# KING OF THE MOUNTAINS

**Picture a primate that grazes like a cow, climbs cliffs like a mountain goat and forms groups as big as shoals of fish. Noah Snyder-Mackler introduces Ethiopia's gelada.**

Photos by **Anup Shah** and **Fiona Rogers**

Now only found in the highlands of Ethiopia, the gelada is the only member of the *Theropithecus* genus and the last surviving species of a once widespread group of primates.

Cecilia and her sister, Carmen, were a bit unsure of the new guy, Orion, who had just joined their group. They stayed far away from him and kept their babies close by. There was a good chance that he could hurt them or, more likely, their infants. Fortunately Doug, the father, was around to protect them. No, this isn't a recap of a recent soap-opera episode – it's just a day in the life of a group of geladas.

If you're ever above the clouds, on the lush plateaus of East Africa, you might find yourself surrounded by thousands of monkeys diligently foraging for food. But these animals aren't swinging from tree branches like some of their close relatives. Instead they spend the majority of their time scooting around on their 'bums', grazing like cows. These are a one-of-a-kind species that can only be found among the escarpments and gorges of the Ethiopian highlands.

These gregarious primates are often called 'bleeding-heart baboons', which, though poetic, is misleading. Not because they don't have blazingly red chests, but because geladas are not actually baboons, they are just their close relatives. Monkeys from the gelada's genus, *Theropithecus*, used to range all over East Africa. Now, however, the gelada is the sole species left – a unique survivor.

## BECAUSE OF THEIR DIET, GELADAS FORM SOME OF THE LARGEST AGGREGATIONS OF ANY NON-HUMAN PRIMATE.

One of the main reasons these monkeys outlived their relatives is due to a panoply of unique adaptations that enables them to survive in a resource-poor, high-altitude environment. In the thin air of the gelada's habitat (often about 3,000m above sea level) there is a dearth of nutrient-rich foods, so they depend almost entirely on the grasses and tubers that carpet the plateaus.

In order to acquire enough nutrients to survive, geladas need to forage from dawn until dusk. And forage they do. Shuffling about on their rears, they methodically poke at the grasses and roots, stabbing at the vegetation like office workers busily typing away on computers.

This derrière-guided movement is often credited as the driving force behind another of their defining characteristics – a bare red patch of skin on the chest, which is an important communicative feature. While their baboon relatives have similar reproductive signals on their rear ends, geladas have them on their chests where they're clearly visible as, owing to the way they move, their behinds can't often be seen.

**Top left: grooming helps to maintain bonds and forge alliances between unit members. Above: the gelada's pale eyelids stand out against their dark faces and are used to communicate.**

The hourglass-shaped chest patch on a gelada's chest ranges in colour from light pink to deep red. After studying this particular characteristic, Gelada Research Project researchers at the University of Michigan, US, found that dominant gelada males possess darker red chest patches than their subordinate, pink-chested counterparts. In females, the colour of the chest patch reflects her reproductive state.

The geladas also have a number of other adaptations perfectly suited to their alpine environment. Because so few trees survive in their habitat, the species uses the surrounding cliffs as their nightly refuge. Here, they can sleep while staying safely out of reach of their primary predators – hyenas and leopards. Daily trips scaling near-vertical cliffs have made the monkeys excellent and fearless climbers, which may be associated with their extremely high finger-thumb opposability. But it's their grass-rich diet that has led to a fascinating discovery about geladas. Relying on such an abundant resource has resulted in less competition for food and because there is strength in numbers, geladas form some of the largest aggregations of any non-human primate.

