

Lizards facing mass extinction

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2013-03-07 (Press-News.org) Climate change could lead to dozens of species of lizards becoming extinct within the next 50 years, according to new research published today.

Globally it has been observed that lizards with viviparous reproduction (retention of embryos within the mother's body) are being threatened by changing weather patterns. A new study suggests that the evolution of this mode of reproduction, which is thought to be a key successful adaptation, could, in fact, be the species' downfall under global warming.

Researchers from the University of Exeter and the University of Lincoln investigated the hypotheses that historical invasions of cold climates by Liolaemus lizards – one of the most diverse groups of vertebrates on earth – have only been possible due to their evolution to viviparity (live birth) from oviparity (laying eggs). Remarkably, however, once these species evolve viviparity, the process is mostly irreversible and they remain restricted to such cold climates.

By analysing this evolutionary transition in the lizards' reproductive modes and projecting the future impact of climate change, the scientists discovered that increasing temperatures in the species' historically cold habitats would result in their areas of distribution being significantly reduced. As a consequence, if global warming continues at the same rate, viviparous lizards are facing extinction in the next few decades.

Dr Dave Hodgson, from Biosciences at the University of Exeter, said: "Climate change must not be underestimated as a threat to modern patterns of biodiversity. Our work shows that lizard species which birth live young instead of laying eggs are restricted to cold climates in South America: high in the Andes or towards the South Pole. As the climate warms, we predict that these special lizard species will be forced to move upwards and towards the pole, with an increased risk of extinction."

Lead author Dr Daniel Pincheira-Donoso from the University of Lincoln's School of Life Sciences is one of the few people in the world who works on the ecology and evolution of these lizard species. He said: "Lizards' reproduction is largely linked to climatic temperatures and viviparous species are usually found in cold environments. When reptiles initially moved to colder areas they needed to evolve emergency measures to succeed in these harsh places, and we believe viviparity is one of these key measures. However, this transition is mostly one-directional and unlikely to be reversed. Rapid changes in the environment's temperature would demand rapid re-adaptations to secure the species' survival. Through the research we found that over the next 50 years nearly half of the area where these species occur may disappear, causing multiple extinctions due to climate change."

Overall the conclusion is that although viviparity allowed lizards in the past to invade and adapt to live in cold environments, and was therefore a key trait for evolutionary success, it will now ultimately lead to multiple events of extinction.

Dr Pincheira-Donoso said: "These lizards are one of the most diverse groups of animals, and are able to adapt to remarkably diverse conditions. Unfortunately, a reduction in cold environments will reduce their areas of existence, which means that their successful evolutionary history may turn into a double-edged sword of adaptation. Their extinctions would be an atrocious loss to biodiversity."

The paper 'The evolution of viviparity opens opportunities for a lizard radiation but drives it into a climatic cul-de-sac' is published in the latest issue of the peer-reviewed journal *Global Ecology and Biogeography* and was funded by the Leverhulme Trust.

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About the University of Exeter

The Sunday Times University of the Year 2012-13, the University of Exeter is a Russell Group university and in the top one percent of institutions globally. It combines world-class research with very high levels of student satisfaction. Exeter has over 18,000 students and is ranked 7th in The Sunday Times University Guide, 10th in the UK in The Times Good University Guide 2012 and 10th in the Guardian University Guide. In the 2008 Research Assessment Exercise (RAE) 90% of the University's research was rated as being at internationally recognised levels and 16 of its 31 subjects are ranked in the top 10, with 27 subjects ranked in the top 20.

The University has over 18,000 students at three campuses. The Streatham and St Luke's campuses are in Exeter and the Cornwall Campus (known locally as the Tremough Campus) near Penryn. In an arrangement that is unique in the UK, the Cornwall Campus is owned and jointly managed as the Tremough Campus with Falmouth University. At the campus, University of Exeter students can study programmes in Geology, Mining and Minerals Engineering, Renewable Energy, Mathematics and the Environment, English, History, Biosciences, Environmental Science, Geography and Politics.

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About:

Dr Daniel Pincheira-Donoso

Dr Pincheira-Donoso is a Lecturer at the University of Lincoln, where he leads the Laboratory of Evolutionary Ecology of Adaptations. He received a BSc in Biology and Biologist Title from the University of Concepcion (Chile) and a PhD in Evolutionary Biology from the University of Exeter (UK), where he held three postdoctoral positions. He is the author of numerous scientific papers and of three books on evolutionary theory, adaptations and systematics of lizards.

For more information or to arrange an interview with Dr Pincheira-Donoso please contact University of Lincoln PR Officer Marie Daniels on (01522) 886244 or e-mail mdaniels@lincoln.ac.uk

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[Penn researchers find molecular key to exhaustion following sleep deprivation](#)



2013-03-07 PHILADELPHIA – It happens to everyone: You stay up late one night to finish an assignment, and the next day, you're exhausted. Humans aren't unique in that; all animals need sleep, and if they don't get it, they must make it up. The biological term for that pay-the-piper behavior is "sleep homeostasis," and now, thanks to a research team at the Perelman School of Medicine, University of Pennsylvania, one of the molecular players in this process has been identified – at least in nematode round worms. David Raizen, MD, PhD, assistant professor of Neurology, and his colleagues ...

