies in the infrasonic range, called 'rumbles'. They are largely below the range of human hearing yet can travel distances of up to several kilometres. Elephants are ideally suited for acoustic monitoring even in dense forests. It has been known that these sounds could be used to count elephants remotely but not determine the age, until now.

"That elephants produce these incredibly low frequency sounds which travel across many kilometres is amazing enough. But what's even more

amazing is that these sounds can be used to assess not just the number, but the ages, of elephants over large distances. That's a powerful tool for conservation, and one that's less invasive and more cost effective than other methods, such as radiotagging," said Andrew Horn, American Editor of *Bioacoustics*, Dalhousie University, Canada.

The researchers statistically analyzed the frequency patterns of calls given by different individuals. Identifying which individual is calling in a group of elephants is extremely hard, but the researchers managed by watching the elephants carefully, noting when they opened their mouths or gave other signs of calling.

Automated extraction of a fundamental frequency (the lowest frequency of a periodic waveform) from an audio signal is a challenging task. Noise often masks the frequency contours, making the contours difficult to detect and track automatically. In noisy recordings, the features were unable to detect the fundamental frequency robustly and generated false estimates.

Conservationists might now be able to monitor not only the number, but also the demographics, of elephant groups over large distances.

Discover more about the research by reading the article online 'Age-group estimation in free-ranging African elephants based on acoustic cues of low-frequency rumbles', by Angela S. Stoeger, Matthias Zeppelzauer and Anton Baotic.

More information: 'Age-group estimation in free-ranging African elephants based on acoustic cues of low-frequency rumbles', by Angela S. Stoeger, Matthias Zeppelzauer and Anton Baotic, *Bioacoustics* published by Taylor & Francis. DOI:10.1080/09524622.2014.888375

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