### GROUP STRUCTURE

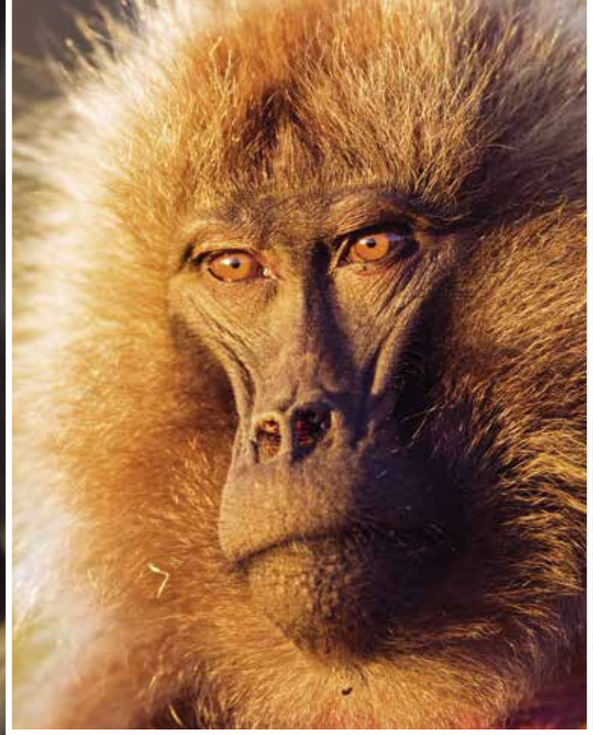
At the core of gelada society is the reproductive unit, similar to a human nuclear family. It usually includes one dominant male 'leader', anywhere from zero to a handful of subordinate 'follower' males, and one to 12 adult females along with their immature offspring. The reproductive unit is the level where the majority of affiliative social interactions occur. Females, in particular, form strong social relationships exclusively with other females in their unit – and these tight bonds, which primarily occur between close relatives, help to keep the unit together under all circumstances.

These reproductive units associate with each other to form a 'multi-level society' that shares similarities with the structure of human society. Units that spend at least 90 per cent of their time together are called 'teams', similar to an extended family. Units in the same 'band' are found together at least 50 per cent of the time, like a group of friends. And units that range in the same area are all part of the same 'community'.

**Top right: the patch on the chest of the females blazes deep red when they are in oestrus. Above: young geladas are vulnerable when a new male becomes the leader of a unit.**

Genetic studies of one population of geladas in the Simien Mountains National Park found that this multi-level association is tightly correlated with relatedness among female geladas, but not the males. A female is most closely related to the other females in her unit; a little less related to females in her team; even less related to females in her band; and the most distantly related to the females in her community. This tiered social and genetic structure prompted researchers to propose that this multi-level society is the result of females maintaining ties with their female relatives after repeated fissions of reproductive units. ▶

A male gelada will fight against a rival bachelor using his large canines to inflict injury to defend his position as leader of his unit.



Above: females form very strong bonds with other females in their group. Far right: Simien Mountains National Park is one of the best place to see gelada monkeys.

**RATHER THAN GIVING BIRTH TO AN OFFSPRING THAT'S LIKELY TO BE KILLED, FEMALES WILL TERMINATE THE PREGNANCY.**

Males leave their mothers, sisters, and aunts once they reach sexual maturity. While this reduces the chance of inbreeding, it means that they must find and be accepted into a new social group. Once they've dispersed from their natal groups, they join all-male groups, which are aptly named 'bachelor groups'. In these groups, the young males hone their competitive skills by sparring with other males and forge coalitions by forming strong grooming relationships with other bachelors.

## A FIGHT TO THE TOP

The ultimate goal of each and every mature male is to become the leader of a reproductive unit in order to sire offspring with the females in that unit. To do so, a bachelor needs to defeat the current leader in what is called a 'takeover'. During a takeover, which can last anywhere from a couple of hours to a few days, the bachelor challenges the leader to a series of competitive chases around the herd. Only when the bachelor and leader are evenly matched does the interaction escalate to an all-out brawl. At this point, the leader and bachelor use their lion-sized canines to harm their opponent until either party submits. At the end of the battle the females in the unit choose the male they want as their leader.

In the event of a successful takeover, the bachelor will become the new leader and the deposed male will often remain in the unit as a follower. These former leaders are likely to remain in their units to defend their young, dependent offspring from being killed by the new leader. The risk of infanticide pressures females to become sexually receptive more quickly than they would otherwise, because they would be infertile until their offspring are weaned. Therefore, takeovers are extremely costly to mothers with youngsters because they could lose up to two years of reproductive effort. Gelada females therefore enlist an interesting counterstrategy to infanticide. Instead of giving birth to an infant that is likely to be killed, females who were pregnant at the time of the takeover will terminate the pregnancy. These spontaneous miscarriages ultimately mean that females no longer invest time and effort rearing offspring that could be killed.