[Advance in re-engineering photosynthesis to make drugs, compounds or ingredients](#)

2013-03-07 Scientists are reporting an advance in re-engineering photosynthesis to transform plants into bio-factories that manufacture high-value ingredients for medicines, fabrics, fuels and other products. They report on the research in the journal ACS Synthetic Biology. Poul Erik Jensen and colleagues explain that photosynthesis does more than transform carbon dioxide and water into sugar and oxygen and generate energy. That process also produces a wealth of natural chemical compounds, many of which have potential uses in medicines and other commercial products. However, evolution ...

[Exercise shields children from stress](#)

2013-03-07 Chew Chase, MD —Exercise may play a key role in helping children cope with stressful situations, according to a recent study accepted for publication in The Endocrine Society's Journal of Clinical Endocrinology & Metabolism (JCEM). When they are exposed to everyday stressors, the study found sedentary children had surges of cortisol – a hormone linked to stress. The most active children had little or no increase in their cortisol levels in similar situations. "The findings suggest physical activity plays a role in mental health by buffering children from the effects ...

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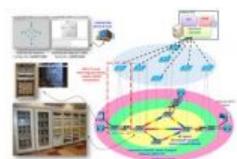


2013-03-07 New software, which will allow GP practice managers to improve healthcare for chronic illnesses including strokes, Alzheimer's and cancer, will be unveiled by scientists from The University of Manchester next week (13 & 14 March). Experts have devised a computer programme which analyses how many patients in a practice have suffered from different conditions over a particular time period and identifies those who might require hospital treatment in the future. Against a backdrop of a drive for NHS efficiency savings, they believe the software will help practice managers ...

[Worming our way to new treatments for Alzheimer's disease](#)

2013-03-07 Philadelphia, PA, March 7, 2013 – According to a 2012 World Health Organization report, over 35 million people worldwide currently have dementia, a number that is expected to double by 2030 (66 million) and triple by 2050 (115 million). Alzheimer's disease, the most common form of dementia, has no cure and there are currently only a handful of approved treatments that slow, but do not prevent, the progression of symptoms. New drug development, no matter the disease, is a slow, expensive, and risky process. Thus, innovative techniques to study and assess the possibilities ...

[New flex-grid system prevents optical network 'traffic jams'](#)



2013-03-07 Services like Google Maps use algorithms to determine the fastest route from point A to point B—even factoring in real-time traffic information as you travel to redirect you if, for example, a parade is blocking part of your route. Now, a team of researchers from Spain and Japan have achieved this kind of traffic control for the connections in optical networks by using a new dynamic network management system—and it does Google Maps one better. If necessary, the flexible-grid system can also redirect the traffic-congesting parade to another street (by re-arranging one or ...

[Even mild traumatic brain injuries can kill brain tissue](#)



2013-03-07 AUGUSTA, Ga. – Scientists have watched a mild traumatic brain injury play out in the living brain, prompting swelling that reduces blood flow and connections between neurons to die. "Even with a mild trauma, we found we still have these ischemic blood vessels and, if blood flow is not returned to normal, synapses start to die," said Dr. Sergei Kirov, neuroscientist and Director of the Human Brain Lab at the Medical College of Georgia at Georgia Regents University. They also found that subsequent waves of depolarization – when brain cells lose their normal positive and ...

[Study finds up to half of gestational diabetes patients will develop type 2 diabetes](#)

2013-03-07 Chewy Chase, MD —Women who were diagnosed with gestational diabetes during pregnancy face a significantly higher risk of developing Type 2 diabetes in the future, according to a recent study accepted for publication in The Endocrine Society's Journal of Clinical Endocrinology & Metabolism (JCEM). The prospective cohort study tracked 843 women who were diagnosed with gestational diabetes between 1996 and 2003 at Cheil General Hospital in Seoul, South Korea. About 12.5 percent of the women developed Type 2 diabetes within two months of delivering their babies. During the ...

[More baccalaureate-prepared nurses in hospitals connected to fewer patient deaths](#)

2013-03-07 When hospitals hire more nurses with four-year degrees, patient deaths following common surgeries decrease, according to new research by the University of Pennsylvania School of Nursing's Center for Health Outcomes and Policy Research as reported in the March issue of the prestigious policy journal Health Affairs. Less than half the nation's nurses (45%) have baccalaureate degrees, according to the most recent data available (2008). If all 134 Pennsylvania hospitals involved in the study had increased the percentage of their nurses with four-year degrees by 10 percentage ...

[Age at first menstrual cycle, menopause tied to heart disease risk](#)

2013-03-07 Chewy Chase, MD —Chinese women are less likely to develop cardiovascular disease if they have their first menstrual cycle or enter menopause later than their peers, according to a recent study accepted for publication in The Endocrine Society's Journal of Clinical Endocrinology & Metabolism (JCEM). The study also found earlier onset of menopause was associated with a higher risk of developing osteoporosis. The risk was significantly lower for women who were older than 50 when they underwent menopause. The findings could be used to identify women who are more likely to ...

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