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High-living geckos survive snowy peaks by cuddling up

Zoologger is our weekly column highlighting extraordinary animals – and occasionally other organisms – from around the world.

Enjoying the high life
Abdellah Bouazza

By **Sandrine Ceurstemont**

Species: Atlas Day gecko, *Quedenfeldtia trachyblepharus*
Habitat: Endemic to the High Atlas mountains in Morocco, at altitudes ranging from 1400 metres to 4000 metres

A lizard might seem out of place in a snowy landscape. But although most geckos thrive in tropical climates, the Atlas Day gecko has adapted to life in the mountain tops, where it lives through cold winters.

The higher they go, the bigger they grow, as there is less competition for resources. But this might change as global warming makes its habitat more available to other species.

Abdellah Bouazza at Cadi Ayyad University in Marrakech, Morocco, and his colleagues have been investigating how the cold-blooded lizard is able to survive the freezing heights.

To understand their heat-conservation strategies, Bouazza and his colleagues studied the geckos in their natural environment from March to July, the most critical period for reproduction. Although the lizards stayed sheltered at night in rock fissures, they emerged in the morning to bask in the sun on exposed rocks. “They always seek out warm spots that are sheltered from the wind,” says Bouazza.

Since rocks store heat, they can be up to 10°C warmer than the ambient temperature. The team found that staying glued to a rock allowed geckos to warm up: as the temperature of a rock increased, so did a gecko’s body.

Communal egg-laying
Atlas Day gecko

Unsurprisingly, the amount of time spent in the sun also played a role. Females carrying eggs spent more time basking compared with males and non-egg-carrying females, especially early in the season, and maintained a higher – and more stable – body temperature.

The researchers suspect that the extra heat could help the eggs hatch early – an advantage in cold climates, giving the newborns more time to develop and thus survive the winter.

But expectant females may have an additional trick. The team noticed marked colour changes in dark Atlas Day geckos when it was cold, which would help them better absorb rays from the sun. But they suspect Atlas Day females change colour more dramatically when carrying eggs. "We hope to investigate further," says Bouazza.

Unlike most geckos, this species is active during the day. They are even occasionally seen running around on rocks surrounded by snow.

Mathew Vickers, at the National Centre for Scientific Research in Moulis, France, thinks the geckos evolved to diurnality to help them survive in this cold climate. "Nocturnal geckos persist in warm places or where they can find warm refuges for the day time," he says.

Territorial living

Geckos are known to be territorial but living in a cold climate seems to make them more social, too. Several animals are often found basking in the same spot and sharing the same shelter, but only when it's cold – presumably for thermal benefits. Females communally lay eggs in warm crevices, which is not unique among geckos but the full benefits are not yet known.

"The Atlas Day gecko is ideal for investigating communal egg-laying because the eggs generally lack parental care," says Bouazza.

Bouazza and his team are currently investigating the effect of altitude on the size of this species. So far, they have found that individuals, and eggs laid by females, are bigger and heavier with increasing altitude, which they attribute to more available food and less competition.

"The size difference is impressive," says Bouazza, who presented the team's latest findings at the African Congress for Conservation Biology in El Jadida, Morocco, last month.

As temperatures rise due to global warming, however, the Atlas Day gecko may no longer be the dominant species in the High Atlas. "Competing species may move to higher altitudes and they may have to fight for resources," says Bouazza.