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Climbing steep hills requires a lot of energy, especially if you're the heaviest mammal on earth. Yet in Tanzania's Udzungwa Mountains, large piles of dung litter the ground from 300 metres above sea level to summits of over 2 000 metres, bearing testimony to the passage of elephants. For four years, **Trevor Jones, Katarzyna Nowak** and their small team of researchers have been tracking ancient elephant paths across the rainforest-draped mountainsides.

mountain elephants

MANY OF THE OLDER AND WIDER elephant paths follow ridges, avoiding the most severe inclines, and serve as highways for numerous other species. But it's not always possible to steer clear of steep slopes, and in the rainy season we have seen mudslides where the giants have descended gradients of more than 45 degrees, sometimes on their ample rumps.

Savanna elephants roam montane forests elsewhere in Tanzania: in the Mahale Mountains on the eastern shore of Lake Tanganyika and the Rubeho Mountains in the central area, and on the lower slopes of Mount Kilimanjaro in the north. But relatively little is known about the mountaineering odysseys of these pachyderms, and Udzungwa is the only range in the Eastern Arc Mountain chain – well known for its exceptional biodiversity and endemism – that harbours resident elephants.

Why are they here? How are they living, what is their role in these forests, and what challenges do they face? To find out, we established the Udzungwa Elephant Project (www.udzungwa.wildlifedirect.org) in 2008 and began to conduct surveys in various parts of the mountains. Elephants are certainly ranging more widely than they have for several decades. When hunting took its toll in the 1960s and '70s, the survivors probably hid out in the remotest, most mountainous areas, and by the '80s and '90s there were

no reports of elephants from the Udzungwas at all. After the Udzungwa Mountains National Park was gazetted in 1992, poaching all but ceased (at least, until very recently) and the elephant population has been slowly recovering and reclaiming its former range. This now includes more farms and settlements around the park's edges. (You can read about what happens when human and elephant interests come into conflict here in the June issue.)

Studying elephants in forests means that we have very few encounters with our subjects – so we resort to becoming dung detectives! Elephant dung provides a wealth of information that gives us extraordinary insights into these animals' lives. For instance, we measure intact boli of dung to explore the structure of the population. This is possible because an elephant grows fast up to the age of 25 years, and there is a reliable relationship between its age and the diameter of its dung bolus. In Udzungwa, we appear to have a young and growing elephant population – which fits with the narrative history we have been piecing together. Indeed, the age structure is comparable to that of other East African elephant populations that are recovering after the widespread poaching of the species in the 1970s and '80s.

We also employ camera traps to spy on our elusive subjects and hope that in time

They're not forest elephants, but they live in the rainforest of the Udzungwa Mountains. What's more, they ascend the range's steep slopes for a quiet life – and, it seems, to access some particularly juicy fare.

our growing catalogue of images will help us to clarify the subtle adaptive physical features that Udzungwa elephants – while undoubtedly of the savanna rather than the forest species – may share with their forest cousins of Central and West Africa.

Like forest elephant researchers in the Congo Basin, we examine dung piles to learn about the special role elephants play in the dispersal and germination of the seeds of Udzungwa's trees. Their droppings are important for other species too: fungi, dung beetles, social insect colonies and spiders, as well as the birds and primates that pick out and feed on the seeds and invertebrates.

Dung also helps us to understand the elephants' patterns of habitat use – and, in fact, why they climb these mountains. The higher realms may provide relative peace and security from people, yet it appears that certain high-altitude foods, notably montane bamboo, may be an even stronger attraction. Defying expectations, elephants may be timing their upward migrations to coincide with the sprouting of bamboo shoots. So, it would seem, there is method in their apparent mountain-climbing madness. **AG**