Research identifies importance of diet in snake venom evolution

April 8 2009

Axel Barlow's paper in *Proceedings of the Royal Society B* on saw-scaled vipers shows that snakes which have evolved to feed on scorpions have also evolved venom which is more lethal to scorpions, demonstrating that changes in diet have been an important factor in snake venom evolution.

The significance of this discovery lies in the medical treatment of snake bites. Variation in venom composition between different species or populations of snakes can complicate antivenom treatment. Understanding the evolutionary processes that produce venom variation can therefore lead to better antivenom design and effectiveness. This is

particularly relevant in the case of saw-scaled vipers, which are probably responsible for the majority of snakebite deaths in Africa. However, many West African hospitals still rely on imported antivenom from Asia, where the saw-scaled vipers have very different venom composition, and the failure of this imported antivenom has led to many unnecessary deaths.

"This study provides one of the most convincing pieces of evidence to date for the role of natural selection for diet in shaping snake venom composition, a key question in our understanding of venom evolution in snakes," commented Dr Wolfgang Wüster, an expert in snakes and snake venoms and a lecturer at Bangor University's School of Biological sciences.

Currently a first year PhD student at Bangor University, Axel compiled much of the work for his undergraduate final year project, which was part of a wider project on venom evolution funded by the Leverhulme Trust.

"Saw-scaled vipers provide a good model to study venom variation as different species have extremely different diets," explains Axel, "this allows us to investigate the effects of evolutionary changes in diet within a single group of related snake species".

Now 28, Axel studied for his first degree in Zoology at Bangor, followed by a MSc in Ecology also at Bangor. He is currently funded by the NERC to follow a PhD investigating genetic variation in Southern African snakes. He comes originally from Dewsbury in West Yorkshire.

More information: Work begun as part of an undergraduate Honours project is to be published in the prestigious journal, Proceedings of the Royal Society B. (available online at rspb.royalsocietypublishing.or … b.2009.0048.abstract)