Pachyderm politics

It takes wisdom, experience and two X chromosomes to successfully lead a herd of elephants, finds **Lesley Evans Ogden**

IMAGEBROKER/FLPA

ELEANOR was nearly 50 when she collapsed and died. While African elephants can live up to 70 years, female life expectancy is just 22 in her group in Samburu, Kenya, and Eleanor was the oldest member of her family – the matriarch. This made her passing particularly significant. For almost a week after her death her carcass was visited not just by members of her immediate family, but by a succession of animals from four unrelated families. Elephants are mysteriously curious about death, a response perhaps heightened when a leader dies.

It has long been clear that elephant groups rely on their elder stateswomen, but just how important these females are is only gradually becoming apparent. Matriarchs are at the hub of a complex, multilayered social network, and we are now getting insights into the nature of the ties that bind these close-knit groups and the key role that wise old leaders play in enhancing the survival of their members. Matriarchs carry with them a treasure trove of crucial information. They have a unique influence over group decision-making. And, like our own leaders, the most successful may even possess certain personality traits.

Much of what we know about elephant social life comes from research done at Amboseli National Park in Kenya, where the population lives in conditions close to a natural, undisturbed state. But this is unusual. Across Africa elephant numbers are dwindling as demand for ivory has surged in recent years. On the black market, a pair of tusks can fetch the equivalent of 15 years of an unskilled worker's salary, so the incentive for poachers is high. Once poachers have killed the biggest males, mature matriarchs are their next targets. What happens to a group that loses its matriarch is not clear. But one thing is certain; if we want to help elephants we need to understand the structure and function of leadership within their society.

Amboseli's elephants number around 1400. They roam over approximately 8000 square kilometres, inside and outside the park, and across international boundaries. With Mount

Like humans, elephants live in a complex fission-fusion society

Kilimanjaro towering in the distance, this is a region constantly in flux, which has big effects on its residents. For elephants, which must drink every day, access to water is the biggest issue. Although there are predictable wet and dry seasons, sometimes the rains fail. And seismic wobbles alter the flow and salinity of underground rivers feeding the springs and swamps on which elephants depend.

"Matriarchs carry a treasure trove of crucial information and have a unique influence over their group"

These are the world's longest studied elephants. Every individual is known and visually catalogued by distinct ear notches. And nobody knows them better than Cynthia Moss, who has led the Amboseli Elephant Research Project (AERP) since she founded it in 1972. After four decades of near-continuous observation of elephants going about their daily lives, she has a vast knowledge. In particular, Moss and her colleagues have discovered much about elephant families and their social interactions. "Our studies show how absolutely crucial matriarchs are to the well-being and success of the family," she says.

At Amboseli, the elephant family unit, consisting of a mother and her immature young, sometimes along with sisters, aunts and grandmothers, is the core of elephant society. Within family groups, which range in size from two to more than 20, the oldest, most experienced female takes the lead. But group size is constantly changing, responding to the seasons, the availability of food and water, and the threat from predators. An adult female elephant might start the day feeding with 12 to 15 individuals, be part of a group of 25 by mid-morning, and 100 at midday, then go back to a family of 12 in the afternoon, and finally settle for the night with just her dependent offspring. Known as a fission-fusion society, it is a complex social dynamic relatively rare in the animal kingdom, but not uncommon in primates, including humans.

Friends and relations

It has long been assumed that the structure of the wider social network grows out of natural patterns of mother-offspring associations, where daughters remain within their group for life, while sons strike out on their own as teenagers. A team led by Beth Archie from Duke University in Durham, North Carolina, decided to test this idea. By genetically analysing faecal and tissue samples from 236 elephants at Amboseli, they determined how closely related they were to each other, and then superimposed the familial ties onto observed patterns of association. They found a remarkable fit, indicating that the fission-fusion dynamic mirrors relatedness – the more closely related individuals are, the more time they tend to spend with one another (*Proceedings of the Royal Society, B*, vol 273, p 513).

So, at Amboseli at least, a matriarch heads up a group of her immediate relatives and the social network extends beyond this core family unit. Multiple families that engage in regular friendly associations, including ceremonial greeting and touching, are known as bond groups. These multifamily groupings can reach 70 to 100, but have historically averaged about 30 at Amboseli. Networks of elephants can reach further still, to include friendships between unrelated individuals, and less frequent aggregations of families known as clans, which when together can reach numbers in the hundreds.

To investigate the dynamics of multi-tiered elephant social networks from the level of family to the population level, Moss, together with Vicki Fishlock, a resident scientist with the AERP, and Phyllis Lee from the University of Stirling, UK, are using a computer model ›