Neon blue-tailed tree lizard glides like a feather

July 17 2009

Most lacertid lizards are content scurrying in and out of nooks and crannies in walls and between rocks. However, some have opted for an arboreal life style. Neon blue tailed tree lizards (*Holaspis guentheri*) leap from branch to branch as they scamper through trees in the African forest.

There are even anecdotes that the tiny African tree lizards can glide. But without any obvious adaptations to help them to upgrade a leap to a glide, it wasn't clear whether the reptiles really do take to the air and, if they do, how they remain aloft. Intrigued by all aspects of lacertid locomotion, Bieke Vanhooydonck from the University of Antwerp and her colleagues, Anthony Herrel and Peter Aerts, decided to find out whether neon blue tailed tree lizards really glide.

Recruiting undergraduate Greet Meulepas to the team, they began filming dainty neon blue tailed tree lizards, gliding geckos (*Ptychozoon kuhli*) and the common wall lizard (*Podarcis muralis*) as the animals leapt from a 2m high platform to see if the neon blue tailed tree lizards really could glide. Vanhooydonck and her colleagues publish their discovery that *H. guentheri* glide like feathers on 17 July 2009 in the Journal of Experimental Biology.

Unfortunately, filming the lizards was extremely difficult. Having startled the small animals into leaping off the platform, the team had little control over the animal's direction, and couldn't guarantee that it was parallel to their camera. It was also difficult to capture each

trajectory with a single camera and tricky to get the lighting conditions right. But after weeks of persistence the team finally collected enough film, as the lizards leapt, to compare their performances.

At first, it didn't look as if the African lizard was gliding any better than the common wall lizard. Both animals were able to cover horizontal distances of 0.5m after leaping from the platform, while the gliding gecko covered distances greater than 1 m, aided by its webbed feet and skin flaps. But when the team compared the lizards' sizes, they noticed that there was a big difference between the common wall lizard and the tree lizard. The tiny tree lizard only weighed 1.5 g, almost 1/3 of the larger common wall lizard's weight and 1/10 the gliding gecko's mass, so Aerts calculated how far each lizard would travel horizontally if they fell like a stone. This time it was clear that the tiny tree lizard was travelling 0.2m further than Aerts would have expected if it were simply jumping off the platform. The tree lizard was definitely delaying its descent and landing more slowly than the common wall lizard; the tree lizard was gliding.

But how was the tiny tree lizard able to remain airborne for so long? Maybe the lizard was squashing itself flat while gliding to increase its surface area and generate more lift. But when the team analysed the lizards' trajectories, the tree lizard's shape did not change. And when Aerts calculated the amount of lift each lizard generated as they descended, it was clear that the tree lizard was unable to produce a lift force. The team realised that instead of increasing its surface area to generate lift, the tree lizard is able to glide because it is so light. The tree lizard's 'wing loading' (mass:surface area ratio) was the same as that of the gliding gecko (assisted by skin flaps and webbed feet) so the tree lizard was able to glide like a feather because it was so light.

Curious to find out why the tree lizard is so light, Herrel contacted Renaud Boistel, Paul Tafforeau and Vincent Fernandez at the European

Synchrotron Radiation Facility to scan all three lizards' bodies. Visualising the animals' skeletons with X-rays, it was clear that the tree lizard's bones were packed full of air spaces, making the lizard's skeleton feather light for gliding.

More information: Vanhooydonck, B., Meulepas, G., Herrel, A., Boistel, R., Tafforeau, P., Fernandez, V. and Aerts, P. (2009). Ecomorphological analysis of aerial performance in a non-specialized lacertid lizard, Holaspis guentheri. *J. Exp. Biol.* 212, 2475-2482. jeb.biologists.org

Source: The Company of Biologists (news : web)