## MISLEADING TACTICS

The new male leader now gets the ultimate prize: he sires the majority of the offspring in the unit. It is the 'majority' and not 'all' of the offspring because in 'multi-male units' (those with subordinate follower males), the follower males sire one fifth of the offspring. They achieve this reproductive success through furtive copulations. During these surreptitious encounters, both the female and follower male suppress their loud copulatory vocalisations, which decreases the chance that the leader will notice them. Deceptive behaviour such as this is rarely found outside of human society and is therefore a fascinating revelation.

Despite this loss of paternity, the leaders of the multi-male units still sire 80 per cent more offspring than leaders of single-male units. In all likelihood, this is because the follower male helps to defend the unit from the constant challenges of other bachelors. This male-male tolerance can even be considered to be a form of cooperation between unrelated males – something that is found across most modern *Homo sapien* societies. ▶

## MOUNTAIN MUSIC: GELADA COMMUNICATION

***Grunt***
A soft call that is used when a gelada approaches or grooms a group member.

***Display call***
A loud call uttered by males during competitive interactions.

***'How' bark***
A loud bark used in similar situations to a display call.

***Wobble***
A soft call produced by males while 'lip-smacking'. This closely matches the cadence of human speech.

***Yawn***
A vocalised yawn, usually given while grooming, after mating or in competitive situations; in males, this is often accompanied by a 'lip-flip'.

***Copulation call***
A loud grunt given by both sexes before and after mating.

**BEING AROUND THESE CHATTY MONKEYS CAN MAKE OBSERVERS FEEL THAT THEY ARE SITTING IN THE MIDDLE OF A CROWDED CAFE.**

Spending most of their time with their heads down and surrounded by hundreds of other monkeys, geladas needed to develop an exceptional communication system. They have one of the most complex vocal repertoires of any primate, and use their wide array of vocalisations in specific situations. One of their most unique sounds, the 'wobble', has the cadence of human speech. Being around these chatty monkeys often makes observers feel like they're sitting in the middle of a crowded café.

## COMPLEX SOCIETY AND COMMUNICATION

Geladas also combine their diverse repertoire of calls to form long strings of vocalisations, which follow a linguistic principle called Menzerath's Law that had, until recently, only been observed in humans. Much like longer sentences tend to be composed of shorter words, longer gelada sequences are comprised of significantly shorter individual calls. By combining different individual vocalisations and altering their duration in the sequence, geladas are able generate an immense number of unique vocal 'sentences'.

With so many individuals and vocalisations to keep track of, one would think that geladas have sophisticated social cognition. Yet research so far has found that males have a very limited ability to vocally recognise other males outside their units.

**Top: by night geladas sleep on rocky outcrops, and forage on nearby grasslands during the day.**

This may be because geladas don't need to keep track of individuals outside their unit if they can rely on the information encoded in their complex vocal sequence, but further research is needed.

There are so many questions about these intriguing animals that still need answering, and this is why researchers will keep returning to the spectacular Ethiopian highlands. Observing the behaviour and interactions of geladas like Cecilia, Carmen, Orion, Doug and their intricate community has revealed how their society functions. Studying these unique and colourful primates in their natural habitat is helping experts to understand more about the evolution of communication and relationships in their complex societies and the many ways in which they share similarities with our own.

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## HOW TO SEE GELADAS

- Geladas are unique to north-central Ethiopia, grazing in high-altitude meadows above 1,500m. The best place to see them is the Simien Mountains NP, where hikers meet bands dozens strong. Tours often also take in Bale Mountains NP, home to Ethiopian wolves.
- Two new mountain 'ecolodges' to consider are **Limalimo** (www.limalimolodge.com) and **Simien Lodge** (www.simiens.com).
- UK operators offering specialist wildlife tours to Simien Mountains NP and Bale Mountains NP include: **Rainbow Tours** (02037 330706, www.rainbowtours.co.uk), **Tracks Safaris** (01386 830264, www.trackssafaris.co.uk), **Steppes Travel** (01258 601495, www.steppestravel.co.uk), **Imagine Africa** (02036 429508, www.imaginetravel.com/imagine-africa), **Naturetrek** (01962 733051, www.naturetrek.co.uk) and **Wildlife Worldwide** (01962 302086, www.wildlifeworldwide.com).
- **Village Ways** (01223 750049, www.villageways.com) works with local communities in the Simien Mountains to provide guided walking tours. Ethiopian company **Simien Trek** (+251 918 77 64 99, www.simientrek.com) offers tailor-made trips throughout the country.